DAS4-Series IP-DSLAM

System Configuration Guide

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DAS4-Series IP-DSLAM
System Configuration Guide
Text Part Number: 2005-0225

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Chapter 1Preface

This preface describes the "*DAS4-Series IP-DSLAM System Configuration Guide"* about how it is organized, and its document conventions. It contains the following topics:

- Purpose
- Organization
- Conventions

Purpose

The purpose of this guide is to provide detailed information and description of DAS4-Series IP-DSLAM, which includes software configuration and other specific features. This document is intended to help system operator to operate the software and understand the DAS4-Series IP-DSLAM system configurations as quickly as possible.

Organization

This guide contains the following chapters:

- Preface
- DAS4-Series User Interface
- Initialing the NE
- Managing the System Profiles
- Managing the Subscriber Interface
- Managing the Network Interface
- Managing the Connection Services
- Managing the System Functions
- Diagnosis and Performance Monitoring
- Appendix

Conventions

This section describes the conventions used in this guide.

The DAS4-Series IP-DSLAM is the Next-Generation xDSL Broadband Access Network comprises a Gigabit Ethernet and a number of ATU-Rs, STU-Rs, and POTS splitter to construct a broadband access network between central office and customer premises. The DAS4-Series IP-DSLAM uses statistically multiplexing and ATM over xDSL technologies to provide the broadband data communication services, such as high speed Internet access and multimedia services, across existing twisted pair telephone line.

DAS4-Series IP-DSLAM (Digital Subscriber Line Access Multiplexer) represents DAS4192 and DAS4672.

All statement in this document applies to the DAS4-Series IP-DSLAM. However it is noted that the valid range of port and slot are different for each model. The following table lists the valid range of slot and port.

Model Name	Valid range of Network Card	Valid range of Line Card	Range of ADSL/SHDSL port
DAS4192	1	1~4	1~48
DAS4672	1~2	1~14	1~48

NE/NEs hereinafter referred as DAS4-Series medium capacity IP-DSLAM, unless specifically indicated.

ADSL mention in this document covers ADSL, ADSL2, and ADSL2+, unless specifically indicated.

xDSL hereinafter referred as ADSL, unless specifically indicated.

The **xDSL** specified in this document compliance with ITU-T Rec. G.992.1, G.992.2, G.992.3 and G.992.5 for ADSL.

CLI Ex – The command line management with a local console or Telnet through in-band or out-of-band IP interface for CIT (Craft Interface Terminal) connection.

AMS – AM Management System (AMS), a complete centralized SNMP base NMS (Network Management System) provides GUI operation under Client-Server architecture through in-band or out-of-band IP interface to carrying out day of day operation, administration, maintenance, and configuration functions of the NE.

- **AMS Client** – Software system for Network Management System (NMS), it's in Client-Server architecture and has ability to provide controlling and management for the whole network through GUI interface to collocate with AMS Server.

- **AMS Server** – The server station provides multiple NEs management and Database in order to perform reliability, stability, and flexibility to entire network management.

AMS LCT – AMS Local Craft Terminal (LCT), a stand-along host with SNMP base EMS (Element Management System) provides GUI operation under single section through in-band or out-of-band IP management interface.

This sign indicates the **NOTICE**. A note contains helpful suggestions or reference relay on the topical subjects.

This sign indicates the **TIP**. Performing the information described in the paragraph will help you solve a problem. The tip information might not be troubleshooting or even an action, but could be useful information.

This sign indicates the **CAUTION**. In this situation, you might do something that could result in equipment damage or loss of data.

This sign indicates the DANGER. You are in situation that could cause bodily injury. Before you work on any equipment, you must be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents.

Revision History

1) Revision Date: 2007/11/13
Release version: 2.0
Author: Tim Yeh
Summary of Reorganized Change(s):
Reorganize the lastest "Release version: 2.0" to make this system configuration guide more clear and easy for reading.

2) Revision Date: 2007/12/07
Release version: 2.0
Author: Tim Yeh
Summary of Reorganized Change(s):
In 3, the example content "put das4192r4031v2_bcm5693.enc" of "Upload NC/ADSL LC Firmware to Flash Memory of NC through FTP" had replaced to "am0031.enc".

3) Revision Date: 2007/12/31
Release version: 2.4.0
Author: Tim Yeh
Summary of Reorganized Change(s):
Add a new section "Telnet Timeout" to describe the function of telnet session timeout and remove the related commands from "Table 3-14 System Information Configuration".

4) Revision Date: 2008/01/17
Release version: 2.4.0
Author: Tim Yeh
Summary of Reorganized Change(s):

(1) Rewrite the Section "Port Interface Indication" to change port interface indication format and its usage in the following table.
In "Table 3-10 Port Interface Indication Format", the input format "[shelf_#]" is removed. And a new input format "**slot_#. port_#- port_#**" which means "**slot_#. port_#- slot_#. port_#**" is added.
(2) In Section "File System Management", notes are added to depict the difference between the user-configured "config.cfg" and manufactory setting "default.cfg"
(3) In Section "VC-to-VLAN Connection Management" of , a notes is added to depict the RFC2684 bridged/routed mode setting on the PVCs of a xDSL port.
(4) In Section "Configuring a VC-to-VLAN Connection for the VC of RFC2684 Bridged Mode", the following CLI commands are added to Table 7-56.
- New CLI commands to configure the aged/non-aged mode in the RFC2684 bridaged mode
"set fdb-non-aged"
"show fdb-non-aged"

is added and is modified to reflect the software changes.
(5) Add the following new CLI command to "Table 7-58 Unicast Connection Status Monitor" to show the PVC state according to the error code
"show error-code"
(6) Modify the Table 7-60 of Section "IGMP Snooping/Proxy Setting" to add the following new CLI commands
- New CLI commands to set IGMP version type for the NE to launch/relay the IGMP query, report and leave message

"version query"
"version report-leavel"

- New CLI commands to configure the "Immediate Leave" function
  "proxy set immediated-leave"
  "proxy set response-interval"
  "proxy set retries"

(7) Add a new section "Configuring the Cascading" to describe the Cascading function.
(8) Add a new section "NE Firmware Upgrade in Cascade mode" to describe the NC/ADSL LC firmware upgrade in Cascade mode through FTP
(9) Add a new section "Configuring Static MAC" to describe the addition/removal of a static MAC entry on a xDSL port.
(10)Add a new section "Filtering the Upstream Traffic of Spoofed MAC" to describe the filtering function of upstream traffic of spoofed MAC.
(11)Rewrite Section "Configuring the System Relay-In Alarm" to adapt to the changed CLI commands.
(12)Add a new section "Configuring the System Relay-Out Alarm" to describe the system relay-out alarm configuration of the NE
(13)Change the following CLI commands in "Table 2-5 User Account Management" and their related examples.

Firmware: v2.0.2	**Firmware: v2.4.0**
config mgt user add <*name*>	config mgt user add <*name*> [<*user-group*>]
config mgt user del <*name*>	config mgt user del <*name*>
config mgt group <*name*><*group*>	config mgt user set group <*name*> <*user-group*>
config mgt password <*name*>	config mgt user set password <*name*>
config mgt show	config mgt user show

(14)Change the following CLI commands in "Table 3-15 SNMP Community Setting".

Firmware: v2.0.2	**Firmware: v2.4.0**
config snmp add community <*name*> ro	config mgt snmp add community <*community-name*> ro
config snmp add community <*name*> rw	config mgt snmp add community <*community-name*> rw
config snmp del community <*name*>	config mgt snmp del community <*community-name*>
config snmp show	config mgt snmp show <*option*>

(15)Change the following CLI commands in "Table 3-16 SNMP Trap Station Setting".

Firmware: v2.0.2	**Firmware: v2.4.0**
config snmp add trapstation <*ip-addr*> <*name*>	config mgt snmp add trapstation <*ip-addr*> <*community-name*>
config snmp del trapstation <*ip-addr*>	config mgt snmp del trapstation <*ip-addr*>
config snmp show trapstation	config mgt snmp show <*option*>

(16)Remove the CLI command "filesystem format {*opCodeA* | *opCodeB* | *cfg*}" from "Table 3-22 File System Configuration".
(17)Change the following CLI commands and their related examples in "Table 4-33 SHDSL Connection Profile Configuration",

Firmware: v2.0.2	**Firmware: v2.4.0**

config shdsl profile conf set <*name*> [minrate <*minrate*> maxrate <*maxrate*> psd <*psd*> transmission <*transmission*> downcurrentsnr<*downcurrentsnr*> downworstsnr<*downworstsnr*> upcurrentsnr<*upcurrentsnr*> upworstsnr <*upworstsnr*> usedsnr <*usedsnr*> lineprobe <*lineprobe*>]	config profile shdsl-conf set line-probe <*name*> <*enabled-state*>
	config profile shdsl-conf set psd <*name*> <*psd-value*>
	config profile shdsl-conf set rate <*name*> <*min-rate*> <*max-rate*>
	config profile shdsl-conf set snr-margin <*name*> <*down-current-snr*> <*down-worst-snr*> <*up-current-snr*> <*up-worst-snr*>
	config profile shdsl-conf set transmission <*name*> <*transmission-mode*>
	config profile shdsl-conf set used-snr <*name*><*used-snr-list*>

(18)Change the following CLI commands in "Table 5-39 ADSL Connection Status Monitor" and their related examples.

Firmware: v2.0.2	**Firmware: v2.4.0**
status port show <*port-range*> [*phy* | *channel*]	status port show [<*port-range*>]

(19)Change the following CLI commands in "Table 5-40 SHDSL Port Interface Configuration" and their related examples.

Firmware: v2.0.2	**Firmware: v2.4.0**
config shdsl port set alarmprofile <*port-range*> < *profile-name* >	config port set adsl-alarm-profile <*port-range*> < *profile-name* >
config shdsl port set profile <*port-range*> < *profile-name* >	config port set adsl-line-profile <*port-range*> < *profile-name* >
config shdsl port set shdsl-alarm-profile <*port-range*> <*profile-name*>	config port set shdsl-alarm-profile <*port-range*> <*profile-name*>
config shdsl port set shdsl-conf-profile <*port-range*> <*profile-name*>	set shdsl-conf-profile <*port-range*> <*profile-name*>
config shdsl port show <*port-range*>	config port show [<*port-range*>]

(20)Change the following CLI commands in "Table 5-41 SHDSL Connection Status Monitor" and their related examples.

Firmware: v2.0.2	**Firmware: v2.4.0**
status shdsl show <*port-range*>	status port show <*port-range*>

(21)Change the following CLI commands in “Table 5-42 Subscriber Interface Administration” and their related examples.

Firmware: v2.0.2	Firmware: v2.4.0
config shdsl enable <*port-range*>	config port enable <*port-range*>
config shdsl disable <*port-range*>	config port disable <*port-range*>

(22)Change the following CLI commands in “Table 6-45 RSTP Port Configuration” and their related examples.

Firmware: v2.0.2	Firmware: v2.4.0
config rstp set uge migration <*uge-range*> {*false* | *true*}	config rstp set uge mcheck <*uge-range*> {*false* | *true*}

(23)Change the following CLI commands in “Table 7-56 Bridged Services Configuration” and their related examples.

Firmware: v2.0.2	Firmware: v2.4.0
set vcvlan <*port-range*> <*vpi*> <*vci*> <*802_1p*> <*iptraffic-profile*> bridged <*vlan-id*> <*mac-limit*>	set mac-limit <*port-range*> <*vpi*> <*vci*> <*pvc-mac-limit*>
	set vcvlan <*port-range*> <*vpi*> <*vci*> <*802_1p*> <*iptraffic-profile*> bridged <*vid*>
show vcvlan <*port-range*>	show mac-limit [<*port-range*>]

(24)Change the following CLI commands in “Table 7-63 Access Control List Configuration” and their related examples.

Firmware: v2.0.2	Firmware: v2.4.0
config acl add <*port-range*> <*vpi*> <*vci*> <*mac*> {*permit* | *deny*}	config fdb add acl <*port-id*> <*vpi*> <*vci*> <*mac-addr*> <*mode*>
config acl del <*port-range*> <*vpi*> <*vci*> <*mac*>	config fdb del <*port-id*> <*vpi*> <*vci*> <*mac-addr*>
config acl show <*port-range*>	config fdb show [<*port-range*>]

(25)Change the following CLI commands in “Table 9-92 Performance Monitoring on ADSL Subscriber Interface” and their related examples.

Firmware: v2.0.2	Firmware: v2.4.0
status alarm show current	status perf show current <*port-id*> <*side*>

(26)Change the following CLI commands in “Table 9-93 Performance Monitoring on SHDSL Subscriber Interface” and their related examples.

Firmware: v2.0.2	Firmware: v2.4.0
status alarm show current	status perf show current <*port-id*> <*side*>

(27)Add the following CLI commands to "Table 9-94 Viewing the System Alarm"
"status alarm show input"
"status alarm show output";
and change the following CLI commands in "Table 9-94 Viewing the System Alarm" as well as their related examples.

Firmware: v2.0.2	Firmware: v2.4.0
status alarm show alarmhistory	status alarm show history

(28)In "Table 9-101 System Performance Monitoring", the following CLI command is added
"status perf show history-1-day <*port-id*>"
and the following CLI commands and their related examples are changed.

Firmware: v2.0.2	Firmware: v2.4.0
status 15min-perf-history show <*port-id*> <*start-interval*>	status perf show history-15-min <*port-id*> <*start-interval*>

(29)In "Table 4-34 SHDSL Performance Alarm Profile Configuration", the "CLI(config shdsl profile alarm)#" is replaced by "CLI(config profile shdsl-alarm)#".
(30)The CLI displayed messages in the following examples are changed
3, 3, 3, 3, 4, 4, 5, 5, 5, 5, 6, 6, , , , , , , , , , 8, 8, 8, 8

5) Revision Date: 2008/03/12
Release version: 2.4.0.1
Author: Tim Yeh
Summary of Reorganized Change(s):
(1) Add Appendix C "Quick Configuration Guide for CLI commands"

6) Revision Date: 2008/07/10
Release version: 2.5.0
Author: Tim Yeh
Summary of Reorganized Change(s):
(1) In "Table 4-30 ADSL Connection Profile Configuration", the "CLI(config profile adsl-conf)#" is replaced by "CLI(config profile adsl-line)#".
(2) Add the following new CLI commands to "Table 4-30 ADSL Connection Profile Configuration" to configure the adsl line standards with multiple selection or allow all the adsl line standards.
"**set line-standard** <*profile-name*> <*adsl,g-dmt,g-lite,adsl2,adsl2+,adsl2m,adsl2+m,readsl,t1-413*>"
"**set line-standard** <*profile-name*> **all**"
(3) Add a note in Section "Configuring the IP Traffic Profile".
(4) Add the following new CLI commands to "Table 5-38 ADSL Port Interface Configuration" to add or remove the packet filter to specific ADSL line ports.
"**add packet-filter** <*port-range*> <*group-name-set*>"
"**clear packet-filter** <*port-range*>"

(5) Add the following new CLI commands to "Table 7-56 Bridged Services Configuration" to configure the authentic IP on specific PVCs.
"**add static-ip** <*port-range*> <*vpi*> <*vci*> <*ip-base*> <*ip-limit*>"
"**del static-ip-base** <*port-range*> <*vpi*> <*vci*> [<*ip-base*>]"
"**set static-ip base** <*port-id*> <*vpi*> <*vci*> <*old-ip-base*> <*new-ip-base*>"

"**show static-ip [**<*port-range*>] [<*vpi*>] [<*vci*>]"

(6) Add some notes in Section "Configuring a VC-to-VLAN Connection for the VC of RFC2684 Bridged Mode".

(7) Add a note in Section "Configuring a VC-to-VLAN Connection for the VC of RFC2684 Routed Mode".

(8) Modify the section "Managing the Subscriber Access Services" to depict the additional STC(Service Type Control).

(9) Add some notes in Section "Managing the Subscriber Access Services".

(10)Add a new section to describe the packet filter functionality.

(11)Add some notes in Section "Packet filter".

(12)Modify the section "Monitoring the Subscriber MAC" to depict the spoofed system between adsl ports and uge ports.

(13)Add the following new CLI commands to "Table 9-94 Viewing the System Alarm" to configure the alarm history report on NE.

"**show history detail** <*serial-number*>"

"**show history**{*ascendant* | *descendant*}"

(14)The CLI displayed messages in the following examples are changed

4,, , , , , , , , , , , , , 8, 8, 8

7) Revision Date: 2008/08/08
Release version: 2.5.1
Author: Paine Peng
Summary of Reorganized Change(s):

(1) Modify service type control description of page122.

Chapter 2DAS4-Series User Interface

This chapter describes the DAS4-Series user interface, the instructions describe how to using the command-line interface, and also describes the command editing and command history features that enable you to recall previous command entries and edit previously entered commands.

- User Interface Mode
- Access via the Console Port
- Access using the Telnet Session
- Managing the Session Login Account
- Command Syntax and Operating Regulation

User Interface Mode

The DAS4-Series provides the CLI Ex mode to access the device in either one of the following ways:

- Remote Telnet via in-band port
- Remote Telnet via out-band port
- Local RS232 Console

Access via the Console Port

The DAS4-Series provides RS232 port for the operator to perform configuration operations via a directly connected VT-100 compatible terminal.

Follow the following procedure to enter the CLI Ex mode via a direct VT100-compatible terminal, for example, the hyper terminal in Microsoft Windows environment.

Step 1 Set the communication parameters of a VT100-compatible terminal shown in Table 2-1.

Table 2-1 DAS4-Series Console Management Setting

Parameter	Setting
Baud rate	9600
Data bits	8
Parity	None
Start bits	1
Stop bits	1
Flow control	None

Step 2 Connect the VT100-compatible terminal to the Console Port on the DAS4-Series front panel.

Step 3 Press **<Enter>** a number of times until the “**Login:**” is displayed on the screen.

Step 4 Enter the username and password. The default administration username and password are listed below (case sensitive):

```
Login: admin
Password: admin
```

See the Section “Managing the Session Login Account” of 2 for detail information.

Access using the Telnet Session

Enter the CLI Ex mode by establishing a Telnet session between the local host and DAS4-Series though either the in-band (UGE) or out-band (M-ETH) port.

Follow the following procedure to enter the CLI Ex mode:

Step 1 Open the MS-DOS prompt window in Microsoft Windows environment.

Step 2 Type the “telnet xx.xx.xx.xx (IP address)” in the MS-DOS prompt window to establish a telnet connection to the target DAS4-series.

Step 3 Enter the username and password. The default administration username and password are listed below (case sensitive):

```
User Name: admin
Password: admin
```

If the IP address of DAS4-Series is changed during configuration, the Telnet session will be broken. The operator needs to build a new Telnet session to continue the configuration process.

If the assigned IP has been changed and forgotten, locally access DAS4-Series via Console port with the command shown in Example 1 to retrieve the IP address assigned to the system.

The IP address assigned must be unique in use with the device on the network segment. Refer to the Section “Configuring the Management Interface” of 3 for more information.

Example 1 Display the system management IP addresses

```
            CLI# config ip show
UGE
  IP address     : 172.17.192.1
  subnet mask    : 255.255.0.0
  MAC address    : 00:11:f5:dc:7a:17
  UGE VLAN ID    : 4092

NME
  IP address     : 192.168.192.1
  subnet mask    : 255.255.255.0
  MAC address    : 00:11:f5:dc:7a:16

Gateway
  IP address     : 172.17.192.254
```

The single NE supports up to 12 concurrent telnet sessions. Only one concurrent telnet session is allowed to enter by admin account user at a time (Console access included),the default “**admin**” account user is with administrator privilege level, see the Section “Managing the Session Login

Account" of 2 for detail information.

Session Logout

The following command is to terminate the Telnet session or quit the console session from CLI Ex mode.

To logout the sessions using the "**logout**" command at the prompt for CLI#.

Table 2-2 Session Logout Command

The following command is to logout the session (Telnet or Console).
CLI# logout

If you are using Telnet access for the CLI Ex mode, the command "**logout**" will terminate the current Telnet session, and the CLI Ex will return to the login prompt if using Console access.

Telnet Timeout

The following command is to set the Telnet session time-out timer from CLI Ex mode.
Telnet session will terminate when the telnet time-out times ends, and the CLI Ex will return to the login prompt if using Console access.

Table 2-3 Telnet Session Timeout Command

Use this command to set the telnet time-out of the system.	
CLI(config mgt)# telnet-timeout set <*min*>	
Use this command to view the telnet time-out of the system.	
CLI(config mgt)# telnet-timeout show	
Parameters	**Task**
<*min*>	This specifies the telnet time out of the system **Type:** Mandatory **Valid values:** 1~1440 minutes. **Default values:** 2 minutes

Example 2 Display the telnet time-out of the system

```
CLI(config mgt)# telnet-timeout set 5
OK

CLI(config mgt)# telnet-timeout show

Telnet time-out       : 5 min (5 min)
```

Managing the Session Login Account

For security reason, the CLI Ex mode provides two groups of user account privileges, "**admin**" group and "**guest**" group. Admin group has read/write access privileges while guest group has only the read privileges.
 shows the system default login account and session information.

Table 2-4 DAS4-Series Default Login Account Index

Group	Default Account	Login Mode	Session	Session Timeout
Admin	Username: admin Password: admin	Console, Telnet	Single session occupying on either Console access or Telnet access.	Console: limitless Telnet: 120 Seconds
Guest	Username: guest Password: guest	Console, Telnet	1 session for Console access, up to 12 sessions for Telnet access.	Console: limitless Telnet: 120 Seconds

The user account management performs how to create, delete and change the user password. Enter to the "**config mgt user**" sub-group directory. Table 2-5 shows the commands to perform user account management. 2 presents how to generate a new account user and join to the admin group; 2 and 2 show how to change the user password and delete a user account respectively.

```
CLI# config mgt user
CLI(config mgt user)#
```

Table 2-5 User Account Management

The following command is to create the account user and its group privileges of console or telnet, while valid user name was defined, the password prompt will appear.

CLI(config mgt user)# add <*name*> **[**<*user-group*>**]**

The following command is to delete a user login of console or telnet.

CLI(config mgt user)# del <*name*>

The following command is to change the user password.

CLI(config mgt user)# set password <*name*>

The following command is to change the user group privileges.

CLI(config mgt user)# set group <*name*> **[**<*user-group* >**]**

The following command is to display information of all the users. Password information is not included.

CLI(config mgt user)# show

Parameters	Task
<*name*>	This specifies the user name and password to be created. **Type:** Mandatory **Valid values:** String of up to 16 characters ('A' – 'Z', 'a' – 'z', '0' – '9', '-', '_', '.', '@')
<*user-group* >	This specifies group privilege of the name user. **Type:** Option **Default value:** guest **Valid values:** admin, guest

Example 3 Create a new user account

```
                    CLI(config mgt user)# add abc
Enter password (up to 16 characters):
Confirm password:

OK

CLI(config mgt user)# set group abc admin
OK
```

```
CLI(config mgt user)# show

management VLAN    : 4092
          user    : guest (guest)
          user    : admin (admin)
          user    : abc (admin)
```

Example 4 Change the user password

```
CLI(config mgt user)# password abc

Enter new password:
Confirm new password:

OK
```

Example 5 Delete a user account

```
CLI(config mgt user)# del abc

OK

CLI(config mgt user)# show

  management VLAN    : 100
        user    : guest (guest)
        user    : admin (admin)
```

Command Syntax and Operating Regulation

This section describes the syntax notation, structure, context-sensitive, command history features, and command syntax help.

Syntax Notation Conventions

CLI Ex command syntax using different bracket form to display syntax notation, Table below lists the notation information.

Table 2-6 Syntax Notation of CLI Ex

Notation	Descriptions
Keyword	Keywords in a command that you must enter exactly as shown.
<*Parameter*>	Parameter values must be specified.
[<*Parameter*>]	Parameter values are optional.
[*Parameter 1* | *Parameter 2* | .. | *Parameter n*]	Parameter values are enclosed in "[.. | ..] " when you optional use one of the values specified.
{*Parameter 1* | *Parameter 2* | .. | *Parameter n*}	Parameter values are enclosed in "{ .. | .. }" when you must use one of the values specified.

Structure of a CLI Command

The CLI Ex commands conform to the following structure in group base. Each group contains sub-group directory or action command that can be used directly with proper syntax.

```
CLI# {[<Group-A> | <Action-A>] | [<Group-B> | <Action-B>] | [<Group-C> | <Action-C>] | <Action-D>}
```

or

```
CLI# [<Group-A> | <Action-A>]
CLI(Group-A)# [<Group-B> | <Action-B>]
CLI(Group-B)# [<Group-C> | <Action-C>]
CLI(Group-C)# <Action-D>
```

The command structure can complete in a single sentence or access into specific group directories.

Table 2-7 Structure of CLI Ex Mode

Keyword	Descriptions
<Group-#>	This is the group directory of a CLI Ex command which contains relative keywords. It indicates the type of group to be performed. "**config**" is an example of the group directory.
<Action-#>	This is the keyword of a CLI Ex command. It indicates the type of operation to be performed. "**ping**" is an example of this action keyword.
Command	**Descriptions**
exit	Jump to the upper group directory.
exit all	Jump to the root directory **CLI#**
clear	Clear the screen.
Press **Enter** / **Return**	Execute the command.

Command Syntax and Context Sensitive Help

Fully utilize the " **?** " command to assist your task; this command can be used to browse command and to be assisted on the command keywords or arguments.

To get help specific to a command, a keyword, or argument, perform**s** one of these tasks:

Table 2-8 CLI Ex Syntax Help

Command	Task
?	To list all commands available of CLI Ex mode.
Command ?	To list the associated keywords and arguments for a command.
Abbreviated-command-entry <Tab>	Complete a partial command or group directory name.

To list the command keywords, enter a question mark " **?** " to complete the command keywords and arguments. Include a space before the **?**. This form of help is called command syntax help.

The CLI Ex mode provides an error announce that appears in which you have entered an incorrect or incomplete command, syntax, keyword, or argument.

If you have entered the correct command but invalid syntax or a wrong keyword parameters, the CLI Ex will automatically prompt the error messages and reprint the commands with cursor indexed on wrong syntax.

Command History and Editing Features

By default, the system records ten command lines in its history buffer. To recall commands from the history buffer, perform one of these commands:

Table 2-9 Command History and Editing

Command	Task
Press the Up arrow key	To recall commands in the history buffer. Beginning with the most recent commands. Repeat the key sequence to recall the older commands.
Press the Down arrow key	To return to more recent commands in the history buffer. Repeat the key sequence to recall the more recent commands.
Press the left arrow key	To move the cursor back one character.
Press the right arrow key	To move the cursor forward one character.
Press **Backspace**	To erase the character to the left of the cursor.

This CLI Ex mode includes an editing feature. You can move cursor around on the command line to insert or delete the character.

NOTE The arrow keys function only on ANSI-compatible terminals such as VT100s.

Ending a Session

If you access using the Telnet session, you can type "**logout**" command to terminate the Telnet session instantly.

NOTE Console port will stay in life until you close the terminal session.

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Chapter 3Initialing the NE

This chapter describes how to configure the DAS4-Series IP-DSLAMs initially, and contains the following sections:

- Port Interface Indication
- Constructing the NE Objects
- Configuring the SNMP Manager
- Configuring the Management Interface
- Maintaining the GE Network Interface
- Maintaining the NE
- Configuring the System Date and Time
- Configuring the Internet Time Server
- Configuring the DNS Server
- Ambient Temperature

Port Interface Indication

The DAS4-Series IP-DSLAM contains 2 models, DAS4192 and DAS4672, whose slot structures are as follows:

- DAS4192: single shelf and five slots, 1 for NC (Network Card) and 4 for xDSL LC (Line Card), each xDSL LC contains 48 ADSL ports or 48 SHDSL ports. Figure 3-1 shows the shelf, slot, and port addressing outward on DAS4192.
- DAS4672: single shelf and sixteen slots, 2 for NC (Network Card) and 14 for xDSL LC (Line Card), each xDSL LC contains 48 ADSL ports or 48 SHDSL ports. Figure 3-2 shows the shelf, slot, and port addressing outward on DAS4672.

Figure 3-1 DAS4192 Port Addressing Diagram

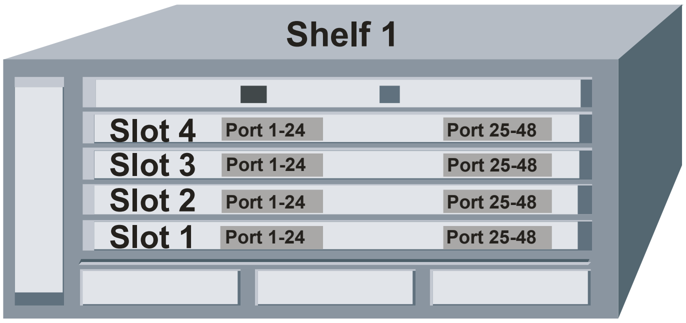
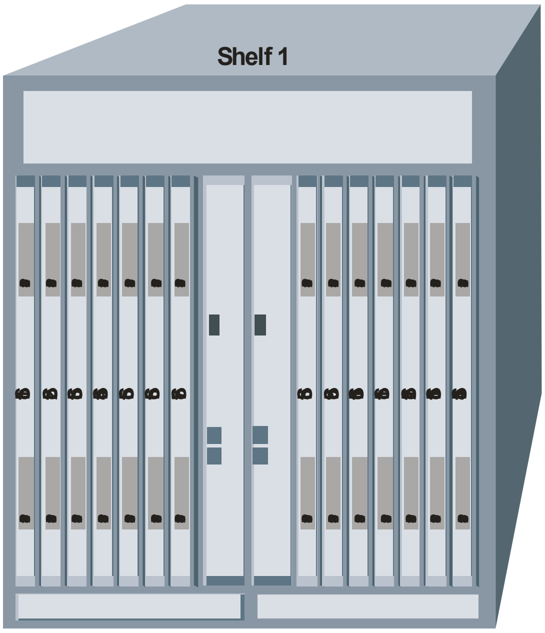


Figure 3-2 DAS4672 Port Addressing Diagram



The CLI described in all chapters applies to the DAS4-Series IP-DSLAM. However it is noted that the valid range of slot and port are different between DAS4192 and DAS4672. The following table lists the valid range of slot and port.

Model Name	Valid range of Network Card	Valid range of Line Card	Range of ADSL/SHDSL port
DAS4192	NC1	1~4	1~48
DAS4672	NC1 or NC2	1~14	1~48

Table 3-10 shows the commands to perform the port interface indication format.

Table 3-10 Port Interface Indication Format

Parameters	Descriptions
<slot-id>	**Format:** slot_# **Valid values:** slot_# (1 ~ 4) **Default value:** slot _# (1)
<port-id>	**Format:** [slot_#] . port_# **Valid values:** slot_# (1 ~ 4), port_# (1 ~ 48) **Default value:** slot_# (1)
<slot-range>	**Format (Continuously):** slot_# - slot_# **Format (Individually):** slot_# **Valid values:** slot_# (1 ~ 4) **Default value:** slot _# (1)
<port-range>	**Format (Continuously):** [slot_#] . port_# - port_# **Format (Individually):** [slot_#] . port_# **Valid values:** slot_# (1 ~ 4), port_# (1 ~ 48) **Default value:** slot_# (1)

Through the document, the notations *<slot-id>*, *<port-id>*, *<slot-range>*, and *<port-range>* are used to identify the particular slot/port interface or range of slot/port inside the CLI Ex mode. The *<slot-range>* and *<port-range>* parameters use "**-**" notation to identify the continuously range.

The form of "**slot_#**" is for the slot-based CLI command. 3 shows the usage of "**slot_#**" to indicate a specific slot in a slot-based CLI command.

Example 6 The usage of “slot_#” to indicate a specific slot in a slot-based CLI command.

```
CLI# status
CLI(status)# lc show 4

LC4
   current card type              : ADSL
   planned card type                     : SHDSL
   hardware version                      : MLA2031-V3
   software version               : 6.5.7_2.4.0
   serial number                  : MLA2031-8169S009034
   oper status                    : up
   system up time                 : 4day / 19hr / 48min / 26sec
   RFC2684 encapsulation                 : LLC
   tagged mode (configured)              : tagged-only
   tagged mode (run-time)                : untagged-only
   VLAN tag pass through (configured)          : enabled
   VLAN tag pass through (run-time)      : disabled


CLI# status
CLI(status)# lc show 3-4

LC3
   current card type              : ADSL
   planned card type                     : ADSL
   hardware version                      : MLA2031-V3
   software version               : 6.5.7_2.4.0
   serial number                         : MLA2031-8169S009033
   oper status                           : up
   system up time                        : 4day / 20hr / 6min / 32sec
   RFC2684 encapsulation                       : LLC
   tagged mode (configured)              : untagged-only
   tagged mode (run-time)                : untagged-only
   VLAN tag pass through (configured)          : disabled
   VLAN tag pass through (run-time)            : disabled

LC4
   current card type              : ADSL
   planned card type                     : SHDSL
   hardware version                      : MLA2031-V3
   software version               : 6.5.7_2.4.0
   serial number                  : MLA2031-8169S009034
   oper status                    : up
   system up time                 : 4day / 20hr / 6min / 55sec
   RFC2684 encapsulation                 : LLC
   tagged mode (configured)              : tagged-only
   tagged mode (run-time)                : untagged-only
   VLAN tag pass through (configured)          : enabled
   VLAN tag pass through (run-time)      : disabled
```

The form of “**slot_#. port_#**” is for the port-based CLI command. If **slot_#** is not specified, CLI_Ex will apply the default value (slot 1) automatically to the syntax. 3shows the usage of “**slot_#. port_#**” to indicate a specific port in a port-based CLI command. It is noted that 3 also depicts the CLI commands with different forms of port index which indicates the same port (slot 1, port 6).

Example 7 CLI commands to show the physical status of (slot 1 . port6)

```
CLI# status port show 6
Port: 1.6
   admin status        : enabled
   oper status        : up
   power state        : L0
   line standard          : G.992.5 Annex A

   [physical status]
          item         US      DS
      ----------------  ------  ------
       attainable rate    1343   30644  kbps
          attenuation     0.0     0.0  dB
           SNR margin     6.5     8.5  dB
         output power    12.1    12.6  dBm

   [channel status]
          item         US      DS
      ----------------  ------  ------
              Tx rate    1342   29204  kbps
      interleave delay       0       0  ms
      CRC block length      39     255  ms
       INP symbol time    0.00    0.00  DMT symbol

CLI# status port show 1.6
Port: 1.6
   admin status        : enabled
   oper status        : up
   power state        : L0
   line standard          : G.992.5 Annex A

   [physical status]
          item         US      DS
      ----------------  ------  ------
       attainable rate    1343   30649  kbps
          attenuation     0.0     0.0  dB
           SNR margin     6.6     8.5  dB
         output power    12.1    12.6  dBm

   [channel status]
          item         US      DS
      ----------------  ------  ------
              Tx rate    1342   29204  kbps
      interleave delay       0       0  ms
      CRC block length      39     255  ms
       INP symbol time    0.00    0.00  DMT symbol

CLI(status)# port show 1.6-25
```

```
Port: 1.6
  admin status       : enabled
  oper status        : up
  power state        : L0
  line standard      : G.992.5 Annex A

  [physical status]
        item          US      DS
    ---------------- ------ ------
     attainable rate   1343   30644  kbps
        attenuation    0.0     0.0  dB
         SNR margin     6.5     8.5  dB
       output power    12.1    12.6  dBm

  [channel status]
        item          US      DS
    ---------------- ------ ------
            Tx rate    1342   29204  kbps
    interleave delay      0       0  ms
    CRC block length     39     255  ms
     INP symbol time   0.00    0.00  DMT symbol

Port: 1.21
  admin status       : enabled

  oper status        : down

Port: 1.23
  admin status       : enabled
  oper status        : up
  power state        : L0
  line standard      : G.992.5 Annex A

  [physical status]
        item          US      DS
    ---------------- ------ ------
     attainable rate   1343   30649  kbps
        attenuation    0.0     0.0  dB
         SNR margin     6.4     8.5  dB
       output power    12.1    12.6  dBm

  [channel status]
        item          US      DS
    ---------------- ------ ------
            Tx rate    1351   29204  kbps
    interleave delay      0       0  ms
    CRC block length     39     255  ms
     INP symbol time   0.00    0.00  DMT symbol
```

Constructing the NE Objects

The DAS4-Series IP-DSLAM provides the flexibility to be equipped with various card modules such as ADSL-LC and SHDSL-LC. Constructing the NE board type of card module is the first task you need to perform.

Once the equipped card modules to the DAS4-Series IP-DSLAM are determined, you need to set the planned type according to their correspondent slot to secure the system operation. For any reason (removed or type error); if the planned type is not the same as the online type detected from the system, the board mismatch alarm message will be reported.

Planning the System Card Type

Enter to the "**config nc**" sub-group directory to plan the NC (Network Control) card.

```
CLI# config nc
CLI(config nc)#
```

Enter to the "**config lc**" sub-group directory to plan the LC (Line Card) card.

```
CLI# config lc
CLI(config lc)#
```

Table 3-11 shows the CLI commands to configure the planned-type of LC/NC in the NE. 3~ 3 shows the usage of these commands as well as their related parameters.

Table 3-11 Planning the system card type

The following command is to modify the planning NC card type.	
CLI(config nc)# set planned-type <*nc-id***>** *{none | cpu}*	
The following command is to modify the planning LC card type.	
CLI(config lc)# set planned-type < *lc-range*> <card-*type*>	
Parameters	**Task**
<*nc-id*>	Identify the slot range of the NC card **Type:** Mandatory **Valid values:** 1 ~ 2 (value = 2 is only for DAS4672)
{*none* | *cpu*}	Identify the NC type.
<*lc-range*>	Identify the slot range of the Line card. **Type:** Mandatory **Valid values:** See the Section "Port Interface Indication" of 3.
<card-*type*>	Identify the line card type **Valid values:** none, adsl, shdsl

Example 8 CLI commands to modify the planning NC card type

```
CLI# config nc
CLI(config nc)# set planned-type 1 cpu
OK

CLI(config nc)# show

NC:
  planned-type  current-type   tagged-mode
  ------------  ------------  -------------
           CPU           CPU  untagged-only

UGE:
  UGE  oper-status  admin-status  auto negotiation  use-mode
  ---  -----------  ------------  ----------------  --------
    1         down       enabled           enabled    uplink
    2         down      disabled           enabled    uplink

Subtend VLAN ID:
  n/a
```

Example 9 CLI commands shows how to modify the planning LC card type

```
CLI# config lc
CLI(config lc)# set planned-type 1.1 adsl

LC 1. 1: OK

CLI(config lc)# show

      planned  current  rfc2684  vlan-tag  service    configured
  LC   type     type     encap     pass      type     tagged-mode
  --  -------  -------  -------  --------  --------  -------------
   1    ADSL     ADSL      LLC  disabled  disabled  untagged-only
   2   SHDSL      n/p      LLC  disabled  disabled  untagged-only
   3   SHDSL     ADSL      LLC  disabled  disabled  untagged-only
   4   SHDSL      n/p      LLC   enabled  disabled    tagged-only

CLI(config lc)# set planned-type 3-4 adsl
LC 1. 3: OK
LC 1. 4: OK

CLI(config lc)# show

      planned  current  rfc2684  vlan-tag  service    configured
  LC   type     type     encap     pass      type     tagged-mode
  --  -------  -------  -------  --------  --------  -------------
   1    ADSL     ADSL      LLC  disabled  disabled  untagged-only
   2   SHDSL      n/p      LLC  disabled  disabled  untagged-only
   3    ADSL     ADSL      LLC  disabled  disabled  untagged-only
   4    ADSL      n/p      LLC   enabled  disabled    tagged-only
```

Verifying Current Software and Hardware Versions

Follow the commands to display the inventory information of NE software/ hardware version, card serial number, card type etc.

Use the "**nc show**" or "**lc show**" command under the "**status**" group directory to display the system H/W and S/W version of each plug-in card module and slot planning type.

Enter to the "**status**" group directory to verify the software and hardware versions.

```
CLI# status
CLI(status)#
```

Table 3-12 shows the commands to retrieve the NC board-level information. 3 shows the usage of these commands.

