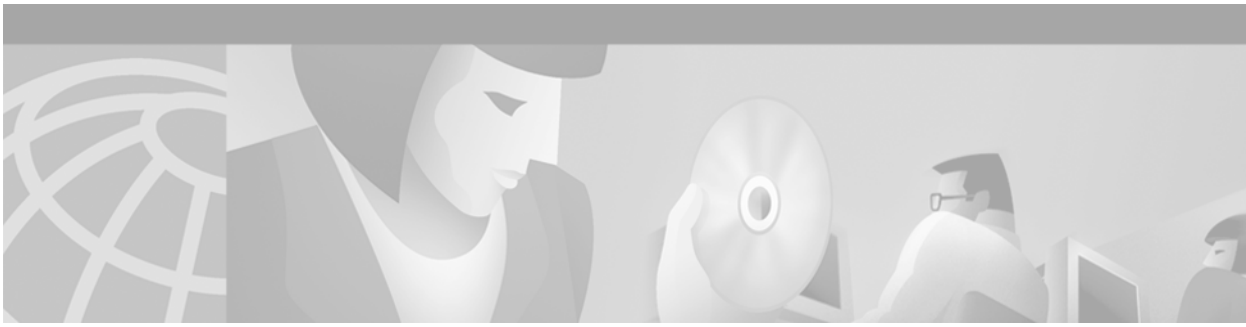

Release Notes and User Guide Update for Cisco 8110 Broadband Network Termination Unit for Cisco Software Release 5.2

Contents

These Release Notes describe the following topics:

CISCO SYSTEMS

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Introduction

The Cisco 8110 Broadband Network Termination Unit is a multiservice IP+ATM CPE device which enables service providers worldwide to cost effectively offer carrier class managed services to enterprise customers with high bandwidth needs and stringent service level agreements. The Cisco 8110 is optimized to enable a wide range of services including IP, ATM, Private Line, Voice and Video services over a single high-speed access link.

Determining the Software Version

There are two methods of determining the 8110 Software Version:

- From booting up the system while the 8110 is switched off.
- From the system menu while logged in to the 8110.

Determining the Software Version by booting up the System

In order to determine the Software Version, the system needs to be booted up. Following the boot up, the system will perform a serious of self tests . The Software Version is displayed at the end of the tests just before the Login prompt as shown in *figure 1*.

Figure 1 Software Version 5.2 self test following boot up example

```
Self Test...
test serial passed
test PPI passed
test Timer passed..
.
.
.
..Warm Start Self Tests - OK
Version v5.2
Login :
```

Determining the Software Version from the 8110 System Menu

To determine the Software Version of the 8110 Broadband Network Termination Unit, from the Configuration Menu type the **SHOW** command and press RETURN.

The **SHOW** command is used to display the global configuration information for this particular Cisco 8110 System as shown in Figure 1. The display includes: EPROM version, Operational software version, Cisco 8110 Address. At the prompt, type the command and press RETURN. The following screen is displayed:

Figure 2 Global Configuration Information

```
Cisco 8110:host:configuration~ show
EPROM version      : 1.6 1998/02/19 13:53:33
Created on         : Tue Feb 24 07:34:23 IST 1998
Software version   : v5.2b
```

```
Created on        : Thu Mar 15 17:01:38 IST 2001
XILINX QLAN version : Sun Mar  8 13:50:33 IST 1998
Kernel version    : WIND version 2.4
OS version        : 5.2
MAC Address       : 00:40:0d:fa:af:01
```

Note After booting up the system, it is required to input passwords for both User and Supervisor. only after the passwords are inputted into the system, the user can begin working. It is also necessary to input read and write password for Community.

Upgrading to a New Software Release

Software download procedure

This section assume you are familiar with the software release already installed, and download procedure in particular.

