



Getting Started

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. The Cisco ONS 15454 SDH can support up to 20 concurrent TL1 sessions in this release. 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 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 PM reports

1.1 Setting up TL1 Communication

The period during which a user is logged into the ONS 15454 SDH 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 SDH allows 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. 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 15454 SDH, 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 access TL1 commands in a telnet session over a craft interface or a LAN connection (TCC2/TCC2P card front panel or backplane pins) you can choose from several ports. Port number 3082 is a raw TCP/IP port; it will not echo and it will not prompt the user. Port number 3083 is a telnet port that uses the telnet protocol and associated telnet escape sequences. Port number 2361 is supported for backward compatibility with earlier releases and has the same behavior as Port 3083 (telnet port). Use the following procedure with PCs running Windows operating systems.

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

The TCC2/TCC2P card has two built-in interface ports for accessing the ONS 15454 SDH. 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 which allows TL1 commands to be entered directly without a browser. For instructions on how to install the TL1 craft interface, refer to the *Cisco ONS 15454 SDH Procedure Guide*.

Step 1 Connect the serial cable to the RS-232 port on the active TCC2/TCC2P 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>;
```

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 SDH), 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 CLI code. To establish the TID for an ONS 15454 SDH node, use the Provisioning > General tabs in CTC.

The AID is an access code used to identify and address specific objects within the ONS 15454. 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 ONS 15454 SDH system 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

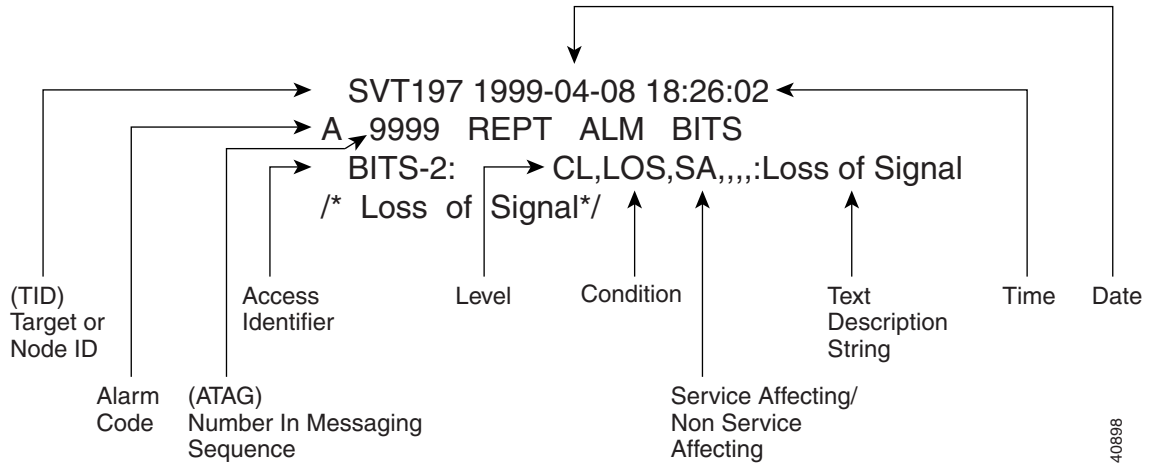
Autonomous messages are used to report alarms, configuration changes or condition changes. Many of these messages, such as those relating to alarm conditions, are spontaneously triggered by the NE itself without intervention. Other messages, such as those relating to the reporting of periodic condition 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 ONS 15454 SDH. The ONS 15454 SDH 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 1-1 Command Access

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

Table 1-1 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 1-2 shows security levels and their default time outs.

Table 1-2 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 E1/E3/DS3I cards 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 E1/E3/DS3I cards to autoprovision. The FMT field will blank out for a few seconds while the card determines 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 E1/E3/DS3I cards; the TL1 interface only supports unframed, M23, or CBit. If autoprovision is selected from CTC and at the same time the TL1 command RTRV-E3 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-E3 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 OutOfServiceandManagement,Disabled 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-(STM, nGIGE, nGFC, 2R)

Examples of provisioning payload:

```
ENT-STM4
```

```
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/STM Payload Provisioning Parameters

SONET/SDH payloads are supported by DWDM cards according to [Table 1-3](#). These payloads are configurable only for the Section and Line layers. STS layers cannot be provisioned or retrieved.

Table 1-3 Payload/Card Mode Support

Card Type	Payload	Card Mode
TXP-MR-10G	OC192/STM64	DWDM-LINE
	10GIGE	DWDM-SECTION DWDM-TRANS-AIS DWDM-TRANS-AIS with REGEN group
	OC192/STM64, 10GIGE	Does not support PPM. Card mode not applicable.
MXP-2.5G-10G	OC48/STM16	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/STM1, OC12/STM4, OC48/STM16	DWDM-LINE, DWDM-SECTION, DWDM-TRANS-AIS
TXP-MR-10E	OC192/STM64	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/STM	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 STM ports can be retrieved/edited using the ED-<STM_TYPE> and RTRV-<STM_TYPE> commands. The following is a list of restrictions when using the ED/RTRV-<STM_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 OutOfService 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 OutOfService 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-(STM, nGIGE, nGFC)

Example of provisioning DCC/GCC:

```
ED-STM64::FAC-1-1-1:100::COMM=DCC:OutOfService,AutomaticInService;
```

- ED-OCH

Example of provisioning DCC/GCC:

```
ED-OCH::CHAN-6-2:114::COMM=GCC:OutOfService,AutomaticInService;
```

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 OutOfService 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 OutOfService 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 OutOfService 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,:OutOfService,AutomaticInService;
```

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-STM

Example of setting port-level synchronization attributes:

```
ED-STM16::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-STM for trace provisioning of client ports provisioned for STM payload.