Table 3-12 Retrieve the software and hardware information of NC card

The following command is to display the version and plugging status of NC card.
CLI(status)# nc show

Example 10Monitoring the NC board-level information

```
CLI(status)# nc show

NC
  current card type    : CPU Module
  planned card type    : CPU Module
  role                 : active
  hardware version     : MCI2031-V3
  software version     : 1.0v2.0.2@R134
  serial number        : MCI2031-8169S008952
  oper status          : up
  system up time       : 2day / 0hr / 23min / 14sec
  tagged mode          : untagged-only
```

Table 3-13 shows the commands to retrieve the LC board-level information. 3 shows the usage of these commands.

Table 3-13 Software and Firmware Verify of LC on-board card

The following command is to display the LC card version and plugging status.
CLI(status)# lc show [<*lc-range* >]

Parameters	Task
<*lc-range*>	Identify the slot range of the Line card. **Type:** Mandatory **Valid values:** See the Section "Port Interface Indication" of 3.

Example 11Monitoring the LC board-level information

```
CLI(status)# lc show

LC1
  current card type          : ADSL
  planned card type          : SHDSL
  hardware version           : MLA2031-V3
  software version           : 6.5.7_2.4.0
  serial number              : MLA2031-8169S009031
  oper status                : up
  system up time             : 0day / 16hr / 5min / 44sec
```

```
RFC2684 encapsulation              : LLC
tagged mode (configured)           : untagged-only
tagged mode (run-time)             : untagged-only
VLAN tag pass through (configured)    : disabled
VLAN tag pass through (run-time)      : disabled
```

It is noted that the NE will drop the tagged Ethernet frames of VLAN-ID not configured by the VC-to-VLAN setting (see Table 6-52) in the following case.
NC tagged mode = Tagged
LC tagged mode Run-Time Status = Tagged
LC VTP Run-Time Status = Enabled

The tagged mode (run-time) indicates the operational status of tagged mode.
Tagged-only: LC (or NC) only forwards the tagged Ethernet frame and drops the untagged Ethernet frame.
Untagged-only: LC (or NC) only forwards the untagged Ethernet frame and drops the tagged Ethernet frame.
It is noted that the value of configured Tagged mode and its Run-Time Status may be different. Please refer to Table 6-52 for the NE behavior when configuring NC and ADSL LC with various Tagged mode and VTP parameters.

Configuring the System Information

The system information contains system name, location, and person contact information as defined in RFC1213.

Enter to the "**config sys-info**" sub-group directory to configure the system information.

```
CLI# config sys-info
CLI(config sys-info)#
```

Table 3-14 shows the commands to perform the configuration of system information. 3 shows the usage of these commands as well as their related parameters.

Table 3-14 System Information Configuration

<table>
<tr><td colspan="2">Use this command to modify the system location.</td></tr>
<tr><td colspan="2"><b>CLI(config sys-info)# set location</b> &lt;<i>string</i>&gt;</td></tr>
<tr><td colspan="2">Use this command to modify the system contact information.</td></tr>
<tr><td colspan="2"><b>CLI(config sys-info)# set contact</b> &lt;<i>string</i>&gt;</td></tr>
<tr><td colspan="2">Use this command to modify the system name.</td></tr>
<tr><td colspan="2"><b>CLI config (sys-info)# set name</b> &lt;<i>string</i>&gt;</td></tr>
<tr><td colspan="2">Use this command to monitor the system information.</td></tr>
<tr><td colspan="2"><b>CLI(config sys-info)# show</b></td></tr>
<tr><th>Parameters</th><th>Task</th></tr>
<tr><td>&lt;<i>string</i>&gt;</td><td>This specifies the textual identification of the information on the given field
<b>Type:</b> Mandatory
<b>Valid values:</b> String of up to 255 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').</td></tr>
</table>

Example 12Modifying the name of system information

```
CLI(config sys-info)# set location Taipei

OK
```

```
CLI(config sys-info)# set contact Allen@Mobile:0928-136588

OK

CLI(config sys-info)# set name IP_DSLAM

OK

CLI(config sys-info)# show

    System Name          : IP_DSLAM
    System Contact       : Allen@Mobile:0928-136588
    System Description    : IP-DSLAM
    System Location      : Taipei
```

Configuring the SNMP Manager

SNMP (Simple Network Management Protocol) is an application-layer protocol designed to facilitate the exchange of management information between network devices. By using SNMP, network administrators can more easily manage network performance, find and solve network problems, and plan for network growth.

In DAS4-Series IP-DSLAM, we use SNMP to exchange management information between a NE and LCT (or AMS server). SNMP enables the administrators to manage the NE by the LCT (or AMS server). In the term of SNMP, the NE plays the role of SNMP agent and the LCT (or AMS server) serves as the SNMP server. This section describes how to configure the SNMP on the NE.

NOTE Beware of the SNMP community setting, this will affect the communication between the AMS LCT (or AMS server) and NE, you must re-login the AMS LCT if the SNMP community has been modified.

Configuring the SNMP Community

The SNMP community is a string representing the password to access the MIB of NE with the associated privilege. The NE supports two levels of privilege (Permission) as follows:

- Read / Write / Create – Allow the SNMP server to read and write all objects in the MIB, as well as the community strings.
- Read-only – Only allow the SNMP server to read all objects in the MIB except the community strings.

NOTE The community string definitions on your AMS LCT (or AMS Server) must match at least one of those community string definitions on the NE. Otherwise, the LCT (or AMS Server) is not allowed to access the NE.

The SNMP Community setting allows you to assign the community privilege levels. Two privilege levels are supported, read-only and read-write.

Enter to the "**config mgt snmp**" sub-group directory to configure the SNMP community.

```
CLI# config mgt snmp
CLI(config mgt snmp)#
```

Table 3-15 shows the commands to perform the setting of SNMP community. 3 shows the usage of these commands as well as their related parameters.

Table 3-15 SNMP Community Setting

The following command is to create new SNMP community information. It is noted that the system supports at most 8 community settings.

CLI(config mgt snmp)# add community *<community-name>* {*rw* | *ro*}

The following command is to delete the SNMP community information.

CLI(config mgt snmp)# del community *<community-name>*

The following command is to monitor the status of SNMP community sets (Community Table).

CLI(config mgt snmp)# show community *<option>*

Parameters	Task
< community-name >	This specifies the community name **Type:** Mandatory **Valid values:** String of up to 20 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').
<option>	This specifies the community types **Type:** Mandatory **Valid values:** community | trapstation
{*rw* | *ro*}	This specifies the access permissions given by managers with this community name. 'ro' implies read only permission and 'rw' implies read-write permission. **Type:** Mandatory

Example 13Add a new SNMP community to the system

```
CLI(config mgt snmp)# add community xxx ro
OK

CLI(config mgt snmp)# show

Community Table:
   Community       Permission
 -------------------- ----------
          "public"  read-only
          "netman" read-write
            "xxx"  read-only

Trap Station Table:
  No entry
```

Configuring the IP Address of SNMP Trap Station

SNMP Trap Manager records the hosts (any SNMP server, like LCT, AMS Server, and so on) to be notified whenever the NE encounters abnormalities. When a trap condition happens, the NE sends the corresponding SNMP trap message to the hosts (SNMP server).

Enter to the "**config mgt snmp**" sub-group directory to configure the Trap station.

```
CLI# config mgt snmp
```

```
CLI(config mgt snmp)#
```

Table 3-16 shows the commands to perform the setting of SNMP Trap Station. 3 shows the usage of these commands as well as their related parameters.

Table 3-16 SNMP Trap Station Setting

The following command is to create a new trap station, system allows of 8 trap stations in maximum.

CLI(config mgt snmp)# add trapstation *<ip-addr> <community-name>*

The following command is to delete the trap station information.

CLI(config mgt snmp)# del trapstation *<ip-addr>*

The following command is to monitor the status of trap stations (Trap Station Table).

CLI(config mgt snmp)# show *<option>*

Parameters	Task
<ip-addr>	This indicates the IP address (Server / Host IP) of SNMP Manager. **Type:** Mandatory
<community-name>	This specifies the SNMP trap community of NE (Send Trap). **Type:** Mandatory
<option>	This specifies the community types **Type:** Mandatory **Valid values:** community | trapstation

Example 14Add a new Trap station

```
CLI(config mgt snmp)# add trapstation 192.168.1.1 public
OK

CLI(config mgt snmp)# show trapstation
Trap Station Table:
  IP Address       Community      Version
 --------------- -------------------- -------
    192.168.1.1           "public"    v2c
```

Configuring the Management Interface

DAS4-series provides 2 kinds of management interfaces on the NC (Network Control) card:

- Network management Ethernet interface (nme)
  The nme is an out-of-band management Ethernet port on the NC card. Packets received on this interface will never reach the switching fabric. Instead, packets are transported between the CPU and the nme port directly.
- Uplink network interface (uge)
  The uge, an in-band management interface connects to the switching fabric, presents the uplink gigabit Ethernet port that has ability to join the VLAN membership. Packets received on this interface are transported to the CPU via switching fabric and vice versa.

This section depicts the CLI commands to configure the IP address of nme and uge ports.

Enter to the “**config ip**” sub-group directory to configure the management interface IP address.

```
CLI# config ip
CLI(config ip)#
```

Enter to the “**config mgt**” sub-group directory to configure the VLAN-ID associated with the uge in-band interface.

```
CLI# config mgt
CLI(config mgt)#
```

Table 3-17 shows the commands to perform the management interface setting of IP address. 3 and 3 shows the usage of these commands as well as their related parameters.

Table 3-17 Management Interface IP Address Setting

The following command is to assign the IP address and subnet mask for management Ethernet interface (nme).

CLI(config ip)# set nme *<ip-addr> <netmask> <gatewayip>*

The following command is to assign the IP address and subnet mask for uplink Network interface (uge).

CLI(config ip)# set uge *<ip-addr> <netmask> <gatewayip>*

The following command is to assign the default gateway. The DAS4-Series IP-DSLAM sends all off-network IP traffic to the default gateway.

CLI(config ip)# set gateway *<ip-addr>*

The following command is to monitor the management interface information.

CLI(config ip)# show

The following command is to identify the VLAN ID for in-band management traffic.

CLI(config mgt)# vlan-id set *<vid>*

The following command is to view the VLAN ID for in-band management traffic.

CLI(config mgt)# vlan-id show

Parameters	Task
<ip-addr>	This specifies the network IP address for nme and uge interface, this IP address is only for system management. **Type:** Mandatory **Valid values:** Any valid class A/B/C address **Default value:** None
<gatewayip>	This specifies the gateway IP address for system, this gateway IP address is only for system management. **Type:** Mandatory **Valid values:** Any valid class A/B/C address
<netmask>	This specifies the subnet mask configured for the interface. **Type:** Mandatory **Valid values:** 255.0.0.0 ~ 255.255.255.255
<vid>	Assign the in-band interface to the proper VLAN (Making sure the VLAN will be associated with the network to which the IP address belongs). **Type:** Mandatory **Valid values:** 1 ~ 4094

Example 15Assign the IP address and subnet mask for nme

```
CLI(config ip)# set nme 192.168.192.1 255.255.0.0 100.168.1.254
OK
```

Example 16Assign the IP address and subnet mask for uge

```
CLI(config ip)# set uge 100.168.1.31 255.255.0.0 100.168.1.254
OK


CLI(config ip)# show
```

```
UGE
  IP address     : 100.168.1.31
  subnet mask    : 255.255.0.0
  MAC address    : 00:11:f5:dc:7a:17
  UGE VLAN ID    : 4092

NME
  IP address     : 192.168.192.1
  subnet mask    : 255.255.0.0
  MAC address    : 00:11:f5:dc:7a:16

Gateway
  IP address     : 100.168.1.254
```

Setting the Management Ethernet (NME) Interface IP Address

Before accessing telnet session to the DAS4-Series IP-DSLAM or SNMP, you must assign an IP address to either the in-band (uge) interface or the management Ethernet (nme) interface.

You can specify the subnet mask (netmask) in dotted decimal format.

To set the management Ethernet (nme) interface IP address, perform these procedures in CLI Ex mode:

Step 1 Assign an IP address and subnet mask to the management Ethernet (nme) interface.

Step 2 Verify the default gateway, if necessary.

3 depicts the CLI commands with how to assign an IP address and subnet mask to the management Ethernet (nme) interface and how to verify the interface configuration.

Example 17Setup the out-of-band management interface

```
CLI(config ip)# set nme 172.16.1.1 255.255.0.0 172.16.1.254
OK

CLI(config ip)# show
UGE
  IP address     : 100.168.3.97
  subnet mask    : 255.255.0.0
  MAC address    : 00:11:f5:dc:7a:17
  UGE VLAN ID    : 4092

NME
  IP address     : 172.16.1.1
  subnet mask    : 255.255.0.0
  MAC address    : 00:11:f5:dc:7a:16

Gateway
  IP address     : 172.16.1.254
```

Setting the in-band Interface (UGE) IP Address

Before accessing telnet session to the DAS4-Series IP-DSLAM or SNMP, you must assign an IP address to either the in-band (uge) interface or the management Ethernet (nme) interface.

You can specify the subnet mask (netmask) in dotted decimal format.

To set the IP address and VLAN membership of the in-band (uge) management interface, you can perform the following procedures in CLI Ex mode:

Step 1 Assign an IP address and subnet mask to the in-band (uge) management interface.

Step 2 Verify the default gateway, if necessary.

Step 3 Assign the in-band interface to the proper VLAN.

The Example 18 and Example 19 depict the CLI commands with how to assign an IP address, specify the subnet mask, and assign the VLAN for the in-band (uge) interface.

Example 18Setup the in-band management interface

```
CLI(config ip)# set uge 192.168.100.1 255.255.255.0 192.168.100.254
OK

CLI(config ip)# show
UGE
  IP address     : 192.168.100.1
  subnet mask    : 255.255.255.0
  MAC address    : 00:11:f5:dc:7a:17
  UGE VLAN ID    : 4092

NME
  IP address     : 192.168.192.1
  subnet mask    : 255.255.248.0
  MAC address    : 00:11:f5:dc:7a:16

Gateway
  IP address     : 192.168.100.254

CLI(config ip)# exit
```

Example 19Assign the in-band interface to the proper VLAN

```
CLI# config mgt
CLI(mgt)# set vlan 10
OK

CLI(mgt)# show

  management VLAN    : 10
        user    : guest (guest)
        user    : admin (admin)
        user    : abc (admin)
```

Configuring the Default Gateway

A gateway is a node that serves as an entrance to another network, and vice-versa. Gateways are most commonly used to transfer data between private networks and the Internet.

The DAS4-Series IP-DSLAM sends IP packets destined for other IP subnets to the default gateway (typically a router interface in the same network or subnet as the switch IP address). The DAS4-Series IP-DSLAM does not use the IP routing table to forward traffic from connected devices, IP traffic only generated by the DAS4-Series IP-DSLAM itself (for example: Telnet, TFTP, and ping).

The switch sends all off-network IP traffic to the primary default gateway. Both the in-band (uge) and management Ethernet (nme) interfaces are specified with common default gateway, the system forward traffic automatically determines through which interface of the default gateway can be reached.

Configuring the Secured Host

The security host mechanism protects the DAS4-Series IP-DSLAM against unauthorized access from untrustful host. This feature allows you to specify up to 10 sections of IPs of trusted hosts and authorized services (e.g. SNMP, TELNET, and FTP)

Enter to the "**config secure**" sub-group directory to configure the secured host IP address.

```
CLI# config secure
CLI(config secure)#
```

Enter the "**enable**" CLI command in sub-group directory to enable the secured host.

```
CLI(config secure)# enable

OK
```

Table 3-18 shows the commands to perform the configuration of secured host. 3 and 3 shows the usage of these commands as well as their related parameters.

Table 3-18 Secured Host Configuration

The following command is to specify the secured host with all permission services.

CLI(config secure)# allow <*index*> **all**

The following command is to specify the secured host without any permission service.

CLI(config secure)# allow <*index*> **none**

The following command is to specify the secured host in a specifics service.

CLI(config secure)# allow <*index*> <*snmp,telnet,ftp,tftp*>

The following command is to enable the secured host feature.

CLI(config secure)# enable

The following command is to disable the secured host feature.

CLI(config secure)# disable

The following command is to specify the secured host IP range.

CLI(config secure)# set <*index*> <*from-ip*> [<*to-ip*>]

The following command is to display the information of secured host.

CLI(config secure)# show [<*index*>]

Parameters	Task
<*index*>	This specifies the entry number of secured host list. **Valid values:** 1 ~ 10
<*snmp,telnet,ftp,tftp*>	This indicates the services (any combination of SNMP, TELNET, FTP and TFTP) the specified secured hosts are allowed. **Valid values:** snmp, telnet, ftp, tftp
<*from-ip*>	This indicates the beginning of the IP address range of the secured hosts. **Valid values:** 0.0.0.0 ~ 255.255.255.255
<*to-ip*>	This indicates the end of the IP address range of the secured hosts. **Valid values:** 0.0.0.0 ~ 255.255.255.255

Example 20Set the secured host IP range

```
CLI(config secure)# set 2 192.168.192.1 192.168.192.255
OK

CLI(config secure)# show

Secured host configuration:
Admin Status: enabled
  index     from IP          to IP          allowed type
  -----  ---------------  ---------------  --------------------
     1          0.0.0.0  255.255.255.255   SNMP + telnet + FTP
     2    192.168.192.1   192.168.192.255                 none
     3          0.0.0.0          0.0.0.0               none
     4          0.0.0.0          0.0.0.0               none
     5          0.0.0.0          0.0.0.0                all
     6          0.0.0.0          0.0.0.0               none
     7          0.0.0.0          0.0.0.0               none
     8          0.0.0.0          0.0.0.0               none
     9          0.0.0.0          0.0.0.0               none
    10          0.0.0.0          0.0.0.0               none
```

Example 21Allow the secured host with the permission services

```
CLI(config secure)# allow 2 all
OK

CLI(config secure)# show

Secured host configuration:
Admin Status: enabled
   index     from IP          to IP          allowed type
   -----  ---------------  ---------------  --------------------
      1        0.0.0.0  255.255.255.255   SNMP + telnet + FTP
      2   192.168.192.1  192.168.192.255                all
      3        0.0.0.0        0.0.0.0              none
      4        0.0.0.0        0.0.0.0              none
      5        0.0.0.0        0.0.0.0               all
      6        0.0.0.0        0.0.0.0              none
      7        0.0.0.0        0.0.0.0              none
      8        0.0.0.0        0.0.0.0              none
      9        0.0.0.0        0.0.0.0              none
     10         0.0.0.0        0.0.0.0              none
```

Maintaining the GE Network Interface

Configuring the UGE Negotiation Mode

The NE supports auto-negotiable uge Ethernet port. Enter to the "**config nc**" sub-group directory to configure the UGE Negotiation Mode.

```
CLI# config nc
CLI(config nc)#
```

Table 3-19 shows the commands to perform the configuration of the UGE Negotiation Mode.
3 shows the usage of these commands as well as its related parameters.

Table 3-19 Configuring the UGE Negotiation Mode

The following command is to modify the UGE negotiation mode.	
CLI(config nc)# set autoneg *<uge-id>* {*off* | *on*}	
Parameters	**Task**
{*off* | *on*}	Identify the auto negotiation mode of specified UGE port. **Type:** Mandatory **Valid values:** off | on
<uge-id>	Identify the slot range of the UGE port **Type:** Mandatory **Valid values:** 1 ~ 2

Example 22The modification of the UGE negotiation mode

```
CLI(config nc)# set autoneg 1 enabled
```

```
OK

CLI(config nc)# show

NC:
   planned-type  current-type   tagged-mode
   ------------  ------------  -------------
          CPU          CPU  untagged-only

UGE:
   UGE  oper-status  admin-status  auto negotiation  use-mode
   ---  -----------  ------------  ----------------  --------
     1       down       enabled          enabled    uplink
     2       down      disabled          enabled    uplink

Subtend VLAN ID:
   n/a
```

Checking the SFP module information

DAS4-Series IP-DSLAM supports 2 SFP (Small Form Pluggable) Mini-GBIC modules on the NC.

Enter to the “**status**” group directory to verify the SFP module information.

Use the “**gbic show**” command under the “**status**” group directory to display the SFP information.

```
CLI# status
CLI(status)#
```

Table 3-20 shows the commands to perform the check of the SFP module information. 3 shows the usage of these commands as well as its related parameters.

Table 3-20 Checking the SFP module information

Using this command to display the system plugged SFP mini GBIC module.

CLI(status)# gbic show *<uge-id>*

Parameters	Task
<uge-id>	This specifies the index of UGE. **Type:** Mandatory **Valid values:** 1 | 2

Example 23Display the system plugged SFP mini GBIC module

```
CLI(status)# gbic show 2

identifier                         : SFP
connector                          : LC
SONET compliance codes             :
ethernet compliance codes          : 1000BASE-LX
fiber channel link length          : long distance (L)
fiber channel transmitter tech     : longwave laser (LC)
fiber channel transmitter media    : single mode (SM)
fiber channel speed               : 100 MBytes/Sec
encoding                          : 8B10B
BR,nominal    - 100Mbps           : 13
length(9um)   - km                : 10
length(9um)   - 100m              : 100
length(50um)  - 10m               : 55
length(62.5um)- 10m               : 55
length(Copper)- 1m                : 0
vendor name                       :
vendor OUI                        : 00:00:00
vendor PN                         : SFP-LX
vendor SN                         : 3119980079
laser wave length                 : 1310 nm
```

Maintaining the NE

The NE supports the storing, backup/restore configuration and firmware upgrade functions as described in the following sub-sections.

- Storing the Active System Configuration
- Backup and Restore the Active System Configuration
- File System Management
- Managing the Boot Section
- NE Firmware Upgrade
- NE Firmware Upgrade in Cascade mode
- SHDSL Firmware Upgrade

Storing the Active System Configuration

The modified configuration will be lost due to the rebooting of hardware without saving (storing). Use "**save**" command under "**config file**" sub-group directory to save your active configuration in system flash, DAS4-Series IP-DSLAM will load the saved configurations and execute them whenever the system reboots.

Enter to the "**config file**" sub-group directory to operate.

```
CLI# config file
CLI(config file)#
```

Table 3-21 Store the Active System Configuration

The following command is to save current configuration and backup old configuration.
CLI(config file)# save
The following command is to remove all saved configuration files.
CLI(config file)# erase
The following command is to show configuration information.
CLI(config file)# ls

Saving system configurations takes about 15 seconds to finish.

Example 24Save the system configuration

```
CLI(config file)# save
OK

CLI(config file)# ls

Listing directory [cfg:]
              Nov 19 2007 18:14         37   mac.cfg
              Oct 10 2000 12:58     146150   default.cfg
              Nov 30 2007 20:43         32   default.md5
              Oct 11 2000 13:38     146993   config.cfg
              Oct 11 2000 13:38         32   config.md5
```

Backup and Restore the Active System Configuration

NE provides the backup and restore related CLI commands to backup or restore the NE configuration via FTP. The backup procedures are as following:

Step 1 Open the DOS prompt window (or environment) on personal computer (PC).

Step 2 Go to the directory where the backup file is saved and then login the DAS4-Series by FTP

Step 3 Get the configuration file from NE to the target partition via FTP by following commands:

```
ftp> cd cfg:
ftp> get default.cfg
or
ftp> put default.cfg
```

It is noted that login device via FTP must be used the read-write authorization. The default username/password is **admin/admin**.

It is noted that the NE configuration is saved in “default.cfg” on the NE. The operator can backup the “default.cfg” and save it with a different filename on the local host. However, the operator has to restore (by the ftp “put” command) the NE configuration with filename of “default.cfg”.

3 and 3 show the process to backup the configurations and restore the configurations, respectively..

Example 25Backup the configurations from the NE via FTP.

```

D:\>ftp 192.168.192.1
Connected to 192.168.192.1.
220-==================================================================-
220-              Welcome to the IP-DSLAM FTP Server              -
220-                                                  -
220- CAUTION: It's your responsibility to use the FTP service correctly -
220-         , please put the right files into the right file system.  -
220 ==================================================================-
User (192.168.192.1:(none)): admin
```

```
331 Password required
Password:
230 User logged in
ftp> cd cfg:
250 Changed directory to "cfg:/"
ftp> get default.cfg D:\DSLAM-TPE-4.txt
200 Port set okay
150 Opening BINARY mode data connection
226 Transfer complete
ftp: 152231 bytes received in 0.45Seconds 335.31Kbytes/sec.
ftp> bye
221 Bye...see you later

D:\>
```

Example 26Restore the configurations to the NE via FTP.

```

D:\>ftp 192.168.192.1
Connected to 192.168.192.1.
220-=====================================================================-
220-              Welcome to the IP-DSLAM FTP Server                -
220-                                                   -
220- CAUTION: It's your responsibility to use the FTP service correctly -
220-       , please put the right files into the right file system.  -
220 =====================================================================-
User (192.168.192.1:(none)): admin
331 Password required
Password:
230 User logged in
ftp> cd cfg:
250 Changed directory to "cfg:/"
ftp> put DSLAM-TPE-4.cfg default.cfg
200 Port set okay
150 Opening BINARY mode data connection
226- CAUTION:Please wait for 120 seconds -
226 Transfer complete
ftp: 152231 bytes sent in 0.80Seconds 191.01Kbytes/sec.
ftp> bye
221 Bye...see you later
```

File System Management

This section depicts the CLI commands for the maintenance of file system in the on-board flash.

Enter the "**filesystem**" in sub-group directory to operate.

```
CLI# filesystem
CLI(filesystem)#
```

Table 3-22 File System Configuration

The following command is to delete a file.

CLI(filesystem)# del {*opCodeA* | *opCodeB* | *cfg*} <*filename*>

The following command is to list files inside file system partition.

CLI(filesystem)# ls [*opCodeA* | *opCodeB* | *cfg*]

Parameters	Task
{*opCodeA* | *opCodeB* | *cfg*}	This specifies the partition of NC on-board flash. *opCodeA/opCodeB*: the partition to store the NE firmware and LC firmware. *cfg*: the partition to store the configuration file.
<*filename*>	This specifies the file name of file to be stored in the partition of NC on-board flash. **Type:** Mandatory **Valid values:** am0031.enc mla2031fw.enc mla2031br.enc config.cfg config.md5

Example 27Configuration of file system in NE

```
CLI# filesystem ls
Listing directory [opCodeA:]
            Dec 18 2007 10:23     2679217   am0031.enc
            Dec 18 2007 15:55      457808   mla2031fw.enc
            Dec 18 2007 15:55       32892   mla2031br.enc

Listing directory [opCodeB:]
                     Dec 15 2007 10:21     2679217   am0031.enc
            Dec 15 2007 13:25      457808   mla2031fw.enc
            Dec 15 2007 13:25       32892   mla2031br.enc



Listing directory [cfg:]
            Nov 19 2007 18:14          37   mac.cfg
            Nov 30 2007 20:43      146150   default.cfg
            Nov 30 2007 20:43          32   default.md5
            Oct 15 2000 09:30      146689   config.cfg
            Oct 15 2000 09:30          32   config.md5

CLI# filesystem del cfg default.cfg
ERROR: Can't delete default configuration file.
```

It is noted that the follwing files can not be deleted via CLI/LCT.

default.cfg
default.md5
mac.cfg

Two kinds of .cfg files, config.cfg and default.cfg, are kept in the NE for the NE to boot up with a set of deterministic configuration parameters. In order to guarantee these .cfg files are not corrupted, the NE also protect them by MD5 encryption.

Whenever the NE boots up, it executes the following procedure.

1. The NE first reads and checks config.cfg and try to rebuild the previous configuration accordingly.

2. If the config.cfg is absent or is corrupted, the NE will read and check default.cfg and try to rebuild the default configuration accordingly.
3. If the default.cfg is absent or is corrupted, the NE will use its internal setting to rebuild the factory-default configuration accordingly

Managing the Boot Section

The NE supports two boot sections ‘opCodeA’ and ‘opCodeB’, each contains the necessary firmware for the system. With 2 boot sections, the original NE firmware can be kept as it is. As a result, the operator is able to recover the NE whenever it fails to upgrade NE firmware due to any reason (ex. the upgraded firmware is corrupted due to network failure.)

To this end, it is recommened the operator to upload the new firmware to the ‘opCodeA’ if the current boot partition is ‘opCodeB’.

Please refer to Section “NE Firmware Upgrade” of 3 for the example of their usage.

Use the command “**boot-device**” to manage the boot section of the system.

```
CLI# boot-device
```

Table 3-23 Managing the Boot Section

The following command is to identify the startup boot section.
CLI# boot-device set {opCodeA | opCodeB}
The following command is to display the current boot device and firmware file.
CLI# boot-device show

NE Firmware Upgrade

NE provides NC/ADSL LC Firmware Upgrade related commands to load the new firmware to the NC on-board flash (non-violent memory) by FTP. The firmware upgrade procedures are as follows.

Step 1 Check the current boot partition via the CLI command:.

```
CLI# boot-device show
current boot device    : opCodeB:xxxxx.enc
next boot device       : opCodeB:xxxxx.enc
```

Step 2 Open the DOS prompt window (or environment) on personal computer (PC).

Step 3 Go to the directory where the new firmware is saved, and then login the DAS4-Series by FTP

Step 4 Upload the new firmware to the target partition via FTP by the following commands. 3 shows an example of uploading firmware to NE.

```
ftp> cd opCodeB: (or ftp> cd opCodeA: )
ftp> bin
ftp> put  xxxxx.enc
```

Step 5 Change the next boot partition to let the NE be rebooted by executing the new image (Refers to Table 3-23 Managing the Boot Section)

```
  CLI# boot-device set opCodeA
  CLI# boot-device show
current boot device    : opCodeB:xxxxx.enc
next boot device       : opCodeA:xxxxx.enc
```

It is noted that login device via FTP must be used the read-write authorization. The default username/password is **admin/admin**.

Example 28Upload NC/ADSL LC Firmware to Flash Memory of NC through FTP

Upgrade am0031.enc (image file of NC)

```
root@redhat9:/tmp> ftp 192.168.192.1
Connected to 192.168.192.1 (192.168.192.1).

Name (192.168.192.1:axdsl): admin
331 Password required
Password:
230 User logged in
ftp> cd opCodeA:
250 Changed directory to "opCodeA:"
ftp> bin
200 Type set to I, binary mode
ftp> put am0031.enc
200 Port set okay
150 Opening BINARY mode data connection
226- CAUTION:Please wait for 120 seconds or check the Flash LED -
226 Transfer complete
ftp: 3126797 bytes sent in 6.91Seconds 452.70Kbytes/sec.
ftp> bye
221 Bye...see you later
```

Upgrade mla2031fw.enc (DSP code of LC)

```
root@redhat9:/tmp> ftp 192.168.192.1
Connected to 192.168.192.1 (192.168.192.1).

Name (192.168.192.1:axdsl): admin
331 Password required
Password:
230 User logged in
ftp> cd opCodeA:
250 Changed directory to "opCodeA:"
ftp> bin
200 Type set to I, binary mode
ftp> put mla2031fw.enc
200 Port set okay
150 Opening BINARY mode data connection
```

```
226- CAUTION:Please wait for 120 seconds or check the Flash LED -
226 Transfer complete
ftp: 457808 bytes sent in 1.03Seconds 444.04Kbytes/sec
ftp> bye
221 Bye...see you later
```

Upgrade mla2031br.enc (Booter of LC)

```
root@redhat9:/tmp> ftp 192.168.192.1
Connected to 192.168.192.1 (192.168.192.1).

Name (192.168.192.1:axdsl): admin
331 Password required
Password:
230 User logged in
ftp> cd opCodeA:
250 Changed directory to "opCodeA:"
ftp> bin
200 Type set to I, binary mode
ftp> put mla2031br.enc
200 Port set okay
150 Opening BINARY mode data connection
226- CAUTION:Please wait for 120 seconds or check the Flash LED -
226 Transfer complete
ftp: 32892 bytes sent in 0.11Seconds 299.02Kbytes/sec
ftp> bye
221 Bye...see you later
```

Make sure the source image file that you select is accordant to the NE model; else the NE may not run well with the upgraded firmware image after rebooting.

NE Firmware Upgrade in Cascade mode

NE provides NC/ADSL LC Firmware Upgrade related commands to load the new firmware to the NC on-board flash (non-violent memory) by FTP. The Remote-NE firmware upgrade procedures are as follows.

Step 1 “Clogin” to check the current boot partition of Remote-NE via the CLI command:.

```
CLI# clogin 1
CLI#
      Please type "@.<cr>" to locally close connection
Login:admin
Password:
```

```
CLI# boot-device show
current boot device    : opCodeB:xxxxx.enc
```

```
next boot device      : opCodeB:xxxxx.enc
```

Step 2 Open the DOS prompt window (or environment) on personal computer (PC).

Step 3 Go to the directory where the new firmware is saved, and then login the DAS4-Series by FTP

Step 4 Upload the new firmware to the target partition via FTP by the following commands. 3 shows an example of uploading firmware to Remote-NE.

```
ftp> bin
ftp> put xxxxx.enc (Client filename) \\1 (Remote ID) \
opCodeB:\xxxxx.enc (Remote filename)
```

Step 5 Change the next boot partition to let the Remote-NE be rebooted by executing the new image (Refers to Table 3-23 Managing the Boot Section)

```
CLI# boot-device set opCodeA
CLI# boot-device show
current boot device    : opCodeB:xxxxx.enc
next boot device       : opCodeA:xxxxx.enc
```

It is noted that login device via FTP must be used the read-write authorization. The default username/password is **admin/admin**.

Example 29Upload NC/ADSL LC Firmware to Flash Memory of a Remote-NE through FTP

Upgrade am0031.enc (image file of NC)

```
root@redhat9:/tmp> ftp 192.168.192.1
Connected to 192.168.192.1 (192.168.192.1).

Name (192.168.192.1:axdsl): admin
331 Password required
Password:
230 User logged in
ftp> bin
200 Type set to I, binary mode
ftp> put am0031.enc \\1\opCodeA:\am0031.enc
200 Port set okay
150 Opening BINARY mode data connection
226- CAUTION:Please wait for 120 seconds or check the Flash LED -
226 Transfer complete
ftp: 3126797 bytes sent in 6.91Seconds 452.70Kbytes/sec.
ftp> bye
221 Bye...see you later
```

Upgrade mla2031fw.enc (DSP code of LC)

```
root@redhat9:/tmp> ftp 192.168.192.1
Connected to 192.168.192.1 (192.168.192.1).

Name (192.168.192.1:axdsl): admin
331 Password required
Password:
230 User logged in
ftp> bin
200 Type set to I, binary mode
ftp> put mla2031fw.enc \\1\opCodeA:\mla2031fw.enc
200 Port set okay
150 Opening BINARY mode data connection
226- CAUTION:Please wait for 120 seconds or check the Flash LED -
226 Transfer complete
ftp: 457808 bytes sent in 1.03Seconds 444.04Kbytes/sec
ftp> bye
221 Bye...see you later
```

Upgrade mla2031br.enc (Booter of LC)

```
root@redhat9:/tmp> ftp 192.168.192.1
Connected to 192.168.192.1 (192.168.192.1).

Name (192.168.192.1:axdsl): admin
331 Password required
Password:
230 User logged in
ftp> bin
200 Type set to I, binary mode
ftp> put mla2031br.enc \\1\opCodeA:\mla2031br.enc
200 Port set okay
150 Opening BINARY mode data connection
226- CAUTION:Please wait for 120 seconds or check the Flash LED -
226 Transfer complete
ftp: 32892 bytes sent in 0.11Seconds 299.02Kbytes/sec
ftp> bye
221 Bye...see you later
```

Make sure the source image file that you select is accordant to the Remote-NE model; else the NE may not run well with the upgraded firmware image after rebooting.

SHDSL Firmware Upgrade

This section depicts the procedures to upgrade the firmware version of the SHDSL line card; the higher version will bring new features and functions of the SHDSL line card.

CLI employs a NE SHDSL Firmware Upgrade utility to transfer the new code files to the memory of NC card by FTP (File Transfer Protocol), and then upgrades this new version from memory to SHDSL line card. You can follow the procedures below to update your SHDSL line card if necessary.

Step 1 Open the DOS prompt window and go to the directory where the new firmware is.

Step 2 Upload the new SHDSL firmware to the flash memory of NC through FTP. 3 shows an example of uploading SHDSL firmware from local host to the flash memory of NC.

Step 3 Use the commands described in Table 3-24 to upgrade the new firmware to SHDSL line card and wait for the state of upgrade to be finished. 3 shows an example of uploading SHDSL firmware from NC to NE.

Example 30Upload SHDSL Firmware to Flash Memory of NC through FTP

```
D:\image\SHDSL Firmware>ftp 192.168.192.1
Connected to 192.168.192.1.
220-=====================================================================-
220-              Welcome to the IP-DSLAM FTP Server              -
220-                                                 -
220- CAUTION: It's your responsibility to use the FTP service correctly -
220-       , please put the right files into the right file system.  -
220 =====================================================================-
User (192.168.192.1:(none)): admin
331 Password required
Password:
230 User logged in
ftp>
ftp> cd shdsl:
250 Changed directory to "shdsl:/"
ftp> put TEImage.bin.gz
200 Port set okay
150 Opening BINARY mode data connection
226- CAUTION:Please wait for 120 seconds or check the Flash LED -
226 Transfer complete
ftp: 1834196 bytes sent in 1.30Seconds 1414.18Kbytes/sec.
ftp>
ftp> bye
221 Bye...see you later
```

Table 3-24 SHDSL Firmware Upgrade

The following command is to upgrade SHDSL firmware from flash memory to SHDSL line card.

CLI# shdsl-fw-upgrade start *<lc-range>*

The following command is to show the upgrade status.

CLI# shdsl-fw-upgrade show

Parameters	Task
<lc-range>	This specifies the slot index of target SHDSL line card. **Type:** Mandatory **Valid values:** 1 ~ 4

Example 31Upload SHDSL Firmware from NC to SHDSL Line Card

```
CLI# shdsl-fw-upgrade start 4
OK: Please reset LC after "finished" state

CLI# shdsl-fw-upgrade show

SHDSL firmware upgrade state
  LC  type          state
  --  -----  ------------------------------
   1   ADSL                   n/a
   2   ADSL                   n/a
   3   ADSL                   n/a
   4  SHDSL  transmission of firmware image
```

Configuring the System Date and Time

You can set the date and time parameters as part of the initial system configuration and set the system date and time by using the "**datetime**" command at the prompt of CLI#.

NOTE

The date and time will be reset due to reboot system. However, the NE will synchronize its date and time with the configured time server's.

(Please refer to Section "Configuring the Internet Time Server" for the setting of time server.

Table 3-25 shows the CLI commands to perform the configuration of system data and time. 3 shows the usage of these commands as well as its related parameters.

Table 3-25 System Date and Time Configuration

The following command is to set the system date time.

CLI# datetime set *<date>* *<time>*

The following command is to set the GMT time zone for system.

CLI# datetime timezone *<zone>*

The following command is to monitor the current system time.

CLI# datetime show

Parameters	Task
<date>	Identify the year, month, and date. **Type:** Mandatory **Valid values:** yyyy-mm-dd
<time>	Identify the time in hour, minute, and second. **Type:** Mandatory **Valid values:** hh:mm:ss
{*zone*}	Identify the GMT time zone. **Type:** Mandatory **Valid values:** -12 ~ +13

Example 32Configure the system date and time

```
CLI# datetime set 2005-03-10 10:38:00
OK

CLI# datetime timezone +8
OK

CLI# datetime show
datetime: 2005-03-10 10:38:11 GMT+8
```

Configuring the Internet Time Server

A time server is a server that reads the actual time from a reference clock and distributes this information to its clients using a computer network. The NE supports to synchronize its date and time with the configured time server's via the Simple Network Time Protocol (SNTP)

We use the following steps to configure the time sever of DAS4-Series IP-DSLAM:

Step 1: Set the time server to let the clock of DAS4-Series IP-DSLAM be synchronized with an Internet time server's.