Upgrading from version 3.3g3

1. Verify that version 3.3g3 is loaded into Flash A, If not please download version 3.3g3 first.
2. type “op init” to initialize the configuration NVRAM.
3. Set the download configuration (file, server access)
4. Type the command " configuration boot from B" (Change boot parameter to run from Flash B)
5. Type "op load" which result in version 5.2 loaded into Flash A

Upgrading from version 5.1c

1. Set the download configuration (file, server access)
2. Type the command " configuration boot from B" (Change boot parameter to run from Flash B)
3. Type "op load" which result in version 5.2 loaded into Flash A

Hardware Supported

Broadband Network Termination Units

Cisco Software Release Version 5.2 supports the following Broadband Network Termination Unit products:

- Cisco 8110 Broadband Network Termination Unit
- Fast Ethernet ports

Line Interface Modules (LIMs)

Table 1 Line Interface Modules (LIMs) and Power Supply sources supported by Cisco Software Release Version 5.2

LIM Model	Revision
LIM-155MM	A0
LIM-155MM-SH	A0
LIM-155SM-I	A0
LIM-155SM-I-SH	A0
LIM-T3-BNC	A0
LIM-T3-BNC-SH	A0
LIM-E3-BNC	A0
LIM-E3-BNC-SH	A0
LIM-E3-1.6/5.6	A0
LIM-E3-1.6/5.6-SH	A0
LIM-E1T1	A0
LIM-E1T1-SH	A0
CSM-4E1T1	A0
8110-PS-110	A0
8110-PS-220	A0
8110-PS-DC	A0

Note Software Version 5.2 is based on Version 5.1c and supports all the features included in Version 5.1c

Version 5.2 Feature List

Log On Security

Secure Log-on procedure, to protect and ensure confidentiality, integrity and availability of the Cisco 8110 configuration, control and maintenance.

UBR+

Support ATM forum UBR (Unspecified bit rate) with minimum cell rate for ATM network. Normally used for non real time application.

PPD

Frame base traffic control discard the reminder of a packet that is known to be incomplete due to cell loss. This feature enable packet base traffic to be more efficient.

VLAN Tagging

Support VLAN Tagging Per 802.1q.

E1 Fractional

Support Fractional E1 per AF-Phy-0130.00

AAL5 And Ethernet Statistics

AAL5 And Ethernet statistics of 15 minutes intervals, which can be accessed via SNMP or user interface.

Cisco Cookie Support

Enables Cookie format support, in line with Cisco standards.

IP Forwarding

This feature supports level three static IP forwarding which enables specific IP packets to be forwarded to a pre defined PVC.

TOS to QOS Mapping

QOS mapping establishes an association between a Behavior Class and a dedicated ATM VC – where a bundle of such VCs to the same IP destination will provide a full transport packet service with different QoS. Each VC is configured with different ATM QoS parameters.

PVC Alternate Route

This feature enables automatic traffic transfer to a n Alternate PVC in case of failure on the active or primary PVC.

Version 5.2 Optional Features

1. Cisco 8110 LIC - FE - Transparent LAN License for Ethernet/Fast Ethernet for the Cisco 8110

The Ethernet interface is either used as an Ethernet to ATM uplink or as Ethernet access to Management. The Ethernet supports auto negotiation 10/100 baseTx standards. There is no forwarding between the ports. The Ethernet interfaces support the relay layer of the IEEE 802.1 MAC Layer Bridge. Ethernet packets are bridged over ATM using RFC 1483, LLC for Bridging encapsulation. The bridge learns MAC addresses and forwards the required MAC addresses. Using Traffic Shaping, Per-Class-Queuing and Performance Monitoring, each LAN interconnection is assigned with required QoS and the performance of each connection is constantly monitored and measured End-to-End. Early Packet Discard mechanism yield an excellent goodput on the Ethernet uplink VCs.

Note Cisco 8110 LIC - FE - Transparent LAN License for Ethernet/Fast Ethernet for the Cisco 8110 can be ordered through Cisco.com

MIBs

The SNMP Cisco 8110 MIB is being provided with the delivery of Release 5.2 of the Cisco 8110 software on CCO. The MIB is in standard ASN.1 format and is located in the same directory within CCO. These files may be compiled with most standards-based MIB compilers. The following files are required:

Unchanged MIBs

- ATOMV1.MIB
- BRIDGE.MIB
- CES.MIB
- DS0.MIB
- DS0BUNDLE.MIB
- DSX1.MIB
- DSX3.MIB
- ETHER.MIB
- HYNEX-APS.MIB
- HYNEX-CES.MIB
- HYNEX-DSX1.MIB
- HYNEX-DSX3.MIB

- HYNEX-FEATURES.MIB
- HYNEX-LIM.MIB
- HYNEX-PRIVATE.MIB
- HYNEX-SHAPER.MIB
- HYNEX-SONET.MIB
- MIB2.MIB
- MIB2IFE.MIB
- MODULES.MIB
- SONNET.MIB
- TIME.MIB

Changed MIBs in Version 5.2

- SWC.MIB
- HYNEX-ETHER.MIB
- HYNEX-COMMON.MIB

Limitations and Restrictions

Bug ID from 5.1c 82824 and 72383

Plus:

- Traffic Stop for E1/T1 LIM while inserting and extracting (bug Id -CSCdt80513 / CSCdt80524)
- LIM extraction and insertion **not** according to activation / deactivation procedure may cause Traffic interruption. It may appear also when activating the LIM while traffic inserted.

