Quick Start Guide

Cisco ONS 15600 SDH TL1 Test Access

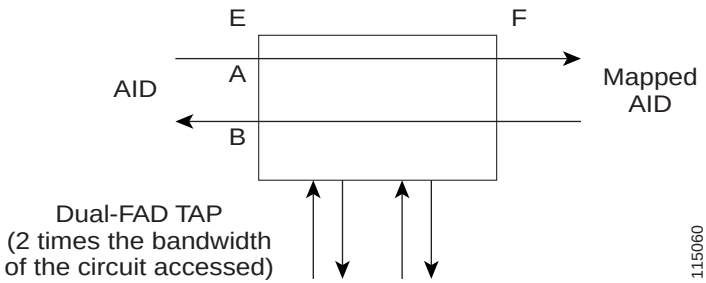
1 Test Access

The test access (TACC) feature allows a third-party Broadband Remote Test Unit (BRTU) to create nonintrusive test access points (TAPs) to monitor the circuits on the ONS 15600 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 15600 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-connects, and changing the mode of test access on the ONS 15600 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).

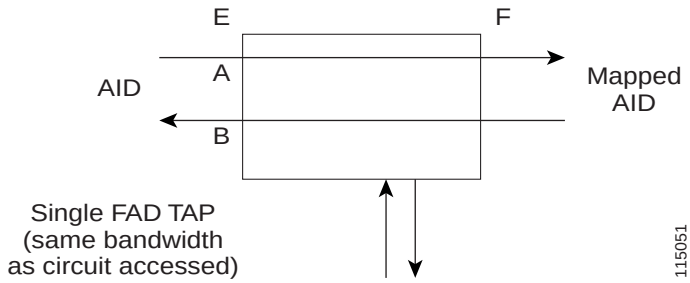
Figure 1 Circuit with No Access (Dual FAD TAP)



A dual facility access digroup (FAD) 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 “ED-<rr>” section on page 3. The values are SINGLE/DUAL. It defaults to DUAL.

A single FAD TAP uses half the bandwidth as that of the dual FAD, that is, 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 “ED-<rr>” section on page 3. The values are SINGLE/DUAL. The MONEF, SPLTEF, and LOOPEF modes are not supported by SINGLE FAD TAPs (Figure 2).

Figure 2 Circuit with No Access (Single FAD TAP)



2 TL1 Interface Commands

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

TAP Creation/Deletion

ED-<rr>

The edit command (ED-<rr>) is used to change an existing Port/VC to a TAP.

```
ED- {VC4| 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/VC*n* already has a cross-connect on it.

The TAPTYPE parameter value is SINGLE or DUAL. The MONEF, SPLTEF, and 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:

- A TAP number is an integer in the range of 1 to 999. When TACC=0 is specified, the TAP is deleted (if already present).
- A TAP number is unique across VC4 TAPs in the system.
- A TAP number is not editable.

ED-VC4n

When an ED-VC4*n* is executed for a TACC it assigns the VC path for the first two-way test access connection and VC+1 as the second two-way connection. Similarly, for VC42c, VC43c, VC44c, VC48c, and VC416c, the next consecutive VC of same width is chosen. The TAP creation fails if either of the consecutive VC's are not available. The command in Example 1 creates a TAP on VC4-5-1-1 and VC4-5-1-2.

Example 1 Creating a Single TAP

```
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 the creation of cross-connects until the TAP is deleted.

The command in Example 2 creates a VC48c DUAL TAP on VC4-6-1-1 and VC4-6-1-25.

Example 2 Creating a Dual TAP

```
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 the creation of cross-connects until the TAP is deleted.

TAP Connections

CONN-TACC-<rr>

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-{VC4| VC44C| VC48C| VC416C| VC464C}:[<TID>]:<AID>:<CTAG>::<TAP>:MD=<MD>;
```

Connect the port/VC4n defined by <AID> to the port/VC4n defined by the <TAP> number. The Mode of Test Access to the circuit/cross-connect is specified by <MD>. The mode can be monitor (MONEF), split (SPLTEF), or loop (LOOPEF). The modes are described in the "Test Access Configurations" section on page 9.

Note The connection is maintained only for the duration of the TL1 session (nonpersistent).

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

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

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

Code	Description
RTBY	REQUESTED TAP BUSY
RTEN	REQUESTED TAP DOES NOT EXIST
SCAT	CIRCUIT IS ALREADY CONNECTED TO ANOTHER TAP

Table 1 Error Codes Supported for the CONN-TACC-<rr> Command (continued)

Code	Description
SRCN	REQUESTED CONDITION ALREADY EXISTS
IIAC	INVALID ACCESS IDENTIFIER (AID)
EANS	ACCESS NOT SUPPORTED
SRAC	REQUESTED ACCESS CONFIGURATION IS INVALID

An example of the CONN-TACC-<rr> command is provided in Example 3Table 1Table 1.