Step 2: Enter the "**config time-service**" sub-group directory to configure the Internet time server.

```
CLI# config time-service
CLI(config time-service)#
```

Table 3-26 shows the CLI commands to perform the Internet Time Server setting. 3 shows the usage of these commands as well as their related parameters.

Table 3-26 Internet Time Server Setting

The following command is to enable the time server IP address or domain name.

CLI(config time-service)# servers set <*server1* | *server2* | *server3*> <*address*>

The following command is to disable the time server.

CLI(config time-service)# servers delete <*server1* | *server2* | *server3*>

The following command is to define the synchronization protocol.

CLI(config time-service)# set protocol <*none* | *sntp*>

The following command is to define the synchronization time period.

CLI(config time-service)# set timezone <*zone-value*>

The following command is to define the synchronization time period.

CLI(config time-service)# set period <*time*>

The following command is to display the time server configuration information.

CLI(config time-service)# show

The following command is to manually synchronize with time server.

CLI(config time-service)# update

Parameters	Task
<*address*>	This specifies the network IP address or domain name for Internet time server. **Type:** Mandatory **Valid values:** Any valid class A/B/C IP address or domain name
<*zone-value*>	Identify the GMT time zone. **Type:** Mandatory **Valid values:** -12 ~ +13
<*time*>	This specifies the automatic synchronizing time period **Type:** Mandatory **Valid values:** 1 ~ 1440 Minutes

Example 33Set the time server IP address or domain name

```
CLI(config time-service)# servers set server1 220.130.158.52
OK

CLI(config time-service)# set protocol sntp
OK

CLI(config time-service)# set timezone +12
OK

CLI(config time-service)# update
OK

CLI(config time-service)# show

Time protocol: SNTP
Update period: 12 hr 0 min
Time servers:
  [server1]
    internet address: 220.130.158.52
              status: backup mode
  [server2]
    internet address:
              status: not set
  [server3]
    internet address:
              status: not set
  [time zone]  GMT+12
```

Configuring the DNS Server

The DNS (Domain Name System) server is used for the resolution of domain name. For example, a query for www.cisco.com will receive a reply with the IP address of the web server of Cisco. Therefore the DNS Server is designed for the resolution of domain name. In other words, the DNS replies the corresponding IP address to the URL like the given example.

Enter to the “**config dns**” sub-group directory to configure the DNS server.

```
CLI# config dns
CLI(config dns)#
```

Table 3-27 shows the CLI commands to perform the DNS server setting. 3 shows the usage of these commands as well as its related parameters.

Table 3-27 DNS Server Setting

The following command is to define the DNS server IP address.	
CLI(config dns)# set *{dns1 | dns2 | dns3} <ip-addr>*	
The following command is to delete the DNS server.	
CLI(config dns)# del *{dns1 | dns2 | dns3}*	
The following command is to display the DNS server.	
CLI(config dns)# show	
Parameters	**Task**
<ip-addr>	This specifies the DNS server IP address. **Type:** Mandatory

Example 34Add a new DNS server to the system

```
CLI(config dns)# set dns1 168.95.1.1
Set OK.

CLI(config dns)# set dns2 168.95.1.88
Set OK.

CLI(config dns)# show
DNS server IP
        dns1          dns2          dns3
  --------------- --------------- ---------------
    168.95.1.1     168.95.1.88        0.0.0.0
```

Ambient Temperature

Ambient temperature is a common term to denote a certain temperature within enclosed space in which the DAS4-Series IP-DSLAM is accustomed.

Enter the "**config hw-sensor**" sub-group directory to set the temperature threshold of hardware sensor of DAS4-Series IP-DSLAM.

```
CLI# config hw-sensor
CLI(config hw-sensor)#
```

Table 3-28 shows the CLI commands to perform the configuration of ambient temperature. 3 shows the usage of these commands as well as its related parameters.

Table 3-28 Configuring Ambient Temperature

The following command is to set the temperature threshold of the system.

CLI(config hw-sensor)# set temp *<temp-high> <temp-low>*

The following command is to show the current setting.

CLI(config hw-sensor)# show

Parameters	Task
<temp-high>	This specifies the high temperature threshold. Whenever the ambient temperature is higher than *<temp-high>* , the NE sends alarm traps to the configured trap hosts (AMC LCT or AMS server) **Type:** Mandatory **Valid values:** -20 ~ 100 (degrees centigrade)
<temp-low>	This specifies the low temperature threshold. Whenever the ambient temperature is lower than *<temp-low>* , the NE sends alarm traps to the configured trap hosts (AMC LCT or AMS server) **Type:** Mandatory **Valid values:** -20 ~ 100 (degrees centigrade)

Example 35Set the temperature threshold of the system

```
CLI(config hw-sensor)# set temp 70 -10
OK

CLI(config hw-sensor)# show

  sensor temperature thresholds: high  low
                                 ----  ----
                                  70   -10
```

Chapter 4Managing the System Profiles

A profile is a named list of configuration parameters with a value assigned to each parameter. By using a profile, the operator can configure the NE without keying in a lot of configuration parameters. However, when the operator modifies a profile, the modification will affect all ports using that profile.

This chapter describes the management of two kinds of profiles, data transport related profiles and alarm definition profile. The alarm definition profile defines the attributes of the report (alarm) of abnormality launched by the NE.

As to the data transport related profiles, they are

- xDSL Profile
- VLAN Profile

The xDSL Profile indicates the ADSL Profile and SHDSL Profile. It defines the attributes of the connection established via the xDSL subscriber loop. As to the VLAN Profile, it defines the attributes of services/applications applied to the xDSL subscriber.

Figure 4-3 and Table 4-29 help you to understand each profile and their interrelationship.

As shown in Figure 4-3, NE forwards traffic on 2 kinds of connections, unicast connection and multicast connection, on the Data Level. For the unicast connection, it carries all traffic (unicast and broadcast) except multicast traffic. The attributes of unicast connection are specified by the IP Traffic Profile. As for the multicast connection, its attributes are specified by the Multicast Channel Profile. Moreover, the NE also supports to restrict the subscriber to receive a set of specific Multicast Channels. Multicast Service Profile records the set of specific Multicast Channels.

Figure 4-3 Interrelationship of Data Transport Related Profiles

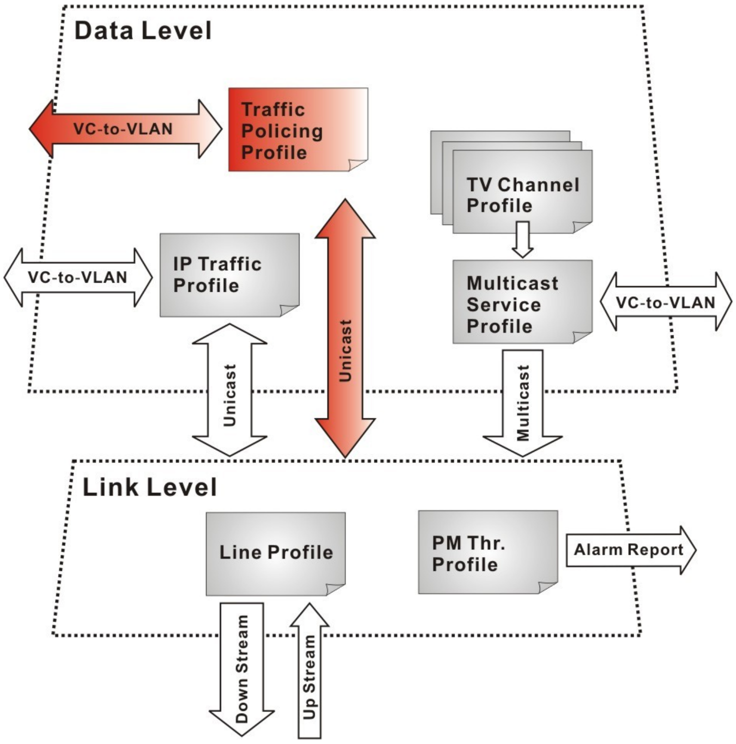


Table 4-29 Data Transport Related Profiles

Profile		Capacity	Level	Category	Description
xDSL Profile	Line Profile	60 sets	Link	Loop	Define the attributes of xDSL loop connection.
	PM Threshold Profile	60 sets	Link	Loop	Report the message if loop connection error across the threshold.
	Traffic Policing Profile (ADSL LC only)	60 sets	Data	User Data	Define the rule of traffic policing for user data.
VLAN Profile	IP Traffic Profile	60 sets	Data	Unicast	Define the traffic bandwidth of Unicast connection.
	Multicast Service Profile	60 sets	Data	Multicast	A set of service selected from menu list.
	Multicast Channel Profile	800 sets	Data	Multicast	A menu list of multicast channel, it also defines the traffic bandwidth of Multicast connection.

NOTE To make Traffic Policing Profile take effect, it needs to set IP Traffic Profile properly. Please refer to the NOTE under "Configuring the Traffic Policing Profile".

NOTE To make an xDSL line work normally, the IP Traffic Profile is essential. As to the Traffic Policing Profile, it is optional and is only applicable to ADSL LC.

! A profile is a named list of configuration parameters with a value assigned to each parameter. When you delete a profile you will affect the change on all port or connection using that profile. If you want to change a single port or a subset of ports, you can create another profile with desired parameters, and then assign the new profile to the desired port.

This chapter contains the following sections:

- Configuring the xDSL Profile
  - Configuring the ADSL Connection Profile
  - Configuring the ADSL Performance Alarm Profile
  - Configuring the Traffic Policing Profile
  - Configuring the SHDSL Connection Profile
  - Configuring the SHDSL Performance Alarm Profile
- Configuring the VLAN Profile
  - VLAN Profile contains 2 categories of profiles.
- Configuring the IP Traffic Profile
- Configuring the Multicast Service Related Profile

Configuring the xDSL Profile

The xDSL profiles enable you to simplify the process to configure the different xDSL loops with the same loop/data connection attributes. For example, you may classify the subscribers to several categories like category of residential customers, category of small office customers, category of enterprise customers and so on. Each category of subscribers is with the same loop/data connection attributes. Different categories are with their specific attributes like the line speed and performance parameters to secure their particular service quality. Once the profiles are created, you can easily assign the xDSL subscriber with the request xDSL loop attributes.

This section depicts the supported xDSL profiles.

- Configuring the ADSL Connection Profile
- Configuring the ADSL Performance Alarm Profile
- Configuring the Traffic Policing Profile
- Configuring the SHDSL Connection Profile
- Configuring the SHDSL Performance Alarm Profile

Configuring the ADSL Connection Profile

The ADSL connection profile indicates the expected overall physical parameters of the ADSL line port. This profile describes the communication at the ADSL layer. A number of parameters will be specified such as fast/interleaved, rate adaptation mode, noise margin, power spectrum density, and transmit rate.

Enter to the “**config profile adsl-line**” sub-group directory to manage the ADSL connection profile.

```
CLI# config profile adsl-line
CLI(config profile adsl-line)#
```

Table 4-30 shows the connection profile configuration of the ADSL line. 4 shows the usage of these commands as well as its related parameters

Table 4-30 ADSL Connection Profile Configuration

The following command is to generate a new ADSL connection profile.
CLI(config profile adsl-line)# add <*profile-name*>
The following command is to remove the specific ADSL connection profile.
CLI(config profile adsl-line)# del <*profile-name*>
The following command is to activate the specific ADSL connection profile.
CLI(config profile adsl-line)# enable <*profile-name*>
The following command is to deactivate the specific ADSL connection profile.
CLI(config profile adsl-line)# disable <*profile-name*>
The following command is to modify the profile rate mode to adaptive with desired parameters.
CLI(config profile adsl-line)# set adaptive-rate <*profile-name*> <*us-min-rate*> <*us-max-rate*> <*ds-min-rate*> <*ds-max-rate*>

Table 4-30 ADSL Connection Profile Configuration (continued)

The following command is to modify the profile rate mode to dynamic with desired parameters.
CLI(config profile adsl-line)# set dynamic-rate *<profile-name> <us-min-rate> <us-max-rate> <ds-min-rate> <ds-max-rate> <us-down-shift> <us-up-shift> <ds-down-shift> <ds-up-shift>*
The following command is to modify the profile rate mode to fix with desired parameters.
CLI(config profile adsl-line)# set fixed-rate *<profile-name> <us-rate> <ds-rate>*
The following command is to modify the profile line mode to interleaved path with latency.
CLI(config profile adsl-line)# set line-mode *<profile-name>* **interleave** *<max-us-latency> <max-ds-latency> <min-us-inp> <min-ds-inp>*
The following command is to modify the profile line mode to fast path.
CLI(config profile adsl-line)# set linemode *<profile-name>* **fast**
The following command is to modify the profile line standards with multiple selection.
CLI(config profile adsl-line)# set line-standard *<profile-name> <adsl,g-dmt,g-lite,adsl2,adsl2+,adsl2m,adsl2+m,readsl,t1-413>*
The following command is to modify the profile with enabling all line standards.
CLI(config profile adsl-line)# set line-standard <*profile-name***> all**
The following command is to modify the profile PSD (Power Spectrum Density) with desired parameters.
CLI(config profile adsl-line)# set psd *<profile-name> <us-psd> <ds-psd>*
The following command is to modify the upstream or downstream shelf SNR margin due to dynamic rate mode.
CLI(config profile adsl-line)# set snr-margin <profile-name> {us | ds} <target-snr> <min-snr><max-snr>
The following command is to modify the upstream or downstream shelf SNR margin due to dynamic rate mode.
CLI(config profile adsl-line)# set shift-snr <profile-name> {us | ds} <down-shift-snr> <up-shift-snr>
The following command is to modify the ADSL2/ADSL2+ power automatic management for L2 state.
CLI(config profile adsl-line)# set pwr-mgt <profile-name> **l2 automatic** <l2-min-rate> <l2-max-rate> <l2-low-time> <l0-time>
The following command is to modify the ADSL2/ADSL2+ power manual management for L2 state.
CLI(config profile adsl-line)# set pwr-mgt <profile-name> **l2 manual** <l2-min-rate> <l2-max-rate>
The following command is to modify the ADSL2/ADSL2+ power management for L3 state.
CLI(config profile adsl-line)# set pwr-mgt *<profile-name>* **l3** *<denied | accepted>*
The following command is to monitor the ADSL connection profile information.
CLI(config profile adsl-line)# show [*<profile-name>*]

Table 4-30 ADSL Connection Profile Configuration (continued)

Parameters	Task
<profile-name>	This specifies the ADSL connection profile name **Type:** Mandatory **Valid values:** String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').
<us-min-rate>	Defines upstream minimum transmit rate, this parameter is available for adaptive and dynamic rate mode. **Type:** Mandatory **Valid values:** 64 ~ 2976 (multiple of 32 kbps) **Default value:** 64 kbps (due to profile generated)
<us-max-rate>	Defines upstream maximum transmit rate, this parameter is available for adaptive and dynamic rate mode. **Type:** Mandatory **Valid values:** 64 ~ 2976 (multiple of 32 kbps) **Default value:** 64 kbps (due to profile generated)
<ds-min-rate>	Defines downstream minimum transmit rate, this parameter is available for adaptive and dynamic rate mode. **Type:** Mandatory **Valid values:** 32 ~ 29984 (multiple of 32 kbps) **Default value:** 32 kbps (due to profile generated)
<ds-max-rate>	Defines downstream maximum transmit rate, this parameter is available for adaptive and dynamic rate mode. **Type:** Mandatory **Valid values:** 32 ~ 29984 (multiple of 32 kbps) **Default value:** 32 kbps (due to profile generated)
<us-rate>	Defines upstream transmit rate, this parameter is available for fixed rate mode. **Type:** Mandatory **Valid values:** 64 ~ 2976 (multiple of 32 kbps) **Default value:** 64 kbps (due to profile generated)
<ds-rate>	Defines downstream transmit rate, this parameter is available for fixed rate mode. **Type:** Mandatory **Valid values:** 32 ~ 29984 (multiple of 32 kbps) **Default value:** 32 kbps (due to profile generated)
< us-down-shift >	Defines the minimum time interval during which the upstream noise margin should stay below the Downshift SNR before the ATU-R triggers the SRA process to decrease the line rate. **Type:** Mandatory **Valid values:** 0 ~ 16383 (seconds) **Default value:** 0 sec (due to profile generated)
< us-up-shift >	Defines the minimum time interval during which the upstream noise margin should stay above the Upshift SNR before the ATU-R triggers the SRA process to increase the line rate. **Type:** Mandatory **Valid values:** 0 ~ 16383 (seconds) **Default value:** 0 sec (due to profile generated)
<adsl,g-dmt,g-lite,adsl2,adsl2+, adsl2m,adsl2+m,readsl,t1-413>	Defines the ADSL line standards which specifies to the ADSL connection profile . **Type:** Mandatory **Valid values:** ADSL/G.DMT, ADSL/G.lite, ADSL2, ADSL2 Annex M, Annex M, ReADSL(Annex L), ANSI T1.413 **Default value:** all

Table 4-30 ADSL Connection Profile Configuration (continued)

Parameters	Task
< ds-down-shift >	Defines the minimum time interval during which the downstream noise margin should stay below the Downshift SNR before the ATU-C triggers the SRA process to decrease the line rate. **Type:** Mandatory **Valid values:** 0 ~ 16383 (seconds) **Default value:** 0 sec (due to profile generated)
< ds-up-shift >	Defines the minimum time interval during which the downstream noise margin should stay above the Upshift SNR before the ATU-C triggers the SRA process to increase the line rate. **Type:** Mandatory **Valid values:** 0 ~ 16383 (seconds) **Default value:** 0 sec (due to profile generated)
< max-*us-latency*>	Defines the maximum upstream interleaved path latency. It applies only to the interleave channel and defines the mapping between subsequent input bytes at the inter-leaver input and their placement in the bit stream at the interleave output. Larger numbers provide greater separation between consecutive input bytes in the output bit stream, allowing for improved impulse noise immunity at the expense of payload latency. **Type:** Mandatory **Valid values:** 1 ~ 255 (milliseconds) **Default value:** 0 msec (due to profile generated)
< max-*ds-latency*>	Defines the maximum downstream interleaved path latency. It applies only to the interleave channel and defines the mapping between subsequent input bytes at the inter-leaver input and their placement in the bit stream at the interleave output. Larger numbers provide greater separation between consecutive input bytes in the output bit stream, allowing for improved impulse noise immunity at the expense of payload latency. **Type:** Mandatory **Valid values:** 1 ~ 255 (milliseconds) **Default value:** 0 msec (due to profile generated)
<min-us-inp>	Defines the minimum upstream INP (Impulse Noise Protect) capability. It indicates the multiple of INP symbol. **Type:** Mandatory **Valid values:** {0 | 1/2 | 1 | 2 | 4 | 8 | 16} **Default value:** 0 (due to profile generated)
<min-ds-inp>	Defines the minimum downstream INP (Impulse Noise Protect) capability. It indicates the multiple of INP symbol. **Type:** Mandatory **Valid values:** {0 | 1/2 | 1 | 2 | 4 | 8 | 16} **Default value:** 0 (due to profile generated)
<us-psd>	Defines upstream power spectrum density level. **Type:** Mandatory **Valid values:** -40.0 ~ 4.0 (dB/Hz) **Default value:** 0 dB/Hz (due to profile generated)
<ds-psd>	Defines downstream power spectrum density level. **Type:** Mandatory **Valid values:** -40.0 ~ 4.0 (dB/Hz) **Default value:** 1.0 dB/Hz (due to profile generated)

Table 4-30 ADSL Connection Profile Configuration **(continued)**

Parameters	Task
<target-snr>	Defines target SNR (Signal-to-Noise Ratio) margin for upstream or downstream signal. **Type:** Mandatory **Valid values:** 0.0 ~ 31.0 (dBm) **Default value:** 6.0 dBm (due to profile generated)
<min-snr>	Defines minimum SNR margin for upstream or downstream signal. **Type:** Mandatory **Valid values:** 0.0 ~ 31.0 (dBm) **Default value:** 0 dBm (due to profile generated)
<max-snr>	Defines maximum SNR margin for upstream or downstream signal. **Type:** Mandatory **Valid values:** 0.0 ~ 31.0 (dBm) **Default value:** 31.0 dBm (due to profile generated)
<down-shift-snr>	Defines down-shift SNR margin for upstream or downstream signal. **Type:** Mandatory **Valid values:** 0.0 ~ 31.0 (dBm) **Default value:** 0 dBm (due to profile generated)
<up-shift-snr>	Defines up-shift SNR margin for upstream or downstream signal. **Type:** Mandatory **Valid values:** 0.0 ~ 31.0 (dBm) **Default value:** 0 dBm (due to profile generated)
<mode>	Defines line power management L2 mode to be either ‘automatic’ or ‘manual’. Automatic – This mode enables the ADSL line to automatically transfer from the L0 (full-on) state to the L2 (low power) state whenever the downstream net data rate is lower than expected. And it also enables the ADSL line to automatically transfer from the L2 state to the L0 state once the NE begins to drop the downstream data. Manual –This mode allows the operator to manually force the specific ADSL line to transfer from the L2 state to the L0 state, and vice versa. **Type:** Mandatory **Valid values:** {automatic | manual} **Default value:** manual
< l2*-min-rate>*	Defines minimum rate and low-bound to data rate for power management L2 state in 32 kbps steps. **Type:** Mandatory **Valid values:** 32 ~ 29984 kbps **Default value:** 64 kbps
< l2*-max-rate>*	Defines maximum rate to data rate for power management L2 state in 32 kbps steps. **Type:** Mandatory **Valid values:** 32 ~ 29984 kbps **Default value:** 29984 kbps
<l2-low-rate-time>	It specifies the contiguous time interval for which the downstream mean net data rate is below the ‘L2 State Min & Low Rate’ on a ADSL line. (See the Note below) **Type:** Mandatory **Valid values:** 0 ~ 65535 seconds **Default value:** 300 seconds
<l0-time>	It specifies the minimum time (seconds) the ADSL line must stay at the L0 state. During this time interval, the ADSL line is not allowed to transfer to the L2 state. It is the so-called L0-TIME as defined in ITU-T G.997.1. (See the Note below) **Type:** Mandatory **Valid values:** 0 ~ 65535 seconds **Default value:** 900 seconds
<denied | accepted>	Defines the management L3 request. If it is, the ADSL lines applied this profile will accept request from CPE and transfer their power management state into L3 by the CPE request. **Type:** Mandatory **Valid values:** {denied | accepted} **Default value:** accepted

NOTE

Comparison of ADSL ‘**adaptive-rate** mode’ and ‘**dynamic-rate** mode’.

- **Adaptive-rate** mode: When the ADSL loop is in the ‘**adaptive-rate** mode’, the NE will re-try to establish a new lower-rate connection with the ATU-R whenever the NE or ATU-R detects 10 consecutive SESs (Severely Error Seconds) in this mode.
- **Dynamic-rate** mode: When the ADSL loop is in the ‘**dynamic-rate** mode’, the NE will trigger the SRA (Seamless Rate Adaptation) process to change the line rates without losing the connection with ATU-R whenever the physical loop environment varies in this mode.

NOTE

The associated parameters of the **Dynamic-rate** mode are as follows.

‘*<up-shift-snr>*’, ‘*<down-shift-snr>*’, ‘*< us-up-shift >*/*< ds-up-shift >*’ and ‘*< us-down-shift>*/*< ds-down-shift >*’

NOTE

In the **Dynamic-rate** mode, the NE will lose the connection with ATU-R if it fails to complete the SRA process to change the line rates

NOTE

The following relationship holds when setting their values.

<min-snr> ≤ *<down-shift-snr>* ≤ *<target-snr>* ≤ *<up-shift-snr>* ≤ *<max-snr>*.

NOTE

Comparison of ADSL ‘**interleave** channel mode’ and ‘**fast** channel mode’

- **Interleave** channel mode: When the ADSL loop is in the ‘**Interleave** channel mode’, it enhances the immunity to the impulse noise like lighting. However, its side effect is to introduce the transmission latency. Hence it is suitable for the time-insensitive data transmission, like file transfer.
- **Fast** channel mode: When the ADSL loop is in the ‘**fast** channel mode’, the latency introduced by the ADSL link is shortest. Hence, it is suitable for the transmission of time-sensitive information such as audio.

NOTE

The default upstream/downstream PSD spectrums in G.992.1 ADSL, G.992.3 ADSL2 and G.992.5 ADSL2+ are different. To simply the configuration effort, *<us-psd>* and *<ds-psd>* here indicate the deviation from the default upstream and downstream PSD spectrums in G.992.x, respectively. Hence, it is recommended to set *<us-psd>* and *<ds-psd>* as zero in normal case.

NOTE

The relationship among *<us-psd>*, observed upstream SNR margin, observed ADSL line upstream rate and ADSL line reach.

- Higher *<us-psd>* results in either higher observed SNR margin or higher observed ADSL line rate or longer ADSL line reach.
- Higher *<us-psd>* also results in more severe Cross Talk.

Hence, for fixed ADSL reach, you will observe either high SNR margin or high ADSL line rate. When you do not need high SNR margin or high ADSL line rate, you can lower the *<us-psd>* to save power (save money).

The above description applies to the relationship among *<ds-psd>*, observed downstream SNR margin, observed ADSL line downstream rate and ADSL line reach.

NOTE

In order to save power, G.992.3 and G.992.5 define the power management function. The operator can either configure the ADSL line Transmission (Tx) power be either manually or automatically managed.

The automatic power management function enables the ADSL line to automatically transfer from the L0 (full-on) state to the L2 (low power) state whenever the downstream net data rate is lower than expected. And it also enables the ADSL line to automatically transfer from the L2 state to the L0 state once the NE begins to drop the downstream data.

Concepts about the setting of automatic L0/L2 power management (**l2 pwr-mgt)**

- The default values are to let the ADSL line be always in the L0 state. If you want to save power, you can alter these values.
- Whenever the ADSL chip detects that the subscriber's data traffic is low on this ADSL line, and it meets the criterion constructed by the setting of <l2-min-rate>, <l2-max-rate>, <l2-low-time> and <l0-time>. The ADSL chip will let the ADSL line enter L2 state to save power. (The ADSL chip will lower the PSD Spectrum to achieve this purpose)

In order to let the ADSL line avoid going into and out of L2 too often, the following L0⇔L2 state transition criteria are adopted.

L0→L2:

- The ADSL line must stay at the L0 state for a period specified by 'L0 State Min Time to Start Monitoring' (i.e., the L0-TIME as defined in ITU-T G.997.1)
- After the L0-TIME, the NE begins to compute the mean net-data rate for a period of 'L2 State Low Rate Min Contiguous Time' on an ADSL line.
- The ADSL line transfers to the L2 state once the computed mean net-data rate is below the 'L2 State Min & Low Rate'.
- Once an ADSL line is at the L2 state, its downstream ADSL line rate is in the range from 'L2 State Min & Low Rate' to 'L2 State Max Rate'.

L2→L0:

- The ADSL line immediately transfers to the L0 state once the NE detects packet loss on the ADSL line in the down stream direction.

Example 36Add a new ADSL connection profile with desired values

```
CLI(config profile adsl-line)# add bank
OK

CLI(config profile adsl-line)# set adaptive-rate bank 512 2048 1024 8192
OK

CLI(config profile adsl-line)# set line-mode bank interleave 10 10 1 1
OK

CLI(config profile adsl-line)# set line-standard bank adsl,adsl2,adsl2m
OK

CLI(config profile adsl-line)# enable bank
OK

CLI(config profile adsl-line)# show bank
profile [bank]
  status      : enabled
  line mode    : interleave
  rate mode    : adaptive
    line standard    : ADSL(G.DMT,G.lite),ADSL2,ADSL2 Annex M
                              up-stream   down-stream
                             -----------  -----------
  fast rate (min/max)            :    64/2976     64/29984 kbps
  interleave rate (min/max)        :    64/2976     64/29984 kbps
  interleave max delay            :         6           6 ms
  interleave min INP symbol time   :         0           0
```

```
target SNR margin              :       6.0         6.0 dB
min./max. SNR margin            :   0.0/31.0     0.0/31.0 dB
down/up shift SNR margin         :    0.0/0.0      0.0/0.0 dB
down/up shift time              :       0/0          0/0 sec
PSD                         :       0.0         0.0 dBm/Hz
power management setting:
   L2-mode   L2-min-rate  L2-max-rate  L2-low-time   L0-time    CPE L3
  ---------  -----------  -----------  -----------  ---------  --------
    manual      32 kbps   29984 kbps      300 sec    900 sec  accepted
```

Attaching the ADSL connection profile to the proper ADSL line port can be tasked to the "**config port**" sub-group directory. It refers to the Section "Configuring the ADSL Line Port"of 5.

Once the ADSL connection profile is created, the operator can apply it to distinct ADSL line port by the CLI commands in the "**config port**" sub-group directory. Please refers to the Section "Configuring the ADSL Line Port"of 5. for the related command.

Configuring the ADSL Performance Alarm Profile

The PM threshold profile sets the threshold values for the performance parameters associated with the ADSL line. The NE will report the threshold-over trap (i.e. TCA, Threshold-Crossing Alarm) to the AMS LCT (or AMS Server) when the specified performance threshold is over.

During the accumulation cycle, if the current value of a performance parameter reaches or exceeds its corresponding threshold value, a threshold crossing alert (TCA) is generated by the system and sent to trap station. TCAs provide early detection of performance degradation. When a threshold is crossed, the ADSL line port continues to count the errors during a given accumulation period. If 0 is entered as the threshold value, the NE never sends the corresponding TCA.

The NE supports to define the Near-End and Far-End thresholds of ES (Errored Seconds), SES (Severely Errored Seconds), and UAS (Unavailable Seconds) conditions in 15 minutes and 1 day interval. The definition of ES, SES and UAS are as follows.

- ES (Error Second)
  ES corresponds to “ES-L” defined in ITU-T G.997.1 (2003 Edition)
  ITU-T G.997.1 defines ES as a count of 1-second intervals with one or more CRC-8 anomalies summed over all received bearer channels, or one or more LOS defects, or one or more SEF defects, or one or more LPR defects.

- SES (Several Error Second)
  SES corresponds to the “SES-L” defined in ITU-T G.997.1 (2003 Edition).
  ITU-T G.997.1 defines ES as a count of 1-second intervals with 18 or more CRC-8 anomalies summed over all received bearer channels, or one or more LOS defects, or one or more SEF defects, or one or more LPR defects.

- UAS (UnAvailable Second)
  UAS corresponds to the “UAS-L” defined in ITU-T G.997.1 (2003 Edition).
  ITU-T G.997.1 defines ES as a count of 1-second intervals for which the ADSL line is unavailable. The ADSL line becomes unavailable at the onset of 10 contiguous SES-Ls. The 10 SES-Ls are included in unavailable time. Once unavailable, the ADSL line becomes available at the onset of 10 contiguous seconds with no SES-Ls. The 10 seconds with no SES-Ls are excluded from unavailable time. Some parameter counts are inhibited during unavailability

Enter to the “**config profile adsl-alarm**” sub-group directory to manage the ADSL performance alarm profile.

```
CLI# config profile adsl-alarm
CLI(config profile adsl-alarm)#
```

Table 4-31 shows the performance alarm profile configuration of the ADSL line. 4 shows the usage of these commands as well as its related parameters.

Table 4-31 ADSL Performance Alarm Profile Configuration

The following command is to generate a new ADSL performance alarm profile.

CLI(config profile adsl-alarm)# add <*profile-name*>

The following command is to remove the specific ADSL performance alarm profile.

CLI(config profile adsl-alarm)# del <*profile-name*>

The following command is to activate the specific ADSL performance alarm profile.

CLI(config profile adsl-alarm)# enable <*profile-name*>

The following command is to deactivate the specific ADSL performance alarm profile.

CLI(config profile adsl-alarm)# disable <*profile-name*>

The following command is to modify the performance ADSL alarm profile parameters at Near-End and Far-End.

CLI(config profile adsl-alarm)# set <*profile-name*> <*15min-es*> <*15min-ses*> <*15min-uas*> <*1day-es*> <*1day-ses*> <*1day-uas*> [*near* | *far*]

The following command is to monitor the ADSL performance alarm profile information.

CLI(config profile adsl-alarm)# show [<*profile-name*>]

Parameters	**Task**
<*profile-name*>	This specifies the performance alarm profile name **Type:** Mandatory **Valid values:** String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').
<*15min-es*>	When the keyword "*near*" is set, This field indicates the threshold of Errored Seconds (ES) on the CO (Central Office) side during the last 15 minutes. When the threshold is set to 10, the NE launches a trap (alarm) if the count of specific errors exceeds 10 during the last 15 minutes. When the keyword "*far*" is set, This field indicates the threshold of Errored Seconds (ES) on the RT side (CPE) during the last 15 minutes. When the threshold is set to 10, the NE launches a trap (alarm) if the count of specific errors exceeds 10 during the last 15 minutes. **Type:** Mandatory **Valid values:** 0 ~ 900 **Default value:** 0 (due to profile generated)
<*15min-ses*>	When the keyword "*near*" is set, This field indicates the threshold of Severely Errored Seconds (SES) on the CO (Central Office) side during the last 15 minutes. When the threshold is set to 10, the NE launches a trap (alarm) if the count of specific errors exceeds 10 during the last 15 minutes. When the keyword "*far*" is set, This field indicates the threshold of Severely Errored Seconds (SES) on the RT side (CPE) during the last 15 minutes. When the threshold is set to 10, the NE launches a trap (alarm) if the count of specific errors exceeds 10 during the last 15 minutes. **Type:** Mandatory **Valid values:** 0 ~ 900 **Default value:** 0 (due to profile generated)

Table 4-31 ADSL Performance Alarm Profile Configuration (continued)

Parameters	Task
<15min-uas>	When the keyword "*near*" is set, This field indicates the threshold of Unavailable Seconds (UAS) on the CO (Central Office) side during the last 15 minutes. When the threshold is set to 10, the NE launches a trap (alarm) if the count of specific errors exceeds 10 during the last 15 minutes. When the keyword "*far*" is set, This field indicates the threshold of Unavailable Seconds (UAS) on the RT side (CPE) during the last 15 minutes. When the threshold is set to 10, the NE launches a trap (alarm) if the count of specific errors exceeds 10 during the last 15 minutes. **Type:** Mandatory **Valid values:** 0 ~ 900 **Default value:** 0 (due to profile generated)
<1day-es>	When the keyword "*near*" is set, This field indicates the threshold of Errored Seconds (ES) on the CO (Central Office) side during the last 1 day. When the threshold is set to 10, the NE launches a trap (alarm) if the count of specific errors exceeds 10 during the last 1 day. When the keyword "*far*" is set, This field indicates the threshold of Errored Seconds (ES) on the RT side (CPE) during the last 1 day. When the threshold is set to 10, the NE launches a trap (alarm) if the count of specific errors exceeds 10 during the last 1 day.. Type: Mandatory **Valid values:** 0 ~ 86400 **Default value:** 0 (due to profile generated)
<1day-ses>	When the keyword "*near*" is set, This field indicates the threshold of Errored Seconds (SES) on the CO (Central Office) side during the last 1 day. When the threshold is set to 10, the NE launches a trap (alarm) if the count of specific errors exceeds 10 during the last 1 day. When the keyword "*far*" is set, This field indicates the threshold of Severely Errored Seconds (SES) on the RT side (CPE) during the last 1 day. When the threshold is set to 10, the NE launches a trap (alarm) if the count of specific errors exceeds 10 during the last 1 day. **Type:** Mandatory **Valid values:** 0 ~ 86400 **Default value:** 0 (due to profile generated)
<1day-uas>	When the keyword "*near*" is set, This field indicates the threshold of Unavailable Seconds (UAS) on the CO (Central Office) side during the last 1 day. When the threshold is set to 10, the NE launches a trap (alarm) if the count of specific errors exceeds 10 during the last 1 day. When the keyword "*far*" is set, This field indicates the threshold of Unavailable Seconds (UAS) on the RT side (CPE) during the last 1 day. When the threshold is set to 10, the NE launches a trap (alarm) if the count of specific errors exceeds 10 during the last 1 day. **Type:** Mandatory **Valid values:** 0 ~ 86400 **Default value:** 0 (due to profile generated)
[*near* | *far*]	Identify the given performance parameter value in Near-End or Far-End side, CLI Ex will apply the same performance parameter value for Near-End and Far-End if not specify. **Type:** Optional **Valid values:** near, far

Example 37Add a new performance alarm profile with correspond performance parameter values

```
CLI(config profile adsl-alarm)# add bank_pm
OK

CLI(config profile adsl-alarm)# set bank_pm 10 15 20 30 40 50
OK
```

```
CLI(config profile adsl-alarm)# enable bank_pm
OK

CLI(config profile adsl-alarm)# show

profile [bank_pm]: enabled
   side-end  15min-es  15min-ses  15min-uas  1day-es  1day-ses  1day-uas
   --------  --------  ---------  ---------  -------  --------  --------
   near end      10        15        20       30       40        50
    far end      10        15        20       30       40        50
```

Once the performance alarm profile is created, the operator can apply it to distinct ADSL line port by the CLI commands in the “**config port**” sub-group directory.

Please refer to the Section “Configuring the ADSL Line Port” of 5 for the related command.

Configuring the Traffic Policing Profile

Traffic policing is to monitor network traffic for conformity with the Service Level Agreement (SLA) between subscribers and ISP (or NSP).

According to the SLA, the edge network equipment (NE) either drops or marks subscriber’s out-of-profile traffic with designated DSCP values to enforce compliance with that SLA.
The traffic policing profile serves to keep the rules per the SLA.

Once the traffic policing profile is created, the operator can apply it to distinct ADSL line port by the CLI commands in the “**config port**” sub-group directory. Please refer to the Section “Configuring the ADSL Line Port” of 5 for the related command.

One example of application of traffic policing is as follows.

Suppose that the SLA defines that the subscriber can send upstream traffic at the rate up to 1.5Mbps. However, the NSP has the right to remark the DSCP value of traffic higher than 1Mbps when the network is in congestion.To accomplish this SLA, the operator can set the CIR to be 1Mbps, and set the out-of-profile action to remark the DSCP value to BE.

To verify the aforementioned setting, you can send 1.5Mega bit in one second in the upstream direction, then set the SmartBit (which connects to GE port to receive the upstream traffic) to capture the upstream traffic. And you will see that the DSCP of IP packet about 0.5Mbit is the value what you set “out-of-profile action”

Enter to the “**config profile metering”** sub-group directory to manage the traffic policing profile.

```
CLI# config profile metering
CLI(config profile metering)#
```

Table 4-32 shows the commands to perform the configuration of traffic policing profile.4 shows the usage of these commands as well as their related parameters.

Table 4-32 Traffic Policing Profile Configuration

The following command is to generate a new traffic policing profile.

CLI(config profile metering)# add <*profile-name*>

The following command is to remove the specific traffic policing profile.

CLI(config profile metering)# del <*profile-name*>

The following command is to modify the traffic policing profile and it desired parameters.

CLI(config profile metering)# set <*profile-name*> <*cir*> <*action*>

The following command is to monitor the traffic policing profile information.

CLI(config profile metering)# show [<*profile-name*>]

Parameters	Task
<*profile-name*>	This specifies the traffic policing profile name **Type:** Mandatory **Valid values:** String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').
<*cir*>	Defines the committed information rate of traffic policing profile. **Type:** Mandatory **Valid values:** 0 ~ 2 (mbps)
<*action*>	This identifies which value will DSCP be replace, drop packets or do nothing when user's upstream traffic exceeds CIR. **Type:** Mandatory **Valid values:** no-action | drop | BE | AF11 | AF12 | AF13 | AF21 | AF22 | AF23 | AF31 | AF32 | AF33 | AF41 | AF42 | AF43 | EF

Example 38Add a new traffic policing Profile with desired values

```
CLI(config profile metering)# add Adsl_tp
OK

CLI(config profile metering)# set Adsl_tp 100 AF32
OK

CLI(config profile metering)# show

Traffic Policing  [Adsl_tp]
   CIR (Mbps)  action
   ----------  ---------
        100  DSCP-AF32
```

The "Service Type Control" should be enabled when Traffic Policing Profile is assigned to xDSL subscribers (refers to Section "Defining the Line Card Operation Mode" of 5 for the commands related to the setting of "Service Type Control").