Workaround :

  - 80513 - Follow activation / deactivation procedure.
  - 80524 - Repeat OOS / active procedure.

Fix - It will be fix in release 6.0

- False BER indications (Bug Id - CSCdt80533 / CSCdt80540 / CSCdt80548)
- 80533 - Mismatch Low BER declaration for E1/T1 interface
- In DS1, when high BER threshold is set to 10e-4 and inserted BER is 10e-4, alarm LOW BER was declared, should declare HIGH BER.
- In E1, when high BER threshold is set to 10e-5 and inserted BER is 10e-5, alarm LOW BER was declared, should declare HIGH BER.
- 80540- False BER declaration removal
- When low BER threshold is set to 10e-6 / 10e-7 and inserted BER is 10e-6 / 10e-7, low BER declaration appear and removed about 10 sec. from appearance. It should be removed only after BER insertion removal.
- 80548 - Low BER not declared

- High BER threshold is set to 10e-6 (Low set to 10e-7) and inserted BER 10e-7, LOW BER alarm was not declared.

Workaround: non.

Fix - It will be fixed in release 6.0

Important Notes

Deployment of the 8110 system involves a configuration and installation process. Please refer to the User Guide (78-11666-01) for guidance. Updating software version from older version should be done according to the software download procedure. Updating not according to the procedure will result in unexpected behavior.

Software Version 5.2 User Guide Update

Log On Security

Secure log-on feature protects and ensures the confidentiality, integrity, and availability of the Cisco 8110 critical information and corporate production networks computing assets, while minimizing the impact of security procedures and policies on business productivity.

All user/management access interfaces to the 8110 application program, directly via the serial console port or remotely over the LAN or the ATM, requires user ID and password.

Two levels of interactive access shall be implemented: - Administrator and User.

After booting up the system, it is required to input passwords for both User and Supervisor. only after the passwords are inputted into the system, the user can begin working.

It is also necessary to input read and write password for SNMP.

To access the passwords feature, from the Root menu type Operational Password? and press return. the Password sub menu is displayed:

supervisor user up top
exit ?

supervisor	change supervisor password
user	change user password

UBR+

The Unspecified Bit Rate service is intended for non real-time applications i.e. those not requiring tightly constrained delay and delay variation. Examples of such applications are traditional computer communications applications, such as file transfer and e-mail.

UBR service does not specify traffic related service guarantees. No numerical commitments are made with connection. (See Table 2).

Table 2 UBR+

	CBR	rt-VBR	nrt-VBR	UBR / UBR+	ABR
Traffic Parameter					
PCR, CDVT	***Specified***			***Specified***	***Specified***
SCR, MBS	***N/A***	***Specified***		***N/A***	
MCR	***N/A***			***Only for UBR+***	***Specified***
QoS Parameters					
P-t-p CDV	***Specified***		***Unspecified***		
maxCTD	***Specified***		***Unspecified***		
CLR	***Specified***			***Unspecified***	***Optional***
Other Attributes					
Feedback	***Unspecified***				***Specified***

To access the UBR+ feature:

- From the Root Menu type Configuration and press Return to bring up the Configuration Menu.
- Type ? and press return to bring up the Configuration Sub Menu.
- from the Configuration Sub Menu type “vc pol type ? “ and press return. The following prompt is displayed:

Usage: type <vpi 0..255> <vci 0..65535> (user|network) (ubr|cbr|vbr1|vbr2|vbr3|pubr|aal5cbr|aal5abr)

vpi 0..255	input the correct VPI value
vci 0..65535	input the correct VCI value
user | network	User or Network side interface
ubr|cbr|vbr1|vbr2|vbr3|pubr|aal5cbr|aal5abr	select service, pubr for ubr+

VLAN Tagging

The 8110 connects LAn segments over ATM using either PVCs or P_SVCs . The VLAN Tagging feature enables the allocation of different PVC’s , hence different QOS per VLAN. The VLAN Tagging feature also provides traffic restriction between VLANs which results in a reductioj in congestion on each LAn segment.