Example 3 CONN-TACC-<rr> Command Example

```
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 “Test Access Mode Definitions” section on page 11.

Change Access Mode

CHG-ACCMD-<rr>

```
CHG-ACCMD- {VC4| VC44C| VC48C| VC416C| VC464C}:[<TID>]:<TAP>:<CTAG>::<MD>;
```

Change the type of test access. This might 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 an existing connection does not exist, a RTEN error is returned.

Table 2 shows the error codes supported for the CHG-ACCMD-<rr> command.

Table 2 Error Codes Supported for the CHG-ACCMD-<rr> Command

Code	Definition
SRCN	REQUESTED CONDITION ALREADY EXISTS

Table 2 Error Codes Supported for the CHG-ACCMD-<rr> Command (continued)

Code	Definition
SRAC	REQUESTED ACCESS CONFIGURATION IS INVALID
RTEN	REQUESTED TAP DOES NOT EXIST

An example of the CHG-ACCMD-<rr> command is provided in Example 4Table 1Table 1.

Example 4 CHG-ACCMD-<rr> Command Example

```
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.

Retrieving TAP Information

RTRV-<rr>

```
RTRV- {VC4| 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 ONS 15600 SDH R1.4.

An example of the RTRV-<rr> command is provided in Example 5.

Example 5 RTRV-<rr> Command Example

```
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:OOS,"
;
```

The parameters supported by the RTRV-<rr> command are listed in Table 3.

Table 3 RTRV=<rr> Command Parameters

Parameter	Definition
<TID>	The node name, which is optional.
<TAP>	A 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. The TAP is entered as an integer.
<CTAG>	Required identifier or number limited to six ASCII characters; correlates response with command.
<MD>	Defines the monitor or split mode: MONE, MONF, MONEF, SPLTE, SPLTF, LOOPE, LOOPF, SPLTA, SPLTB, or SPLTEF. Note that 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 VC*n* as used for test access.

Disconnect a TAP

DISC-TACC

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

Disconnect the TAP and put the connection back to its original state (no access).

Table 4 shows the error codes supported for the CHG-ACCMD-<rr> command.

Table 4 Error Codes Supported by the DISC-TACC Command

Code	Definition
SADC	ALREADY DISCONNECTED
SRTN	UNABLE TO RELEASE TAP

An example of the DISC-TACC command is provided in Example 6.

Example 6 DISC-TACC Command Example

```
DISC-TACC::1:12;

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

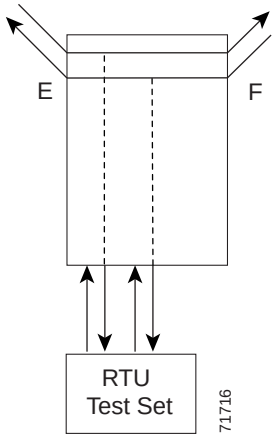
Note This disconnects TAP 1 from the circuit/cross-connect under test.

Note This command generates a REPT DBCHG message.

3 Test Access Configurations

Figure 3 shows a single node configuration.

Figure 3 Single Node View (Node 1)



To configure a single-node TAP, use the following sample code:

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

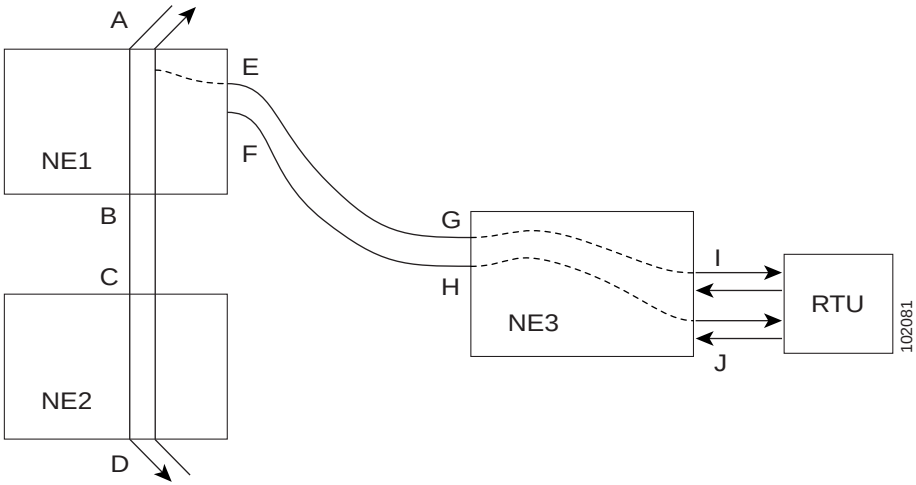
This code changes VC4 1 and VC4 2 on Slot 1 to a TAP. The CTAG is 90. This command also sets the TAP number to 1.