Example of provisioning port-level trace:

```
ED-STM16::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-(STM, nGIGE, nGFC, OCH)
Examples of port-level threshold setting:
SET-TH-STM16::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-(STM, nGIGE, nGFC, OCH)
Examples of port-level threshold setting:
RTRV-PM-STM16::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-(STM, nGIGE, nGFC)
Examples of Y Cable provisioning:
ENT-FFP-STM16::FAC-1-1-1,FAC-2-1-1:100::PROTOTYPE=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::PROTOTYPE=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 OutOfService-Maintenance.
 - 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- (STM, nGIGE, nGFC, OTS, OMS, OCH)

Example of editing ALS attributes:

```
ED-ALS-STM64::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=OutOfService and secondary state=AutomaticInService is not supported for the 1GigE/2GigE payload type.
2. The working and protect port can be put in InService/OutOfService independently.
3. For the protect Transponder card:
 - a. Setting the protect trunk port to OutOfService 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 OutOfService will not switch off the transmit laser unless both trunk ports are OutOfService.
 - 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-(STM, nGIGE, nGFC, OCH)

Example of editing Port State:

```
ED-STM16::FAC-6-1-1:114:::OutOfService,AutomaticInService;
```

```
ED-10GIGE::FAC-6-1:114:::OutOfService,AutomaticInService;
```

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

1.6.18 SDH-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:OutOfService,AutomaticInService;
```

1.6.19 Overhead Circuit Provisioning Rules

1. LOW/EOW is possible between the AIC-I, STM 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 STM cards in line-terminated mode.
 - c. Possible between STM 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.

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 *Cisco ONS 15454 SDH Procedure Guide* for information about setting up ONS 15454 SDH 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 1-20. The caveat is that the implicit list only includes AIDs that apply to the command:

```
SLOT-ALL
FAC-1-ALL
VC-3-ALL
```

where Slot 3 contains an STM-4 and the command is ED-VC3 but VC-3-4 and VC-3-7 are VC-4. The set implied by VC-3-ALL then only contains VC-3-{1,2,3,10,11,12} and will not return an error for VC-3-{4,5,6,7,8,9}. Disregard the VC-4 in this case because the modifier of the command specifies that the user is only interested in VC-3 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 1-20 and the [“1.8.1.2 Implicit List of AIDs - Single AID With Wildcard”](#) section on page 1-20, respectively.

```
FAC-1-1&FAC-2-ALL
FAC-3-ALL&FAC-7-ALL
VC-2-ALL&VC-12-1&VC-13-2&VC-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 VC-N-13 when SLOT-N only contains an STM-4) 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 1-20. 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 1-20. 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-VC3:[<TID>]:VC-9-ALL:<CTAG>; where VC-9-ALL maps to VC-9-{1,2,3,10,11,12} because there is a single-port STM-4 card in Slot 3 with VC-4 defined for VC-9-4 and VC-9-7. You then traverse the set and return only the VC-3 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 1-21 to the implicit list and the rules from the “[1.8.2.1 Explicit List of AIDs - No Wildcards](#)” section on page 1-21 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 PRTL with 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

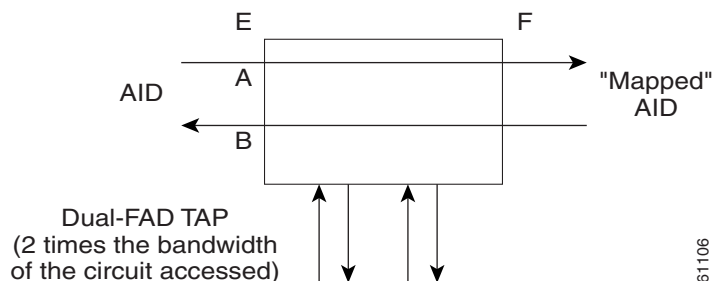
1.9 Test Access

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 SDH 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 SDH 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-connections and changing the mode of test access on the ONS 15454 SDH. You can view test access information in CTC; in node view click the **Maintenance > Test Access** tabs.

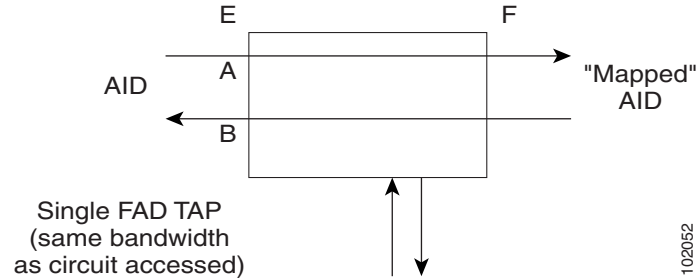
A TAP provides the capability to connect the circuit under test to a BRTU. This connection initially provides in-service monitoring capability to permit the tester to determine that the circuit under test is idle. The monitor connection should not disturb the circuit under test. The access point and 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 “1.9.2.1 ED-<rr>” section on page 1-24. 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 “1.9.2.1 ED-<rr>” section on page 1-24. 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/VC to a TAP.

```
ED- (E1, E3, DS3I, VC12, VC3, VC4, VC42C, VC43C, VC44C, VC48C, VC416C,
VC464C):[<TID>]:<AID>:<CTAG>[::TACC=<TACC>],[TAPTYPE=<TAPTYPE>];
```

Edit an existing Port/ VC and change it to a TAP so it can be used when requesting TACC connections. This includes an optional parameter TACC=n that defines the port/VC as a test access point with a selected unique TAP number. This TAP number will be used when requesting test access connections to circuit cross-connects under test. The TAP creation will fail if the port/VCn already has a cross-connect on it.

The TAPTYPE parameter's values are SINGLE/DUAL. The MONEF, SPLTEF, LOOPEF modes are not supported by single FAD TAPs. It defaults to DUAL.


Note

This command generates a REPT DBCHG message.


Note

The alarms and conditions on TACC paths can be retrieved by the RTRV-ALM-ALL or RTRV-ALM-<MOD2> commands.


Note

The TAP is a persistent object; it will exist even after the user has logged out of the TL1 session.