Please refer to Figure 6-7 and accompany paragraphs for more details of Differentiated Service Code Point.

Configuring the SHDSL Connection Profile

A profile corresponds to a particular set of parameters, and can be referenced to by separated

SHDSL line port.

Enter to the “**config profile shdsl-conf**” sub-group directory to manage the SHDSL connection profile.

```
CLI# config profile shdsl-conf
CLI(config profile shdsl-conf)#
```

Table 4-33 shows the connection profile configuration of the SHDSL line. 4 shows the usage of these commands as well as its related parameters.

Table 4-33 SHDSL Connection Profile Configuration

The following command is to generate a new SHDSL connection profile.
CLI(config profile shdsl-conf)# add <*name*>
The following command is to remove the specific SHDSL connection profile.
CLI(config profile shdsl-conf)# del <*name*>
The following command is to activate the specific SHDSL connection profile.
CLI(config profile shdsl-conf)# enable <*name*>
The following command is to deactivate the specific SHDSL connection profile.
CLI(config profile shdsl-conf)# disable <*name*>
The following command is to set the line probe state before training with STU-R.
CLI(config profile shdsl-conf)# set line-probe <*name*> <*enabled-state*>
The following command is to set the PSD mask of the SHDSL connection profile.
CLI(config profile shdsl-conf)# set psd <*name*> <*psd-value*>
The following command is to set the single-pair minimum/maxmum rate of the SHDSL connection profile.
CLI(config profile shdsl-conf)# set rate <*name*> <*min-rate*> <*max-rate*>
The following command is to set the SNR margin of the SHDSL connection profile.
CLI(config profile shdsl-conf)# set snr-margin <*name*> <*down-current-snr*> <*down-worst-snr*> <*up-current-snr*> <*up-worst-snr*>
The following command is to set the transmission mode of the SHDSL connection profile.
CLI(config profile shdsl-conf)# set transmission <*name*> <*transmission-mode*>
The following command is to set the used SNR margins of the SHDSL connection profile.
CLI(config profile shdsl-conf)# set used-snr <*name*><*used-snr-list*>
The following command is to monitor the SHDSL connection profile information.
CLI(config profile shdsl-conf)# show [<*name*>]

Parameters	Task
<*name*>	It specifies the the SHDSL connection profile name **Type:** Mandatory **Valid values:** String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').
<*min-rate*>	It specifies the minimum transmit rate, this parameter is available for adaptive. rate mode. **Type:** Mandatory **Valid values:** 72 ~ 2312 (multiple of 64 kbps) **Default value:** 72 kbps (due to profile generated)
<*max-rate*>	It specifies the maximum transmit rate, this parameter is available for adaptive . rate mode. **Type:** Mandatory **Valid values:** 72 ~ 2312 (multiple of 64 kbps) **Default value:** 72 kbps (due to profile generated)
<*psd-value*>	It specifies the setting of PSD Mask to be symmetric or asymmetric. **Type:** Mandatory

The following command is to generate a new SHDSL connection profile.

CLI(config profile shdsl-conf)# add <*name*>

The following command is to remove the specific SHDSL connection profile.

CLI(config profile shdsl-conf)# del <*name*>

The following command is to activate the specific SHDSL connection profile.

	Valid values: 1 = symmetric, 2 = asymmetric **Default value:** 1

Table 4-33 SHDSL Connection Profile Configuration (continued)

Parameters	Task
<*transmission-mode*>	It specifies the e transmission mode, Annex A, Annex B, or both. **Type:** Mandatory **Valid values:** 1:Annex.A or 2:Annex.B or 3:Both. **Default value:** 3
<*down-current-snr*>	It specifies the downstream current target SNR margin. **Type:** Mandatory **Valid values:** -10 ~ 21 (dBm) **Default value:** 6 dBm (due to profile generated)
<*down-worst-snr*>	It specifies the downstream worst target SNR margin **Type:** Mandatory **Valid values:** -10 ~ 21 (dBm) **Default value:** 6 dBm (due to profile generated)
<*up-current-snr*>	It specifies the upstream current target SNR margin. **Type:** Mandatory **Valid values:** -10 ~ 21 (dBm) **Default value:** 6 dBm (due to profile generated)
<*up-worst-snr*>	It specifies the upstream worst target SNR margin **Type:** Mandatory **Valid values:** -10 ~ 21 (dBm) **Default value:** 6 dBm (due to profile generated)
<*used-snr-list*>	It specifies that it uses SNR bit-map, 0:down-current, 1:down-worst, 2:up-current, 3:up-worst **Type:** Mandatory **Valid values:** 0, 1, 2, 3
<*enabled-state*>	It specifies to enable or disable the line probe state before training with STU-R. Enable: To make the 'line rate limit' up to 2312Kbps. Disable: To make the 'line rate limit' up to 1.5Mbps. **Type:** Mandatory **Valid values:** 1 =enable, 2= disable.

In the case that <*minrate*> is equal to <*maxrate*>, the SHDSL line is to be in the '**fixed-rate** mode'.

In the case that <*minrate*> is not equal to <*maxrate*>, the SHDSL line is to be in the '**adaptive-rate** mode'.

Example 39Add a new SHDSL Connection Profile with desired values

```
CLI(config profile shdsl-conf)# add shdsl_conf
OK

CLI(config profile shdsl-conf)# set line-probe shdsl_conf 1
OK

CLI(config profile shdsl-conf)# set psd shdsl_conf 1
OK
```

```
CLI(config profile shdsl-conf)# set rate shdsl_conf 300 2312
OK

CLI(config profile shdsl-conf)# set snr-margin shdsl_conf 6 6 6 6
OK

CLI(config profile shdsl-conf)# set transmission shdsl_conf 1
OK

CLI(config profile shdsl-conf)# set used-snr shdsl_conf dc
OK

CLI(config profile shdsl-conf)# show

profile  [shdsl_conf]
  status                          : disabled
  single-pair minimum/maxmum rate    : 264K/2312K
  PSD mask                        : symmetric
  transmission mode                  : region1-Annex.A
  line probe support                : enabled

  SNR margin:
    current down   worst down    current up     worst up      used SNR
    ------------  ------------  ------------  ------------  ------------
          6            6            6            6           DC
```

Configuring the SHDSL Performance Alarm Profile

The PM threshold profile sets the threshold values for the performance parameters associated with the SHDSL line. The NE will report the threshold-over trap (i.e. TCA, Threshold-Crossing Alarm) to the AMS LCT (or AMS Server) when the specified performance threshold is over.

During the accumulation cycle, if the current value of a performance parameter reaches or exceeds its corresponding threshold value, a threshold crossing alert (TCA) is generated by the system and sent to trap station. TCAs provide early detection of performance degradation. When a threshold is crossed, the SHDSL line port continues to count the errors during a given accumulation period. If 0 is entered as the threshold value, the NE never sends the corresponding TCA.

The NE supports to define the Near-End and Far-End thresholds of ES (Errored Seconds), SES (Severely Errored Seconds), and UAS (Unavailable Seconds) conditions in 15 minutes interval. The definition of ES, SES and UAS are as follows.

- ES (Error Second)
  ES corresponds to "ES-L" defined in ITU-T G.997.1 (2003 Edition)
  ITU-T G.997.1 defines ES as a count of 1-second intervals with one or more CRC-8 anomalies summed over all received bearer channels, or one or more LOS defects, or one or more SEF defects, or one or more LPR defects.

- SES (Several Error Second)
  SES corresponds to the "SES-L" defined in ITU-T G.997.1 (2003 Edition).
  ITU-T G.997.1 defines ES as a count of 1-second intervals with 18 or more CRC-8 anomalies summed over all received bearer channels, or one or more LOS defects, or one or more SEF defects, or one or more LPR defects.

- UAS (UnAvailable Second)
  UAS corresponds to the "UAS-L" defined in ITU-T G.997.1 (2003 Edition).
  ITU-T G.997.1 defines ES as a count of 1-second intervals for which the ADSL line is unavailable. The ADSL line becomes unavailable at the onset of 10 contiguous SES-Ls. The 10 SES-Ls are included in unavailable time. Once unavailable, the ADSL line becomes available at the onset of 10 contiguous seconds with no SES-Ls. The 10 seconds with no SES-Ls are excluded from unavailable time. Some parameter counts are inhibited during unavailability

Enter to the "**config profile shdsl-alarm**" sub-group directory to manage the SHDSL performance alarm profile.

```
CLI# config profile shdsl-alarm
CLI(config profile shdsl-alarm)#
```

Table 4-34 shows the performance alarm profile configuration of the SHDSL line. 4 shows the usage of these commands as well as its related parameters

Table 4-34 SHDSL Performance Alarm Profile Configuration

The following command is to generate a new SHDSL performance alarm profile.

CLI(config profile shdsl-alarm)# add <*name*>

The following command is to remove the specific SHDSL performance alarm profile.

CLI(config profile shdsl-alarm # del <*name*>

The following command is to activate the specific SHDSL performance alarm profile.

CLI(config profile shdsl-alarm # enable <*name*>

The following command is to deactivate the specific SHDSL performance alarm profile.

CLI(config profile shdsl-alarm)# disable <*name*>

The following command is to modify the SHDSL performance alarm profile parameters at Near-End.

CLI(config profile shdsl-alarm)# set <*name*> [**atte** <*atte*> **snr** <*snr*> **es** <*es*> **ses** <*ses*> **crc** <*crc*> **losws** <*losws*>**uas** <*uas*>]

The following command is to monitor the SHDSL performance alarm profile information.

CLI(config profile shdsl-alarm)# show <*name*>

Parameters	Task
<*name*>	This specifies the performance alarm profile name **Type:** Mandatory **Valid values:** String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').
<*atte*>	This identifies the attenuation threshold. **Type:** Mandatory **Valid values:** 1 ~ 127
<*es*>	This field indicates the threshold of Errored Seconds (ES) on the CO (Central Office) side during the last 15 minutes. When the threshold is set to 10, the NE launches a trap (alarm) if the count of specific errors exceeds 10 during the last 15 minutes. **Type:** Mandatory **Valid values:** 0 ~ 900 **Default value:** 0 (due to profile generated)
<*ses*>	This field indicates the threshold of Errored Seconds (SES) on the CO (Central Office) side during the last 15 minutes. When the threshold is set to 10, the NE launches a trap (alarm) if the count of specific errors exceeds 10 during the last 15 minutes. **Type:** Mandatory **Valid values:** 0 ~ 900 **Default value:** 0 (due to profile generated)
<*crc*>	This identifies the CRC error threshold. **Type:** Mandatory **Valid values:** 0 ~ 44100
<*losws*>	This identifies the LOSWS error threshold. **Type:** Mandatory **Valid values:** 0 ~ 900
<*uas*>	This identifies the LOSWS error threshold. **Type:** Mandatory **Valid values:** 0 ~ 900
<*usa*>	This field indicates the threshold of Unavailable Seconds (UAS) on the CO (Central Office) side during the last 15 minutes. When the threshold is set to 10, the NE launches a trap (alarm) if the count of specific errors exceeds 10 during the last 15 minutes. **Type:** Mandatory **Valid values:** 0 ~ 900 **Default value:** 0 (due to profile generated)

Example 40Add a new SHDSL port alarm profile with desired values

```
CLI(config profile shdsl-alarm)# add shdsl_ex
OK
```

```
CLI(config profile shdsl-alarm)# set shdsl_ex atte 127 snr 10 ses 100 crc 12800 losws 100 uas 100
OK

CLI(config profile shdsl-alarm)# enable shdsl_ex
OK

CLI(config profile shdsl-alarm)# show

Profile  [shdsl_ex]
  Status        : enabled
  Attenuation   : 127
  SNR margin    : 10

   ES       SES          CRC          LOSWS      UAS
  -------   -------   -------   -------   -------
      0    100         12800      100            100
```

Configuring the VLAN Profile

VLAN Profile contains 2 categories of profiles which are described in the following 2 sub-section.

- Configuring the IP Traffic Profile
- Configuring the Multicast Service

As shown in Figure 4-3, NE forwards traffic on 2 kinds of connections, unicast connection and multicast connection, on the Data Level. For the unicast connection, it carries all traffic (unicast and broadcast) except multicast traffic. The attributes of unicast connection are specified by the IP Traffic Profile. As for the multicast connection, its attributes are specified by the Multicast Channel Profile. Moreover, the NE also supports to restrict the subscriber to receive a set of specific Multicast Channels. Multicast Service Profile records the set of specific Multicast Channels.

Configuring the IP Traffic Profile

Similar to the traffic policing profile, the IP traffic profile serves to keep the rules to enforce compliance with that SLA. (Please refer to Section “Configuring the Traffic Policing Profile” of 4 for the description of traffic policing)

However, it is noted that the scope of traffic policing profile is to police the traffic on a whole ADSL line. As to the IP traffic profile, its scope of is to police the traffic on a PVC in an ADSL line.

The operator can create the IP Traffic Profile according to the SLA and apply it to the corresponding VC-to-VLAN on demand.

By configures IP Traffic Profile, the following traffic attributions of a PVC is specified.

- The maximum upstream/downstream net-data rate limit.
  The system drops upstream/downstream packets whenever it exceeds the corresponding specified rate
- The downstream priority of the PVC
  The system forwards the downstream packets in a differentiated manner. That is, the

system only forwards the traffic on PVC of lower priority whenever either one of the following conditions happened:

- ■ There is no traffic on PVC of higher priority to be forwarded.
- ■ The volume of traffic on PVC of higher priority exceeds the specified downstream net-data rate in a unit time.

- ● The filtering of the downstream broadcasts traffic

Enter to the "**config profile ip-traffic**" sub-group directory to manage the IP traffic profile.

```
CLI# config profile ip-traffic
CLI(config profile ip-traffic)#
```

Table 4-35 shows the commands to perform the configuration of IP traffic profile. 4 shows the usage of these commands as well as their related parameters.

Table 4-35 IP Traffic Profile Configuration

The following command is to generate a new IP traffic profile.	
CLI(config profile ip-traffic)# add *<name>*	
The following command is to remove a new IP traffic profile.	
CLI(config profile ip-traffic)# del *<name>*	
The following command is to configure the rate limit of specific IP traffic profile.	
CLI(config profile ip-traffic)# set *<name> <us-rate> <ds-rate> <vc-priority> <bcast-filter>*	
The following command is to display the IP traffic profile information.	
CLI(config profile ip-traffic)# show	
Parameters	**Task**
<name>	This specifies the IP traffic profile name **Type:** Mandatory **Valid values:** String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').
<us-rate >	This specifies the upstream rate limit for subscriber IP traffic. **Type:** Mandatory **Valid values:** nolimit | 32k | 64k | 128k | 256k | 384k | 512k | 768k
<ds-rate>	This specifies the downstream rate limit for subscriber IP traffic. **Type:** Mandatory **Valid values:** 32 ~ 29984 kbps (multiple of 32 kbps)
< vc-priority >	This defines the downstream priority, the lower the priority, the higher the chance to get drop due to traffic congestion. **Type:** Mandatory **Valid values:** low | medium | high | highest
<bcast-filter>	This defines the downstream broadcast filter of ip-traffic profile. Available on the VLAN ID in which PVC used this ip-traffic. **Type:** Mandatory **Valid values:** drop | forward

Example 41Add a new IP traffic profile with desired values

```
CLI(config profile ip-traffic)# add Adsl_iptraffic

OK

CLI(config profile ip-traffic)# set Adsl_iptraffic no-limit 128 low forward

OK

CLI(config profile ip-traffic)# show
```

```
profile [Adsl_iptraffic]
  index            : 1
  US rate           : no Limit
  DS rate           : 128 (kbps)
  VC priority        : low
  broadcast filter    : forward
```

For each PVC,if the IP traffic profile is not configured or configured by mistake, the PVC can not be enabled.

Configuring the Multicast Service Related Profile

The NE supports to prevent the subscriber to receive un-booked TV channel (multicast channel) by checking the received “IGMP join” packet with a preconfigured Multicast Service Profile. Here, a Multicast Service Profile represents a set of Multicast (TV) Channel Profiles. Each Multicast (TV) Channel Profile describes the attributes of a multicast stream (TV channel). In other words, the subscriber is restriced to receive the TV channels described recorded in the Multicast Service Profile.

This section depicts the concept and configuration of Multicast Service Profile and Multicast Channel Profile.

Multicast Channel Profile Setting

The multicast channel profile sets value of multicast group IP and the associated downstream bandwidth resource, it is a menu list of the Multicast Channel (multicast group; i.e. a TV channel) provided by the Content Service Provider (CSP) or Application Service Provider (ASP).

Enter to the “**config profile mcast**” sub-group directory to manage the multicast channel profile.

```
CLI# config profile mcast
CLI(config profile mcast)#
```

Table 4-36 shows the commands to perform the configuration of multicast channel profile.4 shows the usage of these commands as well as their related parameters.

Table 4-36 Multicast Channel Profile Configuration

<table>
<tr><td colspan="2">The following command is to generate a new multicast group profile.</td></tr>
<tr><td colspan="2"><b>CLI(config profile mcast)# add</b> &lt;<i>profile-name</i>&gt;</td></tr>
<tr><td colspan="2">The following command is to remove the specific multicast group profile.</td></tr>
<tr><td colspan="2"><b>CLI(config profile mcast)# del</b> &lt;<i>profile-name</i>&gt;</td></tr>
<tr><td colspan="2">The following command is to activate the specific multicast group profile.</td></tr>
<tr><td colspan="2"><b>CLI(config profile mcast)# enable</b> &lt;<i>profile-name</i>&gt;</td></tr>
<tr><td colspan="2">The following command is to deactivate the specific multicast group profile.</td></tr>
<tr><td colspan="2"><b>CLI(config profile mcast)# disable</b> &lt;<i>profile-name</i>&gt;</td></tr>
<tr><td colspan="2">The following command is to modify the profile multicast group member and it desired parameters.</td></tr>
<tr><td colspan="2"><b>CLI(config profile mcast)# set</b> &lt;<i>profile-name</i>&gt; &lt;<i>group-ip</i>&gt; &lt;<i>rate</i>&gt; {<i>low</i> | <i>medium</i> | <i>high</i> | <i>highest</i>}</td></tr>
<tr><td colspan="2">The following command is to monitor the multicast group profile information.</td></tr>
<tr><td colspan="2"><b>CLI(config profile mcast)# show</b> [&lt;<i>profile-name</i>&gt;]</td></tr>
<tr><th>Parameters</th><th>Task</th></tr>
<tr><td>&lt;<i>profile-name</i>&gt;</td><td>This specifies the multicast channel profile name
<b>Type:</b> Mandatory
<b>Valid values:</b> String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').</td></tr>
</table>

Table 4-36 Multicast Channel Profile Configuration **(continued)**

<group-ip>	Defines class D IP addressing for multicast channel. **Type:** Mandatory **Valid values:** 224.0.1.0 ~ 239.255.255.255 **Default value:** 0.0.0.0 (due to profile generated)
<rate>	Defines the downstream transmission limit rate of multicast channel. **Type:** Mandatory **Valid values:** 32~29984 +32 kbps **Default value:** 32 kbps (due to profile generated)
{*low* | *medium* | *high* | *highest*}	Defines the downstream forwarding priority of the associated multicast channel **Type:** Mandatory **Valid values:** low, medium, high, highest **Default value:** low (due to profile generated)

Example 42Add a new multicast service Profile with desired values

```
CLI(config profile mcast)# add Adsl_ms
OK

CLI(config profile mcast)# set Adsl_ms 224.0.1.1 1024 high
OK

CLI(config profile mcast)# enable Adsl_ms
OK

CLI(config profile mcast)# show

profile [Adsl_ms]
     grouip-ip     rate(kbps)  priority   status
   ---------------  ----------  --------  --------
       224.0.1.1        1024      high   enabled
```

Multicast Service Profile Setting

The multicast service profile is a set of Multicast Channel profiles. Once the Multicast Channel profiles are created, you can generate the multicast service profile to bind suitable Multicast Channel profiles. Each multicast service profile is viewed as a service package for the subscriber to book. The operator then applies the booked multicast service profile to the distinct VC-to-VLAN associated with the subscriber. Please refer to the Section "Configuring a VC-to-VLAN Connection for the VC of RFC2684 Bridged Mode" and Section "Configuring a VC-to-VLAN Connection for the VC of RFC2684 Routed Mode"of for the related command.

Whenever the subscriber clicks his remote controller to watch a TV channel transmitted via the ADSL line, the set-top-box sends the corresponding IGMP report packet. The NE will forward IGMP packet if its multicast IP hits the associated multicast service profile. Otherwise, the NE drops the IGMP packet. As a result, the subscriber is restricted to watch the TV programs that he booked.

Attaching the multicast profile to the proper ADSL line port can be tasked at "**config profile mservice**" sub-group directory, refers to Section "Multicast Service Management"of .

Enter to the "**config profile mservice**" sub-group directory to manage the multicast service profile.

```
CLI# config profile mservice
CLI(config profile mservice)#
```

Table 4-37 shows the commands to perform the configuration of multicast service profile. 4 and 4 show the usage of these commands as well as their related parameters.

Table 4-37 Multicast Service Profile Configuration

The following command is to generate a new multicast service profile.
CLI(config profile mservice)# add *<service-name>*
The following command is to remove the specific multicast service profile.
CLI(config profile mservice)# del *<service-name>*
The following command is to add the multicast channel profile into specific multicast service profile.
CLI(config profile mservice)# subscribe *<service-name> <profile-list>*
The following command is to remove the multicast channel profile from specific multicast service profile.
CLI(config profile mservice)# cancel *<service-name> <profile-list>*
The following command is to monitor the multicast service profile information.
CLI(config profile mservice)# show

Parameters	Task
<service-name>	This specifies the multicast service profile name **Type:** Mandatory **Valid values:** String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').
<profile-list>	This specifies the multicast group profile name. **Type:** Mandatory **Valid values:** String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@'). **Format:** xxx or xxx|xxx|…|xxx (xxx indicate as multicast group profile)

Example 43Create a new multicast channel profile with desired values

```
CLI(config profile mcast)# add HBO
OK

CLI(config profile mcast)# add ESPN
OK

CLI(config profile mcast)# add CNN
OK

CLI(config profile mcast)# set HBO 224.1.1.10 29984 high
OK

CLI(config profile mcast)# set ESPN 224.1.1.11 29984 medium
OK

CLI(config profile mcast)# set CNN 224.1.1.12 29984 highest
OK

CLI(config profile mcast)# show
profile [HBO]
      grouip-ip     rate(kbps)  priority   status
   --------------- ---------- -------- --------
        224.1.1.10       29984      high  disabled

profile [ESPN]
      grouip-ip     rate(kbps)  priority   status
   --------------- ---------- -------- --------
```

```
      224.1.1.11       29984    medium  disabled

profile [CNN]
     grouip-ip     rate(kbps)  priority   status
   ---------------  ----------  --------  --------
      224.1.1.12       29984   highest  disabled
```

Example 44Subscribe sets of multicast channel into service profile

```
CLI(config profile mservice)# add program-1
OK

CLI(config profile mservice)# subscribe program-1 HBO|ESPN
OK

CLI(config profile mservice)# add program-2
OK

CLI(config profile mservice)# subscribe program-2 HBO|ESPN|CNN
OK

CLI(config profile mservice)# show

Profile  [program-1]
   Mcast Profile: "HBO", "ESPN",
Profile  [program-2]
   Mcast Profile: "HBO", "ESPN", "CNN",
```

Chapter 5Managing the Subscriber Interface

This chapter describes the CLI commands to apply the relative profile to Subscriber interface in the following sections:

- Configuring the ADSL Line Port
- Monitoring the ADSL Connection Status
- Configuring the SHDSL Line Port
- Monitoring the SHDSL Connection Status
- **Subscriber Interface Administrating**

Configuring the ADSL Line Port

This section depcits the CLI commands to apply the following ADSL-related profiles to the ADSL line port in interest.

- ADSL Connection Profile
- ADSL Performance Alarm Profile
- Traffic Policing Profile

This section also depcits the CLI commands to manually perform the power management of the ADSL line port in interest.

On the other hand, the NE allows the operator to specify Agent Remote ID with an ASCII string of up to 63 characters. As to the Agent Circuit ID, it is not permitted to be modified. The format of Agent Circuit ID is as follows.
    "NE-InbandIP-userSrcMAC atm slot-port:VPI.VCI"
Here is one example Agent Circuit ID
    "IP_DSLAM-100.168.3.97-00:11:d8:80:93:23 atm 3-1:100.33",
which represents
    NE's inband IP=100.168.3.97,
    MAC address of subscriber's personal computer (or the CPE)= 00:11:d8:80:93:23,
    slot = 3, port = 1, vpi = 100, vci = 33.

The xDSL Port Agent ID List keeps the Agent Circuit ID (intended for circuits terminated by the system hosting the Relay agent) and Agent Remote ID (intended to identify the remote host end of a circuit).

xDSL Port Agent ID is to be inserted into either all upstream DHCP messages sent by the client and all upstream PPPoE discovery stage packets

Enter to the "**config port**" sub-group directory to configure the relative profile on the ADSL line port.

```
CLI# config port
CLI(config port)#
```

Table 4-37 shows the commands to perform the configuration of multicast service profile. 5 shows the usage of these commands as well as their related parameters.

Table 5-38 ADSL Port Interface Configuration

The following command is to add the packet filter to specific ADSL line ports.
CLI(config port)# add packet-filter <*port-range*> <*group-name-set*>
The following command is to apply the PM alarm profile to specific ADSL line ports.
CLI(config port)# set adsl-alarm-profile <*port-range*> <*profile-name*>
The following command is to apply connection profile to specific ADSL line ports.
CLI(config port)# set adsl-line-profile <*port-range*> <*profile-name*>
The following command is to force the ADSL2/ADSL2+ power management status. (manual mode only)
CLI(config port)# set adsl-pwr-mgt <*port-range*> <*pwr-state*>
The following command is to apply the traffic policing profile to specific ADSL line ports.
CLI(config port)# set metering <*port-range*> <*profile-name*>
The following command is to apply an “Agent Remote ID” to specific xDSL line port.
CLI(config port)# set remote-id <*port-range*> <*idstring*>
The following command is to remove the remote ID from specific subscriber port.
CLI(config port)# clear remote-id <*port-range*>
The following command is to remove traffic policing profile from specific subscriber port.
CLI(config port)# clear metering <*port-range*>
The following command is to remove the PM alarm profile from specific subscriber port.
CLI(config port)# clear alarm-profile <*port-range*>
The following command is to remove the packet filter from the specific ADSL line ports.
CLI(config port)# clear packet-filter <*port-range*>
The following command is to apply the PM alarm profile to specific SHDSL line port.
CLI(config port)# set shdsl-alarm-profile <*port-range*> <*profile-name*>
The following command is to apply connection profile to specific SHDSL line port.
CLI(config port)# set shdsl-conf-profile <*port-range*> <*profile-name*>
The following command is to view the configuration status of ADSL line port in interest.
CLI(config port)# show <*port-range*>

Parameters	Task
<*port-range*>	Identify the port range of the system to apply the relevance profile of line port. **Type:** Mandatory **Valid values:** See the Section “Port Interface Indication” of 3.
<*profile-name*>	Defines the profile name; connection profile, performance alarm profile or traffic policing profile. **Type:** Mandatory **Valid values:** The name of “connection profile”, “performance alarm profile” or “traffic policing profile”
<*pwr-state*>	Defines the ADSL2/ADSL2+ power management operating status, switch between L0, L2 and L3 will only be available if ADSL power management is in “Manual” mode. **Type:** Mandatory **Valid values:** L0, L2,L3
<*group-name-set*>	Defines the set of the filter name configured for upstream/downstream traffic on the specified ADSL line card. **Type:** Mandatory **Valid values:** String of up to 20 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@', '/').
<*idstring*>	Identify the remote ID information which is used for the DHCP option 82 tag and PPPoE tag.

The “Service Type Control” should be enabled when Traffic Policing Profile is assigned to xDSL subscribers (refers to Section “Defining the Line Card Operation Mode” of 5 for the commands related to the setting of “Service Type Control”).

Example 45Apply the profile to the specify of ADSL line port

```
CLI(config port)# set adsl-line-profile 1.6 ADSL_P1

OK

CLI(config port)# set adsl-alarm-profile 1.6 ADSL_PM
OK

CLI(config port)# set remote-id 1.6 1234
OK

CLI(config port)# set metering 1.6 ADSL_TRAF
OK: But LC1 STC is disabled. The traffic policing is not active until STC enabled.

CLI(config port)# show 1.6

Port: 1.6
  admin status          : enabled
  oper status           : up
  ADSL config profile   : "ADSL_P1"
  ADSL alarm profile    : "ADSL_PM"
  SHDSL config profile  : ""
  SHDSL alarm profile   : ""
  traffic policing      : "ADSL_TRAF"
  circuit ID            : "IP_DSLAM-172.17.192.1-00:00:00:00:00:00 atm 1/6:0.0"
  remote ID             : "1234"
```

Monitoring the ADSL Connection Status

The NE supports to display the actual ADSL connection status as follows.

Enter to the “**status**” group directory to monitor the ADSL line Connection status.

```
CLI# status
CLI(status)#
```

Table 5-39 shows the commands to monitor of ADSL connection status. 5 shows the usage of these commands as well as their related parameters.

Table 5-39 ADSL Connection Status Monitor

The following command is to view the ADSL line Connection status.	
CLI(status)# port show [<*port-range*>]	
Parameters	**Task**

The following command is to view the ADSL line Connection status.	
CLI(status)# port show [<*port-range*>]	
<*port-range*>	Identify the port range of the system to view the status of line port. **Type:** Mandatory **Valid values:** See the Section “Port Interface Indication” of 3.

Example 46Display the ADSL Connection Status

```
CLI(status)# port show 1.6

Port: 1.6
  admin status       : enabled
  oper status       : up
  power state        : L0
  line standard      : G.992.5 Annex A

  [physical status]
          item         US      DS
    ----------------  ------  ------
     attainable rate    1343   30649  kbps
         attenuation     0.0     0.0  dB
          SNR margin     6.4     8.4  dB
        output power    12.1    12.6  dBm

  [channel status]
          item         US      DS
    ----------------  ------  ------
             Tx rate    1342   29204  kbps
    interleave delay       0       0  ms
    CRC block length      39     255  ms
     INP symbol time    0.00    0.00  DMT symbol
```

Configuring the SHDSL Line Port

This section depcits the CLI commands to apply the following SHDSL-related profiles to the SHDSL line port in interest.

- SHDSL Connection Profile
- SHDSL Performance Alarm Profile

Enter to the “**config port**” sub-group directory to configure the relative profile on the SHDSL line port.

```
CLI# config port
CLI(config port)#
```

Table 5-40 shows the commands to configuration of SHDSL port interface.5 shows the usage of these commands as well as their related parameters.

Table 5-40 SHDSL Port Interface Configuration

The following command is to apply the PM alarm profile to specific ADSL line port.
CLI(config port)# set adsl-alarm-profile *<port-range>* *< profile-name >*
The following command is to apply connection profile to specific ADSL line port.
CLI(config port)# set adsl-line-profile *<port-range>* *< profile-name >*
The following command is to apply the PM alarm profile to specific SHDSL line port.
CLI(config port)# set shdsl-alarm-profile *<port-range>* *<profile-name>*

Table 5-40 SHDSL Port Interface Configuration (Continued)

The following command is to apply connection profile to specific SHDSL line port.

CLI(config port)# set shdsl-conf-profile *<port-range> <profile-name>*

The following command is to view the SDSL line port operation status.

CLI(config port)# show [*<port-range>*]

Parameters	Task
<port-range>	Identify the port range of the system wish to apply the relevance profile of line port. **Type:** Mandatory **Valid values:** See the Section "Port Interface Indication" of 3.
<profile-name>	Defines the profile name; connection profile or performance alarm profile. **Type:** Mandatory **Valid values:** The name of "connection profile" or "performance alarm profile"

Example 47Display the Configuration of SHDSL Port Interface

```
CLI(config port)# show 4.1
Port: 4.1
   admin status           : enabled
   oper status            : down
   ADSL config profile    : ""
   ADSL alarm profile     : ""
   SHDSL config profile   : " SHDSL "
   SHDSL alarm profile    : " SHDSL_PM "
   traffic policing       : "SHDSL_TRAF"
   circuit ID            : "IP_DSLAM-172.17.192.1-00:00:00:00:00:00 atm 4/1:0.0"
   remote ID              : ""
```

Monitoring the SHDSL Connection Status

The NE supports to display the actual SHDSL connection status as follows.

Enter to the "**status port**" group directory to monitoring the SHDSL line Connection status.

```
CLI# status port
CLI(status port)#
```

Table 5-41 shows the commands to monitor of SHDSL connection status. 5 shows the usage of these commands as well as their related parameters.

Table 5-41 SHDSL Connection Status Monitor

The following command is to view the ADSL line Connection status.

CLI(status port)# show *<port-range>*

Parameters	Task
<port-range>	Identify the port range of the system to view the status of line port. **Type:** Mandatory **Valid values:** See the Section "Port Interface Indication" of 3.

Example 48Display the SHDSL connection status

```
CLI(status port)# show 2.37
```

```
port: 2.37
   admin status       : enabled
   oper status        : up
```

Subscriber Interface Administrating

Enter to the “**config port**” sub-group directory to administrate (enable/disable) the ADSL line port or the SHDSL line port.

```
CLI# config port
CLI(port)#
```

Table 5-42 shows the commands to perform the subscriber service administration. 5 shows the usage of these commands as well as their related parameters.

Table 5-42 Subscriber Interface Administration

The following command is to activate the subscriber service of ADSL line port or the SHDSL line port.	
CLI(config port)# enable *<port-range>*	
The following command is to deactivate the subscriber service of ADSL line port or the SHDSL line port.	
CLI(config port)# disable *<port-range>*	
Parameters	**Task**
<port-range>	Identify the port range of the system to enable or disable the connection of ADSL line port. **Type:** Mandatory **Valid values:** See the Section “Port Interface Indication” of 3.

Example 49Administrating the connection of ADSL line port

```
CLI(config port)# enable 1.6
OK

CLI(config port)# show 1.6

Port: 1.6
   admin status           : enabled
   oper status            : up
   ADSL config profile    : "ADSL_P1"
   ADSL alarm profile     : "ADSL_PM"
   SHDSL config profile   : ""
   SHDSL alarm profile    : ""
   traffic policing       : "ADSL_TRAF"
   circuit ID             : "IP_DSLAM-172.17.192.1-00:00:00:00:00:00 atm 1/6:0.0"
   remote ID              : ""       CRC block length      7      15  ms
```

Defining the Line Card Operation Mode

You are allowed to plan the expecting card type address in specific slot; there will have an alarm arise if the planned card type and the actual plug-in card type are mismatch.

The DAS4-Series support the following functions on a per LC basis.

- Planning the card type of a LC slot
  To ease the operator to plan the usage of each LC slot in advance, the NE support to configure the planned type of a LC slot. There will be an alarm arise if the planned card type and the actual plug-in card type are different.
- RFC 2684 encapsulation method for ADSL line card, either LLC or VCMUX.
- "Service Type Control" for ADSL line card.
  Operator can define the service which allow user to pass, they are "DHCP", "PPPoE" and "Static IP".
- VLAN tag pass-through function for ADSL line card
  Whenever the VLAN tag pass-through (VTP) is configured as enabled, the LC provides transparent transportation of the VLAN traffic from subscriber interface to network interface without any VLAN tag attachment. The LC will not attach any VLAN tag to the upstream subscriber traffic. In the mean time, the LC will also not replace the existing VLAN tag of the upstream subscriber traffic.
  On the other hand, in the case that the VTP function is configured as disabled, the LC will attach a VLAN tag to all the traffic from subscriber interface to network interface.
- IEEE 802.1Q VLAN forwarding function for ADSL line card
  The operator can set the xDSL subscriber ports as well as the GE ports to only forward either tagged traffic or untagged traffic. This section depicts the commands to set the IEEE 802.1Q VLAN forwarding function on the xDSL subscriber ports. As to the setting on the GE ports, please refer to Section "Network Interface Administrating" of 6 for the configuration of GE ports to either only forward either tagged traffic or untagged traffic.

Please refer to Section "Verifying Current Software and Hardware Versions" of 3 for the run-time status of the tagged mode on NC and LC.

It is noted that the run-time status of Tagged mode and VTP on LC may be different to their corresponding configuration. In this case, the behavior of the NE is per the run-time status of NE instead of their configuration. Please refer to Table 6-52 for the expected NE behavior.

The ADSL LC needs to be reset to perform the expected system behavior as depicted in Table 6-52 whenever its run-time status changes.

It is noted that the NE will drop the tagged Ethernet frames of VLAN-ID not configured by the VC-to-VLAN setting (see Table 6-52) in the following case.
NC tagged mode = Tagged
LC tagged mode Run-Time Status = Tagged
LC VTP Run-Time Status = Enabled

The tagged mode (run-time) indicates the operational status of tagged mode.
Tagged-only: LC (or NC) only forwards the tagged Ethernet frame and drops the untagged Ethernet frame.
Untagged-only: LC (or NC) only forwards the untagged Ethernet frame and drops the tagged Ethernet frame.
It is noted that the value of configured Tagged mode and its Run-Time Status may be different. Please refer to Table 6-52 for the NE behavior when configuring NC and ADSL LC with various Tagged mode and VTP parameters.

Enter to the "**config lc**" sub-group directory to plan the line card slot.

```
CLI# config lc
CLI(config lc)#
```

Table 5-43 shows the commands to perform the planning of the line card slot. 5 shows the usage of these commands as well as their related parameters.

Table 5-43 Plan the Line Card Slot

Use this command to plan the line card type address in specific slot.

CLI(config lc)# set planned-type <*lc-range*> <card-*type*>

Use this command to define the RFC 2684 encapsulation method for specific line card.

CLI(config lc)# set rfc2684-encap <*lc-range*> <encap-*type*>

Use this command to define the Service Type Control function for specific line card.

CLI(config lc)# set service-type <*lc-range*> <*option*>

Use this command to modify the VLAN tag pass-through (VTP) that configured as enables or not. (per LC setting).

CLI(config lc)# set vlan-tag-pass <*lc-id*> <*option*>

Use this command to define the tagged mode in specific slot.

CLI(config lc)# set tagged-mode <*lc-id*> <*mode*>

Use this command to monitor the line card plug-in and planned status.

CLI(config lc)# show

Parameters	Task
<*lc-range*>	Specify the slot range of the system **Type:** Mandatory **Valid values:** See the Section "Port Interface Indication" of 3.
<*lc-id*>	Specify the specific slot identifier of NE. **Type:** Mandatory **Default values:** 1
<*card-type*>	Specify the planning line card type **Type:** Mandatory **Valid values:** none, adsl, shdsl
<*encap-type*>	Specify the RFC 2684 encapsulation method. **Type:** Mandatory **Valid values:** llc, vc-mux
<*option*>	Specify the VLAN tag pass-through status or Service Type Control, enable or disable. **Type:** Mandatory **Valid values:** enabled | disabled
<*mode*>	Specify the tagged mode is configured as either tagged or untagged mode. **Type:** Mandatory **Valid values:** tagged-only | untagged-only

Example 50Display the line card type status

```
CLI(config lc)# set planned-type 1 adsl

LC 1. 1: OK

CLI(config lc)# set rfc2684-encap 1 vc-mux

LC1 will be reset. Are you sure? (Y/N) Y
OK

CLI(config lc)# set vlan-tag-pass 1 enabled

OK

CLI(config lc)# set tagged-mode 1 tagged-only
LC1 will be reset. Are you sure? (Y/N) Y
```

```
OK

CLI(config lc)# show

     planned  current  rfc2684  vlan-tag  service    configured
  LC   type     type     encap     pass      type     tagged-mode
  --  -------  -------  -------  --------  --------  -------------
   1    ADSL     ADSL   VC-MUX   enabled  disabled    tagged-only
   2     n/a      n/p      LLC  disabled  disabled  untagged-only
   3     n/a      n/p      LLC  disabled  disabled  untagged-only
   4     n/a      n/p      LLC  disabled  disabled  untagged-only
```

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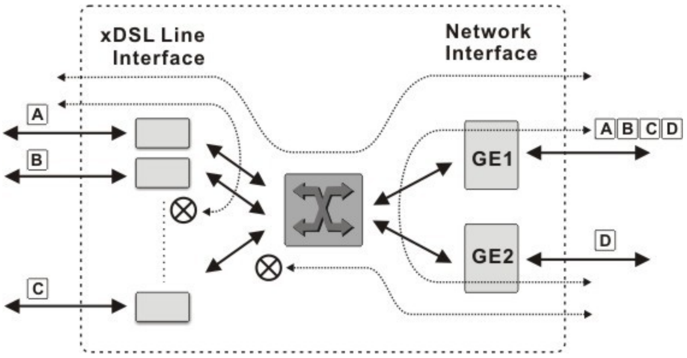
Chapter 6Managing the Network Interface

There are two GE network interfaces, GE1 and GE2, for DAS4-Series IP-DSLAM. By default, GE1 is stated as the uplink GE port. GE2 is stated as the subtended GE port, and it connects to other equipment and forward traffics to GE1 if none of LACP or RSTP is enabled.