To connect the AID to the TACC defined by TAP 1 on the E side, use the following code (where the CTAG is 91)

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

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

Figure 4 Multi-node View (MONE Example)



To create a multi-node configuration:

Step 1 Enter the following command on NE3:

```
ENT-CRS-VC::<AID I-G>:100::2WAY;
```

This is a connection, not a TAP. The CTAG is 100.

Step 2 Enter this command on NE3:

```
ENT-CRS-VC::<AID J-H>:101::2WAY;
```

This second connection is not a TAP.

Step 3 Enter the following command on NE1. Assume that 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;
```

This creates a TAP with VC4-1-1-1 and VC4-1-1-2 through NE1. The TAP number assigned is 4.

Step 4 To connect TAP 4 to the circuit, enter the following command:

```
CONN-TACC-VC::<AID A or B>:102::4:<MD>
```

Note The I and J connections in Figure 4 are TAPS, but are normal connections in this configuration.

4 Test Access Mode Definitions

The following diagrams show what the different test access modes <MD> refer to. Figure 5 shows a circuit with no access (DUAL FAD TAP), Figure 6 shows a circuit with no access (SINGLE FAD TAP), followed by all the modes. The QRS might be generated by an outside source, that is, the empty connection of the BRTU.

Intrusive and Nonintrusive Modes