VLAN Tagging also enables internet working between two different LAN environments: tagged and non tagged.

The VLAN Tagging feature can be accessed from the Configuration sub menu

To access the VLAN Tagging feature:

- From the Root Menu type Configuration and press Return to bring up the Configuration Menu.
- Type ? and press return to bring up the Configuration Sub Menu.
- Type VLAN ? and press return to bring up the VLAN sub menu. The following commands are displayed:

```
new                 delete              show                operation_mode
  up        top       exit      ?
```

new - Define a new VLAN. Type the command and press return. The following prompt is displayed:

Usage: new < ethernet port 1..2> < vlan id 2..4095>

ethernet port 1..2	select Ethernet port
vlan id 2..4095	input the required value for VLAN ID

Note A maximum of 32 VLANs can be defined (created) for both Ethernet ports

delete - This commands enables users to delete VLANs. Type the command and press return. The following prompt is displayed:

Usage: delete < ethernet port 1..2> < vlan id 2..4095>

ethernet port 1..2	select Ethernet port
vlan id 2..4095	input the required value for VLAN ID

show - This command displays VLAN Configuration information, as displayed in figure 3.

```
VLAN CONFIGURATION
------------------

Tag Operation mode: TAG_AWARE (Status: Active)
 VLAN TABLE
Port VLAN_ID
 1    1
 2    1
 2   100
 2   200
```

Figure 3 VLAN Configuration

operation_mode - This command enables users to enable / disable the VLAN Tagging feature.

Usage: operation_mode (aware_tag|ignorant_tag)

aware_tag	select to enable VLAN Tagging
ignorant_tag	select to disable VLAN Tagging

In order to complete the procedure, the VLAN id needs to be assigned to a VCI and VPI.

From the Configuration menu type pvc vlan? and press return. The following usage is displayed:

Usage: vlan <vpi 0..7> <vci 1..1023> <vid 0..4095> (transparent|add_tag)

vpi 0..7	input the required value for VPI
vci 1..1023	input the required value for VCI
vid 0..4095	input the value for VLAN ID
transparent|add_tag	select either transparent or add tag

AAL5 And Ethernet statistics

AAL5 And Ethernet statistics of 15 minutes intervals, which can be accessed via SNMP or user interface.

In order to view Ethernet and AAL5 Statistics, the Configuration History parameters must be enabled.

To enable Ethernet and AAL5 History:

- From the Root menu type Configuration History Write_Enable and press return. The following usage is displayed:

Usage: write_enable (vc|lim1|lim2|lim3|logging|shaper1|shaper2|shaper3|ces3|ces1|**aal5**|**ethr1**|**ethr2**|svc0|svc1|svc2|svc3|all)

aal5	select to enable aal5 history
ethr1|ethr2	select to enable either Ethernet port 1 or port 2 history

Viewing Ethernet and AAL5 history

To view AAL5 history statistics, from the Root menu type History aal5 ? and press return. The following prompt is displayed:

Usage: aal5 < interval 1..96>

interval 1..96	select an interval to view history statistics

Figure 4 displays the selected interval history statistics.

```
Aal5 Packets History for interval 1
-----------------------------------
Aal5 In Octets          : 0
Aal5 In Unicast Packets      : 0
Aal5 In Non Unicast Packets     : 0
Aal5 In Discards         : 0
Aal5 In Errors          : 0
Aal5 Out Octets          : 0
Aal5 Out Unicast Packets      : 0
Aal5 Out Non Unicast Packets    : 0
Aal5 Out Discards         : 0
Aal5 Out Errors          : 0

Aal5 Errors History for interval 1
----------------------------------
Vpi  Vci  CRCErrors SarTimeOuts OverSizSDUs
 1  32     0     0     0
 1  100     0     0     0
 2  200     0     0     0
```

Figure 4 AAL5 History Statistics

To view Ethernet history statistics, from the Root menu type History Ethernet ? and press return. The following prompt is displayed:

Usage: ethernet (1|2) < interval 1..96>

ethernet (1|2)	select port 1 or 2
interval 1..96	select an interval

Figure 5 displayes the selected port and interval history statistics.

```
ethernet History for port 1 interval 1
----------------------------------------
Ether In Octets           : 10558140
Ether In Unicast Packets       : 17556
Ether In Non Unicast Packets     : 14326
Ether In Discards          : 17479
Ether In Errors           : 0
Ether Out Octets          : 2441
Ether Out Unicast Packets      : 27
Ether Out Non Unicast Packets    : 0
Ether Out Discards         : 0
Ether Out Errors          : 0
Ether Alignment Errors        : 0
Ether FCS Errors          : 0
Ether Single Collision Frames    : 0
Ether Multiple Collision Frames   : 0
Ether Deferred Transmissions     : 0
Ether Late Collisions        : 0
Ether Excessive Collisions      : 0
Ether Internal Mac Transmit Errors  : 0
Ether Carrier Sense Errors      : 0
Ether Frame Too Longs        : 0
Ether Mac Receive Errors       : 0
Rfc1483 In Octets          : 0
Rfc1483 In Unicast Packets      : 0
Rfc1483 In Non Unicast Packets    : 0
Rfc1483 In Discards         : 0
Rfc1483 In Errors          : 0
Rfc1483 Out Octets          : 0
Rfc1483 Out Unicast Packets      : 48
Rfc1483 Out Non Unicast Packets    : 14326
Rfc1483 Out Discards         : 0
Rfc1483 Out Errors           : 15641
```

Figure 5 Ethernet History Statistics

TOS to QOS Mapping

This feature enables users to configure several PVCs per IP, providing differentiated services across the ATM network, end to end.

The mapping between the IP QOS and the ATM VC will use the TOS field of the IP header in order to differentiate between the IP flows, and forward each flow to the assigned QoS class.

To access the TOS to QOS feature:

from the root menu type Configuration PVC Bundle? and press return. The TOS to QOS sub menu is displayed:

```
add                    remove              show                up
  top        exit        ?
```

add - add new Bundle. Type the command and press return. The following prompt is displayed:

```
Usage:   add  <basevpi 0..7>  <basevci 1..1023>  <vpi 0..7>  <vci 1..1023>
```

basevpi 0..7	select a base vpi
basevci 1..1023	select a base vci
vpi 0..7	select a vpi
vci 1..1023	select a vci

remove - remove a Bundle. Type the command and press return. The following prompt is displayed:

```
remove  <vpi 0..7>  <vci 1..1023>
```

vpi 0..7	select vpi
vci 1..1023	select vci

show - This command displays the Bundles table. Type the command and press return. The following information is displayed:

```
BUNDLES  TABLE
Peer  Network          MASK      |PVC  MASK      |vpi|vci  |staus|alter.|alter.|alter.
                                   |                 |     | |vpi      |vci       |status
```

The following procedure explains how to create bundles.

Step 1 Configure a new PVC. From the root menu type Configuration PVC New ? and press return. The following prompt is displayed:

```
Usage:   new  <vpi 0..7>  <vci 1..1023>  (ethernet|ipmng)  (bridgeencaps|routeencaps)  <serviceid 1..8>  {<peakrate 1..8>}
```

vpi 0..7	select vpi (e.g. 5)
vci 1..1023	select vci (e.g.10)
ethernet|ipmng	select between ethernet or ip management
bridgeencaps|routeencaps	select bridge or route encapsulation (the pvc bundle feature is supported only in route encapsulation - mode)

serviceid 1..8	for ip management select 1 - 8 for pvc mapping , 100 or 200 corresponds to ethernet ports 1 and 2. a pvc with service id 100/200 is considered the base vc, and used as a key to bundle operations. (a base pvc identifies a bundle)
peakrate 1..8	select a peak rate

Step 2 Set a Peer Network and Mask while creating a link between the IP net address, the TOS Mask for the net flow, and a base PVC. The VC which is given as a parameter, should be pre-defined in step 1 (base PVC). From the root menu type Configuration PVC peer_arp ?and press return. The following prompt is displayed:

Usage: peer_arp <vpi 0..7> <vci 1..1023> <peer network address> <peer network mask> {< tos bit mask>}

vpi 0..7	select vpi
vci 1..1023	select vci
peer network address	enter network address (e.g.10.52.20.0)
peer network mask	enter mask for ip address class: A,B or C
tos bit mask	enter the tos bit mask string e.g. xxx111

The Cisco 8110 is now configured to transmit each packet received from the Ethernet and distend to 10.52.20.0 on the VC identified by 5 (vpi) 10 (vci). This VC is consider to be the base VC of the peer, and should always be defined.