Figure 6-4shows the packet forwarding diagram. As can be seen, the so-called "Port Isolation" indicates that all xDSL users can not communicate with each other. That is, all traffic from the xDSL line interface is forwarded to the GE1 interface. In the mean time, once the GE2 is configured as a subtended port, all the ingress traffic of GE2 is restricted to be forwarded to GE1.

Figure 6-4 GE Network Interface Packet Forwarding Illustrate



This chapter contains the following sections:

- Configuring the RSTP
- Configuring the Link Aggregation
- Configuring the CoS Traffic Mapping
- Network Interface Administrating
- Defining the NC Card Operation Mode
- Configuring the Subtending
- Configuring the Cascading

Configuring the RSTP

The 802.1D Spanning Tree Protocol (STP) standard was designed at a time when the recovery of connectivity after an outage within a minute or so was considered adequate performance. Rapid Spanning Tree Protocol (RSTP; IEEE 802.1w) can be seen as an evolution of the 802.1D standard more than a revolution. The 802.1D terminology remains primarily the same.

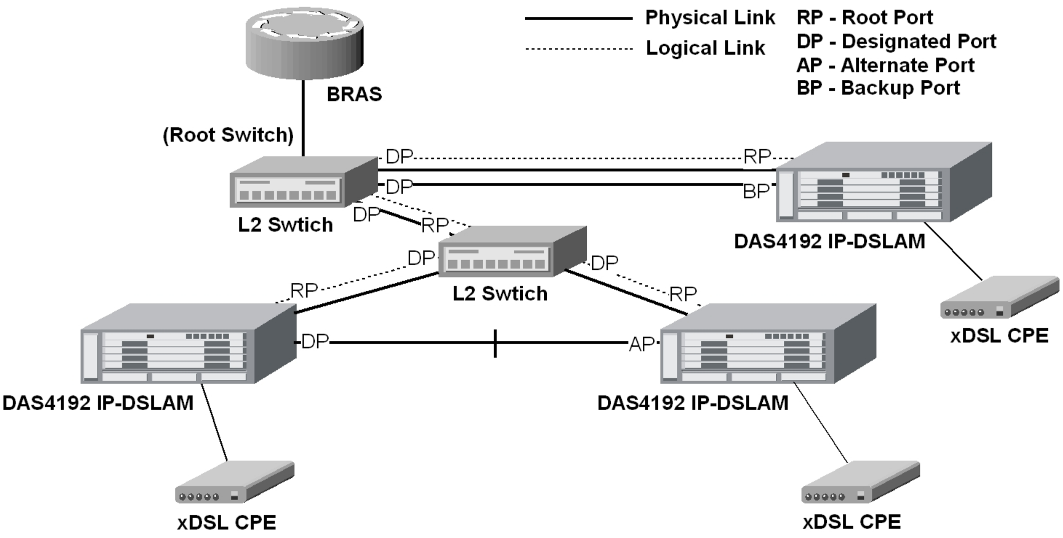
Port Roles and the RSTP Topology

The RSTP selects the bridge with the highest switch priority (lowest numerical priority value) as the root bridge. When the RSTP function of DAS4-Series IP-DSLAM is enabled, it assigns their network interface to play one of following port-roles. Figure 6-5 shows an example of Rapid Spanning Tree Topology when the RSTP converges.

- Root port – Provides the best path (lowest cost) when the switch forwards packets to the root switch.
- Designated port – Connects to the designated switch, which incurs the lowest path cost when forwarding packets from that LAN to the root switch. The port through which the designated switch is attached to the LAN is called the designated port.
- Alternate port – An alternate port is a port blocked by receiving more BPDUs form another bridge.

- Backup port – A backup port is a port blocked by receiving more useful BPDUs from the same bridge which is on.

Figure 6-5 Rapid Spanning Tree Active Topology



The RSTP protocol smartly prevents the loop connection in your uplink networks. It improves the Spanning Tree Protocol (STP) by reducing the fail-over time whenever there is network topology change. The configuration of RSTP is divided into 2 parts. One is the system-wise configuration, which is described in the subsection “Bridge”. The other one is the port-specific configuration, which is described in the subsection “Port GE1/Port GE2”.

Configuring RSTP Bridge Parameters

Enter to the “**config rstp**” sub-group directory to set the RSTP bridge-related parameters.

```
CLI# config rstp
CLI(config rstp)#
```

Table 6-44 shows the commands to perform the configuration of RSTP switch. 6 shows the usage of these commands as well as their related parameters.

Table 6-44 RSTP Switch Configuration

The following command is to enable the RSTP function.

CLI(config rstp)# enable

The following command is to disable the RSTP function.

CLI(config rstp)# disable

The following command is to specify the version, RSTP or STP compatible.

CLI(config rstp)# set forceversion <*protocol*>

The following command is to configure the forwarding-delay for all RSTP instance.

CLI(config rstp)# set forwarddelay <*delay-sec*>

The following command is to configure the interval between the generations of configuration messages by the root switch to change the hello time.

CLI(config rstp)# set hellowtime <*hello-sec*>

The following command is to configure the maximum-aging time for all RSTP instance.

CLI(config rstp)# set maxage <*aging-sec*>

The following command is to configure the switch priority and make it more likely that the switch will be chosen as the root switch.

CLI(config rstp)# set priority <*priority-value*>

The following command is to configure the Tx hold count for all RSTP instance.

CLI(config rstp)# set txholdcount <*count*>

The following command is to view the RSTP bridge information.

CLI(config rstp)# show bridge

Parameters	**Task**
<*protocol*>	This specifies the Network interface to be acting in RSTP mode or STP-Compatible mode. **Valid values:** rstp, stp **Default:** rstp
<*delay-sec*>	This specifies the time value that controls how fast a port changes its spanning state when moving towards the Forwarding state. The value determines how long the port stays in the Learning states, which precede the Forwarding state. This value is also used, when topology change has been detected and is underway, to age all dynamic entries in the Forwarding Database. **Default:** 15 **Valid values:** 4 ~ 30 (Second)
<*hello-sec*>	The hello time is the interval between the generations of configuration messages by the root switch and specifies the amount of time between the transmission of configuration bridge PDUs by this node on any port when it is the root of the spanning tree or trying to become so. **Default:** 2 **Valid values:** 1 ~ 10 (Second)
<*aging-sec*>	This specifies the maximum age time (in second) of STP/RSTP information learned from the network on any port before it is discarded. **Default:** 20 **Valid values:** 4 ~ 60 (Second)
<*priority-value*>	Configure the switch priority for an RSTP instance, the range is 0x0000 to 0xF000 in increments of 0x1000. The lower the number, the more likely the switch will be chosen as the root switch. **Default:** 0x8000 **Valid values:** 0x0000 ~ 0xF000 in steps of 0x1000.
<*count*>	This specifies the value used by the port Transmit state machine to limit the maximum transmission rate. **Default:** 3 **Valid values:** 0 ~ 10

It is noted that the following relationships have to be maintained.

2 x (***<delay-sec>*** – 1 *second*) >= ***<aging-sec>***
<aging-sec> ≥ 2 x (***<hello-sec>*** + 1 *second*)

Example 51RSTP switch configuration

```
CLI(config rstp)# set forceversion rstp
OK

CLI(config rstp)# set forwarddelay 10
OK

CLI(config rstp)# set hellotime 5
OK

CLI(config rstp)# set maxage 30
OK

CLI(config rstp)# set priority 0x1000
OK

CLI(config rstp)# set txholdcount 5
OK

CLI(config rstp)# show bridge

[bridge]
  admin status                    : disabled
  force version                   : RSTP
  bridge ID                       : 0x1000-00:11:f5:dc:7a:17
  bridge priority                 : 4096
  bridge max age                  : 30 sec
  bridge hello time               : 5 sec
  bridge forward delay            : 10 sec
  bridge Tx hold count            : 5
  root bridge ID                  : 0x8000-00:11:f5:dc:7a:17
  root port ID                    : N/A
  root path cost                  : 0
  root max age                    : 20 sec
  root hello time                 : 2 sec
  root forward delay              : 15 sec
  time since last topology change : 0 sec
  topology change count           : 0
```

Configuring RSTP Port GE1/Port GE2 parameters

Enter to the "**config rstp**" sub-group directory to set the RSTP port-related parameters. It is noted that the RSTP port-related parameters apply to the GE1/GE2 ports only, not to the xDSL subscriber ports.

```
CLI# config rstp
CLI(config rstp)#
```

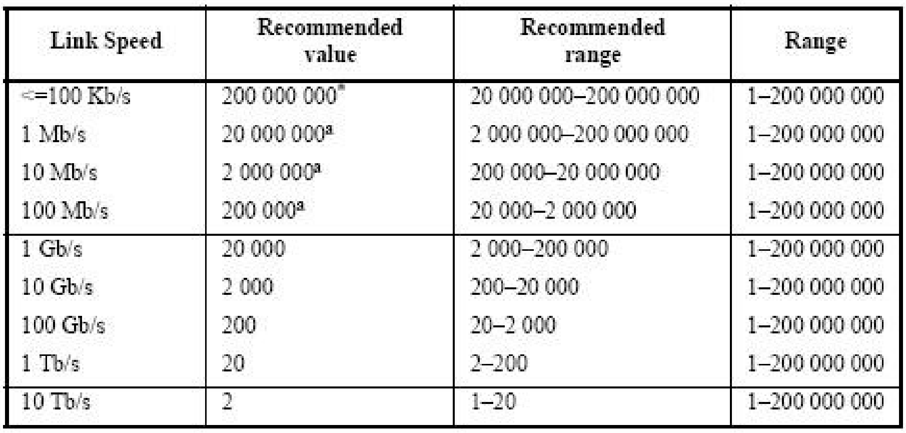
Table 6-45 shows the commands to perform the configuration of RSTP port. 6 shows the usage of these commands as well as their related parameters.

Table 6-45 RSTP Port Configuration

The following command is to configure the path cost of port interface.
CLI(config rstp)# set uge cost <*uge-range*> <*cost-value*>
The following command is to disable the STP function of UGE port.
CLI(config rstp)# set uge disable <*uge-range*>
The following command is to configure the edge port instance.
CLI(config rstp)# set uge edge <*uge-range*> {*false* | *true*}
The following command is to enable the STP function of UGE port.
CLI(config rstp)# set uge enable<*uge-range*>
The following command is to migrate the operation of RSTP and STP swap ability.
CLI(config rstp)# set uge mcheck <*uge-range*> {*false* | *true*}
The following command is to configure the point-to-pint instance.
CLI(config rstp)# set uge p2p <*uge-range*> {*true* | *false* | *auto*}
The following command is to configure the port interface priority.
CLI(config rstp)# set uge priority <*uge-range*> <*port-priority*>
The following command is to view the RSTP information on GE Network interface.
CLI(config rstp)# show uge

Parameters	Task
<*uge-value*>	This specifies the Network interface number (UGE port). **Valid values:** 1 (UGE port 1), 2 (UGE port 2)
<*cost-value*>	It specifies the contribution of this port to the path cost of paths towards the spanning tree root bridge. A port of higher speed should be configured with lower numerical value. When set it to be "default", its value follows the definition of IEEE 802.1d Table 17-3. You can assign lower cost values to interfaces that you want to select first and higher cost values that you want to select last. 0 means automatically calculated default Path Cost value. Default: 20000 Valid values: 0 ~ 200000000
set uge edge < *uge-range* > {*false* | *true*}	Check to let the port become edge port in spanning tree topology. An edge port on an RSTP switch will immediately transition to the forwarding state. However, the port will be a non-edge port if the NE receives RSTP BPDU on that port. And the port state and port role of the non-edge port will be determined by the RSTP hereafter. Default: false Valid values: false, true
set uge mcheck < *uge-range* >	Check to force this port to transmit RSTP BPDUs. **Default:** false
set uge p2p < *uge-range* > {*true* | *false* | *auto*}	This specifies the type of link the RSTP-enaabled port connects. *true:* Indicates to force this port always be treated as if it is connected to a point-to-point link. *false:* Indicates to let this port be treated as having a shared media connection. *auto*: Indicates that this port is considered to have a point-to-point link if it is an aggregator and all of its members are aggregately, or if the MAC entity is configured for full duplex operation, either through auto-negotiation or by management means. **Default:** auto **Valid values:** true, false, auto
<*port-priority*>	It specifies the port priority of a port. In the case that more than one ports form a loop in the NE, the RSTP/STP will block the ports of lower Port Priority (higher numerical value). Only the port of higher Port Priority (lower numerical value) is to be at the Forwarding state. **Default:** 128 **Valid values:** 0, 16, 32, 48, 64, 80, 96, 112, 128, 144, 160, 176, 192, 208, 224, and 240. All other values are rejected.

NOTE When set Path Cost to be "default", its value follows the definition of IEEE 802.1d Table 17-3 as follows.



Link Speed	Recommended value	Recommended range	Range
<=100 Kb/s	200 000 000[a]	20 000 000–200 000 000	1–200 000 000
1 Mb/s	20 000 000[a]	2 000 000–200 000 000	1–200 000 000
10 Mb/s	2 000 000[a]	200 000–20 000 000	1–200 000 000
100 Mb/s	200 000[a]	20 000–2 000 000	1–200 000 000
1 Gb/s	20 000	2 000–200 000	1–200 000 000
10 Gb/s	2 000	200–20 000	1–200 000 000
100 Gb/s	200	20–2 000	1–200 000 000
1 Tb/s	20	2–200	1–200 000 000
10 Tb/s	2	1–20	1–200 000 000

Example 52RSTP port Configuration

```
CLI(config rstp)# set uge cost 1 2000
OK

CLI(config rstp)# set uge edge 1 true
OK

CLI(config rstp)# set uge mcheck 1
OK

CLI(config rstp)# set uge priority 1 32
OK

CLI(config rstp)# show uge

[UGE 1]
  STP admin status          : enabled
  port ID                   : 0x2001
  port priority             : 32
  STP state                 : broken
  admin path cost           : 2000
  oper path cost            : 2000
  admin edge port           : true
  oper edge port            : true
  admin P2P MAC             : auto
  oper P2P MAC              : true

[UGE 2]
  STP admin status          : enabled
  port ID                   : 0x8002
  port priority             : 128
  STP state                 : broken
  admin path cost           : 0 (default)
  oper path cost            : 20000
  admin edge port           : false
  oper edge port            : false
```

```
admin P2P MAC          : auto
oper P2P MAC           : true
```

Configuring the Link Aggregation

Link aggregation (LA) is to aggregate the 2 GE ports to form a single logical GE-channel to provide higher uplink bandwidth. This NE supports both static link aggregation and LACP (IEEE802.3ad, Link Aggregation Control Protocol). Figure 6-6 shows a typical GE-channel configuration.

Static link aggregation

In this mode, the NE forces to bundle GE1 and GE2 ports to form a single logical GE-channel without negotiating with its peer L2/L3 switch/router.
For the traffic to be forwarded via the GE-channel as depicted in Figure 6-6, the NE will distribute the traffic on the GE1 and GE2 ports.

NOTE When the NE is configured to operate in the static LA mode, its peer L2/L3 switch/router needs to be configured in the same mode. Otherwise, the network may malfunction.

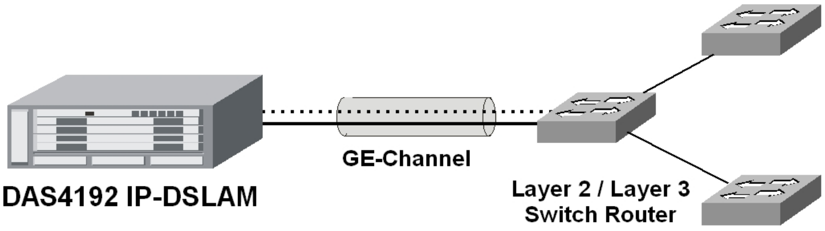
Dynamic link aggregation (LACP)

In this mode, the GE1 and GE2 ports are to form a single logical GE-channel by the LACP negotiating with its peer L2/L3 switch/router. By using the LACP, the NE learns the capability of its LACP peer. It then groups similarly configured ports into a single logical link (GE-channel). Once the GE-channel is built at the end of LACP negotiation, the NE will will forward traffic via the GE-channel by distributing the traffic on the "member port(s)" of GE-channel as depicted in Figure 6-6. Here, the "member port(s)" indicate GE1, GE2 or both GE ports of the NE.

In the LACP, two modes, active and passive modes, are defined for the LACP engine to decide to actively or passively negotiate with its LACP peer for the physical port in interest.

- **Active mode**
  In this mode, The NE is willing to initiate the LACP negotiation procedure on the specified group and sends out an LACP packet voluntarily. The aggregation link will be formed if the other end is running in LACP active or passive mode.
- **Passive mode**
  In this mode, The NE does not initiate LACP negotiation procedure on the specified group voluntarily, but waits for its LACP peer (in active state) initiates negotiation. The NE will form the aggregation link with its peer at the end of the negotiation procedure.

Figure 6-6 Typical GE-Channel Configuration



NOTE A LACP enabled switch/router needs to assign its "System ID". The "System ID" is of 8 bytes which consists of 2 parts:
SystemPriority: SystemMacAddress

During the LACP negotiation process, the LACP enabled device of lowest System ID has the previliage to determine the configuration of aggregated ports. Its peer will follow it.

Enter to the "**config la**" sub-group directory to manage the LACP function.

```
CLI# config la
CLI(config la)#
```

Table 6-46 shows the commands to perform the configuration of LACP. 6 shows the usage of these commands as well as their related parameters.

Table 6-46 LACP Configuration

The following command is to enable the static link aggregation or LACP.

CLI(config la)# enable *<option>*

The following command is to disable the static link aggregation or LACP.

CLI(config la)# disable

The following command is to configure the LACP group to be active or passive.

CLI(config la)# set group-activity *<group-id> <activity>*

The following command is to define the UGE port which the LACP group is.

CLI(config la)# set group-member *<uge-range> <group-id>*

The following command is to configure the timeout parameter of the LACP group.

CLI(config la)# set group-timeout *<group-id> <timeout>*

The following command is to configure the priority of UGE in LACP.

CLI(config la)# set port-priority *<uge-range> <priority>*

The following command is to configure the priority of the system in LACP.

CLI(config la)# set sys-priority *<priority>*

The following command is to view the LACP information.

CLI(config la)# show

Parameters	Task
<option>	Configure the aggregation mode to LACP or force to static link aggregation. **Valid values:** lacp | static
<group-id>	This indicates the LACP group ID. **Valid values:** 0 | 1
<uge-range>	This indicates the UGE port. **Valid values:** 1 | 2
<timeout>	It specifies the interval of periodical transmitting LACP BPDU by the peer NE. If the NE does not receive the LACP BPDU after 3 consecutive specified intervals, the NE will remove the port from the aggregation link. For a busy aggregation link, it is recommended to set a short timeout to ensure that a disabled port is removed as soon as possible. Configure the LACP timeout. Timeout = long means that BPDU is sent every 30 seconds. Timeout = short means that BPDU is sent every 1 second. **Valid values:** long | short
<priority>	This indicates the LACP port priority or LACP system priority. **Valid values:** 0 ~ 65535 or 0x0000 ~ 0xFFFF

Example 53LACP Configuration

```
CLI(config la)# set group-activity 1 active
OK

CLI(config la)# set group-member 1 1
OK

CLI(config la)# set group-timeout 1 long
OK

CLI(config la)# set port-priority 1 0x0011
OK
```

```
CLI(config la)# show

Link aggregation state    : disabled
LACP system priority      : 0x8000

LACP group
  group-ID  activity  timeout
  --------  --------  -------
        1   passive    long
        2   passive    long

UGE port state
  UGE-port  LACP-priority  group-ID
  --------  -------------  --------
        1       0x0011        1
        2       0x8000        1
```

Configuring the CoS Traffic Mapping

In order for the NE to play the role of edge (boundary) node of a DiffServ domain, the NE supports the the configurable mapping among the following entities.

- IEEE 802.1p User Priority as configured in the VC-to-VLAN configuration.
- Queue (Traffic Class) on each uplink trunk GE port
- DiffServ Code Point (DSCP) of the IP frame to be forwarded via the uplink trunk GE port.

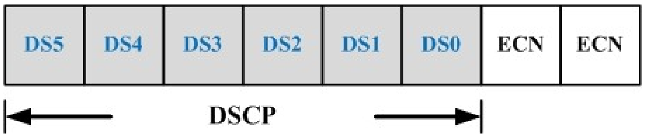
User priority: The IEEE 802.1p user priority is a label carried with the frame that communicates the requested priority to the next hop (bridge, router or end systems). Typically, the user priority is not modified in the intermediate hop. Thus, the user priority has end-to-end significance across bridged LANs.

Queue (traffic class): A bridge can be configured so that multiple queues are used to hold frames waiting to be transmitted on a given outbound port, in which case the traffic class is used to determine the relative priority of the queues. Whenever the bridge's physical port is configured as strict priority (SP), all waiting frames at a higher traffic class are transmitted before any waiting frames of a lower traffic class. As with access priority, traffic class is assigned by the bridge on the basis of incoming user priority.

Currently, the NE supports 8 traffic classes (queues) on its GE ports with the strict priority (SP) scheduling policy only.

Differentiated Service Code Point (DSCP): RFC 2474/2475 defines the DiffServ field, which replaces the Type of Service (ToS) field in the IPv4 header. It facilitates the network devices behind IP-DSLAM to fulfill the end-to-end QoS.
Figure 6-7 shows the DiffServ field.

Figure 6-7 DiffServ Field



The most significant six bits of DiffServ field are called DSCP. The network device classifies packets and marks them with appropriate DSCP value. According to these values, other network devices in the DiffServ domain can make decision for packets behavior and provide the Quality of Service properly.

A network device classify the priorities of traffic with 6 different levels, they are Express Forwarding (EF), Assured Forwarding Class 4 (AF4), Assured Forwarding Class 3 (AF3), Assured Forwarding Class 2 (AF2), Assured Forwarding Class 1 (AF1) and Best Effort (BE). These forwarding classes are represented by the first 3 bits of DSCP as shown in Table 6-47. Moreover, the network device differentiates three drop precedence in AF4~AF1 respectively into last 3 bits of DSCP, they are Low Drop Precedence, Medium Drop Precedence and High Drop Precedence.

Table 6-47 DSCP: DS3~DS5 Bit Representation

Decimal representation of bits DS5, DS4 and DS3	Description
7	For link layer and routing protocol keep alive.
6	For using for IP routing protocols.
5	Express Forwarding (EF)
4	Assured Forwarding Class 4 (AF4)
3	Assured Forwarding Class 3 (AF3)
2	Assured Forwarding Class 2 (AF2)
1	Assured Forwarding Class 1 (AF1)
0	Best Effort (BF)

Expedited Forwarding: The code point of EF is 101110, the packets marked with EF is to be transmitted with highest priority, lowest drop probability.

Assured Forwarding: Assured Forwarding PHB is suggested for applications that require a better reliability than the best-effort service. There are 4 classes of AF. Within Each AF class, there are 3 drop precedences. In case of congestion, the drop precedence of a packet determines the relative importance of the packet within the AF class. Table 6-48 indicates the relationship of the 4 AF class.

Table 6-48 DSCP Class Relationship

	Class			
Drop	**AF1**	**AF2**	**AF3**	**AF4**
Low Drop Probability	001010 (AF11)	010010 (AF21)	011010 (AF31)	100010 (AF41)
Medium Drop Probability	001100 (AF12)	010100 (AF22)	011100 (AF32)	100100 (AF42)
High Drop Probability	001110 (AF13)	010110 (AF23)	011110 (AF33)	100110 (AF43)

The rest of this section depicts the setting of so called "per hop behavior (PHB)" defined in DiffServ. The setting of PHB is separated in two parts.

- Mapping the 802.1p value to the priority queue of GE port
- Mapping the 802.1p value to the DSCP value

NOTE

In the definition of PHB defined in DiffServ, it implicates that the Hop (usually a router) needs to classify the received traffic and remark its DSCP accordingly. The classification here indicates either MFC (Multi-Field classification) or DSCP classification. When the NE is at the edge, it should adopt the MFC. Otherwise, it should adopt the DSCP classification.

Then if the physical link is Ethernet, it has to also reassign the 802.1p value to be consistent with the DSCP assignment.

However, as the NE can only support the PVC-based classification, and can only reassign the 802.1p value. We therefore adopt a way different to the formal DiffServ definition.

Mapping the 802.1p value to the priority queue of GE port

Enter to the “**config cos-queue**” sub-group directory to configure the CoS traffic mapping.

```
CLI# config cos-queue
CLI(config cos-queue)#
```

Table 6-49 shows the commands to configure the CoS traffic mapping of NE. 6 shows the usage of these commands as well as their related parameters.

Table 6-49 CoS Traffic Mapping

The following command is to configure the CoS queue mapping between 802.1p priority and system queue index.	
CLI(cos-queue)# mapping *<802_1p> <queue-index>*	
The following command is to viewing the CoS mapping information.	
CLI(cos-queue)# show	
Parameters	**Task**
<802_1p>	This indicates the 802.1p priority for VLAN traffic. **Type:** Mandatory **Valid values:** 0 ~ 7
<queue-index>	The system switch queue index, the higher the number, the higher the forwarding priority. **Type:** Mandatory **Valid values:** 1 ~ 8

Example 54Set and display the CoS traffic mapping of NE

```
CLI(config cos-queue)# mapping 0 1
OK

CLI(config cos-queue)# show

  802.1p  queue-index
  ------  -----------
     0         1
     1         1
     2         2
     3         4
     4         5
     5         6
     6         7
     7         8
```

Mapping the 802.1p value to the DSCP value

Enter to the “**config diffserv**” sub-group directory to configure the DiffServ function.

```
CLI# config diffserv
CLI(config diffserv)#
```

Table 6-50 shows the commands to configure the differentiated service of NE. 6 shows the usage of these commands as well as their related parameters.

Table 6-50 Configuring the DiffServ

The following command is to enable diffserv function.

CLI(config diffserv)# enable

The following command is to disable diffserv function.

CLI(config diffserv)# disable

The following command is to configure the DiffServ action mapping between 802.1p priority and DSCP value.

CLI(config diffserv)# mapping *<802_1p> <dscp>*

The following command is to viewing the diffserv information.

CLI(config diffserv)# show

Parameters	Task
<802_1p>	This indicates the 802.1p priority for VLAN traffic. **Type:** Mandatory **Valid values:** 0 ~ 7
<dscp>	Defines the DSCP value mapping to 802.1p priority. **Type:** Mandatory **Valid values:** BE | AF11 | AF12 | AF13 | AF21 | AF22 | AF23 | AF31 | AF32 | AF33 | AF41 | AF42 | AF43 | EF

Example 55Set and display the differentiated service of NE

```
CLI(config diffserv)# mapping 0 AF11
OK

CLI(config diffserv)# enable
OK

CLI(config diffserv)# show

DiffServ: enabled
DiffServ 802.1p and DSCP mapping:
  802.1p  :   0     1     2     3     4     5     6     7
    DSCP   : AF11  AF11  AF11  AF21  AF21  AF31  AF31   EF
```

Network Interface Administrating

Enter to the “**config nc**” sub-group directory to manege the GE network interface.

```
CLI# config nc
CLI(config nc)#
```

shows the commands to perform the network services administration of NE. 6 shows the usage of these commands as well as their related parameters.

Table 6-51 Network Interface Administration

The following command is to activate the network service of specific UGE port.	
CLI(config nc)# enable *<uge-id>*	
The following command is to deactivate the network service of specific UGE port.	
CLI(config nc)# disable *<uge-id>*	
The following command is to display the UGE interface status.	
CLI(config nc)# show	
Parameters	**Task**
<uge-id>	This specifies the Network interface number (UGE port). **Valid values:** 1 (UGE port 1), 2 (UGE port 2)

Example 56Network Services Administration of NE

```
CLI(config nc)# add subtend-vid 100
OK

CLI(config nc)# set planned-type 1 cpu
OK

CLI(config nc)# set autoneg 1 enabled
OK

CLI(config nc)# set tagged-mode untagged-only

This operation will save configuration and reboot system. Are you sure? (Y/N)
Y
Saving...
OK

CLI(config nc)# set subtend enabled
You will enable subtending. Set subtending port VLANs for passing packets.
And you should use IGMP proxy at remote NE. Make sure your IGMP usage.
Are you sure? (Y/N) y
OK

CLI(config nc)# enable 1
OK

CLI(config nc)# show
NC:
  planned-type  current-type   tagged-mode
  ------------  ------------  -------------
         CPU          CPU  untagged-only

UGE:
  UGE  oper-status  admin-status  auto negotiation  use-mode
  ---  -----------  ------------  ----------------  --------
    1        down       enabled          enabled    uplink
    2        down      disabled          enabled   subtend

Subtend VLAN ID:
   100
```

Defining the NC Card Operation Mode

The NE supports the IEEE 802.1Q VLAN forwarding function. The operator can set the xDSL subscriber ports as well as the GE ports to only forward either tagged traffic or untagged traffic. This section depicts the commands to set the IEEE 802.1Q VLAN forwarding function on GE ports. As to the setting on the xDSL subscriber ports, please refer to Section “Defining the Line Card Operation Mode” of 5 for the configuration of xDSL subscriber port to either only forward either tagged traffic or untagged traffic on a per-LC basis.

Table 6-52 depicts the NE behavior with the follwoing configurations.

- NC with various Tagged mode parameters.
- ADSL LC with various Tagged mode and VTP parameters.

It is noted that the run-time status of LC may be different to its corresponding configuration. In this case, the behavior of the NE is per the run-time status of NE instead of their configuration. To describe the NE behavior, the following notations are adopted in Table 6-52.

- Q_S represents the service VLAN-tag and its VLAN-ID value is provided by the NE.
- $Q_{S\ (CPE)}$ represents the service VLAN-tag and the notation $_{(CPE)}$ indicates that its VLAN-ID value is provided by the CPE (or the subscriber’s PC behind the CPE).
- $Q_{(CPE)}$ represents the 802.1Q VLAN-tag.
- $Q_{C\ (CPE)}$ represents the customer VLAN-tag and the notation $_{(CPE)}$ indicates that its VLAN-ID value is provided by the CPE (or the subscriber’s PC behind the CPE).

NOTE Please refer to Section “Verifying Current Software and Hardware Versions” of 3 for the run-time status of the tagged mode on NC and LC.

NOTE The ADSL LC needs to be reset to perform the expected system behavior as depicted in Table 6-52 whenever its run-time status changes.

NOTE The NC needs to be reset to perform the expected system behavior as depicted in Table 6-52 whenever its configured tagged mode changes.

NOTE Whenever the GE2 is set as subtended port and the NC is set as “tagged-only” mode, in order to make the NE forward the VLAN-specific traffic between GE1 and GE2, the operator needs to manually set GE1 and GE2 as the member ports of VLANs in interest. Please refer Table 6-52 for the “subtend-vid” related CLI commands.

Table 6-52 The NE behavior when configuring NC and ADSL LC with various Tagged modes and VTP parameters.

NC Setting	**ADSL LC setting**		**ADSL LC Run-Time Status**		**Expected NE behavior**			
					VLAN-tagging Status of Egress Traffic		**Acceptable Ingress Traffic**	
Tagged mode	Tagged mode	**VTP**	Tagged mode	**VTP**	**On the GE port**	**On the ADSL line**	**On the GE port**	**On the ADSL line**
Tagged	Tagged	Enabled	Tagged	Enabled	Q_S (CPE)	Q (CPE)	Tagged	Tagged
		Disabled	Tagged	Disabled	Q_S+Q_C (CPE)	Q (CPE)	Tagged	Tagged
	Untagged	Enabled	Untagged	***Disabled***	Q_S	Untagged	Tagged	Untagged
		Disabled	Untagged	Disabled	Q_S	Untagged	Tagged	Untagged
Untagged	Tagged	Enabled	***Untagged***	***Disabled***	Untagged	Untagged	Untagged	Untagged
		Disabled	***Untagged***	Disabled	Untagged	Untagged	Untagged	Untagged
	Untagged	Enabled	Untagged	***Disabled***	Untagged	Untagged	Untagged	Untagged
		Disabled	Untagged	Disabled	Untagged	Untagged	Untagged	Untagged

It is noted that the NE will drop the tagged Ethernet frames of VLAN-ID not configured by the VC-to-VLAN setting (see Table 6-52) in the following case.
NC tagged mode = Tagged
LC tagged mode Run-Time Status = Tagged
LC VTP Run-Time Status = Enabled

The tagged mode (run-time) indicates the operational status of tagged mode.
Tagged-only: LC (or NC) only forwards the tagged Ethernet frame and drops the untagged Ethernet frame.
Untagged-only: LC (or NC) only forwards the untagged Ethernet frame and drops the tagged Ethernet frame.
It is noted that the value of configured Tagged mode and its Run-Time Status may be different. Please refer to Table 6-52 for the NE behavior when configuring NC and ADSL LC with various Tagged mode and VTP parameters.

Enter to the "**config nc**" sub-group directory to manege the GE network interface.

```
CLI# config nc
CLI(config nc)#
```

Table 6-53 shows the commands to perform the network services administration of NE. 6 shows the usage of these commands as well as their related parameters.

Table 6-53 Defining the NC Card Operation Mode

Use this command to modify the planning NC card type.

CLI(config nc)# set planned-type <*nc-id*> {*none* | *cpu*}

Use this command to modify the negotiation mode of GE port.

CLI(config nc)# set autoneg <*uge-id*> {*off* | *on*}

Use this command to configure the both of the GE ports to operate either in the "*tagged-only*" or "*untagged-only*" mode.

CLI(config nc)# set tagged-mode { *tagged-only* | *untagged-only*}

Use this command to display the UGE interface status.

CLI(config nc)# show

Parameters	Task
<*nc-id*>	Identify the slot range of the NC card **Type:** Mandatory **Valid values:** 1 ~ 2 (value = 2 is only on DAS4672)
{*none* | *cpu*}	Identify the NC type.
<*uge-id*>	This specifies the Network interface number (UGE port). **Valid values:** 1 (UGE port 1), 2 (UGE port 2)
{*off* | *on*}	Identify the auto negotiation mode of specified UGE port. **Type:** Mandatory **Valid values:** off | on
{ *tagged-only* | *untagged-only*}	This specifies both of the GE ports to operate either in the "*tagged-only*" or "*untagged-only*" mode. **Type:** Mandatory **Valid values:** tagged-only | untagged-only

NOTE

The operator needs to add both of the GE ports as member-ports of vlan <*vid*> when the following cases hold.

- GE1 port and GE2 port on NC is configured as tagged-only mode.
- GE2 port is configured as a subtended port. (Section "Configuring the Subtending" of 6 for the configuration of GE ports to either only forward either tagged traffic or untagged traffic.)

Example 57Network Services Administration of NE

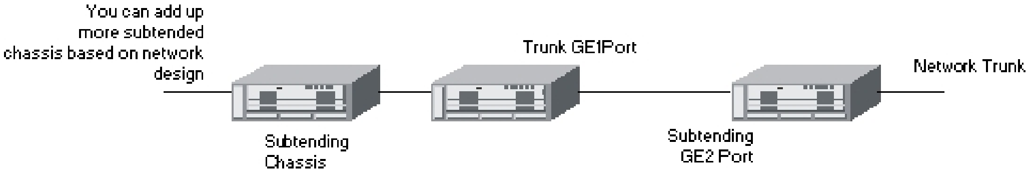
```
CLI(config nc)# add subtend-vid 100
OK

CLI(config nc)# set planned-type 1 cpu
OK

CLI(config nc)# set autoneg 1 enabled
OK

CLI(config nc)# set tagged-mode untagged-only

This operation will save configuration and reboot system. Are you sure? (Y/N)
Y
Saving...
OK

CLI(config nc)# set subtend enabled
```

```
You will enable subtending. Set subtending port VLANs for passing packets.
And you should use IGMP proxy at remote NE. Make sure your IGMP usage.
Are you sure? (Y/N) y
OK

CLI(config nc)# enable 1
OK

CLI(config nc)# show
NC:
  planned-type  current-type   tagged-mode
  ------------  ------------  -------------
          CPU          CPU  untagged-only

UGE:
  UGE  oper-status  admin-status  auto negotiation  use-mode
  ---  -----------  ------------  ----------------  --------
    1        down       enabled           enabled    uplink
    2        down      disabled           enabled   subtend

Subtend VLAN ID:
    100
```

Configuring the Subtending

In some network deployment environment, it is desired to connect several IP-DSLAMs to share a single uplink to the access network as shown in Figure 6-8. As can be seen in Figure 6-8, three DAS4-Series IP-DSLAMs are connected via their GE ports to each other in a Daisy-Chain topology. The left-most NE connects to the access network (where the Internet is behind) via its GE1 port (uplink GE port). It also connects to the middle NE via its GE2 port (subtending GE port).

Figure 6-8 Illustration of 3 DAS4-Series IP-DSLAMs are connected in a Daisy-Chain topology



This section depicts the manual VLAN-member port setting procedure of GE1 and GE2. The operator needs to choose the VLAN between 1 and 4094 to apply to GE ports when the following cases hold.

- GE1 port and GE2 port on NC is configured as tagged-only mode.
- GE2 port is configured as a subtended port

Enter to the "**config nc**" group directory to enable the subtending function.

```
CLI# config nc
CLI(config nc)#
```

Table 6-54 shows the commands to perform the configuration of subtending port. 6 shows the usage of these commands as well as their related parameters.

Table 6-54 Subtending Configuration

The following command is to enable, disable, or show the subtend status of system.

CLI(config nc)# set subtend <*option*>

The following command is to set GE2 as a subtendded port (by "*enable*") or an uplink port. (by "*disable*")

CLI(config nc)# set subtend { *disabled* | *enabled*}

The following command is to add both of the GE ports as member-ports of vlan <*vid*>. (See the note at the end of this section to learn the usage of this command.)

CLI(config nc)#add subtend-vid <*vid*>

The following command is to configure both of the GE ports to be not the member-ports of the VLAN specified by <*vid*>.

CLI(config nc)#del subtend-vid <*vid*>

The following command is to configure both of the GE ports to be not the member-ports of any VLAN.

CLI(config nc)#clear subtend-vid

Parameters	Task
{ *disabled* | *enabled*}	Specify the GE2 as either a subtendded port or an uplink port. Enable: GE2 works as a subtend port of the NC Disable: GE2 works as an uplink port of the NC. **Type:** Mandatory **Valid values:** disabled | enabled
<vid>	Identify the vlan id of the VLAN which the GE ports belong to. **Type:** Mandatory **Default value:** 1 **Valid values:** 1 ~ 4093
<*option*>	Configure the subtend function of system. **Valid values:** enable, disable

RSTP and LACP can not work when the subtending function is enabled.