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

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

Figure 5 Circuit with No Access (DUAL FAD TAP)

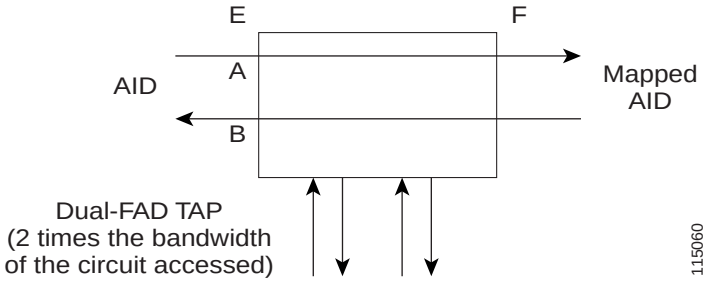
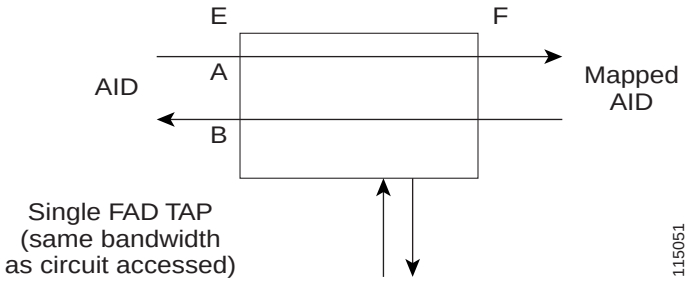


Figure 6 Circuit with No Access (SINGLE FAD TAP)



MONE

Monitor E (MONE) indicates a monitor connection provided from the FAD to the A transmission path of the accessed circuit (Figure 7 and Figure 8). This is a nonintrusive mode.

Figure 7 MONE Access SINGLE TAP

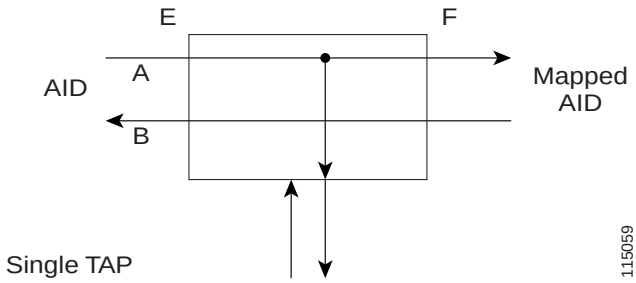
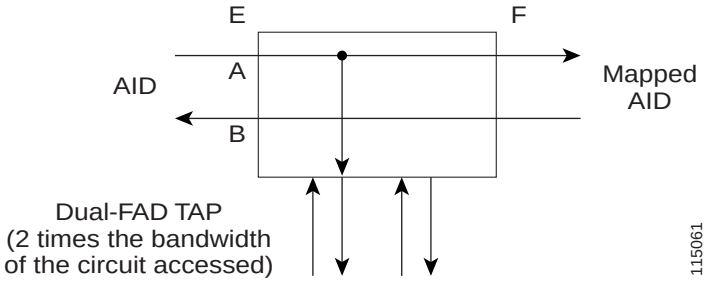


Figure 8 MONE Access DUAL TAP



MONF

Monitor F (MONF) indicates that the FAD is providing a monitor connection to the B transmission path of the accessed circuit (Figure 9 and Figure 10). This is a nonintrusive mode.

Figure 9 MONF Access SINGLE TAP

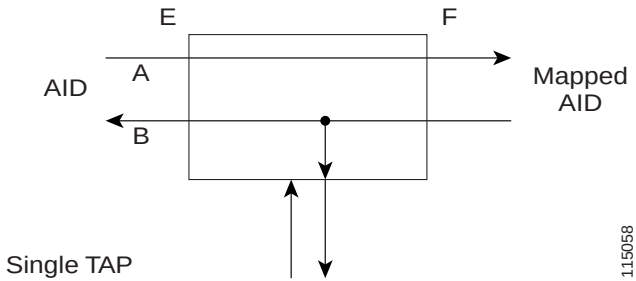
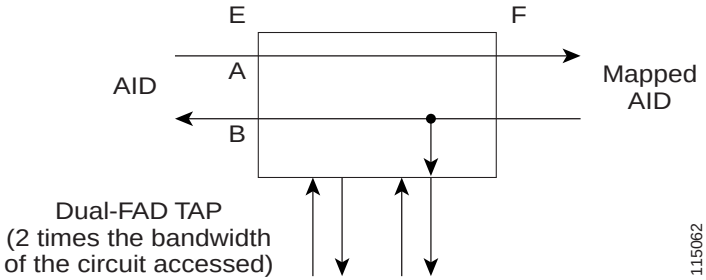


Figure 10 MONF Access DUAL TAP



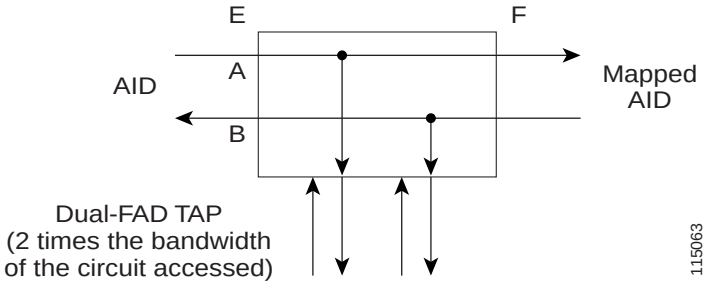
Note The MONE and SPLTA modes are applicable to unidirectional circuits from E to F. The MONF and SPLTB modes are applicable to unidirectional circuits from F to E.

MONEF

Monitor EF (MONEF) is a monitor connection provided from the FAD 1 (odd pair) to a dual facility access digroup (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 11). This is a nonintrusive 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 11 MONEF Access DUAL TAP