Step 3 Configure additional Primary/Alternate PVC's for a bundle, and link them to a specific TOS value. From the root menu type Configuration pvc bundle add? and press return. The following prompt is displayed:

Usage: add <basevpi 0..7> <basevci 1..1023> <vpi 0..7> <vci 1..1023> < tos bit string> (primary|alternate) {<peakrate 1..8>}

basevpi 0..7	enter the base vpi defined in step 1. e.g. 5
basevci 1..1023	enter the base vci defined in step 1. e.g.10
vpi 0..7	select a new vpi
vci 1..1023	select a new vci
tos bit string	enter the tos bit string e.g. xxx101

primary|alternate	define if the pvc is primary or alternate
peakrate 1..8	select a peak rate

Note Please ensure that the base VC is linked to a Peer (step 2) otherwise this command will fail.

Tips The user is responsible for configuring QOS parameters for each VC using the shaping mechanism.

E1 Fractional

This feature supports unrestricted information transfer rates at multiples of 64 kbit/s up to the maximum rate of the interface. The physical interface may typically be E1.

To access the E1 Fractional feature:

From the root menu type Configuration dsx1 Fraction? and press return. The following prompt is displayed:

Usage: fraction <lim 1..3> <channels 1..30 n-m,l,all>

fraction -

lim 1..3	select lim
channels 1..30	select channel
n-m,l,all	time slot to be assigned

```
Example:

Usage:  new <limid 3>  <port 1>  <channels 2-3, 4, 6-7, 8>

<n-m,l,all>
```

PVC Alternate

The Cisco 8110 has the capability to define an alternate PVC for each active PVC. The alternate PVC will be used in case of failure. In case of an active or primary PVC failure, its traffic will be transmitted automatically on its alternate PVC if defined. It is the user's responsibility to set the alternate PVC QoS parameters in order to match the primary PVC parameters. In addition, the Group Shaping mechanism is useful to take additional advantage of the Cisco 8110 capabilities.

The Alternate PVC feature can be used through Bridging or Routing.

In order to access the Alternate PVC Bridge feature, from the root menu type: Configuration PVC Alternate? and press return.

The PVC Alternate sub menu is displayed:

add remove show up
top exit ?

add	add alternate PVC
remove	remove alternate PVC
show	show status

add -add an alternate PVC. Type the command and press return. The following prompt is displayed:

Usage: add <primaryvpi 0..7> <primaryvci 1..1023> <alternatevpi 0..7> <alternatevci 1..1023>

primaryvpi 0..7	select a primary VPI
primaryvci 1..1023	select a primary VCI
alternatevpi 0..7	select an alternate VPI
alternatevci 1..1023	select an alternate VCI

remove - remove an alternate PVC. Type the command and press return. The following prompt is displayed:

Usage: remove <vpi 0..7> <vci 1..1023>

vpi 0..7	select a VPI
vci 1..1023	select a VCI

show - displays the Alternate PVC status. Type the command and press return. The following prompt is displayed:

```
primary vpi primary vci primary status alter vpi alter vci alter status

2          200          Up          3          200          Down
```

In order to access the Alternate PVC Route feature, from the root menu type: Configuration PVC Bundle? and press return.

The PVC Bundle sub menu is displayed:

add remove show up
top exit ?

add	add alternate PVC
remove	remove alternate PVC
show	show status

add -add an alternate PVC. Type the command and press return. The following prompt is displayed:

Usage: add <basevpi 0..7> <basevci 1..1023> <vpi 0..7> <vci 1..1023> < tos bit string> (primary|alternate) {<peakrate 1..8>}

basevpi 0..7	select a base VPI
basevci 1..1023	select a base VCI
vpi 0..7	select VPI
vci 1..1023	select VCI
tos bit string	enter the 6 digit string
primary|alternate	define if the pvc is primary or alternate
peakrate 1..8	select a peak rate

remove - remove an alternate PVC. Type the command and press return. The following prompt is displayed:

Usage: remove <vpi 0..7> <vci 1..1023>

vpi 0..7	select VPI
vci 1..1023	select VCI

show - displays the Alternate PVC status. Type the command and press return. The following prompt is displayed:

```
BUNDLES TABLE
Peer Network     MASK   |PVC MASK   |vpi|vci |status|alter.vpi|alter.vci|alter.status
1.1.1.1          111111 |000000 BASE|1  |100 |Down  |     |     |
```