The following apply to TAP numbers:

1. A TAP number is an integer in the range of 1-999. When TACC=0 is specified, the TAP is deleted (if already present).
2. A TAP number is unique across E1, E3, DS3I, VC12, VC3, VC4, VC42C, VC43C, VC44C, VC48C, VC416C, VC464C TAPs in the system.
3. A TAP number is not editable.

1.9.2.2 ED-E1

When an ED-E1 is executed with a specified TACC value for a given E1 port/facility, a DFAD (dual facility access digroup) is created by using the specified port/facility and the consecutive port/facility. The command in [Example 1-1](#) creates a DFAD on FAC-1-1 and FAC-1-2.

Example 1-1 ED-E1::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-connections until the TAP is deleted.

1.9.2.3 ED-E3

When an ED-E3 is executed with a specified TACC value for a given E3 port/facility, a DFAD is created by using the specified port/facility and the consecutive port/facility. The command in [Example 1-2](#) creates an E3 DFAD on FAC-2-1 and FAC-2-2.

Example 1-2 *ED-E3::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-connections until the TAP is deleted.

1.9.2.4 ED-DS3I

The ED-DS3I command is used for DS3 access on a DS3I card. When an ED-DS3I is executed with a specified TACC value for a given DS3I, a DFAD is created by using the specified facility and the consecutive port/facility. The command in [Example 1-3](#) creates DFAD on FAC-16-1 and FAC-16-1.

Example 1-3 *ED-DS3I::FAC-16-1:12::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-connections until the TAP is deleted.

1.9.2.5 ED-VC4n

When an ED-VC4n is executed for a TACC it assigns the VC path for the first 2-way test access connection and VC+1 as the 2nd 2-way connection. Similarly, for VC42c, VC43c, VC44c, VC48c, VC416c next consecutive VC of same width is chosen. The TAP creation will fail if either of the consecutive VC's are not available. The command in [Example 1-4](#) creates a TAP on VC4-5-1-1 and VC4-5-1-2.

Example 1-4 *ED-VC4::VC4-5-1-1:12::TACC=4;*

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



Note

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

The command in [Example 1-5](#) creates a VC48C Dual TAP on VC4-6-1-1 and VC4-6-1-25.

Example 1-5 *ED-VC48C::VC4-6-1-1-12::TACC=5;*

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

**Note**

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

1.9.2.6 ED-VC12

When an ED-VC12 is executed for a TACC a VC12 TAP is created. The specified VC12 AID is taken as the first VC12 connection, and the consecutive VC12 connection is used for as the second path for the TAP.

For example on a E1 card:

Example 1-6 *ED-VC12::VC12-1-1-1-1-12::TACC=6;*

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

This creates a VC12 TAP on VC12-1-1-1-1 and VC12-1-1-1-2-1. These VC's cannot be used for creation of cross-connects until the TAP is deleted.

1.9.2.7 ED-VC3

When an ED-VC3 is executed for a TACC a VC3 TAP is created. The specified VC3 AID is taken as the first VC3 connection, and the consecutive VC3 connection is used for as the second path for the TAP.

For example on an E3 card:

Example 1-7 *ED-VC3::VC3-1-1-1-12::TACC=6;*

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

This creates a VC3 TAP on VC3-1-1-1 and VC3-1-1-2. These VC's cannot be used for 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.

```
CONN-TACC-(E1, E3, DS3I, VC12, VC3, VC4, VC42c, VC43c, VC44c, VC48c, VC416c,
VC464c):[<TID>]:<AID>:<CTAG>::<TAP>:MD=<MD>;
```

Connect the port/VC4n/VC3 defined by <AID> to the port/VC4n/VC3 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 [“1.9.8 Test Access Configurations”](#) section on page 1-31.



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.

Table 1-4 shows the error codes supported by the CONN-TACC-<rr> command.

Table 1-4 Supported Error Codes for CONN-TACC-<rr>

Error Code	Definition
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

Example 1-8 CONN-TACC-E1::FAC-1-3:12::1:MD=MONE;

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

This creates a connection between TAP with number 1 and the port/facility FAC-1-3 with access mode as MONE. The various modes are explained in detail in the [“1.9.9 Test Access Mode Definitions”](#) section on page 1-32.

1.9.4 Change Access Mode

CHG-ACCMD- (E1, E3, DS3I, VC12, VC3, VC4, VC42c, VC43c, VC44c, VC48c, VC416c, VC464c):[<TID>]:<TAP>:<CTAG>::<MD>;

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

Table 1-5 shows the error codes supported by the CHG-ACCMD-<rr> command.

Table 1-5 Supported Error Codes for CHG-ACCMD-<rr>

Error Code	Definition
SRCN	REQUESTED CONDITION ALREADY EXISTS
SRAC	REQUESTED ACCESS CONFIGURATION IS INVALID
RTEN	REQUESTED TAP DOES NOT EXIST

Example 1-9 *CHG-ACCMD-E1::1:12::LOOPE;*

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



Note This changes the access mode of TAP 1 to LOOPE.



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



Note This command generates a REPT DBCHG message.

1.9.5 Retrieving 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.

RTRV- (E1, E3, DS3I, VC12, VC3, VC4, VC42c, VC43c, VC44c, VC48c, VC416c, VC464c):[<TID>]:<AID>:<CTAG>;

These commands are 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. The TAPTYPE is supported starting with R4.6.

Example 1-10 *RTRV-E1::FAC-1-1:D;*

```
VA454E-96 2003-04-24 20:06:46
M D COMPLD
"FAC-1-1::LINECDE=HDB3,FMT=E1-MF,TACC=1,TAPTYPE=DUAL,
SOAK=32:UNLOCKED,"
;
```

Table 1-6 shows parameters for the RTRV-<rr> command.