SPLTE

Split E (SPLTE) splits both the A and B paths and connects the E side of the accessed circuit to the FAD (Figure 12 and Figure 13).

Figure 12 SPLTE Access SINGLE TAP

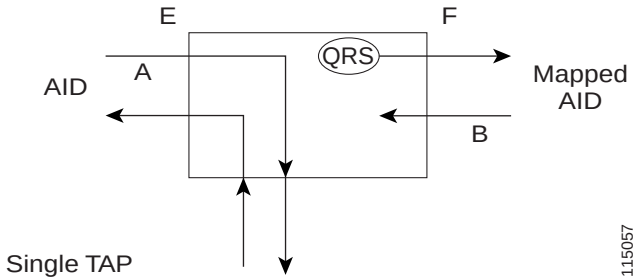
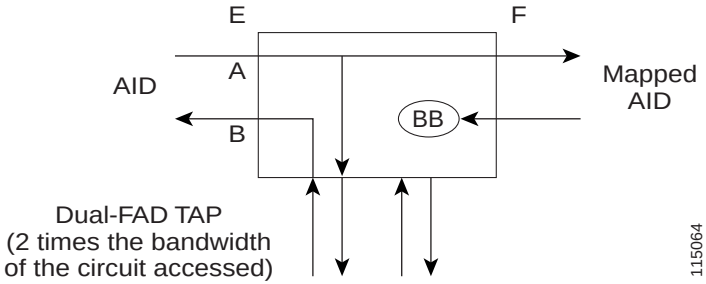


Figure 13 SPLTE Access DUAL TAP



SPLTF

Split F (SPLTF) splits both the A and B paths and connects the F side of the accessed circuit to the FAD (Figure 14 and Figure 15).

Figure 14 SPLTF Access SINGLE TAP

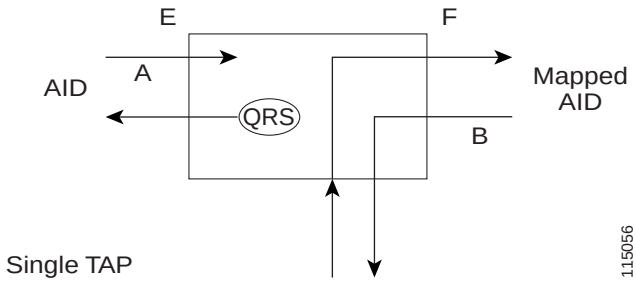
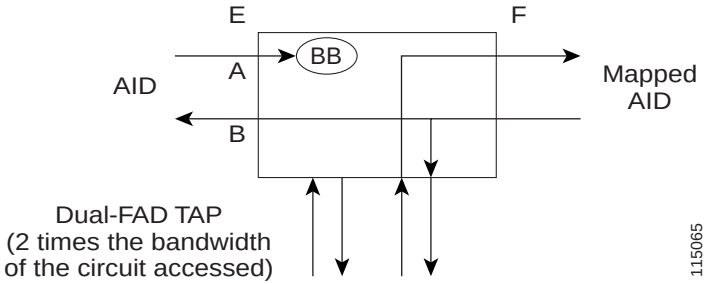


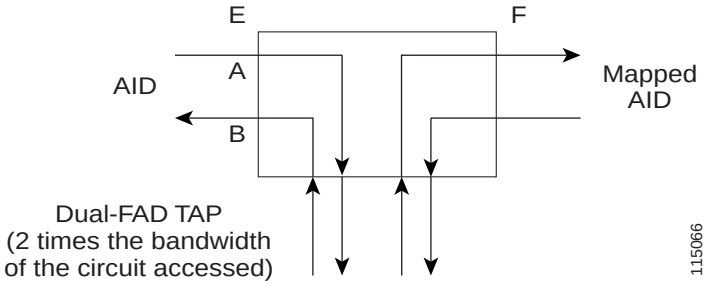
Figure 15 SPLTF Access DUAL TAP



SPLTEF

Split EF (SPLTEF) for T1 (DS1 HCDS) splits both the A and B paths, connects the E side of the accessed circuit to FAD1 and the DFAD pair, and connects the F side to the FAD 2 of the same DFAD pair. SPLTEF for T3 (DS3 HCDS) splits 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 16).

Figure 16 SPLTEF Access DUAL TAP



LOOPE

Loop E (LOOPE) splits both the A and B paths, connects the incoming line from the E direction to the outgoing line in the E direction, and connects this looped configuration to the FAD (Figure 17 and Figure 18). 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 17 LOOPE Access SINGLE TAP