Example 58The configuration of subtending port

```
CLI(config nc)# set subtend enabled
You will enable subtending.Set subtending port VLANs for passing packets.
And you should use IGMP proxy at remote NE. Make sure your IGMP usage.
Are you sure? (Y/N) y
OK

CLI(config nc)# show

NC:
  planned-type  current-type   tagged-mode
  ------------  ------------  -------------
        CPU          CPU    tagged-only

UGE:
  UGE  oper-status  admin-status  auto negotiation  use-mode
  ---  -----------  ------------  ----------------  --------
   1       down       enabled          enabled    uplink
   2       down      disabled          enabled   subtend
```

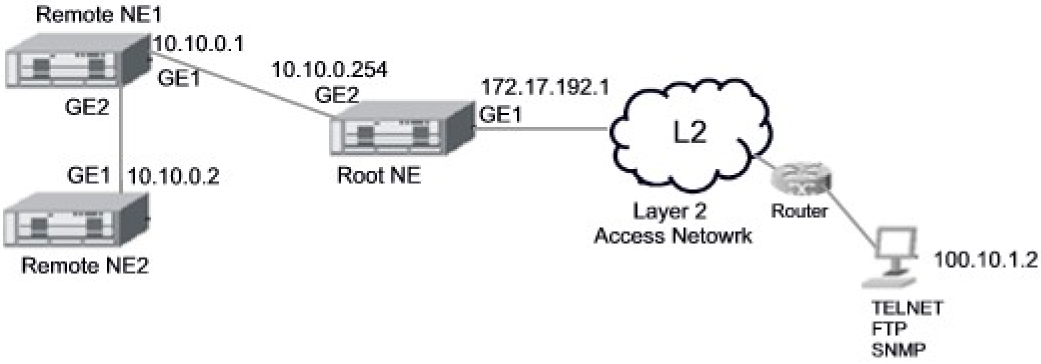
Subtend VLAN ID:

n/a

Configuring the Cascading

In some network deployment environment, it is desired to cascade several IP-DSLAMs to share a single uplink as well as the same management IP address to the access network. Hereafter, the NE is said to be connected in a cascading topology when it is deployed in the aforementioned way. And the NE is said to run in the cascade mode. Figure 6-9 depicts a typical cascading topology.

Figure 6-9 Illustration of cascading topology



When the NEs are connected in a cascading topology, the NE plays either one of the following roles.

- Root-NE
  The Root-NE indicates the NE which is directly connected to the L2 access network as shown in Figure 6-9. The Root-NE possesses 2 IP addresses.
  - UGE IP: “UGE IP” is for the communication with the EMS server, LCT and Telnet hosts.
  - root IP: “root IP” is for the communication with the Remote-NE. It is invisible to the network operartor.
- Remote-NE
  The Remote-NE indicates the NE which is is not directly connected to the L2 access network as shown in Figure 6-9. The Remote-NE possesses only one IP address.
  - UGE IP: “UGE IP” is for the communication with the Root-NE.

The following 2 IPs should be the same otherwise, the Root-NE can not communicate with Remote-NE.

- “remote-ne-ip” of the Root-NE
- “UGE IP” of the Remote-NE

In order for the operator to manage the NEs in a cascading topology as shown in Figure 6-9, the operator needs to set them to run in the cascade mode. After appropriate configurations on the Root-NE and Remote-NEs, these NEs will work as a single NE which possesses several shelves via the EMS.

This section depicts the CLI commands to set the NE to run in the cascade mode. Once the Remote-NE is properly set, the operators can manage the remote NEs via the Root-NE by the “clogin” CLI command to login the remote NE.

Enter to the “**config mgt**” group directory to enable the cascade management function.

```
CLI# config mgt
CLI(config mgt)#
```

Table 6-54 shows the commands to perform the configuration of cascaded management. 6~6 shows the usage of these commands as well as their related parameters.

Table 6-55 Cascaded Management Configuration

The following command is to enable the cascaded management (single IP management) of the NE.

CLI(config mgt)# cascade enable

The following command is to disable the cascaded management (single IP management) of the NE.

CLI(config mgt)# cascade disable

The following command is to set the role of the NE to be either "Root-NE" or "Remote-NE"

CLI(config mgt)# cascade set role {*root* | *remote*}

The following command is to add a NE into the "Remote-NE-list" of the Root-NE.

CLI(config mgt)# cascade add <*remote-ne-id*> <*remote-ne-ip*> [<*note*>]

The following command is to remove the remote NE from the "Remote-NE-list" of the Root-NE.

CLI(config mgt)# cascade del <*remote-ne-id*>

The following command is to set the user login account and password for the Root-NE to login the remote NE via Telent.

CLI(config mgt)# cascade set remote-account <*remote-ne-id*> <*login-user*> <*login -password*>

The following command is to set the community of the remote NE for the Root-NE to access the Remote-NE via SNMP.

CLI(config mgt)# cascade set remote-community <*remote-ne-id*> <*community-name*>

The following command is to enable/disable the Root-NE to be allowed to access the Remote-NE specified by <*remote-ne-id*>

CLI(config mgt)# cascade set remote-state <*remote-ne-id*> {*disabled* | *enabled*}

The following command is to set the IP address as well as the associated subnet for the Root-NE to communicate with the Remote-NE

CLI(config mgt)# cascade set root-ip <*root-ne-ip*> <*net-mask*>

The following command is to view the status of the cascaded management mode.

CLI(config mgt)# cascade show <*remote-ne-id*>

The following command is to view the status of the cascade connection.

CLI(status)# cascade show

The following command is to access the Remote-NE via Telnet.

CLI# clogin <*remote-ne-id*>

Parameters	**Task**
<*remote-ne-id*>	This specifies the identified number of remote NE **Type:** Mandatory **Valid values:** 1~2147483647
<*remote-ne-ip*>	This specifies the IP address of the NE to be added into the "Remote-NE-list" of the Root-NE **Type:** Mandatory **Valid values:** Any valid class A/B/C address

Table 6-55 Cascaded Management Configuration (Continued)

Parameters	Task
[<*note*>]	This specifies the note the operator takes for the NE to be added into the “Remote-NE-list” of the Root-NE. **Type:** Mandatory **Valid values:** none
<*login-user*>	This specifies the login user name for the Root-NE to login the remote NE via Telent. **Type:** Mandatory **Valid values:** String of up to 16 characters (‘A’ – ‘Z’, ‘a’ – ‘z’, ‘0’ – ‘9’, ‘-’, ‘_’, ‘.’, ‘@’)
<*login -password*>	This specifies the login user password for the Root-NE to login the remote NE via Telent.. **Type:** Mandatory **Valid values:** String of up to 16 characters (‘A’ – ‘Z’, ‘a’ – ‘z’, ‘0’ – ‘9’, ‘-’, ‘_’, ‘.’, ‘@’)
<*community-name*>	This specifies the community name for the Root-NE to access the remote NE via SNMP. **Type:** Mandatory **Valid values:** String of up to 16 characters (‘A’ – ‘Z’, ‘a’ – ‘z’, ‘0’ – ‘9’, ‘-’, ‘_’, ‘.’, ‘@’)
<*root-ne-ip*>	This specifies the IP address of the Root-NE for the Root-NE to communicate with the Remote-NE. **Type:** Mandatory **Valid values:** Any valid class A/B/C address
<*net-mask*>	This specifies the subnet mask associated with <*root-ne-ip*> to specifies a subnet where the Remote-NE to resides in **Type:** Mandatory **Valid values:** 255.0.0.0 ~ 255.255.255.255

NOTE

Th following setting of the Root-NE and Remote-NEs are different.

- “Secured host” of Remote-NE: must be set to be Root-NE.
  “Secured host” of Root-NE: must be set to be LCT, EMS server and so on.
- “SNMP trap station” of Remote-NE: must be set to be Root-NE.
  “SNMP trap station” of Root-NE: must be set to be LCT, EMS server and so on.

NOTE

Th following setting of the Root-NE and Remote-NEs must be the same.

- “SNMP community” of the read-write privileage.
- <*login-user*> and <*login -password*> of the read-write privileage.
- “tagged mode” of the UGE ports: Either “tagged” or “untagged”.
- Management VLAN setting: when the the UGE ports of Root-NE and Remote-NEs are set to be “tagged” mode.
- The software version of NC.

NOTE

Whenever the operator establishes a telnet session to access the Root-NE, he/she can use the “clogin” command to establish a telnet session to access Remote-NE. In such situation, he/she has to use the “logout” CLI command to close the telnet session between the Root-NE and Remote-NE before he/she close the telnet session between the host PC and Root-NE. Otherwise, the operator can not “clogin” the Remote-NE anymore.

Hence the following rules should be followed strictly.

- “telnet time-out value between the Root-NE and host PC” should be set to longer than the “telnet time-out value between the Root-NE and Remote-NE”.
- Be carefully not to disconnect the “telnet session between the Root-NE and host PC” before disconnect the “telnet session between the Root-NE and Remote-NE”.

When deploying NEs to form a cascading topology as shown in Figure 6-10, the IP address of UGE ports of Remote-NE1and Remote-NE2 have to be setup up frist. As can be seen in Figure 6-10, they are set as UGE IP#1 and UGE IP#2, respectively.

On the Root-NE, suppose the operator sets <*remote-ne-ip*> corresponding to Remote-NE1and Remote-NE2 as Remote IP#1 and Remote IP#2, respectively.
In this situation, the operator has to let the following equations hold.

Remote IP#1 = UGE IP#1
Remote IP#2 = UGE IP#2

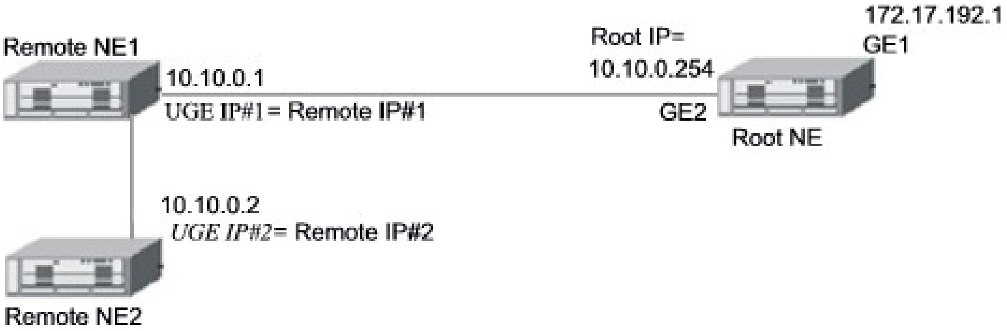
Moreover, the Root IP of Root NE, UGE IP#1 and UGE IP#2, have to be set in the same subnet.

The mini-GBIC and fiber have to be of the same type, either SM or MM.

The LCT does not support to manage the Remote-NE.

The operators can upgrade the firmware of Remote-NE via FTP. (Please refer to the Section “NE Firmware Upgrade in Cascade mode” of 3)

Figure 6-10 Illustration the IP configuration of NEs in a cascading topology



Example 59Configuration of NE to play the role of “Root-NE”

```
CLI(config mgt)# cascade set role root
OK.

CLI(config mgt)# cascade set root-ip 10.10.0.254 255.255.255.0
OK

CLI(config mgt)# cascade add 1 10.10.0.1 Remote_NE1
OK

CLI(config mgt)# cascade set remote-account 1 admin admin
OK

CLI(config mgt)# cascade set remote-community 1 netman
OK
```

```
CLI(config mgt)# cascade set remote-state 1 enabled
OK

CLI(config mgt)# cascade enable
OK

CLI(config mgt)# cascade show

[Cascaded management]
   control status           : enabled
   current role             : root
   cascaded root IP         : 10.10.0.254
   cascaded root net mask    : 255.255.255.0

[Remote NE ID: 1]
   IP               : 10.10.0.1
   community         : netman
   account          : admin
   password         : ************
   admin status      : enabled
   note             : Remote_NE1

CLI# config ip show

UGE
   IP address     : 100.168.100.100
   subnet mask    : 255.255.0.0
   MAC address    : 00:11:f5:dc:7a:17
   UGE VLAN ID    : 4092

NME
   IP address     : 10.12.3.63
   subnet mask    : 255.255.0.0
   MAC address    : 00:11:f5:dc:7a:16

Gateway
   IP address     : 10.12.1.252
```

Example 60Configuration of NE to play the role of “Remote-NE”

```
CLI# clogin 1

CLI#
     Please type "@.<cr>" to locally close connection
Login:admin
Password:

CLI# config mgt
CLI(config mgt)# cascade set role remote
OK
```

```
CLI(config mgt)# cascade enable
OK

CLI(config mgt)# cascade show

[Cascaded management]
  control status          : enabled
  current role            : remote
  cascaded root IP        :
  cascaded root net mask  : 255.255.255.0

CLI# config ip show

UGE
  IP address     : 10.10.0.1
  subnet mask    : 255.255.0.0
  MAC address    : 00:01:03:05:07:09
  UGE VLAN ID    : 4092

NME
  IP address     : 10.12.3.125
  subnet mask    : 255.255.0.0
  MAC address    : 00:01:55:66:11:22

Gateway
  IP address     : 10.12.1.252
```

Example 61Monitoring the Cascade Connection Status on the Root-NE

```
CLI(status)# cascade show

[Cascaded management]
  control status          : enabled
  current role            : root
  cascaded root IP        : 10.10.0.254
  cascaded root net mask  : 255.255.255.0

                        admin     oper
remote ID   remote IP   status    status          note
---------- --------------- -------- ------------ ---------------------------
     1      10.10.0.1   enabled   connected       Remote_NE1
```

Example 62Monitoring the Cascade Connection Status on the Remote-NE

```
CLI# clogin 1

CLI#
     Please type "@.<cr>" to locally close connection
```

```
Login:admin
Password:

CLI# status cascade show

[Cascaded management]
  control status           : disabled
  current role             : root
  cascaded root IP         : 172.16.1.1
  cascaded root net mask   : 255.255.255.0

CLI# config mgt cascade
CLI(config mgt cascade)# set role remote

OK

CLI(config mgt cascade)# exit
CLI# status cascade show

INFO: This NE is not cascaded root.
```

Managing the Connection Services

This chapter describes how to manage the system connection services and contains the following sections:

- VC-to-VLAN Connection Management
- Multicast Service Management
- Managing the Subscriber Access Services
- Configuring the Access Control List
- Configuring the System Services

VC-to-VLAN Connection Management

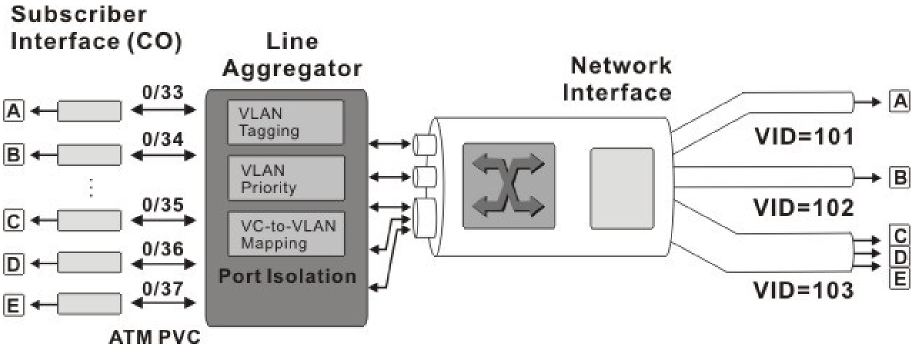
The VC-to-VLAN setting can easily define the multiple to one or one to one mapping; you can group different PVCs to a single VLAN ID as well as single PVC to one VLAN mapping. Figure 7-11 illustrates the basic principle for VLAN assignment in the DAS4-Series IP-DSLAM. As shown in Figure 7-11, the NE forwards five data flows, A~E, which may be either owned by the same subscriber or by different subscribers. It is noted that these data flows are conveyed in five individual ATM PVCs, and they are grouped into 3 individual VLANs.

NOTE

The NE supports up to 8 PVCs per xDSL port.

The NE supports up to 4094 VLANs per system.

Figure 7-11 VC-to-VLAN Mapping Illustration



According to IETF RFC2684, an IP packet is encapsulated in either bridged mode or routed mode. The VC-to-VLAN settings are similar but not the same in these two encapsulation modes. This section depicts their configuration separately.

NOTE

The VC-to-VLAN configuration procedures are the same to both the ADSL port and SHDSL port.

NOTE

More than one PVCs can be configured in a xDSL port. Each PVC can be configured with different RFC 2684 mode (either RFC 2684 routed mode or RFC 2684 bridged mode). However, the NE supports only one RFC 2684 mode to be enabled for the PVCs in a xDSL port.

Different xDSL ports are allowed to have their PVCs to run with distinct RFC 2684 mode.

Configuring a VC-to-VLAN Connection for the VC of RFC2684 Bridged Mode

In the RFC 2684 bridged mode, the NE needs to perform the following functions for the xDSL subscriber to access the Internet.

- For the upstream traffic
  1. Performs the ATM SAR (Segmentation and Reassembly) function to reassemble the ATM cells to get an ATM AAL5 frame.
  2. Strip off the ATM AAL5 tailer to get the RFC2684-encapsulated Ethernet frame.
  3. Strip off the RFC2684 header to get the Ethernet frame.
  4. Add a VLAN tag (Q_S) to the Ethernet frame if required. (see the definition of “Q_S” in the description of Table 6-52)
  5. Forward the Ethernet frame from the xDSL subscriber to ISP.
- For the downstream traffic
  1. Strip off the VLAN tag (Q_S) from the Ethernet frame if required. (see the definition of “Q_S” in the description of Table 6-52)
  2. Encapsulate the downstream Ethernet frame with RFC2684 header
  3. Append the ATM AAL5 tailer to the RFC2684-encapsulated Ethernet frame to get an ATM AAL5 frame.
  4. Performs the ATM SAR (Segmentation and Reassembly) function to segment the ATM AAL5 frame to get ATM cells.
  5. Forward the Ethernet frame from the ISP to the xDSL subscriber.

Enter to the “**config ucast**” sub-group directory to configure the bridged services of unicast connections.

```
CLI# config ucast
CLI(config ucast)#
```

Table 7-56 shows the commands to perform the configuration of bridged services.~ shows the usage of these commands as well as their related parameters.

Table 7-56 Bridged Services Configuration

The following command is to create a new VC-to-VLAN connection on specific of xDSL line port.
CLI(config ucast)# add vcvlan *<port-range> <vpi> <vci>*
The following command is to create a new authentic IP on specific PVCs.
CLI(config ucast)# add static-ip *<port-range> <vpi> <vci> <ip-base> <ip-limit>*
The following command is to remove an authentic IP on specific PVCs.
CLI(config ucast)# del static-ip-base *<port-range> <vpi> <vci>* [*<ip-base>*]
The following command is to remove the VC-to-VLAN connection on specific of xDSL line port.
CLI(config ucast)# del vcvlan *<port-range> <vpi> <vci>*
The following command is to set the bridged VC-to-VLAN parameters on specific of xDSL line port.
CLI(config ucast)# set vcvlan *<port-range> <vpi> <vci> <802_1p> <iptraffic-profile>* **bridged** *<vid>*
The following command is to activate the VC-to-VLAN service on specific of xDSL line port.
CLI(config ucast)# enable vcvlan *<port-range> <vpi> <vci>*
The following command is to deactivate the VC-to-VLAN service on specific of xDSL line port.
CLI(config ucast)# disable vcvlan *<port-range> <vpi> <vci>*
The following command is to set the FDB (filtering Database) non-aged mode on specific PVCs.
CLI(config ucast)# set fdb-non-aged *<port-range> <vpi> <vci> <option>*

Table 7-56 Bridged Services Configuration (continued)

The following command is to display the FDB (filtering Database) non-aged mode on specific PVCs.

CLI(config ucast)# show fdb-non-aged [<*port-range*>]

The following command is to change the existent authentic IP base on specfic PVCs.

CLI(config ucast)# set static-ip base <*port-id*> <*vpi*> <*vci*> <*old-ip-base*> <*new-ip-base*>

The following command is to change the MAC limit on specific of xDSL line ports.

CLI(config ucast)# set mac-limit <*port-range*> <*vpi*> <*vci*> <*pvc-mac-limit*>

The following command is to display the MAC limit on specific of xDSL line ports.

CLI(config ucast)# show mac-limit [<*port-range*>]

The following command is to display the static IP configuration on specific PVCs.

CLI(config ucast)# show static-ip [<*port-range*>] [<*vpi*>] [<*vci*>]

The following command is to display the VC-VLAN connection on specific of xDSL line ports.

CLI(config ucast)# show vcvlan [<*port-range*>]

Parameters	Task
<*port-range*>	Identify the port range of the system wish to configure in bridged services. **Type:** Mandatory **Valid values:** See the Section “Port Interface Indication” of 3.
<*vpi*>	Defines the VPI (Virtual Path Identifier) value. **Type:** Mandatory **Valid values:** 0 ~ 255
<*vci*>	Defines the VCI (Virtual Channel Identifier) value. **Type:** Mandatory **Valid values:** 1 ~ 65535 (1 ~ 31 are reserved)
<*802_1p*>	Defines the tagging of VLAN 802.1p priority of egress switch fabric on specific of VC-to-VLAN connection. **Type:** Mandatory **Default value:** 0 **Valid values:** 0 ~ 7 (low ~ high)
<*iptraffic-profile*>	Defines the IP traffic profile name. (See the Section “Configuring the IP Traffic Profile” of 4) **Type:** Mandatory **Valid values:** The name of “ip traffic profile”
<*vid*>	Defines the VLAN ID to be assign on specific of VC-to-VLAN connection. **Type:** Mandatory **Default value:** 1 **Valid values:** 1 ~ 4093
<*pvc-mac-limit*>	Defines the limit of MAC address learning from specific bridged service per xDSL line port. Each xDSL line port allow maximum of 64 MAC address learning in total of VC-to-VLAN usage. **Type:** Mandatory **Default value:** 1 **Valid values:** 1~16, 32, 40 , 48, 56, 64

Table 7-56 Bridged Services Configuration (continued)

<ip-limit>	This specifies the maximum IP counter when the service type is either "DHCP" or "Static IP". **Type:** Mandatory **Default value:** 0(Static IP), 1(DHCP) **Valid values:** 1 ~ 64
<ip-base>	Defines the base IP address of the authentic IP in static IP access mode. **Type:** Mandatory **Valid values:** 0.0.0.0 ~ 255.255.255.255 (Reference to Appedix E)
<old-ip-base>	This indicates the old IP address base of the authentic IP in static IP access mode. **Type:** Mandatory **Valid values:** 0.0.0.0~255.255.255.255 (Reference to Appedix E)
<new-ip-base>	Defines the new IP address base of the authentic IP in static IP access mode. **Type:** Mandatory **Valid values:** 0.0.0.0~255.255.255.255 (Reference to Appedix E)
<option>	Enable or disable the FDB (filtering Database) non-aged mode on specific PVCs. **Valid values:** enable: to let the MAC entries dynamically learned from the specific PVCs never be aged. disable:to let the MAC entries learned from the specific PVCs be aged as in normally FDB aging process.

Example 63Bridged Services Configuration of NE

```
CLI(config ucast)# add vcvlan 1.6 8 35
OK

CLI(config ucast)# set vcvlan 1.6 8 35 0 ADSL_TRAF bridged 100
OK

CLI(config ucast)# enable vcvlan 1.6 8 35
OK

CLI(config ucast)# show vcvlan 1.6

port ID  VPI/VCI     IP-traffic    VLAN 1p MAC RFC2684  next-hop   admin   oper
------- --------- ---------------- ---- -- --- ------- ---------- -------- ----
   1. 6   8/   35       ADSL_TRAF  100  0   1 bridged            enabled   up
```

Example 64Bridged FDB Non-Aged Mode Configuration of NE

```
CLI(config ucast)# set fdb-non-aged 1.6 8 35  enabled
OK

CLI(config ucast)# show fdb-non-aged 1.6
port ID   VPI/VCI   non-aged
-------  ---------  --------
   1. 6    8/   35   enabled
```

Example 65Bridged MAC Limit Configuration of NE

```
CLI(config ucast)# set mac-limit 1.6 8 35 40
OK

CLI(config ucast)# show mac-limit 1.6

port ID   VPI/VCI   mac-limit
-------  ---------  ---------
  1. 6    8/   35        40
```

Example 66Bridged Static IP Configuration of NE

```
CLI(config ucast)# add static-ip 1.1 8 35 10.10.10.1 5
OK

CLI(config ucast)# add static-ip 1.1 8 35 10.10.10.7 5
OK

CLI(config ucast)# add static-ip 1.1 8 35 10.10.10.12 5
OK

CLI(config ucast)# show static-ip

 port             base        IP
  ID   VPI/VCI     IP address   limit
----- --------- --------------- -----
 1. 1   8/   35      10.10.10.1     5
                   10.10.10.7     5
                  10.10.10.12     5
```

Example 67Bridged Static IP Confliction in different ports of NE

```
CLI(config ucast)# add static-ip 1.2 8 35 10.10.10.2 1
OK

CLI(config ucast)# add static-ip 1.3 8 35 10.10.10.2 1

[Port  1. 3]
total conflicted PVCs: 1

  port               base       IP
   ID    VPI/ VCI      IP address  limit
  -----  ---------  -------------- -----
   1. 2    8/   35      10.10.10.2     1
```

NOTE In the RFC 2684 bridged mode, the NE supports to IP counts <= MAC limit per PVC of xDSL port.

NOTE In the RFC 2684 bridged mode, the NE supports to the max numbers of MAC address per PVC of xDSL port which is located on the range in 1~16, 32, 48, 40, 56, 64. The setting is caused by the hardware limitation.

NOTE In the RFC 2684 both bridged and routed mode, the NE supports to the amount of MAC limit in enabled PVCs <= 384 in each line card.

NOTE In the RFC 2684 bridged mode/routed mode, the NE supports to the amount of Service Type Control (STC) IP count <= 108 in each line card. The amount of Service Type Control (STC) IP count includes Static IP range, DHCP IP limit and the count of the routed mode distributed in each port.

NOTE In the RFC 2684 bridged mode/routed mode, the NE supports eight IP base for each PVC.

Configuring a VC-to-VLAN Connection for the VC of RFC2684 Routed Mode

In the RFC 2684 routed mode, the NE needs to perform the following functions for the xDSL subscriber to access the Internet.

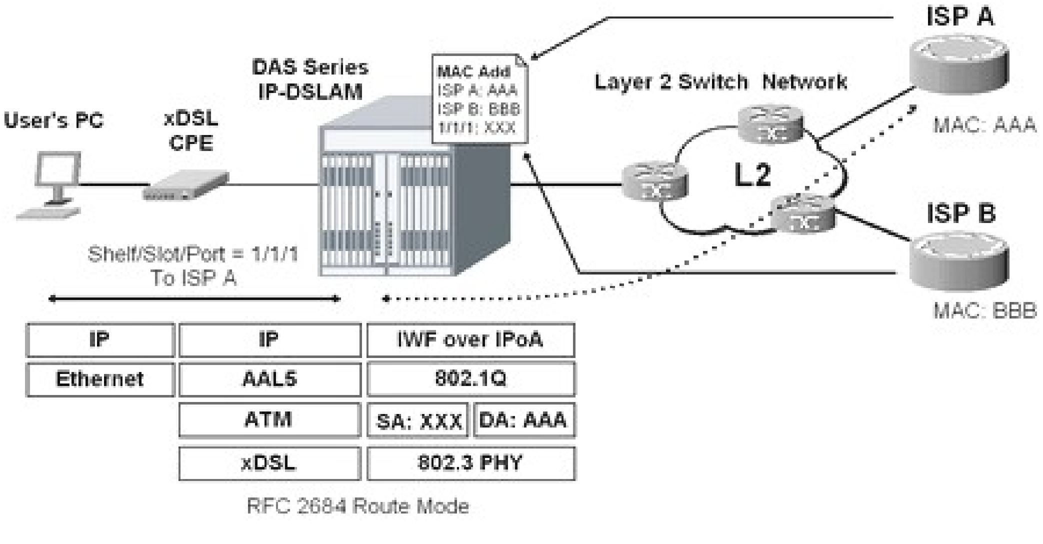
- For the upstream traffic
  1. Performs the ATM SAR (Segmentation and Reassembly) function to reassemble the ATM cells to get an ATM AAL5 frame.
  2. Strip off the ATM AAL5 tailer to get the RFC2684-encapsulated IP packet.
  3. Strip off the RFC2684 header to get the IP packet.
  4. Prefix an Ethernet header to the IP packet. The prefixed Ethernet header is of the following setting.
     Destination MAC = the MAC of Next-hop router toward the ISP’s router.
     Source MAC = an unique MAC generated by the NE.
  5. Add a VLAN tag (Q_S) to the Ethernet frame if required. (see the definition of “Q_S” in the description of Table 6-52)
  6. Forward the Ethernet frame from the xDSL subscriber to ISP.
- For the downstream traffic
  1. Strip off the VLAN tag (Q_S) from the Ethernet frame if required. (see the definition of “Q_S” in the description of Table 6-52)
  2. Strip off the Ethernet header from the IP packet.
  3. Encapsulate the downstream IP packet with RFC2684 header
  4. Append the ATM AAL5 tailer to the RFC2684-encapsulated Ethernet frame to get an ATM AAL5 frame.
  5. Performs the ATM SAR (Segmentation and Reassembly) function to segment the ATM AAL5 frame to get ATM cells.
  6. Forward the Ethernet frame from the ISP to the xDSL subscriber.

NOTE

In the RFC 2684 routed mode, IP packets are directly encapsulated, i.e., no MAC layer is presented. Through the IWF (Inter-Work Function) of IPoA of IP-DSLAM, it needs to prefix the Ethernet MAC layer for particular subscriber interface. The source MAC address is specially generated by IP-DSLAM, and the destination MAC address is the next-hop router toward the ISP’s router. The NE determines the MAC address of next-hop router by the (Address Resolution Protocol (ARP).

Figure 7-12 illustrates an example of the IWF in the case of RFC 2684 routed mode.

Figure 7-12 RFC 2684 Route Mode Connection Method



IP	IP	IWF over IPoA	
Ethernet	AAL5	802.1Q	
	ATM	SA: XXX	DA: AAA
	xDSL	802.3 PHY	

NOTE

When you set the IP of “Next Hop”, the NE will send ARP to query the MAC of the “Next Hop”. When the MAC you observe is 00:00:00:00:00:00, it indicates something wrong such that the NE can not get the MAC of the Next-Hop router via ARP.

Enter to the “**config ucast**” sub-group directory to configure the routed services of unicast connection.

```
CLI# config unast
CLI(config ucast)#
```

Table 7-57 shows the commands to perform the configuration of routed services. shows the usage of these commands as well as their related parameters.

Table 7-57 Routed Services Configuration

The following command is to create a new VC-to-VLAN connection on specific of xDSL line port.

CLI(config ucast)# add vc-vlan *<port-range> <vpi> <vci>*

The following command is to create a new ISP (Internet Service Provider) connection.

CLI(config ucast)# add nexthop *<ispname> <ip-addr><vid>*

The following command is to remove the VC-to-VLAN connection on specific of xDSL line port.

CLI(config ucast)# del vc-vlan *<port-range> <vpi> <vci>*

The following command is to remove the ISP connection.

CLI(config ucast)# del nexthop *<ispname>*

The following command is to activate the VC-to-VLAN service on specific of xDSL line port.

CLI(config ucast)# enable vc-vlan *<port-range> <vpi> <vci>*

The following command is to deactivate the VC-to-VLAN service on specific of xDSL line port.

CLI(config ucast)# disable vc-vlan *<port-range> <vpi> <vci>*

The following command is to change the routed VC-to-VLAN parameters on specific of xDSL line port.

CLI(config ucast)# set vc-vlan *<port-range> <vpi> <vci> <802_1p> <iptraffic-profile>* **routed** *<ispname>*

Parameters	Task
<port-range>	Identify the port range of the system wish to configure in routed services. **Type:** Mandatory **Valid values:** See the Section “Port Interface Indication” of 3.
<vpi>	Defines the VPI (Virtual Path Identifier) value. **Type:** Mandatory **Valid values:** 0 ~ 255
<vci>	Defines the VCI (Virtual Channel Identifier) value. **Type:** Mandatory **Valid values:** 1 ~ 65535 (1 ~ 31 are reserved when VPI equal 0)
<ispname>	Defines the ISP name for routed service. **Type:** Mandatory **Valid values:** String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').
<ip-addr>	Defines IP address of the ISP server. **Type:** Mandatory **Valid values:** 0.0.0.0 ~ 255.255.255.255
<vid>	Defines the VLAN ID to be assign on specific of VC-to-VLAN connection. **Type:** Mandatory **Default value:** 1 **Valid values:** 1 ~ 4093
<802_1p>	Defines the tagging of VLAN 802.1p priority of egress switch fabric on specific of VC-to-VLAN connection. **Type:** Mandatory **Default value:** 0 **Valid values:** 0 ~ 7 (low ~ high)
<iptraffic-profile>	Defines the created IP traffic profile name. **Type:** Mandatory **Valid values:** The name of “ip traffic profile”

Example 68Configure the routed services of NE

```
CLI(config ucast)# add nexthop PC1 192.168.192.63 100
OK

CLI(config ucast)# add vc-vlan 1.37 8 35
OK

CLI(config ucast)# set vc-vlan 1.37 8 35 0 ADSL_TRAF routed PC1
OK

CLI(config ucast)# enable vc-vlan  1.37 8 35
OK

CLI(config ucast)# show vc-vlan 1.37

port ID  VPI/VCI     IP-traffic    VLAN 1p MAC RFC2684  next-hop   admin   oper
------- --------- ---------------- ---- -- --- ------- ---------- -------- ----
  1. 37   8/  35       ADSL_TRAF    -   0   1  routed       PC1  enabled  up
```

If the “next-hop” is not configured or configured by mistake, the PVC can not be RFC 2684 routed mode.

Monitoring the VC-to-VLAN Connection Status

Enter to the “**config ucast**” sub-group directory to monitoring the unicast connection status.

```
CLI# config ucast
CLI(config ucast)#
```

Table 7-58 shows the commands to perform the unicast connection status of NE. shows the usage of these commands as well as their related parameters.

Table 7-58 Unicast Connection Status Monitor

<table>
<tr><td colspan="2">The following command is to view the VC-to-VLAN connection of specific xDSL line port.</td></tr>
<tr><td colspan="2"><b>CLI(config ucast)# show vcvlan</b> [&lt;<i>port-range</i>&gt;]</td></tr>
<tr><td colspan="2">The following command is to view the status of ISP server use for routed services.</td></tr>
<tr><td colspan="2"><b>CLI(config ucast)# show nexthop</b></td></tr>
<tr><td colspan="2">The following command is to view the launched service type of specific xDSL line port.</td></tr>
<tr><td colspan="2"><b>CLI(config ucast)# show servicetype</b> [&lt;<i>port-range</i>&gt;]</td></tr>
<tr><td colspan="2">The following command is to view the various error code to identify the PVC errors.</td></tr>
<tr><td colspan="2"><b>CLI(config ucast)# show error-code</b> &lt;<i>code-value</i>&gt;</td></tr>
<tr><th>Parameters</th><th>Task</th></tr>
<tr><td>&lt;<i>port-range</i>&gt;</td><td>Identify the port range of the system wish to view the VC-to-VLAN connection.
<b>Type:</b> Mandatory
<b>Valid values:</b> See the Section “Port Interface Indication” of 3.</td></tr>
<tr><td>&lt;<i>code-value</i>&gt;</td><td>Identify the PVC error code to form with '0xNNNNNNNN' where N is the hex between 0 to f.
<b>Type:</b> Mandatory
<b>Valid values:</b> 0x00000000-0xffffffff.</td></tr>
</table>

Example 69Displaying the unicast connection status

```
CLI(config ucast)# show vcvlan 1.6

port ID  VPI/VCI    IP-traffic    VLAN 1p MAC RFC2684  next-hop   admin   oper
------- --------- ---------------- ---- -- --- ------- ---------- -------- ----
   1. 6   8/   35       ADSL_TRAF  100  0   1 bridged           enabled   up

CLI(config ucast)# show nexthop

       next-hop name            next-hop IP         MAC        VLAN  status
-------------------------------- --------------- ----------------- ---- --------
                      PC1  192.168.63.100 00:18:f3:91:99:50  100 inactive

CLI(config ucast)# show servicetype 1.6

 port          RFC2684   STC      runtime     configured       base       IP
  ID   VPI/VCI    mode   status  service-type service-type  IP address    count
----- --------- ------- -------- ------------ ------------ --------------- -----
 1. 6   8/   35 bridged disabled  pure-bridge        DHCP        0.0.0.0     1
```

Example 70Displaying the various error code to identify the PVC errors

```
CLI(config ucast)# show error-code  0x000000F

Bit 0: PVC is nonexistent.
Bit 1: PVC has enabled.
Bit 2: PVC values are not changed.

CLI(config ucast)# show error-code  0x0000EEE

Bit 1: PVC had been enabled.
Bit 2: PVC values are not changed.
Bit 5: Enabled VPI/VCI pairs amount on this LC reaches maximum (32).
Bit 6: PVC amount on this port reaches maximum (8).
Bit 7: Sum of enabled PVCs and MCAUs on this port reaches maximum (8).
Bit 9: No IP traffic profile assigned on this PVC.
Bit10: IP limit amount reaches the MAC limit amount on this bridged PVC.
Bit11: IP limit amount reaches maximmum (64) on this PVC, no matter what RFC2684 mode it is.
```

Multicast Service Management

Whenever the subscriber clicks his remote controller to watch a TV channel transmitted via the ADSL line, the set-top-box sends the corresponding IGMP report packet. The NE will forward IGMP packet if its multicast IP hits the associated multicast service profile. Otherwise, the NE drops the IGMP packet. As a result, the subscriber is restricted to watch the TV programs that he booked.

To provide multicast service, the operator needs to properly configure the multicast channel and

IGMP snooping /IGMP proxy. This section contains the following two subsections.

- Configuring Multicast Channel
- IGMP Snooping/Proxy Setting

Configuring Multicast Channel

The NE supports to prevent the subscriber to receive un-booked TV channel (multicast channel) by checking the received “IGMP join” packet with a preconfigured Multicast Service Profile. (A Multicast Service Profile consists of a number of Multicast Channel Profiles.) The subscriber is restriced to receive the TV channels (recorded in the Multicast Channel Profile).

This sub-section depicts the CLI commands to associate the ADSL subscriber with the created Multicast Service Profiles.

Refer for the CLI commands to create Multicast Channel Profiles and Multicast Service Profiles in Section “Configuring the Multicast Service Related Profile” of 4.

Enter to the “**config mcau**” sub-group directory to configure the multicast connection.

```
CLI# config mcau
CLI(config mcau)#
```

Table 7-59 shows the commands to perform the multicast connection status of NE. shows the usage of these commands as well as their related parameters.

Table 7-59 Multicast Services Configuration

The following command is to remove the multicast service on specific of xDSL line port.
CLI(config mcau)# del *<port-range>*
The following command is to activate the multicast service on specific of xDSL line port.
CLI(config mcau)# enable *<port-range>*
The following command is to deactivate the multicast service on specific of xDSL line port.
CLI(config mcau)# disable *<port-range>*
The following command is to change the multicast service with desired parameters on specific of xDSL line port.
CLI(config mcau)# set *<port-range> <vpi> <vci> <vlan-id> <channel-limit> <mservice-name>*
The following command is to show the multicast service with desired parameters on specific of xDSL line port.
CLI(config mcau)# show [*<port-range>*]

Parameters	**Task**
<port-range>	Identify the port range of the system wish to configure in multicast services. **Type:** Mandatory **Valid values:** See the Section “Port Interface Indication” of 3.
<vpi>	Defines the VPI (Virtual Path Identifier) value. **Type:** Mandatory **Default value:** 8 **Valid values:** 0 ~ 255
<vci>	Defines the VCI (Virtual Channel Identifier) value. **Type:** Mandatory **Default value:** 35 **Valid values:** 1 ~ 65535 (1 ~ 31 are reserved)
<channel-limit>	Defines the limit of concurrent multicast channel transmission on specific of VC-to-VLAN connection. **Type:** Mandatory **Default value:** 1 **Valid values:** 1 ~ 5
<vlan-id>	Defines the VLAN ID to be assign to a multicast VLAN

The following command is to remove the multicast service on specific of xDSL line port.