Table 1-6 *RTRV-<rr> Parameters*

Parameter	Definition
<TID>	The node name which is optional
<TAP>	Number from 1 to 999 identifying the Test Access Point. Returned by the CONN-TACC command. A TAP value of 0 means destroy the TAP. TAP is an integer
<CTAG>	Required identifier or number limited to 6 ASCII characters, correlates response with command

Table 1-6 RTRV-<rr> Parameters

Parameter	Definition
<TID>	The node name which is optional
<MD>	Defines the monitor or split mode: MONE, MONF, MONEF, SPLTE, SPLTF, LOOPE, LOOPE, 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. Marks the VCn 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 1-11 RTRV-TACC:CISCO:241:CTAG;

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

Table 1-7 on page 1-29 shows parameters for the RTRV-TACC command.

Table 1-7 RTRV-TACC Parameters

Parameter	Definition
<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 VC path of the TAP
<TACC_AIDB>	The B path of the TAP, i.e., the second VC 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

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

Disconnect the <TAP> and put the connection back to it's original state (no access).

Table 1-8 shows the error codes supported by the DISC-TACC command.

Table 1-8 Supported Error Codes for DISC-TACC

Error Code	Definition
SADC	ALREADY DISCONNECTED
SRTN	UNABLE TO RELEASE TAP

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

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

**Note**

This disconnects TAP 1 from the circuit/cross-connect under test.

**Note**

This command generates a REPT DBCHG message.

1.9.7 Delete Test Access Points

The command in [Example 1-13](#) deletes a TAP.

Example 1-13 ED-<VC_PATH>:[<[TID]>]:<AID>:<CTAG>:::TACC=0;;

**Note**

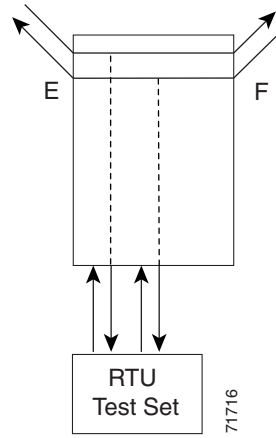
The TACC number must be set to zero in order to delete a TAP.

**Note**

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

1.9.8 Test Access Configurations

Figure 1-4 Single Node View (Node 1)



ED-VC4::VC4-1-1-1:90::TACC=1;

Changes VC4 1 & VC4 2 on slot 1 to a TAP. The CTAG is 90. Sets the TAP number to 1.

CONN-TACC-VC4::<AID for E or F depending on md>:91::1:MONE

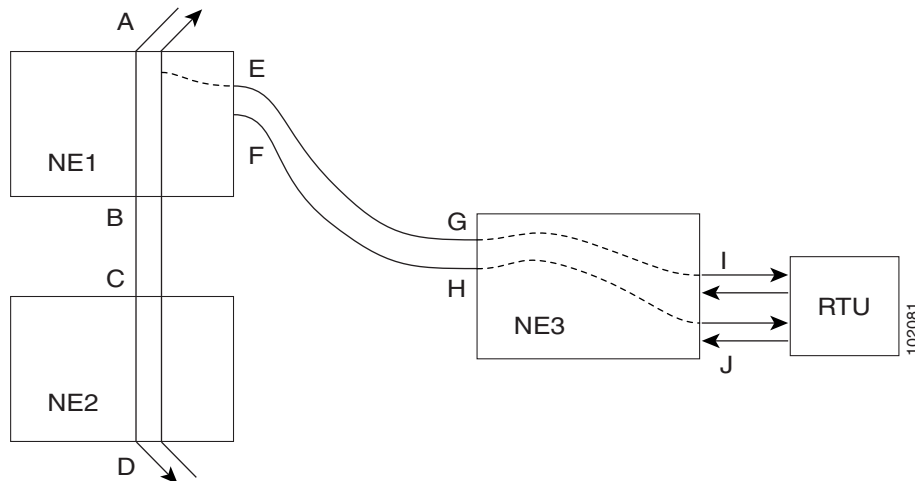
Connects the <AID> to the TACC defined by TAP 1 on the E side. CTAG is 91



Note

The connection made in the CONN-TACC command may 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 then the top line would be connected to the other side of the path, or what is shown in the diagram as the F side. Once a CONN-TACC is setup these designations cannot change until a DISC-TACC or another CONN-TACC command is executed. The connection is really based on the <AID> supplied.

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



On NE3

ENT-CRS-VC4::<AID I-G>:100::2WAY; A connection, not a TAP. CTAG is 100.

ENT-CRS-VC4::<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.

ED-VC4::VC4-1-1-1:D::TACC=4; Creates TAP with VC4-1-1-1 and VC4-1-1-2 through NE1. TAP number assigned is 4.

CONN-TACC-VC4::<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 but normal connections in this 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), [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 locked (in service) port state.

LOOPE, LOOPE, SPLTE, SPLTF, SPLTEF, SPLTA, SPLTB, and SPLTAB access modes are intrusive and only be applied to a circuit/port that is in the Unlocked_Maintenance (out of service, maintenance) port state. The NE will change the state of the circuit under test to Unlocked_Maintenance 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)

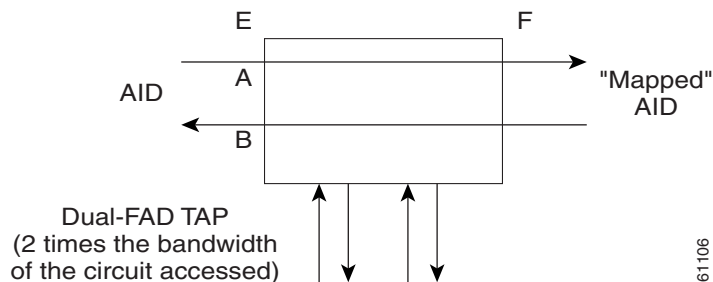
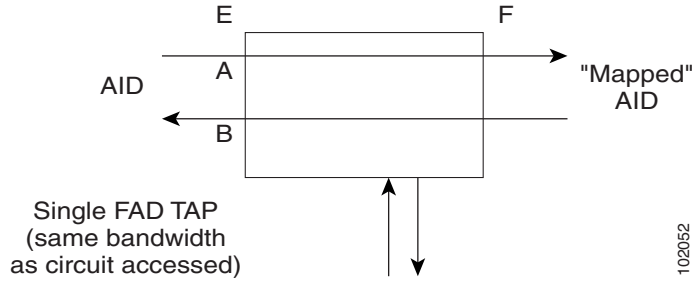