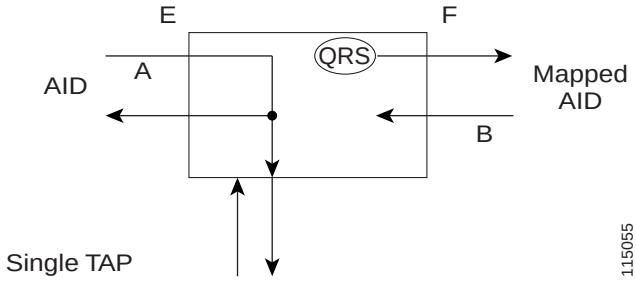
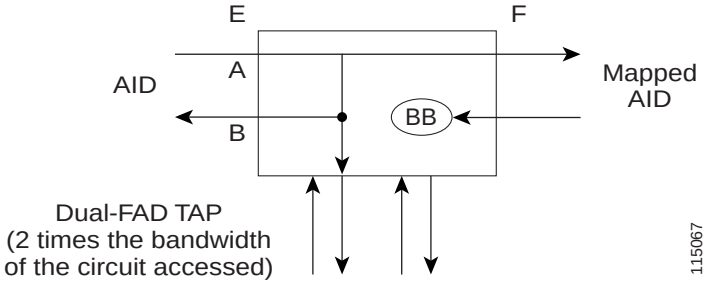


Figure 18 LOOPE Access DUAL TAP



LOOPF

Loop F (LOOPF) splits both the A and B paths, connects the incoming line from the F direction to the outgoing line in the F direction, and connects this looped configuration to the FAD (Figure 19 and Figure 20).

Figure 19 LOOPF Access SINGLE TAP

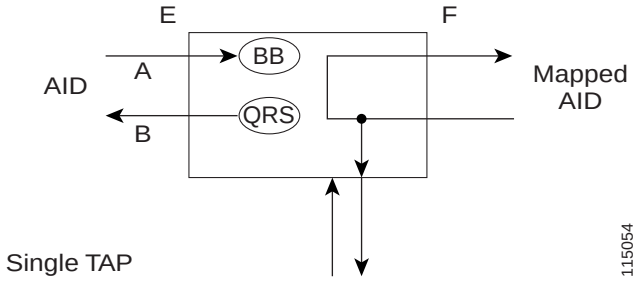
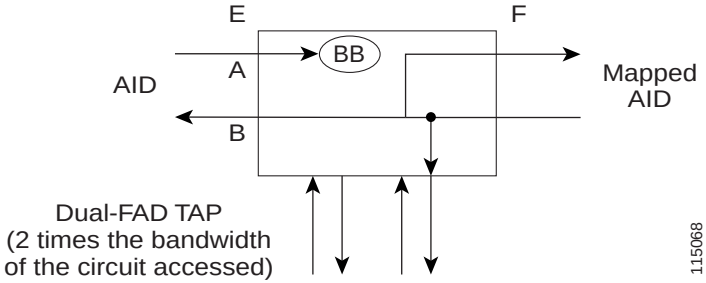


Figure 20 LOOPF Access DUAL TAP



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 the A transmission path is split (Figure 21 and Figure 22). 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 21 SPLTA Access SINGLE TAP

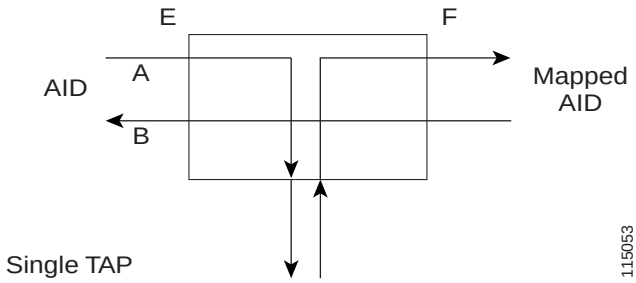
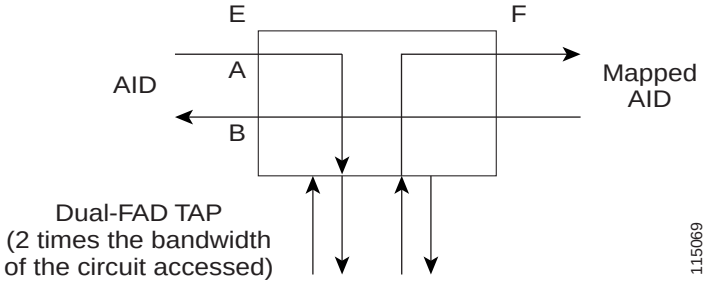


Figure 22 SPLTA Access DUAL TAP



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 the B transmission path is split (Figure 23 and Figure 24).

Figure 23 SPLTB Access SINGLE TAP

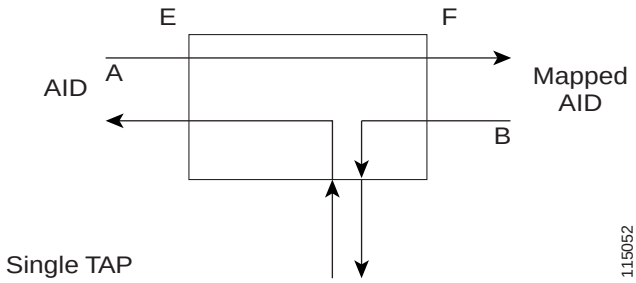
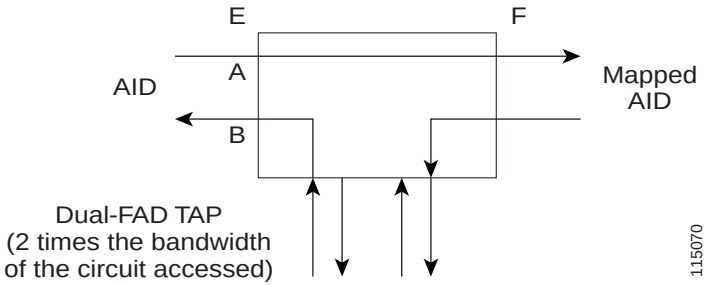


Figure 24 SPLTB Access DUAL TAP



5 Unmapped AID TAP Connections

The Cisco ONS 15600 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 7 creates a TAP on VC4-5-1-1. Table 5 describes the modes and the circuit types that support them.

Example 7 Sample TAP on VC4-5-1-1