CLI(config mcau)# del *<port-range>*

The following command is to activate the multicast service on specific of xDSL line port.

	Type: Mandatory **Default value:** 1 **Valid values:** 1 ~ 4093
<mservice-name>	This specifies the multicast service profile name **Type:** Mandatory **Valid values:** String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').

Example 71Display the multicast connection status

```
CLI(config mcau)# set 1.6 8 35 100 1 program_1
OK

CLI(config mcau)# enable 1.6
OK

CLI(config mcau)# show 1.6

                        channel
port ID   VPI/VCI   VLAN  limit        service-profile          status
-------  ---------  ----  -----  --------------------------------  --------
   1. 6    8/   35   100     1                     program_1   enabled
```

IGMP Snooping/Proxy Setting

The NE supports IGMP snooping and IGMP proxy as follows.

- IGMP snooping:
  When the IGMP snooping function is enabled,
  1. The NE starts to "listen in" IGMP conversations between hosts and routers.
  2. Once the NE hears an "IGMP join" message on an xDSL interface, it checks the associated Multicast Service Profile to prevent the subscriber to receive un-booked TV channels (multicast channel).
  3. If the multicast group IP of the received "IGMP join" message "hits" the Multicast Service Profile, the NE adds that xDSL interface to the corresponding multicast forwarding table and forwards this "IGMP join" message out of the GE port.
     Otherwise, the NE drops the "IGMP join" message.
  4. As the NE hears an "IGMP leave" message or the 'snooping aging-time' expires, the NE will remove that xDSL interface from the corresponding multicast forwarding table.
- IGMP proxy:
  When the IGMP proxy function is enabled,
  1. The NE starts to "listen in" IGMP conversations between hosts and routers.
  2. Once it recieves an "IGMP join" message from the subscribers, it checks the associated Multicast Service Profile to prevent the subscriber to receive un-booked TV channels (multicast channel).
  3. If the multicast group IP of the received "IGMP join" message "hits" the Multicast Service Profile, the NE adds that xDSL interface to the corresponding multicast forwarding table. And the NE further checks if it already forwards the TV channel requested by this "IGMP join" message. If the answer is YES, the NE drops this "IGMP join" message. Otherwise, the NE sends an "IGMP join" message to request that TV channel via the GE port.
     If the multicast group IP of the received "IGMP join" message "misses" the Multicast Service Profile, the NE drops the "IGMP join" message.

4. As the NE receives an “IGMP leave” message or the ‘response-time’ expires, the NE will remove that xDSL interface from the corresponding multicast forwarding table.

Follow the commands to configure the IGMP snooping or proxy function.

Enter to the “**config igmp**” sub-group directory to configure the related parameters.

```
CLI# config igmp
CLI(config igmp)#
```

Table 7-60 shows the commands to set the IGMP snooping and proxy functions of NE. shows the usage of these commands as well as their related parameters.

Table 7-60 IGMP Snooping/Proxy Setting

The following command is to activate the IGMP snooping or proxy function for multicast services.
CLI(config igmp)# enable <*igmp-mode*>
The following command is to deactivate both the IGMP snooping and proxy function for multicast services.
CLI(config igmp)# disable
The following command is to enable the IGMP proxy to perform "immediated-leave" function or not. (see the note below)
CLI(config igmp)# proxy set immediated-leave <*option*>
The following command is to configure the IGMP proxy response time against the subscriber link.
CLI(config igmp)# proxy set response-interval <*interval*>
The following command is to configure the IGMP proxy retry counter.
CLI(config igmp)# proxy set retries <*times*>
The following command is to enable the IGMP snooping to perform "immediated-leave" function or not. (see the note below)
CLI(config igmp)# snooping set immediated-leave <*option*>
The following command is to configure the IGMP snooping response time against the subscriber link.
CLI(config igmp)# snooping set response-interval <*interval*>
The following command is to configure the IGMP snooping retry counter.
CLI(config igmp)# snooping set retries <*times*>
The following command is to configure the aging time of IGMP Snooping.
CLI(config igmp)# snooping set aging-time <*sec*>
The following command is to configure the stateful mode of IGMP packets.
CLI(config igmp)# set stateful <*level*>
The following command is to viewing the IGMP status.
CLI(config igmp)# show
The following command is to set the IGMP version for query.
CLI(config igmp)# version query <*version-type*>
The following command is to set the IGMP version for report and leave.
CLI(config igmp)# version report-leavel < *version-type* >

Table 7-60 IGMP Snooping/Proxy Setting (Continued)

Parameters	Task
<igmp-mode>	Define the IGMP mode for multicast services **Type:** Mandatory **Valid values:** proxy | snooping
<option>	Enable the IGMP snooping or proxy to perform "immediated-leave" function or not **Type:** Mandatory **Valid values:** disabled | enabled
<sec>	Defines the IGMP snooping aging time in second. **Type:** Mandatory **Valid values:** 30 ~ 3600 (sec.) **Default value:** 300 (sec.)
<interval>	Defines the time period waiting for subscriber response the IGMP message. **Type:** Mandatory **Valid values:** 1 ~ 30 (sec.) **Default value:** 30 (sec.)
<times>	Defines the retry counting for STB response the IGMP message, if the system did not receive IGMP message from subscriber edge, system will treat as 'leave' hence will stop the multicast stream to the particular link. **Type:** Mandatory **Valid values:** 1 ~ 5 **Default value:** 3 (count.)
<level>	Define the print out mode when system receives IGMP packets. **Type:** Mandatory **Valid values:** none | flow | msg None – show nothing Flow – show flow state only Msg – show packet flag and error message
< version-type >	Define the IGMP version type for the NE to launch/relay the IGMP query, report and leave message. **Type:** Mandatory **Valid values:** v2 | v3 | auto v2 – Indicate to force the NE to launch the IGMP packets of version 2 no matter what version of IGMP packet it receives v3 –Indicate to force the NE to launch the IGMP packets of version 3 no matter what version of IGMP packet it receives auto –Indicate to launch/relay the IGMP packets of version the same as the version of IGMP packet it receives.

- If "Immediate Leave" is enabled:
  The NE will stop forwarding the multicast stream once it receives the corresponding IGMP "leave" packet. That is, the TV image should be "freezed" immediately
- If " Immediate Leave" is disabled:
  The NE will react on the received IGMP "leave" packet and start the "leave" process as follows.
  1. The NE will re-send the "IGMP query" packet 'Robustness (Query Retry)' times if it does not receive "IGMP join".
  2. The time interval between 2 consecutive "IGMP query" packets is 'Query Response Interval' seconds.
  3. During the of "leave" process, if the NE receives the corresponding "IGMP join" packet, it continues to forward the multicast stream and stops the "leave" process.
  4. At the end of "leave" process, the NE will stop forwarding the multicast stream if it does not receive any "IGMP join" packet.

Example 72Configure the IGMP proxy and display its status

```
CLI(config igmp)# proxy set immediate-leave enabled
OK
```

```
CLI(config igmp)# proxy set response-interval 300
OK

CLI(config igmp)# proxy set retrials 3
OK

CLI(config igmp)# enable proxy
OK

CLI(config igmp)# show

IGMP proxy
  status               : enabled
  immediate leave      : enabled
  retrials             : 3
  response interval    : 300   in 1/10 sec

IGMP snooping
  status               : disabled
  immediate leave      : enabled
  aging time           : 30   sec
  retrials             : 2
  response interval    : 100   in 1/10 sec

IGMP version
  query version        : v2
  report/leave version : auto

Stateful
  level                : none - show nothing
```

Example 73Configure the IGMP snooping and display its status

```
CLI(config igmp)# snooping set immediate-leave enabled
OK

CLI(config igmp)# snooping set response-interval 300
OK

CLI(config igmp)# snooping set retrials 3
OK

CLI(config igmp)# snooping set aging-time 30
OK

CLI(config igmp)# set stateful flow
OK

CLI(config igmp)# enable snooping
OK
```

```
CLI(config igmp)# show

IGMP proxy
    status                 : disabled
    immediate leave        : enabled
    retrials               : 3
    response interval      : 300   in 1/10 sec

IGMP snooping
    status                 : enabled
    immediate leave        : enabled
    aging time             : 30   sec
    retrials               : 3
    response interval      : 300   in 1/10 sec

IGMP version
    query version          : v2
    report/leave version   : auto

Stateful
    level                  : flow - show flow state only
```

Example 74Configure the IGMP version for query, report and leave

```
CLI(config igmp)# version query v2
OK

CLI(config igmp)# version report-leave v3
OK

CLI(config igmp)# show
IGMP proxy
    status                 : disabled
    immediate leave        : disabled
    retrials               : 3
    response interval      : 30   in 1/10 sec

IGMP snooping
    status                 : enabled
    immediate leave        : enabled
    aging time             : 30   sec
    retrials               : 2
    response interval      : 100   in 1/10 sec

IGMP version
    query version          : v2
    report/leave version   : v3

Stateful
```

```
    level               : none - show nothing
```

Monitoring the IGMP Snoopy/Proxy Information

Enter to the “**status igmp**” sub-group directory to display the IGMP snoop and proxy information with associated xDSL line port.

```
CLI# status igmp
CLI(status igmp)#
```

Table 7-61 shows the commands to set the IGMP snooping and proxy information of NE. shows the usage of these commands as well as their related parameters.

Table 7-61 Viewing IGMP Proxy Information

The following command is to view the IGMP group (IP) with associated xDSL line port.

CLI(status igmp)# group show [<*group-ip*>]

The following command is to show IGMP member information on this port.

CLI(status igmp)# member show <*port-id*>

Parameters	Task
<group-ip>	Defines class D IP addressing for multicast channel **Type:** Mandatory **Valid values:** 224.0.1.0 ~ 239.255.255.255
<port-id>	Identify the port ID of the system line card **Type:** Mandatory **Valid values:** See the Section “Port Interface Indication” of 3.

Example 75Display the IGMP snooping/proxy information

```
CLI(status igmp)# group show

Current IGMP: IGMP Snooping

Group IP [234.5.1.1]
  group MAC        : 01:00:5e:05:01:01
  last reporter    : 10.10.10.10
  up time          : 00:00:00:50
  last port        : 1.37
  member counter   : 1
  member port      :

    slot [ 1]: 37
    slot [ 2]: none
    slot [ 3]: none
    slot [ 4]: none
    uge      : none


CLI(status igmp)# member show 1.37

Current IGMP: IGMP Snooping
```

```
port-ID   group-IP    state
-------  ---------------  ------
  1.37      234.5.1.1  active
```

Managing the Subscriber Access Services

The system supports the so-called “service type control” function to restrict the type of traffic to be forwarded on the PVC of individual subscriber.

- In RFC2684 routed mode, the following service type is supported.
    - Static IP
- In RFC2684 bridged mode, the following three service types are supported.
    - PPPoE
    - DHCP
    - Static IP
    - PPPoE+DHCP
    - PPPoE+Static IP

Enter to the “**config ucast**” sub-group directory to manage the access service control.

```
CLI# config ucast
CLI(config ucast)#
```

Table 7-62 shows the commands to perform the access services configuration of NE. shows the usage of these commands as well as their related parameters.

Table 7-62 Access Services Configuration

The following command is to define the access service of particular PVC.

CLI(config ucast)# set service-type *<port-range> <vpi> <vci> <mode>*

The following command is to create a new authentic IP in static IP access mode on specific PVCs.

CLI(config ucast)# add static-ip *<port-range> <vpi> <vci> <ip-base> <ip-limit>*

The following command is to remove an authentic IP in static IP access mode on specific PVCs.

CLI(config ucast)# del static-ip-base *<port-range> <vpi> <vci>* [*<ip-base>*]

The following command is to set the count of IP address assigned by DHCP on specific PVCs.

CLI(config ucast)# set dhcp-ip-limit *<port-range> <vpi> <vci> <ip-limit>*

The following command is to set the count of contiguous IP address from static IP base on specific PVCs.

CLI(config ucast)# set static-ip limit *<port-range> <vpi> <vci> <ip-base> <ip-limit>*

The following command is to display the access service status in specific subscriber port interface.

CLI(config ucast)# show service-type *<port-range>*

Parameters	Task
<port-range>	Identify the port range of the system line card **Type:** Mandatory **Valid values:** See the Section "Port Interface Indication" of 3.
<vpi>	Defines the VPI (Virtual Path Identifier) value. **Type:** Mandatory **Valid values:** 0 ~ 255
<vci>	Defines the VCI (Virtual Channel Identifier) value. **Type:** Mandatory **Valid values:** 1 ~ 65535 (1 ~ 31 are reserved)
<staticipbase>	This specifies the base of the IP address if the service type is Static IP **Type:** Mandatory **Valid values:** Any valid class A/B/C address **Default value:** None
<ip-limit>	This specifies the maximum IP counter when the service type is either "DHCP" or "Static IP". **Type:** Mandatory **Default value:** 0(DHCP),1(Static IP) **Valid values:** 1 ~ 64
<ip-base>	Defines the base IP address of the authentic IP in static IP access mode. **Type:** Mandatory **Valid values:** 0.0.0.0 ~ 255.255.255.255 (Reference to Appendix E)
<mode>	This specifies the authentic of access service mode in particular PVC. **Type:** Mandatory **Valid values:** pppoe | dhcp | staticip | pppoe+dhcp | pppoe+staticip

Example 76Configure the static IP access service

```
CLI(config ucast)# add static-ip 1.1 8 35 10.10.10.1 8
OK

CLI(config ucast)# set service-type 1.1 8 35 staticip
OK

CLI(config ucast)# show service-type 1.1

                                       DHCP/
port        RFC2684  STC    runtime      configured   static-IP
 ID   VPI/VCI   mode  status  service-type   service-type  IP limit
```

```
----- --------- ------- -------- --------------- --------------- ---------
 1. 1   8/   35 bridged disabled     pure-bridge      static-IP      1/ 8
```

Example 77Configure the DHCP IP access service

```
CLI(config ucast)# set dhcp-ip-limit 1.1 8 35 8
OK

CLI(config ucast)# CLI# config ucast show service-type 14.48

                                                    DHCP/
 port         RFC2684   STC      runtime        configured    static-IP
  ID   VPI/VCI    mode   status   service-type    service-type   IP limit
----- --------- ------- -------- --------------- --------------- ---------
14.48   0/   32 bridged  enabled     PPPoE+DHCP     PPPoE+DHCP      1/ 0
        0/   33 bridged  enabled     PPPoE+DHCP     PPPoE+DHCP      1/ 0
        0/   34 bridged  enabled     PPPoE+DHCP     PPPoE+DHCP     51/ 0
        0/   35 bridged  enabled     PPPoE+DHCP     PPPoE+DHCP     51/ 0
```

Example 78Configure the static IP+PPPoE access service

```
CLI(config ucast)# set service-type 1.1 8 35 pppoe+staticip
OK

CLI(config ucast)# show service-type 1.1

                                                    DHCP/
 port         RFC2684   STC      runtime        configured    static-IP
  ID   VPI/VCI    mode   status   service-type    service-type   IP limit
----- --------- ------- -------- --------------- --------------- ---------
 1. 1   8/   35 bridged disabled     pure-bridge  PPPoE+staticip      8/ 8
```

The CLI commands in this section take effect only when the **service-type** setting of ADSL LC is enabled. Please refer to Table 5-43 for the related commands.

In the RFC 2684 bridged mode, the NE supports to IP counts <= MAC limit per PVC of xDSL port.

In the RFC 2684 bridged mode, the count of IP base range for each PVC is set to 8.

Enabling the Service Type Control makes the NE to provide the IP/MAC anti spoofing function.

- **In the case that the subscriber acquires his IP address dynamically via PPPoE**
  The NE will block the subscriber's traffic before a valid IP address assignment. Once the subscriber possesses a valid dynamic IP, the NE will just forward the packet of valid source MAC addresses. In other words, the NE drops the subscriber's traffic of invalid source MAC addresses
- **In the case that the subscriber acquires his IP address dynamically via DHCP**
  The NE will block the subscriber's traffic before a valid IP address assignment. Once the subscriber possesses a valid dynamic IP, the NE will just forward the packet of valid source IP/MAC addresses. In other words, the NE drops the subscriber's traffic of invalid source IP/MAC addresses.
- **In the case that the subscriber possesses static IP address**
  The NE will just forward the packet of valid source IP/MAC addresses. In other words, the NE drops the subscriber's traffic of invalid source IP/MAC addresses.
- **In the case that the subscriber acquires his IP address dynamically via PPPoE+DHCP**
  The NE will block the subscriber's traffic before a valid IP address assignment. Once the subscriber possesses a valid dynamic IP, the NE will just forward the packet of valid source MAC addresses via PPPoE or IP/MAC addresses via DHCP. In other words, the NE drops the subscriber's traffic of invalid source MAC addresses or IP/MAC addresses.
- **In the case that the subscriber acquires his IP address dynamically via PPPoE+Static IP**
  The NE will block the subscriber's traffic before a valid IP address assignment. Once the subscriber possesses a valid dynamic IP or source IP/MAC addresses, the NE will just forward the packet of valid source IP via Static IP or source IP/ MAC addresses via PPPoE. In other words, the NE drops the subscriber's traffic of invalid source IP or source IP/MAC addresses.

Configuring the Access Control List

This section describes the configurations of the following 2 kinds of Access Control List (ACL).

- Source MAC Access Control List
- Filtering the NetBIOS and NetBEUI
- Packet filter

Source MAC Access Control List

The NE supports the VC-to-VLAN ACL function is to provide the operator a tool to manually deny/permit the ADSL subscriber's upstream Ethernet frame according to their source MAC addresses.

For example, if there are duplicate MAC addresses from two or more individual xDSL subscriber ports, the operator should deny the hacker's traffic and permit the good guy's traffic. With the VC-to-VLAN ACL function, the operator can manually set to permit (forward) one of them and deny the rest traffic. (or via the CLI commands depicts in Section "Filtering the Upstream Traffic of Spoofed MAC" of)

The VC-to-VLAN ACL function is to apply to the specified PVC on the ADSL line only.

The roles of access control function, Deny and Permit, are repulsive, i.e. a “deny” role will be replaced while a new role “permit” is be configured.

Enter to the “**config fdb**” sub-group directory to manage the ACL statement.

```
CLI# config fdb
CLI(config fdb)#
```

Table 7-63 shows the commands to configure the access control list of NE. shows the usage of these commands as well as their related parameters.

Table 7-63 Access Control List Configuration

The following command is to add the ACL permission of the specified MAC addresses on specified xDSL line port.

CLI(config fdb)# add acl *<port-id> <vpi> <vci> <mac-addr> <mode>*

The following command is to remove the specified MAC addresses of specified xDSL line port.

CLI(config fdb)# del *<port-id> <vpi> <vci> <mac-addr>*

The following command is to display the FDB entries on specified xDSL line ports

CLI(config fdb)# show [*<port-range>*]

Parameters	Task
<port-range>	Identify the port range of the system wish to configure in bridged services. **Type:** Mandatory **Valid values:** See the Section “Port Interface Indication” of 3.
<port-id>	Identify the port id of the system wish to display current list of learning MAC addresses from their remote network. **Type:** Mandatory **Valid values:** See the Section “Port Interface Indication” of 3.
<vpi>	Defines the VPI (Virtual Path Identifier) value. **Type:** Mandatory **Valid values:** 0 ~ 255
<vci>	Defines the VCI (Virtual Channel Identifier) value. **Type:** Mandatory **Valid values:** 1 ~ 65535 (1 ~ 31 are reserved)
<mac-addr>	Indicate the target MAC address. **Type:** Mandatory **Valid values:** Valid MAC addresses form. (for example: 00:1F:AA:19:78:03)
<mode>	Defines the ACL action of specific MAC address in the PVC connection. Permit or deny the specific MAC addresses of xDSL line port where addresses are learned. **Type:** Mandatory **Valid values:** permit, deny

Example 79Configure the access control list

```
CLI(config fdb)# add acl 1.6 8 35 00:11:f5:dc:7a:15 permit
OK

CLI(config fdb)# show 1.6

port ID   VPI/VCI     MAC address     VLAN  type
-------  ---------  ----------------  ----  ----
   1. 6    8/   35  00:11:f5:dc:7a:15   100    AP
```

Packet filter

The DAS4-Series system supports various combinations of packet filtering functionality is to provide the operator a method to permit/deny the ADSL subscriber's upstream/downstream Ethernet frame according to manually setting up the packet filtering functionality.

The types of packet fiter functionality in DAS4-Series device are described as follows.

- Fully configured filter (FCF)
  The FCF is the fully filter configuration to filter upstream or downstream incoming packet according to Ethernet type, IP protocol , transport source port and transport destination port on the specified ADSL line card.
- Ether type only filter (EOF)
  The ECF is the packet filter configuration to filter upstream or downstream incoming packet only according to Ethernet type on the specified ADSL line card.
- Known filter (KF)
  The KF is the packet filter configuration to filter upstream incoming packet according to some known protocols defined as BOOTP, (R)ARP, PPPoE, IGMP and multicast on the specified ADSL line card.

The actions of packet fiter functionality in DAS4-Series device are described as follows

- "match-forward"
  If the incoming packet matches the configured filter, the packet will be forwarded.
- "match-drop"
  If the incoming packet matches the configured filter, the packet will be dropped.
- "no-match-drop"
  If the incoming packet dosen't match the configured filter, the packet will be dropped.

Enter to the "**config packet-filter**" sub-group directory to manage the packet filter statement.

```
CLI# config packet-filter
CLI(config packet-filter)#
```

Table 7-64 shows the commands to configure the packet filter of NE. ~ shows the usage of these commands as well as their related parameters.

Table 7-64 Packet Filter Configuration

The following command is to add the packet filter group for downstream traffic on the specified ADSL line card.
CLI(config packet-filter)# add group ds <*lc-id*> <*group-name*> <*filter-name-set*>
The following command is to add the packet filter group for upstream traffic on the specified ADSL line card.
CLI(config packet-filter)# add group us <*lc-id*> <*group-name*> <*filter-name-set*>
The following command is to clear the packet filter group on the specified ADSL line card.
CLI(config packet-filter)# clear <*lc-id*> <*group-name*>
The following command is to remove the packet filter from the filter group on the specified ADSL line card.
CLI(config packet-filter)# del group <*lc-id*> <*group-name*> <*filter-name-set*>
The following command is to disable the packet filter on the specified ADSL line card.
CLI(config packet-filter)# disable filter <*lc-id*> <*filter-name*>
The following command is to disable the packet filter group on the specified ADSL line card.
CLI(config packet-filter)# disable group <*lc-id*> <*group-name*>
The following command is to enable the packet filter on the specified ADSL line card.
CLI(config packet-filter)# enable filter <*lc-id*> <*filter-name*>
The following command is to enable the packet filter group on the specified ADSL line card.
CLI(config packet-filter)# enable group <*lc-id*> <*group-name*>

Table 7-64 Packet Filter Configuration(Continued)

The following command is to set the packet filter according to the Ethernet type for downstream on the specified ADSL line card.
CLI(config packet-filter)# set eof ds <*lc-id*> <*filter-name*> <*ether-type*> <*action*>
The following command is to set the packet filter name according to the Ethernet type for downstream on the specified ADSL line card.
CLI(config packet-filter)# set eof ds-name <*lc-id*> <*eof-filter-id*> <*filter-name*>
The following command is to set the packet filter according to the Ethernet type for upstream on the specified ADSL line card.
CLI(config packet-filter)# set eof us <*lc-id*> <*filter-name*> <*ether-type*> <*action*>
The following command is to set the packet filter name according to the Ethernet type for upstream on the specified ADSL line card.
CLI(config packet-filter)# set eof us-name <*lc-id*> <*eof-filter-id*> <*filter-name*>
The following command is to set the fully configured packet filter for downstream on the specified ADSL line card.
CLI(config packet-filter)# set fcf ds-action <*lc-id*> <*filter-name*> <*action*>
The following command is to set the fully configured packet filter for destination port of downstream on the specified ADSL line card.
CLI(config packet-filter)# set fcf ds-dest-port <*lc-id*> <*filter-name*> <*dest-port*> [<*prefix*>]
The following command is to set the fully configured packet filter according to the Ethernet type for downstream on the specified ADSL line card.
CLI(config packet-filter)# set fcf ds-ether-type <*lc-id*> <*filter-name*> <*ether-type*>
The following command is to set the fully configured packet filter according to the IP protocols for downstream on the specified ADSL line card.
CLI(config packet-filter)# set fcf ds-ip-protocol <*lc-id*> <*filter-name*> <*ip-protocol*>
The following command is to set the fully configured packet filter name for downstream on the specified ADSL line card.
CLI(config packet-filter)# set fcf ds-name <*lc-id*> <*fcf-filter-id*> <*filter-name*>
The following command is to set the fully configured packet filter of source port for downstream on the specified ADSL line card.
CLI(config packet-filter)# set fcf ds-src-port <*lc-id*> <*filter-name*> <*src-port*> [<*prefix*>]
The following command is to set the action of fully configured packet filter for upstream on the specified ADSL line card.
CLI(config packet-filter)# set fcf us-action <*lc-id*> <*filter-name*> <*action*>
The following command is to set the fully configured packet filter of destination port for upstream on the specified ADSL line card.
CLI(config packet-filter)# set fcf us-dest-port <*lc-id*> <*filter-name*> <*dest-port*> [<*prefix*>]
The following command is to set the fully configured packet filter according to Ethernet type for upstream on the specified ADSL line card.
CLI(config packet-filter)# set fcf us-ether-type <*lc-id*> <*filter-name*> <*ether-type*>
The following command is to set the fully configured packet filter according to IP protocol for upstream on the specified ADSL line card.
CLI(config packet-filter)# set fcf us-ip-protocol <*lc-id*> <*filter-name*> <*ip-protocol*>
The following command is to set the fully configured packet filter name for upstream on the specified ADSL line card.
CLI(config packet-filter)# set fcf us-name <*lc-id*> <*fcf-filter-id*> <*filter-name*>

Table 7-64 Packet Filter Configuration(Continued)

The following command is to set the fully configured packet filter of source port for upstream on the specified ADSL line card.

CLI(config packet-filter)# set fcf us-src-port *<lc-id> <filter-name> <src-port>* [*<prefix>*]

The following command is to set the packet filter group name for downstream on the specified ADSL line card.

CLI(config packet-filter)# set group ds-name *<lc-id> <group-id> <group-name>*

The following command is to set the packet filter group name for upstream on the specified ADSL line card.

CLI(config packet-filter)# set group us-name *<lc-id> <group-id> <group-name>*

The following command is to set the action of known protocols packet filter for upstream on the specified ADSL line card.

CLI(config packet-filter)# set kf us-action *<lc-id> <filter-name> <action>*

The following command is to set the known protocols packet filter's name for upstream on the specified ADSL line card.

CLI(config packet-filter)# set kf us-name *<lc-id> <known-protocol> <filter-name>*

The following command is to display the packet filter on the specified ADSL line card.

CLI(config packet-filter)# show filter [*<lc-range>*] *<filter-type>*

The following command is to display the packet filter group on the specified ADSL line card.

CLI(config packet-filter)# show group [*<lc-range>*]

Parameters	Task
<lc-range>	Specify the slot range of the system **Type:** Mandatory **Valid values:** See the Section "Port Interface Indication" of 3.
<lc-id>	Specify the specific slot identifier of NE. **Type:** Mandatory **Valid values: See** the Section "Port Interface Indication" of 3.
<group-name>	Defines the filter group name for upstream/downstream traffic on the specified ADSL line card. **Type:** Mandatory **Valid values:** String of up to 20 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@', '/ ').
<filter-name-set>	Defines the set of the filter name configured for upstream/downstream traffic on the specified ADSL line card. **Type:** Mandatory **Valid values:** String of up to 20 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@', '/ ').
<filter-name>	Defines the packet filter name for upstream/downstream traffic on the specified ADSL line card. **Type:** Mandatory **Valid values:** String of up to 20 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@', '/ ').
<ether-type>	Defines the ethernet type of packets in a string format '0xNNNN'. **Type:** Mandatory **Valid values:** N is the hex-decimal number between 0x0~0xffff.
<ip-protocol>	Defines the IP protocol of packet filter to allow or deny forwarding the packets within the matched IP protocol. **Type:** Mandatory **Valid values:** 0~255. See the Appendix D.
<action>	Defines the actions if the packets match the configured filter or not. **Type:** Mandatory **Valid values:** match-forward | match-drop | no-match-drop
<eof-filter-id>	Defines the identity of ether type only filter on the specified ADSL line card. **Type:** Mandatory **Valid values:** 1-2

Table 7-64 Packet Filter Configuration(Continued)

<fcf-filter-id>	Defines the identity of fully configured filter on the specified ADSL line card. **Type:** Mandatory **Valid values:** 1~2
<src-port>	Defines the packet filter according to the source port of incoming packets. **Type:** Mandatory **Valid values:** 1~65535
<dest-port>	Defines the packet filter according to the destination port of incoming packets. **Type:** Mandatory **Valid values:** 1~65535
[*<prefix>*]	Defines the range of source port or destination port by prefix lenth mask configured in packet fileter. **Type:** Mandatory **Valid values:** 1~16
<known-protocol>	Indicate the known protocols wish to permit or deny the specific packets with in the known protocols configured . **Type:** Mandatory **Valid values:** bootp | rarp | pppoe | igmp | multicast
<filter-type>	Indicate the filter types configured on the specified ADSL line card . **Type:** Mandatory **Valid values:** eof | kf | fcf

Example 80Configure the Packet Filtering Group

```
CLI(config packet-filter)# add group us 1 usg1 useof1
OK

CLI(config packet-filter)# enable group 1 usg1
OK

CLI(config packet-filter)# enable filter 1 useof1
OK

CLI(config packet-filter)# show group 1

                    group                  filter
LC stream       group name    state     filter name      state
-- ------ -------------------- -------- -------------------- --------
 1    us            usg1  enabled            useof1  enabled
                  usg2 disabled
                  usg3 disabled
     ds             dsg1 disabled
                  dsg2 disabled
                  dsg3 disabled
                  dsg4 disabled
```

Example 81Configure the Packet Filtering According to the Ethernet Packet Type

```
CLI(config packet-filter)# set eof us 1 useof1 0x0800 match-forward
OK

CLI(config packet-filter)# enable filter 1 useof1
OK
```

```
CLI(config packet-filter)# show filter 1 eof
Line Card: 1

[EOF / US]
              ether          admin
  #   filter name   type   action    state
  - -------------------- ------ ------------- --------
  1        useof1 0x0800 match-forward  enabled
  2        useof2 0x0800 match-forward disabled

[EOF / DS]
              ether          admin
  #   filter name   type   action    state
  - -------------------- ------ ------------- --------
  1        dseof1 0x0800 match-forward disabled
  2        dseof2 0x0800 match-forward disabled
```

Example 82Configure the Fully Configured Packet Filtering

```
CLI(config packet-filter)# set fcf us-dest-port 1 usfcf1 1024 16
OK

CLI(config packet-filter)# set fcf us-ether-type 1 usfcf1 0x0800
OK

CLI(config packet-filter)# set fcf us-ip-protocol 1  usfcf1 1
OK

CLI(config packet-filter)# show filter 1 fcf

Line Card: 1

[FCF / US]
              ether   IP    src port/ dest port/       admin
  #  filter name     type  protocol  prefix   prefix   action   state
  - -------------------- ------ -------- --------- ---------- ------- --------
  1        usfcf1 0x0800      1    - /16    1024/16    M-F disabled
  2        usfcf2                - /16     - /16    M-F disabled

[FCF / DS]
              ether   IP    src port/ dest port/       admin
  #  filter name     type  protocol  prefix   prefix   action   state
  - -------------------- ------ -------- --------- ---------- ------- --------
  1        dsfcf1                - /16     - /16    M-F disabled
  2        dsfcf2                - /16     - /16    M-F disabled
```

Example 83Configure the Known Protocols Packet Filtering

```
CLI(config packet-filter)# set kf us-action 1 uskf1 match-forward
OK
```

```
CLI(config packet-filter)# enable filter 1 uskf1
OK

CLI(config packet-filter)# show filter 1 kf

Line Card: 1

[KF / US]
                known               admin
  #  filter name      type      action      state
  - -------------------- --------- ------------- --------
  1             uskf1    bootp match-forward  enabled
  2             uskf2     rarp match-forward disabled
  3             uskf3    pppoe match-forward disabled
  4             uskf4     igmp match-forward disabled
  5             uskf5 multicast match-forward disabled
```

Each line card contains 7 separated filter groups, 3 groups are for upstream and 4 groups are for downstream. The groups configured in different line cards are under independent operation.

The same packet filters can be applied to different groups at the same time.

Each port can be applied to 3 upstream groups and 4 downstream groups at most.

Filtering the NetBIOS and NetBEUI

The NE allows the operator to configure to forward or drop the name server protocol (NetBIOS and NetBEUI) traffics received on the subscriber interfaces and network interfaces.

Enter to the “**config filter**” sub-group directory to define the NetBIOS and NetBEUI filtering function.

```
CLI# config filter
CLI(config filter)#
```

Table 7-65 shows the commands to filter the NetBIOS and NetBEUI packets. shows the usage of these commands as well as their related parameters.

Table 7-65 NetBIOS and NetBEUI Filter

The following command is to define the action NetBIOS and NetBEUI filtering.	
CLI(config filter)# netbios <*netbios-action*>	
The following command is to display current setting of NetBIOS and NetBRUI filtering.	
CLI(config filter)# show	
Parameters	**Task**
<*netbios-action*>	Identify the NetBIOS and NetBEUI filtering action. **Type:** Mandatory **Valid values:** drop, forward

Example 84NetBIOS and NetBEUI Filtering

```
CLI(config filter)# netbios drop
OK

CLI(config filter)# show

NetBIOS filter action: drop
```

Configuring the System Services

This section describes the configurations of the following System Services.

- DHCP Broadcast Control
- DHCP Relay Setting
- DHCP Relay Option 82 Setting
- Configuring the PPPoE Suboption
- Configuring the VLAN MAC Limitation
- Configuring MAC Aging for Bridged Services
- Monitoring the VLAN Member Set
- Filtering the Upstream Traffic of Spoofed MAC
- Monitoring the Subscriber MAC

DHCP Broadcast Control

Users can set the DHCP broadcast packet rate limit and set the action to be applied to the out-of-profile traffic on a per-NE basis.

Enter to the “**config dhcp**” sub-group directory to configure the DHCP broadcast control.

```
CLI# config dhcp
CLI(config dhcp)#
```

Table 7-66 shows the commands to perform the DHCP broadcast control. shows the usage of these commands as well as their related parameters.

Table 7-66 DHCP Broadcast Control

The following command is to define the action to the DHCP packets which exceed the specified <*rate-limit*>.

CLI(config dhcp)# set bc <*rate-limit*> <*action*>

The following command is to disable the DHCP broadcast control

CLI(config dhcp)# disable bc

The following command is to enable the DHCP broadcast control

CLI(config dhcp)# enable bc

The following command is to display the DHCP broadcast control information

CLI(config dhcp)# show

Parameters	**Task**
<*action*>	Defines the action to be applied to the DHCP broadcast packets which exceed the specified <*rate-limit*>. **Type:** Mandatory **Valid values:** none, drop, alarm, both none – do nothing drop – drop DHCP broadcast packets alarm – send alarm to the configured trap host (AMS LCT or AMS EMS Server) both– drop DHCP broadcast packets and send alarm **Default value:** none
<rate-*limit*>	Defines the rate limit of DHCP broadcast packets **Type:** Mandatory **Valid values:** 1 ~ 100000 (pkts/sec.) **Default value:** 100 (pkts/sec.)

When the action is set to be either “alarm” and “Drop packet and send alarm”, the NE will launch SNMP traps to the SNMP trap managers as specified in the Section “Configuring the IP Address of SNMP Trap Station” of 3.

Example 85Configure the DHCP broadcast control

```
CLI(config dhcp)# set bc 1000 both
OK

CLI(config dhcp)# enable bc
OK

CLI(config dhcp)# show

  DHCP option82              : disabled
  broadcast control          : enabled
    rate limit               : 1000 pkts/sec
    action over rate limit   : both (drop & alarm)
  stateful level             : none - show nothing
  DHCP relay                 : disabled
  relay server               : no server exists
```

DHCP Relay Setting

The DHCP relay intercepts the DHCP request packets from subscriber interface and forwards them to the specified DHCP server. In the opposite direction, the DHCP relay transfers the DHCP reply packets from DHCP server to the specified xDSL subscriber.

Enter to the “**config dhcp**” sub-group directory to configure the DHCP relay.

```
CLI# config dhcp
CLI(config dhcp)#
```

Table 7-67 shows the commands to perform the DHCP relay server configuration. shows the usage of these commands as well as their related parameters.

Table 7-67 DHCP Relay Setting

The following command is to define the DHCP relay server and its correspondent VLAN ID.
CLI(config dhcp)# add relay-server *<server-ip>*
The following command is to remove the DHCP relay server IP
CLI(config dhcp)# del relay-server *<server-ip>*
The following command is to enable the DHCP relay functionality.
CLI(config dhcp)# enable relay
The following command is to disable the DHCP relay functionality.
CLI(config dhcp)# disable relay
The following command is to configure the stateful mode of DHCP packets.
CLI(config dhcp)# set stateful *<level>*
The following command is to view the DHCP relay status.
CLI(config dhcp)# show

Parameters	**Task**
<server-ip>	This specifies the IP address of DHCP server. **Type:** Mandatory **Valid values:** Any valid class A/B/C address **Default value:** None
<level >	Define the print out mode when system receives DHCP packets. **Type:** Mandatory **Valid values:** none | flow | pf | all None – show nothing Flow – show flow state only Pf – show packet content and flow state All – all content with hexadecimal data

Example 86Set the DHCP relay server

```
CLI(config dhcp)# add relay-server 192.168.192.1
OK

CLI(config dhcp)# enable relay
OK

CLI(config dhcp)# set stateful flow
OK

CLI(config dhcp)# show

option82                : disabled
broadcast control           : enabled
broadcast rate limit        : 1000 pkts/sec
broadcast action            : both (drop & alarm)
stateful level          : flow - show flow state only
```

```
relay                   : enabled
relay server 1              : 192.168.192.56
relay server 2              : 192.168.192.1
```

DHCP Relay Option 82 Setting

Enter to the “**config dhcp**” sub-group directory to configure the DHCP relay option 82.

```
CLI# config dhcp
CLI(config dhcp)#
```

Table 7-68 shows the commands to perform the DHCP Relay Option 82 configuration. shows the usage of these commands as well as their related parameters.

Table 7-68 DHCP Relay Option 82 Setting

The following command is to enable the DHCP relay option 82 functionality.
CLI(config dhcp)# enable op82
The following command is to disable the DHCP relay option 82 functionality.
CLI(config dhcp)# disable op82

Example 87Configure the DHCP Relay Option 82

```
CLI(config dhcp)# enable op82

OK

CLI(config dhcp)# show

option82                  : enabled
broadcast control             : disabled
broadcast rate limit          : 100 pkts/sec
broadcast action              : both (drop & alarm)
stateful level            : none - show nothing
relay                   : disabled
relay server                : no server exists
```

The setting of DHCP option 82 contents is performed by configuring the xDSL Port Agent ID. (See the Section “Configuring the ADSL Line Port” of 5)

Configuring the PPPoE Suboption

PPPoE sub-option has similar mechanism as DHCP option 82. The NE can insert Circuit ID and Remote ID in all upstream PPPoE packets in the PPPoE discovery stage, i.e. the PADI, PADR and upstream PADT packets.

The setting of PPPoE sub-option contents is performed by configuring the xDSL Port Agent ID

Enter to the “**config pppoe**” sub-group directory to configure the PPPoE suboption.

```
CLI# config pppoe
CLI(config pppoe)#
```

Table 7-69 shows the commands to perform the PPPoE suboption configuration. shows the usage of these commands as well as their related parameters.

Table 7-69 PPPoE Suboption Setting

The following command is to enable the PPPoE suboption function.

CLI(config pppoe)# enable suboption

The following command is to disable the PPPoE suboption function.

CLI(config pppoe)# disable suboption

The following command is to configure the stateful mode of PPPoE packets.