Figure 1-7 Circuit With No Access (Single FAD TAP)



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

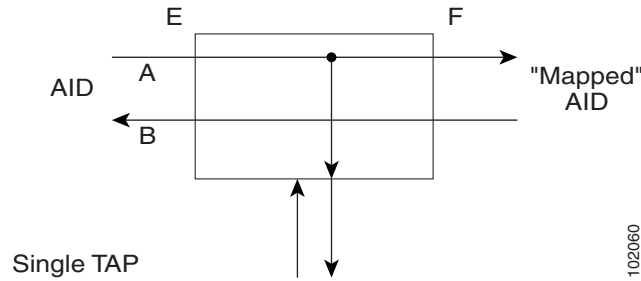
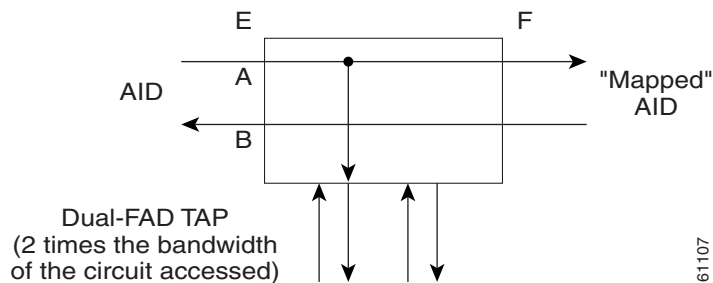


Figure 1-9 MONE Access Dual TAP



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

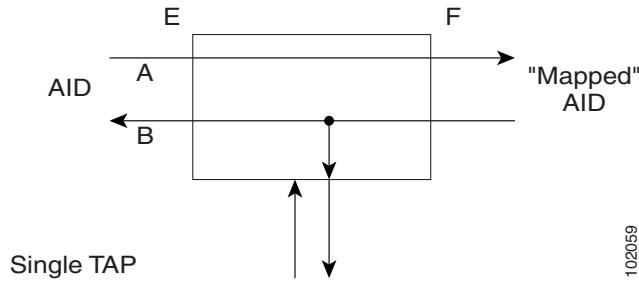
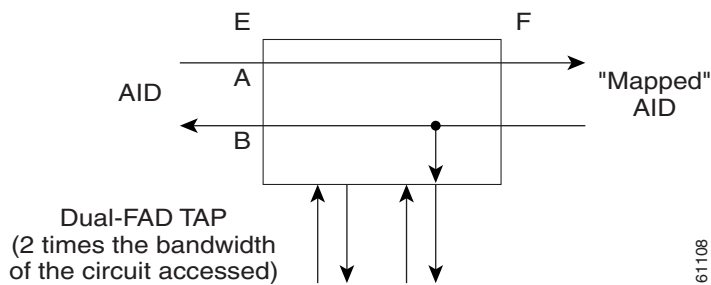


Figure 1-11 MONF Access Dual TAP

**Note**

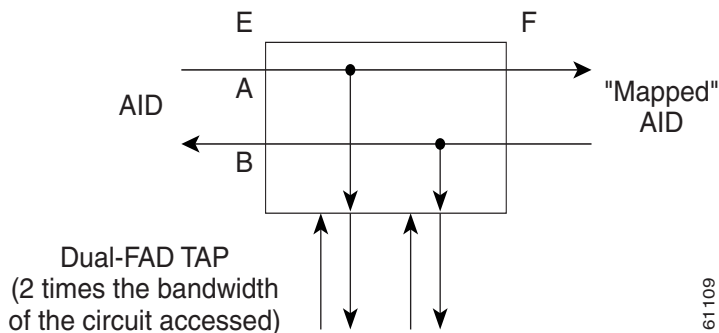
The MONE and SPLTA modes are applicable to unidirectional circuits from E to F. The MONF and SPLTB modes are applicable to unidirectional circuits from F to E.

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 (Figure 1-12). This is a non-intrusive mode.

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

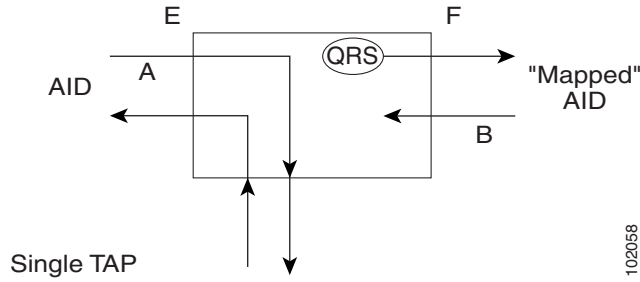
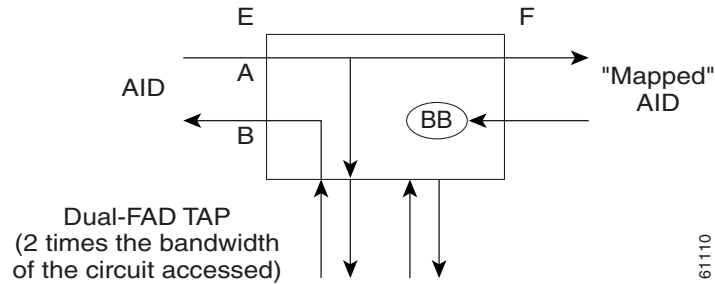