```
ED-VC4::VC4-5-1-1:12:::TACC=1;

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

Example 8 creates an unmapped AID connection with a MONE access mode. VC-5-1-3 does not have a cross-connect on it. VC-5-1-3 becomes unusable until the connection is disconnected by the DISC-TACC command.

Example 8 Sample Unmapped AID Connection with MONE Access Mode

```
CONN-TACC-VC4::VC4-5-1-3:12::1:MD=MONE;

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

Table 5 Modes Supported by Circuit Type

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

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 one-way circuits (1-way, UPSR_HEAD, UPSR_DROP,UPSR_DC, and UPSR_EN), if the AID specified is the source AID, the direction is designated as from E in Table 5. If the AID specified is the destination AID or the drop side, the direction is designated as from F in Table 5.

6 Parameter Types

TACC_MODE

The test access mode parameter values are described in Table 6.

Table 6 TACC_MODE Parameter Values

TACC_MODE Values	Description
LOOPE	Splits both the A and B paths, connects the line incoming from E direction to the line outgoing in the E direction, and connects this looped configuration to the FAD. The line outgoing in the F direction has a QRS connected, and the line incoming from the F direction is terminated by the nominal characteristic impedance of the line.
LOOPF	Splits both the A and B paths, connects the line incoming from F direction to the line outgoing in the F direction, and connects this looped configuration to the FAD. The line outgoing in the E direction has a QRS connected, and the line incoming from the E direction is terminated by the nominal characteristic impedance of the line.
MONE	Indicates that a monitor connection is to be provided from the FAD to the A transmission path of the accessed circuit.
MONEF	Indicates that a monitor connection is to be provided from the FAD1 to a DFAD, or from the odd pair of a FAP to the A transmission path and from FAD2 of the same DFAD or the even pair of a FAP to the B transmission path of the accessed circuit.
MONF	Indicates that a monitor connection is to be provided from the FAD to the B transmission path of the accessed circuit.

Table 6 TACC_MODE Parameter Values (continued)

TACC_MODE Values	Description
SPLTA	Indicates that a connection is to be provided from both the E and F sides of the A transmission path of the circuit under test to the FAD and the A transmission path will be split.
SPLTB	Indicates that a connection is to be provided from both the E and F sides of the B transmission path of the circuit under test to the FAD and the B transmission path will be split.
SPLTE	Splits both the A and B paths and connects the E side of the accessed circuit to the FAD. The line outgoing in the F direction has a QRS connected, the line incoming from the F direction has a QRS connected, and the line incoming from the E direction will be terminated by the nominal characteristic impedance of the line.
SPLTEF	Splits both the A and B paths, and connects the E side of the accessed circuit to FAD 1 and the F side to FAD 2.
SPLTF	Splits both the A and B paths, and connects the F side of the accessed circuit to the FAD. The line outgoing in the E direction has a QRS connected, the line incoming in the E direction has a QRS connected, and the line incoming from the E direction will be terminated by the nominal characteristic impedance of the line.

MOD_TACC

The test access modifier parameter values are provided in Table 7.

Table 7 MOD_TACC Parameter Values

MOD_TACC Values	Description
VC44C	VC44C path
VC464C	VC464C path
VC48C	VC48C path
VC4	VC4 path
VC416C	VC416C path

TAPTYPE

The test access path/point type parameter values are provided in Table 8.

Table 8 TAPTYPE Parameter Values

TAPTYPE Values	Description
DUAL	Dual-FAD type
SINGLE	Single-FAD type

7 Test Access Terminology

Table 9 lists test access terminology and definitions. Path naming conventions are listed in Table 10.

Table 9 Test Access Terminology

Term	Definition
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)
RTU	Remote test unit
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

Table 9 Test Access Terminology (continued)

Term	Definition
TACC	Test access
TAP	Test access path/point
TL1	Transaction Language 1
SDH	Synchronous digital hierarchy
VC-11	Virtual container Level 1, Type 1. SDH lower-order path equivalent to SONET VT-1.5.
VC-12	Virtual container Level 1, Type 2. SDH lower-order path equivalent to SONET VT-2.
VC-3	Virtual container Level 3. An SDH lower-order path.
VT1	Virtual tributary 1

Table 10 Path Naming Conventions

Path Name	Definition
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)

8 Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation on the World Wide Web at this URL:

http://www.cisco.com/univercd/home/home.htm

You can access the Cisco website at this URL:

http://www.cisco.com

International Cisco websites can be accessed from this URL:

http://www.cisco.com/public/countries_languages.shtml

Ordering Documentation

You can find instructions for ordering documentation at this URL:

http://www.cisco.com/univercd/cc/td/doc/es_inpck/pdi.htm

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Ordering tool:

  http://www.cisco.com/en/US/partner/ordering/index.shtml

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

9 Documentation Feedback

You can submit e-mail comments about technical documentation to bug-doc@cisco.com.