IP Forwarding

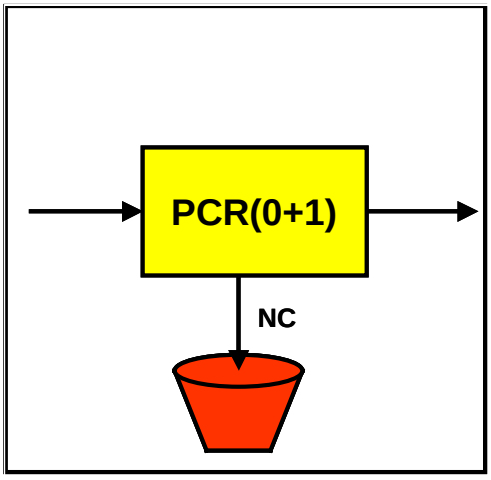
This feature enables the 8110 to act as a static Router. IP packets that carry the 8110 MAC address will undergo a regular IP forwarding process - mapping each destination IP to it's associate PVC. In this case the 8110 also responds to ARP requests for the configured IP in the LAN side.

PPD

This feature enables users to define a connection which supports AAL5 PPD (Partial Packet Discaed), enabling packet discard in case of cell loss.

In PPD mode, the VC connection is defined as a AAL5 connection that enables packet discard / tagging.

In this case the policer is assigned to police either the PCR or SCR, and the connection type as CBR/VBR or ABR.



OR

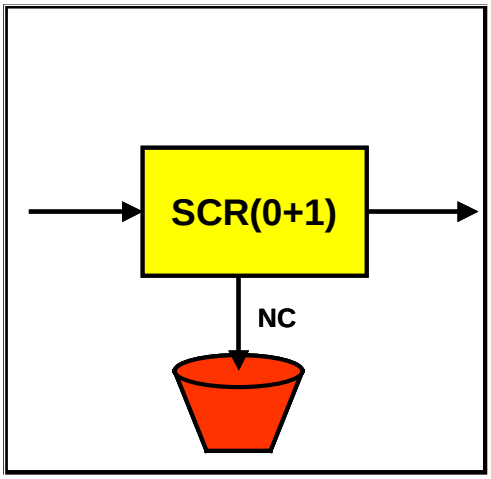


Figure 6 PPD service

To access the PPD feature, from the root menu type Configuration VC policing Type ? and press return. The following prompt is displayed:

Usage: type <vpi 0..255> <vci 0..65535> (user|network) (ubr|cbr|vbr1|vbr2|vbr3|pubr|aal5cbr|aal5abr)

vpi 0..255	select vpi
vci 0..65535	select vci
user|network	select User or Network side interface
ubr|cbr|vbr1|vbr2|vbr3|pubr|**aal5cbr**|**aal5abr**	select service

Obtaining Documentation

The following sections provide sources for obtaining documentation from Cisco Systems.

World Wide Web

You can access the most current Cisco documentation on the World Wide Web at the following sites:

- http://www.cisco.com
- http://www-china.cisco.com
- http://www-europe.cisco.com

Documentation CD-ROM

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Technical Assistance Center

The Cisco TAC website is available to all customers who need technical assistance with a Cisco product or technology that is under warranty or covered by a maintenance contract.

Contacting TAC by Using the Cisco TAC Website

If you have a priority level 3 (P3) or priority level 4 (P4) problem, contact TAC by going to the TAC website:

http://www.cisco.com/tac

P3 and P4 level problems are defined as follows:

- P3—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- P4—You need information or assistance on Cisco product capabilities, product installation, or basic product configuration.

In each of the above cases, use the Cisco TAC website to quickly find answers to your questions.

To register for Cisco.com, go to the following website:

http://www.cisco.com/register/

If you cannot resolve your technical issue by using the TAC online resources, Cisco.com registered users can open a case online by using the TAC Case Open tool at the following website:

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

Contacting TAC by Telephone

If you have a priority level 1(P1) or priority level 2 (P2) problem, contact TAC by telephone and immediately open a case. To obtain a directory of toll-free numbers for your country, go to the following website:

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

P1 and P2 level problems are defined as follows:

- P1—Your production network is down, causing a critical impact to business operations if service is not restored quickly. No workaround is available.
- P2—Your production network is severely degraded, affecting significant aspects of your business operations. No workaround is available.