Figure 1-14 SPLTE Access Dual TAP



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

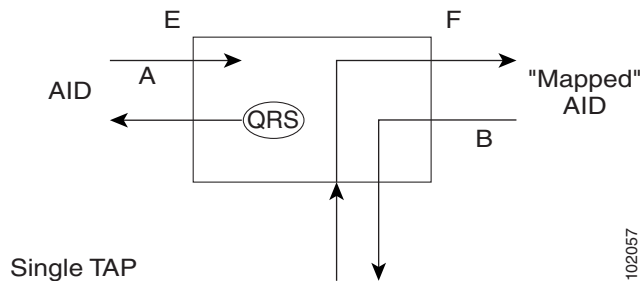
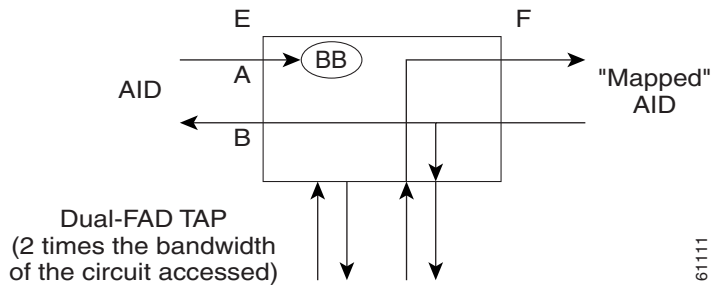


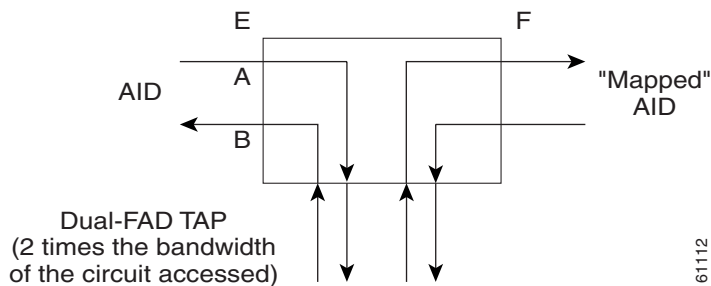
Figure 1-16 SPLTF Access Dual TAP



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. 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).

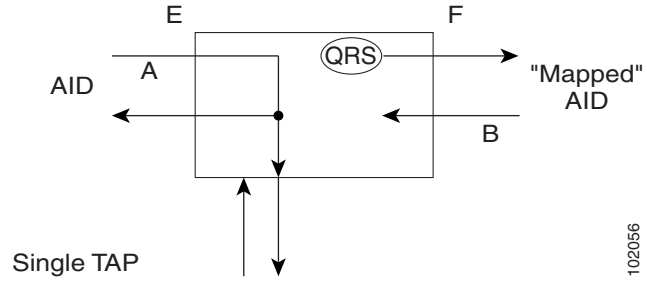
Figure 1-17 SPLTEF Access Dual TAP



1.9.9.7 LOOPE

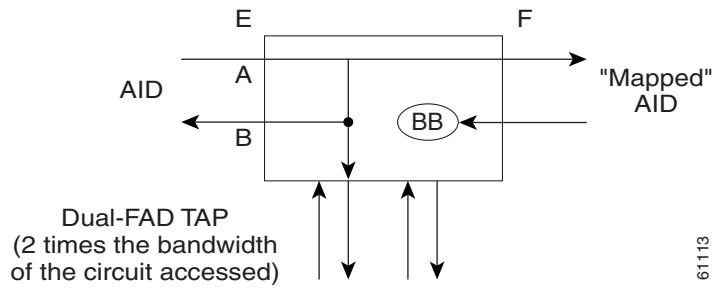
Loop E (LOOPE) indicates to split both the A and B paths, connect the incoming line from the E direction to the outgoing line in the E direction, and connect this looped configuration to the FAD (Figure 1-18 and Figure 1-19). Loop E and F modes are basically identical to the SPLT E and F modes except 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



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Figure 1-19 LOOPE Access Dual TAP

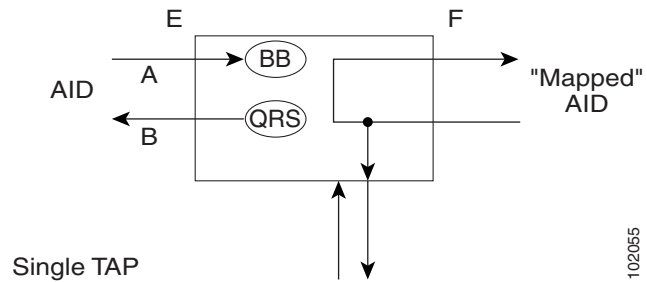


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1.9.9.8 LOOPF

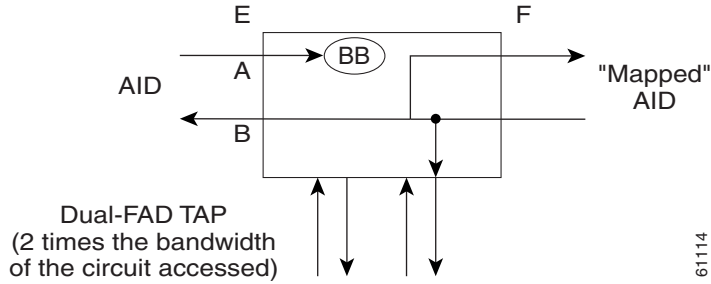
Loop F (LOOPF) indicates to split both the A and B paths, connect the incoming line from the F direction to the outgoing line in the F direction and connect this looped configuration to the FAD (Figure 1-20 and Figure 1-21).