You can submit comments by using the response card (if present) behind the front cover of your document or by writing to the following address:

Cisco Systems
Attn: Customer Document Ordering
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

10 Obtaining Technical Assistance

For all customers, partners, resellers, and distributors who hold valid Cisco service contracts, the Cisco Technical Assistance Center (TAC) provides 24-hour-a-day, award-winning technical support services, online and over the phone. Cisco.com features the Cisco TAC website as an online starting point for technical assistance. If you do not hold a valid Cisco service contract, please contact your reseller.

Cisco TAC Website

The Cisco TAC website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The Cisco TAC website is available 24 hours a day, 365 days a year. The Cisco TAC website is located at this URL:

http://www.cisco.com/tac

Accessing all the tools on the Cisco TAC website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a login ID or password, register at this URL:

http://tools.cisco.com/RPF/register/register.do

Opening a TAC Case

Using the online TAC Case Open Tool is the fastest way to open P3 and P4 cases. (P3 and P4 cases are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Case Open Tool automatically recommends resources for an immediate solution. If your issue is not resolved using the recommended resources, your case will be assigned to a Cisco TAC engineer. The online TAC Case Open Tool is located at this URL:

http://www.cisco.com/tac/caseopen

For P1 or P2 cases (P1 and P2 cases are those in which your production network is down or severely degraded) or if you do not have Internet access, contact Cisco TAC by telephone. Cisco TAC engineers are assigned immediately to P1 and P2 cases to help keep your business operations running smoothly.

To open a case by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)
EMEA: +32 2 704 55 55
USA: 1 800 553-2447

For a complete listing of Cisco TAC contacts, go to this URL:

http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml

TAC Case Priority Definitions

To ensure that all cases are reported in a standard format, Cisco has established case priority definitions.

Priority 1 (P1)—Your network is “down” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Priority 2 (P2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Priority 3 (P3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Priority 4 (P4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

11 Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- Cisco Marketplace provides a variety of Cisco books, reference guides, and logo merchandise. Go to this URL to visit the company store:

  http://www.cisco.com/go/marketplace/

- The Cisco *Product Catalog* describes the networking products offered by Cisco Systems, as well as ordering and customer support services. Access the Cisco Product Catalog at this URL:

  http://cisco.com/univercd/cc/td/doc/pcat/

- *Cisco Press* publishes a wide range of general networking, training and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press online at this URL:

  http://www.ciscopress.com

- *Packet* magazine is the Cisco quarterly publication that provides the latest networking trends, technology breakthroughs, and Cisco products and solutions to help industry professionals get the most from their networking investment. Included are networking deployment and troubleshooting tips, configuration examples, customer case studies, tutorials and training, certification information, and links to numerous in-depth online resources. You can access Packet magazine at this URL:

  http://www.cisco.com/packet

- *iQ Magazine* is the Cisco bimonthly publication that delivers the latest information about Internet business strategies for executives. You can access iQ Magazine at this URL:

  http://www.cisco.com/go/iqmagazine

- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:

  http://www.cisco.com/ipj

- Training—Cisco offers world-class networking training. Current offerings in network training are listed at this URL:

  http://www.cisco.com/en/US/learning/index.html

Corporate Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

European Headquarters
Cisco Systems International BV
Haarlerbergpark
Haarlerbergweg 13-19
1101 CH Amsterdam
The Netherlands
www-europe.cisco.com
Tel: 31 0 20 357 1000
Fax: 31 0 20 357 1100

Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-7660
Fax: 408 527-0883

Asia Pacific Headquarters
Cisco Systems, Inc.
Capital Tower
168 Robinson Road
#22-01 to #29-01
Singapore 068912
www.cisco.com
Tel: +65 6317 7777
Fax: +65 6317 7799

Cisco Systems has more than 200 offices in the following countries. Addresses, phone numbers, and fax numbers are listed on the

Cisco Web site at www.cisco.com/go/offices

Argentina • Australia • Austria • Belgium • Brazil • Bulgaria • Canada • Chile • China PRC • Colombia • Costa Rica • Croatia • Czech Republic • Denmark • Dubai, UAE
Finland • France • Germany • Greece • Hong Kong SAR • Hungary • India • Indonesia • Ireland • Israel • Italy • Japan • Korea • Luxembourg • Malaysia • Mexico
The Netherlands • New Zealand • Norway • Peru • Philippines • Poland • Portugal • Puerto Rico • Romania • Russia • Saudi Arabia • Scotland • Singapore • Slovakia
Slovenia • South Africa • Spain • Sweden • Switzerland • Taiwan • Thailand • Turkey • Ukraine • United Kingdom • United States • Venezuela • Vietnam • Zimbabwe

Printed in the USA on recycled paper containing 10% postconsumer waste.
78-16214-01
DOC-7816214=