Figure 1-20 LOOPF Access Single TAP



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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

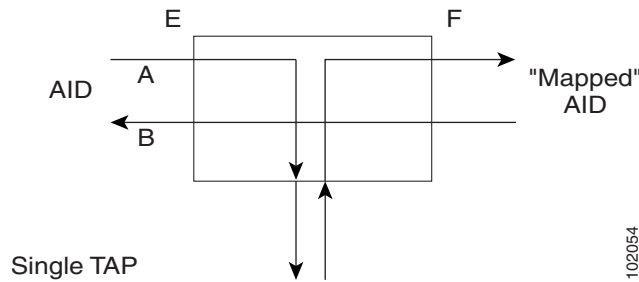
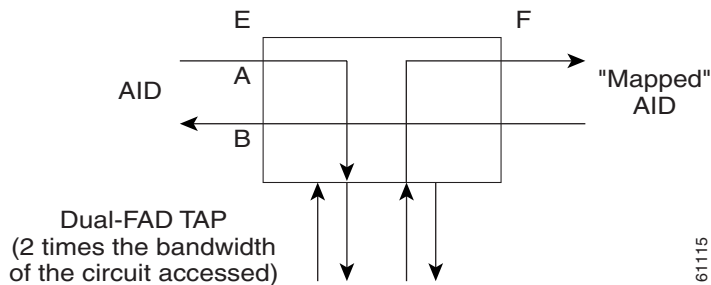


Figure 1-23 SPLTA Access Dual TAP



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

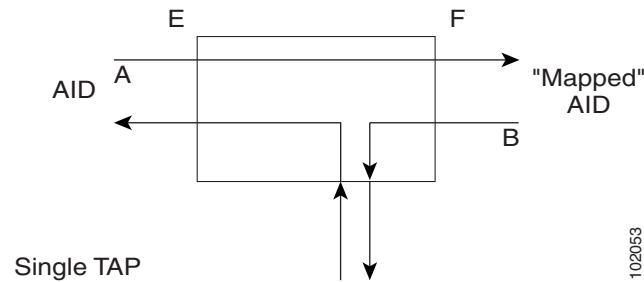
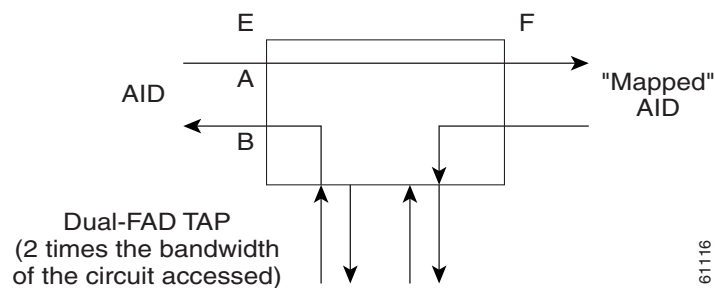


Figure 1-25 SPLTB Access Dual TAP



1.9.10 Unmapped AID Test Access Point Connections

The Cisco ONS 15454 SDH also supports connections to unmapped AIDs (unmapped circuits). The TAPs can be connected to an unmapped AID (an AID that does not have a cross-connect on it). The access modes supported are MONE, SPLTE and LOOPE. [Example 1-14](#) creates a TAP on VC4-5-1-1.

Example 1-14 *ED-VC4::VC4-5-1-1:12::TACC=1;*

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

[Example 1-15](#) creates an unmapped AID connection with a MONE access mode. VC4-5-1-3 does not have a cross-connect on it. VC4-5-1-3 becomes unusable until the connection is disconnected by the DISC-TACC command.

Example 1-15 *CONN-TACC-VC4::VC4-5-1-3:12::1:MD=MONE;*

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



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, SNCP_HEAD, SNCP_DROP, SNCP_DC, SNCP_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 a VC TAP is already created with TAP number = 1.

1.9.10.1 1-Way Circuit

Example 1-16 *ENT-CRS-VC3::VC-5-1,VC-5-2:12::1WAY;
DV9-99 1970-07-01 20:29:06
M 12 COMPLD;*

Example 1-17 *CONN-TACC-VC3::VC-5-1:12::1:MD=MONF;
DV9-99 1970-01-01 20:29:47
M 12 DENY
EANS
VC-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 1-9 on page 1-41](#)).

Example 1-18 *CONN-TACC-VC3::VC-5-1:12::1:MD=MONE;
DV9-99 1970-01-01 20:30:09
M 12 COMPLD*

Example 1-19 *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 1-20 *CONN-TACC-VC3::VC-5-2:12::1:MD=MONF;
DV9-99 1970-01-01 20:30:32
M 12 COMPLD*

Notes:

1. The same examples apply for SNCP_HEAD, SNCP_DROP, SNCP_DC and SNCP_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 1-9](#) and the same applies for SNCP_SNCP and SNCP circuit types. In the case of SNCP_SNCP and SNCP 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 1-39, 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 1-9](#).

Table 1-9 Modes Supported by Circuit Type

Circuit Type (Direction)	MONE	MONF	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	X
SNCP	X	X	X	X	X	X	X	X	X	X	X
SNCP_HEAD (from E)	X									X	
SNCP_HEAD (from F)		X									X
SNCP_DROP SNCP_DC SNCP_EN (from E)	X									X	
SNCP_DROP SNCP_DC SNCP_EN (from F)		X									X
SNCP_SNCP	X	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, SNCP_HEAD, SNCP_DROP,SNCP_DC, SNCP_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 MS-SPRing topologies at these supported VC rates: STM-4 (two-fiber only), STM-16, and STM-64. 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 MS-SPRing the extra traffic is provisioned on the upper half of the bandwidth path. In a four-fiber MS-SPRing 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 MS-SPRing and protection channel of the four-fiber MS-SPRing 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-VCp/VC12 commands. If the cross-connection is a PCA cross-connection, either 1WAYPCA or 2WAYPCA is shown in the CCT field of the RTRV-CRS-VCp/VC12 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 STM-4, STM-16, or STM-64 MS-SPRing.


Note

The VC path cross-connection can be established with TL1 commands (ENT-CRS-xxx).


Note

Because the RTRV-CRS-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 1-21 ENT-CRS-<PATH>[:<TID>]:<FROM>,<TO>:<CTAG>::[:<CCT>][:];
 <PATH>::={VC_PATH | VC12}
 [:<CCT>]::={1WAY, 1WAYDC, 1WAYEN, 2WAY, 1WAYPCA, 2WAYPCA}, it defaults to 2WAY.
 {VC_PATH}::={VC3 | VC4 | VC42C | VC43C | VC44C | VC48C | VC416C | VC464C}

VC= all the VC bandwidth cross-connections.

VC12=VC12_5 cross-connection.

Input example of provisioning an VC4 PCA cross-connection:

Example 1-22 *ENT-CRS-VC4::VC4-1-1,VC4-2-1:123::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 1-23 *RTRV-CRS- [<PATH>]: [<TID>]: <AID>: <CTAG> [:::]; <PATH> ::= {VC_PATH | VC12 | VC}*

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

<AID>={FacilityAIDs, VCAIDs, VC12AIDs, ALL}

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

Example 1-24 *"<FROM>, <TO>:2WAYPCA, VC4"*

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

Example 1-25 *"<FROM>, <TO>:2WAYPCA"*

1.11 FTP Software Download

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



Note

FTP timeout is 30 seconds and is not configurable.

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 the TCC2/TCC2P 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 1-26 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 card will reboot.

Input format:

Example 1-27 *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 1-28 *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 card using TL1.

Download New Software



Note Only Superusers can download and activate software.

- Step 1** Copy the new software package (15454SDH-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 1-29 *RTRV-NE-GEN:::1;*

Output example:

```
Example 1-30  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 1-43 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 CISCO454SDH. The directory path of the package is similar to what you will see during an FTP session.

```
Example 1-31 COPY-RFILE::RFILE-
PKG:CTAG::TYPE=SWDL,SRC="FTP://TL1:CISCO454SDH@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 SDH 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 1-32 *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 1-33 *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 1-34 *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 1-35 *RTRV-NE-GEN*

VA454-94 1970-01-06 22:22;12
M 1 COMPLD
 "IPADDR=10.82.87.94,IPMASK=255.255.245.0,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=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 1-36 *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 1-37 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 1-38 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 1-39 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 1-45](#) for correct APPLY syntax).

Activate New Software

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

Example 1-40 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 1-41 *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 SDHs, 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 1-46 and the “[Activate New Software](#)” procedure on page 1-48, but ensure that the TID in each command is filled with the ENE node name.

Each GNE can support 11 (TCC2/TCC2P) concurrent communication gateway sessions and up to a maximum of 176 (TCC2/TCC2P) ENEs/GNE. For more information on TL1 Gateway, see [Chapter 2](#), “TL1 Gateway.”

Example 1-42 *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 1-43 *COPY-RFILE:NODE1:RFILE-PKG:CTAG::TYPE=SWDL,SRC="FTP://TL1:*
CISCO454@10.7729.199/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 1-44 *APPLY:NOE1::1::ACT;
 APPLY:NOE2::1::ACT;
 APPLY:NOE3::1::ACT;
 APPLY:NOE4::1::ACT;
 APPLY:NOE5::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 SDH. With scheduled PM report the system automatically and periodically generates the PM report of any specified facility or cross-connection. For more information on performance monitoring, refer to the Cisco ONS 15454 SDH user documentation, Release 5.0.



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 3-687
- ALW-PMREPT-ALL on page 3-42
- RTRV-PMSCHED-<MOD2> on page 3-597
- RTRV-PMSCHED-ALL on page 3-601
- INH-PMREPT-ALL on page 3-242
- REPT PM <MOD2> on page 3-326

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 SDH.

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.

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 TPER 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 “[3.2.214 RTRV-PM-<MOD2>](#)” section on page 3-583 for a full command description.

Input Format

```
RTRV-PM-<MOD2>:[<TID>]:<AID>:<CTAG>::[<MONTYPE>],[<MONLEV>],[<ISTM>],
[<DIRECTION>],[<TPER>],[<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>],[<TPER>],[<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 1-10 shows the error messages associated with the RTRV-PM-<MOD2> command.

Table 1-10 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 STM16 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 “3.2.88 ENT-RMONTH-<MOD2_RMON>” section on page 3-224 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 1-11 shows the error messages associated with the ENT-RMONTH-<MOD2_RMON> command.

Table 1-11 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.

Table 1-11 Error Messages for ENT-RMONTH-<MOD2_RMON>

Error Code	Description	Scenario When the Error Message is Sent
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 3-79 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 1-12](#) shows the error messages associated with the DLT-RMONTH-<MOD2_RMON> command.

Table 1-12 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 “[3.2.224 RTRV-RMONTH-<MOD2_RMON>](#)” section on page 3-621 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 1-13](#) shows the error messages associated with the DLT-RMONTH-<MOD2_RMON> command.

Table 1-13 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 [“3.2.127 REPT EVT <MOD2ALM>”](#) section on page 3-301 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 [“3.2.103 INIT-REG-<MOD2>”](#) section on page 3-250 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 [“3.2.242 SCHED-PMREPT-<MOD2>”](#) section on page 3-687 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 “[3.2.216 RTRV-PMSCHED-<MOD2>](#)” section on page 3-597 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 “[3.2.137 REPT PM <MOD2>](#)” section on page 3-326 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-<MOD2> command.

See the “[3.2.126 REPT DBCHG](#)” section on page 3-299 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 RFC 1757.

Unlike the PM of other SDH entities (such as VC path, STM), 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 1-14 *TMPER Type*

Values	Description
1-DAY	Performance Parameter Accumulation Interval Length - Every 24 Hours. 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 1-15 *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 1-16 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 SDH 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 SDH 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 SDH PM. When the LOCN or DIRN parameter is specified it would only apply to the SDH PM.
- Because 1-MIN, 1-HR or RAW-DATA are not applicable to SDH PM, no SDH PM would be returned in the output of RTRV-PM. If RAW-DATA is specified in the input of the INIT-REG command, no SDH 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 SDH 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.

- An SDH PM montype cannot be specified in the input of the INIT-REG command only the SDH PM counters will be cleared. When the ALL montype is specified, both the RMON and the SDH 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 SDH 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 SDH 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 SDH 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 1-59](#).