CLI(config pppoe)# set stateful *<level>*

The following command is to display the PPPoE suboption and stateful information.

CLI(config pppoe)# show

Parameters	Task
<level>	Define the print out mode when system receives PPPoE packets. **Type:** Mandatory **Valid values:** none | flow | msg none – show nothing flow – show flow state only msg – show flow message

Example 88Configure the PPPoE suboption

```
CLI(config pppoe)# set stateful flow
OK

CLI(config pppoe)# enable suboption
OK

CLI(config pppoe)# show

suboption        : enabled
stateful level   : flow
```

Configuring the VLAN MAC Limitation

To limit the number of source MAC address learned in a specific VLAN, the users can enable the MAC limiting function and configure the upper limit of allowed MAC for a specific VLAN.

Enter to the “**config vlan-mac-limit**” sub-group directory to manage the VLAN MAC limitation.

```
CLI# config vlan-mac-limit
CLI(config vlan-mac-limit)#
```

Table 7-70 shows the commands to perform the VLAN MAC limiting configuration. shows the usage of these commands as well as their related parameters.

Table 7-70 VLAN MAC Limiting Configuration

<table>
<tr><td colspan="2">The following command is to enable or disable the MAC limiting of specific VLAN ID.</td></tr>
<tr><td colspan="2"><b>CLI(config vlan-mac-limit)# set</b> <i>&lt;vid&gt; <option&gt;</i></td></tr>
<tr><td colspan="2">The following command is to define the MAC number of specific VLAN ID.</td></tr>
<tr><td colspan="2"><b>CLI(config vlan-mac-limit)# set</b> <i>&lt;vid&gt; <maclimit&gt;</i></td></tr>
<tr><td colspan="2">The following command is to display the status of VLAN MAC limiting.</td></tr>
<tr><td colspan="2"><b>CLI(config vlan-mac-limit)# show</b> <i>&lt;vid&gt;</i></td></tr>
<tr><th>Parameters</th><th>Task</th></tr>
<tr><td><i>&lt;vid&gt;</i></td><td>This specifies the VLAN ID of system.
<b>Type:</b> Mandatory
<b>Valid values:</b> 1 ~ 4094</td></tr>
<tr><td><i>&lt;option&gt;</i></td><td>This enable/disable the VLAN MAC limiting function of specific VLAN ID.
<b>Type:</b> Mandatory
<b>Valid values:</b> enabled | disabled</td></tr>
<tr><td><i>&lt;maclimit&gt;</i></td><td>This defines the MAC number of specific VLAN ID to be accept
<b>Type:</b> Mandatory
<b>Valid values:</b> 1 ~ 1536
<b>Default values:</b> 1536</td></tr>
</table>

Example 89Configure the VLAN MAC limiting

```
CLI(config vlan-mac-limit)# set 100 43
OK

CLI(config vlan-mac-limit)# set 100 on
OK

CLI(config vlan-mac-limit)# show 100

  VID [ 100]
    MAC Limit : 43
    MAC Limit Control: enabled
```

Configuring MAC Aging for Bridged Services

The MAC aging time sets the lifetime for the learned MAC address. A specific MAC address will be dropped when aging out until it is learned by the NE again.

Enter to the "**config bridge**" sub-group directory to configure the system bridging and monitor its status.

```
CLI# config bridge
CLI(config bridge)#
```

Table 7-71 shows the commands to perform the MAC aging for bridged services. shows the usage of these commands as well as their related parameters.

Table 7-71 Bridged Services Setting

The following command is to configure the bridging service aging time.

CLI(config bridge)# set aging-time *<sec>*

The following command is to view the bridging aging time status.

CLI(config bridge)# show

Parameters	Task
<sec>	Defines the bridging aging time in second. **Type:** Mandatory **Valid values:** 10 ~ 1000 (sec.) **Default value:** 300 (sec.)

Example 90Display the bridging status

```
CLI(config bridge)# set aging-time 300
OK

CLI(config bridge)# show
MAC aging time: 5 min 0 sec (300 sec)
```

Monitoring the VLAN Member Set

Enter to the "**status vlan**" sub-group directory to display

- the VLAN member set of a specified VLAN.
- the VLANs which the GE port is a member port of.

```
CLI# status vlan
CLI(status vlan)#
```

Table 7-72 shows the commands to show the Subscriber VLAN Group configuration. shows the usage of these commands as well as their related parameters.

Table 7-72 Viewing Subscriber VLAN Group

Use this command to viewing the xDSL line ports which are the VLAN member ports of a specified VLAN

CLI(status vlan)# show vlan-id *<vid>*

Use this command to view VLANs which the GE port is a member port of

CLI(status vlan)# show uge *<uge-id>*

Parameters	Task
<vid>	This specifies the VLAN ID of correspond xDSL line port. **Type:** Mandatory **Valid values:** 1~ 4094
<uge-id>	This specifies the uge id of correspond xDSL line port. **Type:** Mandatory **Valid values:** 1~2

Example 91Display the subscriber VLAN group

```
CLI(status vlan)# show vlan-id 100


VLAN [100] egress ports
```

```
  LC 1: 6,21
  LC 2:
  LC 3:
  LC 4:
  UGE : 1, 2

CLI(status vlan)# show uge 1
Use mode: uplink

VLAN ID:
   100, 4092
```

Configuring Static MAC

The NE supports the operator to add the “static” MAC addresses to specified xDSL line port manually. In comparison with the the MAC addresses learned from the associate ATM VC, the manually added “static” MAC addresses are never aged out.

Enter to the “**config fdb**” sub-group directory to add the static MAC entry to the FDB associated with the specified ATM PVC (i.e., the so-called “PVC_FDB”).

```
CLI# config fdb
CLI(config fdb)#
```

Table 7-73 shows the commands to add the static MAC entry to the PVC_FDB. shows the usage of these commands as well as their related parameters.

Table 7-73 Configuring a static MAC entry in PVC_FDB

The following command is to add the static MAC addresses of specified ATM PVC of an xDSL line port.

CLI(config fdb)# add static *<port-id> <vpi> <vci> <mac-addr>*

The following command is to remove the static MAC addresses of specified ATM PVC of an xDSL line port.

CLI(config fdb)# del *<port-id> <vpi> <vci> <mac-addr>*

The following command is to display the FDB entries on specified xDSL line ports

CLI(config fdb)# show [*<port-range>*]

Parameters	Task
<port-range>	Identify the xDSL port range of FDB to show. **Type:** Mandatory **Valid values:** See the Section “Port Interface Indication” of 3.
<port-id>	Identify the xDSL port id of the system to add/delete static MAC to **Type:** Mandatory **Valid values:** See the Section “Port Interface Indication” of 3.
<vpi>	Defines the VPI (Virtual Path Identifier) value. **Type:** Mandatory **Valid values:** 0 ~ 255
<vci>	Defines the VCI (Virtual Channel Identifier) value. **Type:** Mandatory **Valid values:** 1 ~ 65535 (1 ~ 31 are reserved)
<mac-addr>	Indicate the static MAC address to be added. **Type:** Mandatory **Valid values:** Valid MAC addresses form. (for example: 00:1F:AA:19:78:03)

Example 92Adding a static MAC addresses to specified ATM PVC of an xDSL line port.

```
CLI(config fdb)# add static 1.6 8 35 00:00:00:00:00:11

OK


CLI(config fdb)# show

port ID   VPI/VCI     MAC address     VLAN  type
-------  ---------  ----------------  ----  ----
   1. 6    8/   35  00:00:00:00:00:11   100     S
```

Filtering the Upstream Traffic of Spoofed MAC

The FDB (filtering Database) of DAS4-Series system stored the MAC addresses learning from the associate ATM VC at bridged mode. The NE supports to prevent forwarding the upstream traffic of duplicated MAC address from xDSL subscribers as they may be maybe opportunist or hacker

When the NE learns two or more duplicated MAC addresses from xDSL subscribers’s side learned at the same time, the NE’s default action is to **allow the first MAC address and block all the others.** However, the illegal user’s MAC address may be learned firstly. To provide the operator a tool to cure the aforementioned situation, the NE supports to manually change the default action.

Enter to the “**config fdb**” sub-group directory to configure learning MAC addresses from the associate ATM VC.

```
CLI# config fdb
CLI(config fdb)#
```

Table 7-74 shows the commands to configure the VC MAC Learning Table. ~ shows the usage of these commands as well as their related parameters.

Table 7-74 Configuring the action to the upstream traffic of spoofed MAC

The following command is to permit the upstream traffic of spoofed MAC address on the specified xDSL port.

CLI(config fdb)# set spoofed <*port-id*> <*mac-addr*> permit

The following command is to drop all the upstream traffic of spoofed MAC addresses.

CLI(config fdb)# set spoofed <*mac-addr*> deny-all

The following command is to display the FDB entries on specified xDSL line ports

CLI(config fdb)# show [<*port-range*>]

Parameters	Task
<*port-range*>	Identify the xDSL port range of FDB to show. **Type:** Mandatory **Valid values:** See the Section “Port Interface Indication” of 3.
<*port-id*>	Identify the xDSL port id of the system to set the action to the upstream traffic of spoofed MAC address **Type:** Mandatory **Valid values:** See the Section “Port Interface Indication” of 3.
<*mac-addr*>	Indicate the spoofed MAC address. **Type:** Mandatory **Valid values:** Valid MAC addresses form. (for example: 00:1F:AA:19:78:03)

Example 93Permitting the upstream traffic of spoofed MAC address on the specified xDSL port.

```
CLI(status fdb)# show spoofed

  MAC address      port    VPI/VCI   VLAN  status
----------------- ------- --------- ---- ------
00:00:00:00:00:11    1. 6    8/   35     0     LSA
                     1.23    8/   35     0     LSI

CLI(config fdb)# set spoofed 1.23 00:00:00:00:00:11 permit
OK

CLI(config fdb)# show

port ID   VPI/VCI      MAC address      VLAN  type
------- --------- ----------------- ---- ----
  1.6    8/   35  00:00:00:00:00:11     0    AD
```

Example 94Denying all the upstream traffic of spoofed MAC addresses

```
CLI(status fdb)# show spoofed

  MAC address      port    VPI/VCI   VLAN  status
```

```
----------------- ------- --------- ---- ------
00:00:00:00:00:11    1. 6    8/   35    0    LSA
                     1.23    8/   35    0    LSI


CLI(config fdb)# set spoofed 00:00:00:00:00:11 deny-all
OK

CLI(config fdb)# show

port ID   VPI/VCI     MAC address     VLAN  type
------- --------- ----------------- ---- ----
   1. 6    8/   35  00:00:00:00:00:11    0    AD
   1.23    8/   35  00:00:00:00:00:11    0    AD
```

Example 95Denying all the upstream traffic of spoofed MAC addresses and then trying to permit one on the specified xDSL port.

```
CLI(status fdb)#show spoofed

   MAC address      port    VPI/VCI   VLAN  status
----------------- ------- --------- ---- ------
00:00:00:00:00:11    1. 6    8/   35    0    LSI
                     1.23    8/   35    0    LSA

CLI(config fdb)# set spoofed 00:00:00:00:00:11 deny-all
OK

CLI(config fdb)# show

port ID   VPI/VCI     MAC address     VLAN  type
------- --------- ----------------- ---- ----
   1. 6    8/   35  00:00:00:00:00:11    0    AD
   1.23    8/   35  00:00:00:00:00:11    0    AD


CLI(config fdb)# set spoofed 1.6 00:00:00:00:00:11 permit

ERROR: MAC address is not spoofed.
```

Example 96Permitting one spoofed MAC address and then trying to denying all the upstream traffic of spoofed MAC addresses on the specified xDSL port.

```
CLI(status fdb)# show spoofed

   MAC address      port    VPI/VCI   VLAN  status
----------------- ------- --------- ---- ------
00:00:00:00:00:11    1. 6    8/   35    0    LSA
                     1.23    8/   35    0    LSI

CLI(status fdb)# exit
```

```
CLI# config fdb

CLI(config fdb)# set spoofed 1.23 00:00:00:00:00:11 permit
OK

CLI(config fdb)# show

port ID   VPI/VCI      MAC address     VLAN  type
------- --------- ----------------- ---- ----
  1. 6    8/   35  00:00:00:00:00:11     0    AD

CLI(config fdb)# set spoofed 00:00:00:00:00:11 deny-all

ERROR: MAC address is not spoofed.
```

Monitoring the Subscriber MAC

The FDB (filtering Database) of DAS4-Series system stores the following MAC entries

- the manually configured MAC addresses on an ATM VC of xDSL port.
- the MAC addresses learned from the associate ATM VC of xDSL port.
- the MAC addresses learned from the GE1(uplink GE port) or GE2 port(uplink/subtending GE port).

According to the nature of stored MAC entry, each entry possesses "status" field. The definitions of "status" field are as follows.

- "**AD**" : the abbreviation of "ACL Deny",
  It means the NE is to drop the upstream traffic of the indicated source MAC and forward the upstream traffic of other source MAC from the indicated xDSL port.
- "**AP**" : the abbreviation of "ACL Permit",
  It means the NE is to forward the upstream traffic of this indicated source MAC and drops the upstream traffic of other source MAC from the indicated xDSL port.
- "**S**": the abbreviation of "Static",
  It means this MAC entry is configured manually in FDB.
- "**LU**": the abbreviation of "Learned Unique",
  It means this MAC is learned on the indicated xDSL port dynamically with setting aged time and is a unique one.
- "**LUN**": the abbreviation of "Learned Unique, non-aged",
  It means this MAC is learned on the indicated xDSL port dynamically with setting non-aged time and is a unique one.
- "**LR**" : the abbreviation of "Learned Routed",
  It means this MAC is inserted by the xDSL LC in the case that the indicated xDSL port is in the RFC2684 routed mode.
- "**LSI**": the abbreviation of "Learned Spoofed Inactive",
  It means the following identities.
  - This MAC is learned on the indicated xDSL port.
  - The NE learns the same MAC on the xDSL other than the indicated xDSL. That is, this MAC is spoofed.
  - This spoofed MAC is at the "inactive" state. That is the NE is to drop the upstream traffic of the spoofed MAC from the the indicated xDSL port.
- "**LSA**" : the abbreviation of "Learned Spoofed Active",
  It means the following identities.
  - This MAC is learned on the indicated xDSL port or uge ports.
  - The NE also learns the same MAC on the xDSL ports or uge ports other than the

indicated xDSL port or uge ports. That is, this MAC is spoofed.

- This spoofed MAC is at the “active” state. That is the NE is to forward the upstream traffic of the spoofed MAC from the the indicated xDSL port or uge ports.

Table 7-75 shows how the NE treats the upstream Ethernet frame whenever its source MAC hits the PVC_FDB. Here, the "PVC_FDB" indicates the the FDB associated with the specified ATM PVC.

Table 7-76 shows the conditions the NE will not learn the source MAC of upstream traffic.

Table 7-75 The treatment of an upstream Ethernet frame of source MAC hitting the PVC_FDB

Status of hitted MAC entry in PVC_FDB	S	AD	AP	LU	LUN	LR	LSA	LSI
Forward (F) /Drop (D) packets of the same source MAC	F	D	F	F	F	F	F	D

Table 7-76 The conditions the NE does not learn additional source MAC of upstream traffic

Status of existent MAC entry in PVC_FDB	S	AD	AP	LU	LUN	LR	LSA	LSI
Allow (Y) /Deny (N) learning any additional MAC	Y	Y	N	Y	Y	NA	Y	Y

The NE may add a MAC entry to FDB due to either one of the following cases.

- The operator intends to manually add a MAC ACL entry.
- The operator intends to manually add a static MAC entry.
- The NE executes the basic "learning process of a bridge".

Depending on the status of existent MAC entries in FDB, the NE may take some or all of the following actions when it is to add a MAC entry to FDB

- Change the status of existent MAC entries of the same MAC.
- Reject to add this new MAC entry.
- Allow to add this new MAC entry but assign it some different status.

Table 7-77~Table 7-83 depicts the expected status of hitted MAC entry as well as the status of new added MAC entry in the aforementioned cases with the follwoing notations.

- Dif_Port_FDB = The MAC entries of FDB associated with different port
- Dif_PVC_FDB = The MAC entries of FDB associated with the same port but different PVC
- PVC_FDB = The MAC entries of FDB associated with the same port and the same PVC
- o : Permit x : Reject # : Clear LU/LUN Entry
- c : Clear AP Entry & : Clear non-AP Entry r : Replacement
- c-u: Clear the uge spoofed table

Table 7-77 The expected status of hitted MAC entry as well as the status of new added MAC entry in the case that the MAC entry to be added hits the entry of Dif_Port_FDB

The reason to add a MACentry Status of matched MAC entry of Dif_Port_FDB	Manual addition			Dynamicaly learning on ATM PVC of		
	a static MAC	a MAC ACL Permit MAC	a MAC ACL Deny MAC	RFC2684 routed mode	"aged" RFC2684 bridged mode	"non-aged" RFC2684 bridged mode
S	x S	x S	o S	NA	LSI S	LSI S
AP	x AP	x AP	o AP	NA	LSI AP	LSI AP
AD	o AD	o AD	o AD	NA	LU AD	LUN AD
LR	x LR	x LR	x LR	NA	LSI LR	LSI LR
LU	x LU	x LU	o LU	NA	LSI LSA	LSI LSA
LUN	x LUN	x LUN	o LUN	NA	LSI LUN	LSI LUN
LSA	x LSA	x LSA	o LSA	NA	LSI LSA	LSI LSA
LSI	x LSI	x LSI	o LSI	o NA	LSI LSI	LSI LSI

NA indicates "Not Applicable". As the NE reserves MACs for routed PVC. It's not possible for NE to dynamicaly learn such a MAC address on an ATM PVC of RFC2684 routed mode.

Whenever the following 3 cases hold simultaneously.

- NE learns a new MAC entry on a ATM PVC of "non-aged"/"aged" RFC2684 bridged mode,
- This new MAC is the same as the one of FDB associated with different port
- The status of the MAC entry associated with different port is "LUN".

The NE will keep the status of the MAC entry associated with different port as "LUN".

Table 7-78 The expected status of hitted MAC entry as well as the status of new added MAC entry in the case that the MAC entry to be added hits the entry of Dif_PVC_FDB

The reason to add a MACentry Status of matched MAC entry of Dif_PVC_FDB	Manual addition			Dynamicaly learning on ATM PVC of		
	a static MAC	a MAC ACL Permit MAC	a MAC ACL Deny MAC	RFC2684 routed mode	“aged” RFC2684 bridged mode	“non-aged” RFC2684 bridged mode
S	o S	o S	o S	NA	LU S	LUN S
AP	o AP	o AP	o AP	NA	LU AP	LUN AP
AD	o AD	o AD	o AD	NA	LU AD	LUN AD
LR	x LR	x LR	x LR	NA	NA	NA
LU	o LU	o LU	o LU	NA	LU LU	LUN LU
LUN	o LUN	o LUN	o LUN	NA	LU LUN	LUN LUN
LSA	x LSA	x LSA	x LSA	NA	LSA LSA	LSA LSA
LSI	x LSI	x LSI	x LSI	NA	LSI LSI	LSI LSI

Table 7-79 The expected status of hitted MAC entry as well as the status of new added MAC entry in the case that the MAC entry to be added hits the entry of PVC_FDB

The reason to add a MACentry Status of matched MAC entry of PVC_FDB	Manual addition		
	a static MAC	a MAC ACL Permit MAC	a MAC ACL Deny MAC
S	x S	x S	x S
AP	x AP	x AP	x AP
AD	x AD	x AD	x AD
LR	x LR	x LR	x LR
LU	r LU	r+& LU	r+c LU
LUN	r LUN	r+& LUN	r+c LUN
LSA	x LSA	x LSA	x LSA
LSI	x LSI	x LSI	x LSI

Table 7-80 The expected spoofed status between the xDSL line port and uplink (uge1) port

The reason to add a MAC entry Status of matched uplink (uge1) port	Manual addition			Dynamically learning on the line port of		
	a static MAC	a MAC ACL Permit MAC	a MAC ACL Deny MAC	LR	LU	LUN
LU	S LU	AP LU	AD LU	NA	LU c-u	LUN c-u
LSA	x LSA	x LSA	AD LSA	NA	LSI LSA	LSI LSA

The reason to add a MAC entry Status of matched xDSL line port	Dynamically learning on the uplink (uge1) port of
	LU
S	LSA S
AP	LSA AP
AD	LU AD
LR	X LR
LU	LSA LSA
LUN	LSA LUN
LSA	LSA LSA
LSI	LSA LSI

Table 7-81 The expected spoofed status between the xDSL line port and subtending (uge2)port

The reason to add a MAC entry Status of matched subtending (uge2) port	Manual addition			Dynamically learning on the line port of		
	a static MAC	a MAC ACL Permit MAC	a MAC ACL Deny MAC	LR	LU	LUN
LU	S LU	AP LU	AD LU	NA	LU c-u	LUN c-u
LSA	x LSA	x LSA	AD LSA	NA	LSI LSA	LSI LSA

The reason to add a MAC entry Status of matched xDSL line port	Dynamically learning on the subtending (uge2) port of
	LU
S	LSA S
AP	LSA AP
AD	LU AD
LR	X LR
LU	LSA LSA
LUN	LSA LUN
LSA	LSA LSA
LSI	LSA LSI

Table 7-82 The expected spoofed status between uplink(uge1) port and subtending(uge2)port

The reason to add a MAC entry Status of matched subtending (uge2) port	Dynamically learning on uplink (uge1) port of
	LU
LU	LU c-u
LSA	LSA LSA

The reason to add a MAC entry Status of matched uplink (uge1) port	Dynamically learning on subtending (uge2) port of
	LU
LU	LU c-u
LSA	LSA LSA

Table 7-83 The expected spoofed status between uplink(uge1) port and uplink (uge2)port

The reason to add a MAC entry Status of matched uplink (uge2) port	Dynamically learning on uplink (uge1) port of
	LU
LU	LU c-u
LSA	LSA LSA

The reason to add a MAC entry Status of matched uplink (uge1) port	Dynamically learning on uplink (uge2) port of
	LU
LU	LU c-u
LSA	LSA LSA

Enter to the “**status fdb**” sub-group directory to view learning MAC addresses from the associate ATM VC.

```
CLI# status fdb
CLI(status fdb)#
```

Table 7-84 shows the commands to show the VC MAC Learning Table. ~ shows the usage of these commands as well as their related parameters.

Table 7-84 VC MAC Learning Table

The following command is to display the MAC addresses learned on the specified xDSL line port.	
CLI(status fdb)# show port *<port-range>*	
The following command is to display the spoofed MAC addresses and the xDSL line ports where spoofed MAC addresses are learned.	
CLI(status fdb)# show spoofed	
The following command is to display the xDSL line ports where the specified MAC addresses are learned.	
CLI(status fdb)# show mac *<mac-addr>*	
Parameters	**Task**
<port--range >	Identify the port id of the system wish to display current list of learning MAC addresses from their remote network. **Type:** Mandatory **Valid values:** See the Section “Port Interface Indication” of 3.
<mac-addr>	Indicate the target MAC address. **Type:** Mandatory **Valid values:** Valid MAC addresses form. (for example: 00:1F:AA:19:78:03)

Example 97Displaying the MAC addresses learned on the specified xDSL line port

```
CLI(status fdb)# show port 1.6
```

```
Port  1. 6

 ID  VPI  VCI     MAC Address    Status
 --- --- ----- ----------------- ------
   1   8    35 00:00:00:00:00:11     LU
```

Example 98Displaying the spoofed MAC addresses and the xDSL line ports where spoofed MAC addresses are learned

```
CLI(status fdb)# show spoofed

   MAC address      port     VPI/VCI   VLAN  status
-----------------  -------  ---------  ----  ------
00:00:00:00:00:11     1. 6    8/   35     0     LSA
                      1.23    8/   35     0     LSI
```

Example 99Displaying the xDSL line ports where the specified MAC addresses are learned

```
CLI(status fdb)# show mac 00:00:00:00:00:11

   MAC address      port     VPI/VCI   VLAN  status
-----------------  -------  ---------  ----  ------
00:00:00:00:00:11     1. 6    8/   35     0     LSA
                      1.23    8/   35     0     LSI
```

Example 100Displaying the spoofed MAC addresses between UGE ports and xDSL line ports where spoofed MAC addresses are learned

```
CLI(status fdb)# show spoofed

   MAC address      port     VPI/VCI   VLAN  status
-----------------  -------  ---------  ----  ------
00:00:00:00:00:01     UGE1                      LSA
                      UGE2                      LSA
                      4. 1    0/   32   100     LSI
```

Example 101Displaying the alarm message of UGE ports where spoofed MAC addresses are learned

```
CLI# status alarm show detail uge1

          Detail alarm list is:
                 alarm name      severity            description
            ---------------------  --------  ----------------------------------------
                    MAC_SPOOFED   warning  Duplicated MAC addresses from differe...
```

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Chapter 7Managing the System Operations

This chapter describes the system functions of DAS4-Series IP-DSLAM.

This chapter contains the following sections:

- System Administrating
- Alarm Definition and Relay Setting
- Configuring the Redundancy

System Administrating

The system administrating provides command for you to logout the Telnet session or reboots the system device.

Reset the Line Card and Port

Reset the line card and port using the "**reset**" command at the prompt for CLI#.

Table 8-85 shows the commands to reset the planning of line card and port. 7 shows the usage of these commands as well as their related parameters.

Table 8-85 Line Card and Port Reset Command

<table>
<tr><td colspan="2">The following command is to reset the specify line card.</td></tr>
<tr><td colspan="2"><b>CLI# reset lc</b> &lt;<i>lc-id</i>&gt;</td></tr>
<tr><td colspan="2">The following command is to reset the specify NC card.</td></tr>
<tr><td colspan="2"><b>CLI# reset nc</b> &lt;<i>nc-id</i>&gt;</td></tr>
<tr><td colspan="2">The following command is to reset the specify xDSL port interface.</td></tr>
<tr><td colspan="2"><b>CLI# reset port</b> &lt;<i>port-id</i>&gt;</td></tr>
<tr><td colspan="2">The following command is to reset (reboot) the system device.</td></tr>
<tr><td colspan="2"><b>CLI# reset system</b></td></tr>
<tr><td><b>Parameters</b></td><td><b>Task</b></td></tr>
<tr><td>&lt;<i>lc-id</i>&gt;</td><td>Identify the slot id of the system
<b>Type:</b> Mandatory
<b>Valid values:</b> See the Section "Port Interface Indication" of 3.</td></tr>
<tr><td>&lt;<i>nc-id</i>&gt;</td><td>Identify the slot id of the network card
<b>Type:</b> Mandatory
<b>Valid values:</b> 1 | 2</td></tr>
<tr><td>&lt;<i>port-id</i>&gt;</td><td>Identify the port id of the system
<b>Type:</b> Mandatory
<b>Valid values:</b> See the Section "Port Interface Indication" of 3.</td></tr>
</table>

Example 102Reset the line card and xDSL port

```
CLI# reset lc 2
OK

CLI# reset port 1.2.1
OK
```

The pop-up information for reset line card command shows only on Console port access.

Reboot the System

The reboot command activates the software restart of system device. The configuration change will be lost if you did not committed (store) it.

Reboot the system using the "**reboot**" command at the prompt for CLI#.

Table 8-86 System Reboot Command

The following command is to reboot the system device.
CLI# reboot

Alarm Definition and Relay Setting

The alarm definition profile allows you to define the rule of alarm element in system. Through this profile, you are able to change the severity of individual alarm element and decide to report it or not. Alarm element is specified in the class of module or port. Different types of module may present different alarm element. Different types of port may also present different alarm element.

The relay input management allows you to define the alarm relay input. Please see "*System Installation Guide*" for the definition. Once the normal status of input signal is different from the current status, the NE will launch an "abnormal status" alarm of the specified relay input to LCT and AMS server.

Configuring the Alarm Definition

Enter to the "**config alarm definition**" sub-group directory to manage the alarm definition. Please refer to 8 for the detailed description of defined alarms and their default severity.

```
CLI# config alarm definition
CLI(config alarm definition)#
```

Table 8-87 shows the commands to configure the alarm definition of line card and port. 7 shows the usage of these commands as well as their related parameters.

Table 8-87 Alarm Definition Configuration

The following command is to change the default alarm severities

CLI(config alarm definition)# set *<vendorType> <alarmType> {none | critical | major | minor | info} {true | false} <suppressby>*

The following command is to view the status of system alarm severities.

CLI(config alarm definition)# show

Parameters	Task
<vendorType>	It specifies an entuty of NE. **Type:** Mandatory **Valid values:** noEntity, cpuModule, adslModule, powerModule, fanModule, adslPort, alarmRelayModule, gePort, alarmRelayInPort
<alarmType>	It specifies a numerical representation of the condtion may happen to an entity (*<vendorType>*) of NE. (see the note below) **Type:** Mandatory **Valid values:** 0 ~ 31
{none | critical | major | minor | info}	Defines the severity level of alarm type. **Type:** Mandatory **Valid values:** none, critical, major, minor, info
{true | false}	Defines the filtering status of specific alarm type. **Type:** Mandatory **Valid values:** true, false true – The NE is not to send alarm trap to the trap host whenever there is an alarm indicated by *<vendorType>* and *<alarmType>* false –The NE is to send alarm trap to the trap host whenever there is an alarm indicated by *<vendorType>* and *<alarmType>*
<suppressby>	Defines the prevent alarms from being reported on another alarm, when an alarm or condition exists but you do not want it to appear instead of another.. (see the note below) **Type:** Mandatory **Valid values:** Hexadecimal number

NOTE The alarm suppression (suppressed by) allows you to mask specific alarms when there are sequences occurred at the same time. For example, let the LOF (Loss of Frame) be configured to be suppressed by the LOS (Loss of Signal), the LOF will not be display on the screen but only LOS whenever the corresponding ADSL loop is cut.

NOTE In 7, the "name" represents an abbreviation of the condtion indicated by *<alarmType>*.

<alarmType> may indicate different condtions when it appeas with different *<vendorType>*. For example, in 7, the *<alarmType>* of value 6 represents
"TCA_DHCP_BC" when it appears with "cpuModule",
"UAS_FE_15_MIN" when it appears with "adslPort"
and
"TCA_SNR_NE" when it appears with "shdslPort".

Example 103Display the system alarm definition

```
CLI# config alarm definition set adslModule 0 critical true 0x0a
OK

CLI# config alarm definition show

Alarm definition
  vendor-type  type        name          severity  filtered  supress-by
  -----------  ----  --------------------  --------  --------  ----------
  noEntity    0            EMPTY     none    false       0x0
 cpuModule    0            MISSING    major    false       0x0
 cpuModule    1              TEMP    major    false       0x0
 cpuModule    2               VOL    major    false       0x0
 cpuModule    3           MISMATCH    major    false       0x0
 cpuModule    6         TCA_DHCP_BC  warning    false       0x0
 cpuModule   30          HW_INFO_INV    major    false       0x0
adslModule    0           MISSING  critical     true      0xa
adslModule    1              TEMP    major    false       0x0
adslModule    2               VOL    major    false       0x0
adslModule    3           MISMATCH    major    false       0x0
adslModule    4        NOT_OPERABLE    major    false       0x0
adslModule   30          HW_INFO_INV    major    false       0x0
shdslModule    0            MISSING    major    false       0x0
shdslModule    1              TEMP    major    false       0x0
shdslModule    2               VOL    major    false       0x0
shdslModule    3           MISMATCH    major    false       0x0
shdslModule    4        NOT_OPERABLE    major    false       0x0
shdslModule   30          HW_INFO_INV    major    false       0x0
powerModule    0            MISSING    major    false       0x0
powerModule    4        NOT_OPERABLE    major    false       0x0
powerModule    5           PWR_FAIL    major    false       0x0
 fanModule    0           MISSING    major    false       0x0
 fanModule    1              FAN1    major    false       0x0
 fanModule    2              FAN2    major    false       0x0
 fanModule    9               VOL    major    false       0x0
  adslPort    1        ES_NE_15_MIN    minor    false       0x0
  adslPort    2       SES_NE_15_MIN    minor    false       0x0
  adslPort    3       UAS_NE_15_MIN    minor    false       0x0
  adslPort    4        ES_FE_15_MIN    minor    false       0x0
  adslPort    5       SES_FE_15_MIN    minor    false       0x0
  adslPort    6       UAS_FE_15_MIN    minor    false       0x0
  adslPort    7         ES_NE_1_DAY    minor    false       0x0
  adslPort    8        SES_NE_1_DAY    minor    false       0x0
  adslPort    9        UAS_NE_1_DAY    minor    false       0x0
  adslPort   10         ES_FE_1_DAY    minor    false       0x0
  adslPort   11        SES_FE_1_DAY    minor    false       0x0
  adslPort   12        UAS_FE_1_DAY    minor    false       0x0
  adslPort   13              LOS    minor    false       0x0
  adslPort   14              LOF    minor    false       0x0
  adslPort   15             LPWR    minor    false       0x0
  adslPort   16    GEN_LINE_INIT_FAIL    minor    false       0x0
  adslPort   17        CONFIG_ERROR    minor    false       0x0
  adslPort   18        HIGH_BIT_RATE    minor    false       0x0
  adslPort   19        COMM_PROBLEM    minor    false       0x0
  adslPort   20     NO_PEER_DETECTED    minor    false       0x0
  adslPort   21           TRAINING   warning    false       0x0
  adslPort   22          NO_CONFIG   warning    false       0x0
  adslPort   23        PS_L2_MANUAL     info    false       0x0
  adslPort   24          PS_L2_AUTO     info    false       0x0
  adslPort   25           PS_L3_CO     info    false       0x0
  adslPort   26         PS_L3_CPE     info    false      0x0
  adslPort   29         ILLEGAL_IP   warning    false      0x0
  adslPort   30        MAC_SPOOFED   warning    false      0x0
  adslPort   31          DISABLED     info    false      0x0
   ugePort    0          MISSING    major    false      0x0
   ugePort    4             LOS    major    false      0x0
   ugePort   27         LINK_DOWN    major    false      0x0
   ugePort   29         STP_LEARN     info    false      0x0
   ugePort   30         STP_BLOCK     info    false      0x0
   ugePort   31          DISABLED     info    false      0x0
relayModule    0            MISSING    major    false      0x0
relayInPort    1      RELAY_ABNORMAL    major    false      0x0
relayInPort   31          DISABLED     info    false      0x0
 shdslPort    1      TCA_ES_NE_15MIN    minor    false      0x0
 shdslPort    2     TCA_SES_NE_15MIN    minor    false      0x0
 shdslPort    3     TCA_UAS_NE_15MIN    minor    false      0x0
 shdslPort    4     TCA_CRC_NE_15MIN    minor    false      0x0
 shdslPort    5    TCA_LOSW_NE_15MIN    minor    false      0x0
 shdslPort    6          TCA_SNR_NE    minor    false      0x0
 shdslPort    7         TCA_ATTN_NE    minor    false      0x0
 shdslPort    8              OPI    minor    false      0x0
 shdslPort    9              LOS    minor    false      0x0
 shdslPort   10              SEGA    minor    false      0x0
 shdslPort   11              LPWR    minor    false      0x0
 shdslPort   12              SEGD    minor    false      0x0
 shdslPort   13            PBO_NE     info    false      0x0
 shdslPort   14         DEVFAULT_NE    minor    false      0x0
 shdslPort   15          DCCONT_NE    minor    false      0x0
 shdslPort   16            LOSW_NE    minor    false      0x0
 shdslPort   17          INI_CFG_NE    minor    false      0x0
 shdslPort   18      INI_PROTOCOL_NE    minor    false      0x0
 shdslPort   22            NOPEER    minor    false      0x0
 shdslPort   23            PBO_FE     info    false      0x0
 shdslPort   24         DEVFAULT_FE    minor    false      0x0
 shdslPort   25          DCCONT_FE    minor    false      0x0
 shdslPort   26            LOSW_FE    minor    false      0x0
 shdslPort   27          INI_CFG_FE    minor    false      0x0
 shdslPort   28      INI_PROTOCOL_FE    minor    false      0x0
 shdslPort   31           DISABLED     info    false      0x0
```

Configuring the System Relay-In Alarm

The DAS4-Series support housekeeping alarm relays for input signals.

Enter to the “**config alarm input**” sub-group directory to activate and monitor the alarm relay-in.

```
CLI# config alarm input
CLI(config alarm input)#
```

Table 8-88 shows the commands to configure system relay-in alarm input configuration. 7 shows the usage of these commands as well as their related parameters.

Table 8-88 System Relay-In Alarm Configuration

The following command is to set the name and index of system relay-in alarm input function.

CLI(config alarm input)# set name *<index> <input-name>*

The following command is to set the normal state of system relay-in alarm input function.

CLI(config alarm input)# set normal-state *<index> <state>*

The following command is to enable the system relay-in alarm input function.

CLI(config alarm input)# enable *<index>*

The following command is to disable the system relay-in alarm input function.

CLI(config alarm input)# disable *<index>*

The following command is to view the status of system relay-in alarm input function.

CLI(config alarm input)# show

Parameters	Task
< index>	Identify the port number of relay-in alarm. **Type:** Mandatory **Valid values:** 1 ~ 4
< input-name >	This specifies the name of given relay-in alarm port. **Type:** Mandatory **Valid values:** String of up to 10 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').
< state >	Identify one of the parameter of expects normal status of the relay-in alarm port. **Type:** Mandatory **Valid values:** open, close

Example 104Display the system relay-in alarm input port status

```
CLI(config alarm input)# set name 1 Door
OK

CLI(config alarm input)# set normal-state 1 closed
OK

CLI(config alarm input)# enable 1
OK

CLI(config alarm input)# show

 index              name              admin-state  normal-state
-------  -------------------------------  -----------  ------------
    1                         Door      enabled       closed
    2               << not defined >>     disabled       opened
    3               << not defined >>     disabled       opened
    4               << not defined >>     disabled       opened
```

Configuring the System Relay-Out Alarm

The DAS4-Series support housekeeping alarm relays to trigger the external device such as speaker or light to launch warning signal.

Enter to the “**config alarm output**” sub-group directory to activate and monitor the alarm relay-in.

```
CLI# config alarm output
CLI(config alarm output)#
```

Table 8-89 shows the commands to configure system relay-in alarm output configuration of line card and port. 7 shows the usage of these commands as well as their related parameters.

Table 8-89 System Relay-Out Alarm Configuration

The following command is to set the name and index of system relay-in alarm output function.
CLI(config alarm output)# set name *<index> <output-name>*
The following command is to set the severities of system relay-in alarm output function.
CLI(config alarm output)# set alarm-severities *<index> <severities>*
The following command is to enable the system relay-in alarm output function.
CLI(config alarmoutput)# enable *<index>*
The following command is to disable the system relay-in alarm output function.
CLI(config alarm output)# disable *<index>*

Table 8-89 System Relay-Out Alarm Configuration (continued)

The following command is to view the status of system relay-in alarm output function.

CLI(config alarm output)# show

Parameters	Task
< index>	Identify the port number of relay-in alarm. **Type:** Mandatory **Valid values:** 1 ~ 1
<output-name >	This specifies the name of given relay-in alarm port. **Type:** Mandatory **Valid values:** String of up to 10 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').
< severities >	Identify one of the parameter of expects normal status of the relay-in alarm port. **Type:** Mandatory **Valid values:** open, close

Example 105Display the system relay-in alarm input port status

```
CLI(config alarm output)# set name 1 Alarm_Output
OK

CLI(config alarm output)# set alarm-severities 1 major
OK

CLI(config alarm output)# enable 1
OK

CLI(config alarm output)# show

name              : Alarm_Output
alarm severities    : major
admin state         : enabled
```

Configuring the Redundancy

What described in this section is not suitable for the DAS-4192 IP-DSLAM.

When two NC cards are equipped in the DAS-4672 IP-DSLAM, the redundancy mechanism automatically operates. The standby NC will synchronize its configuration with the active NC's periodically. This section depicts the command to set the related synchronization parameters between these two NCs as follows.

Enter to the "**config rdn**" sub-group directory to operation.

Table 8-90 shows the commands to configure the redundancy function between NC1 and NC2. 7 shows the usage of these commands as well as their related parameters.

Table 8-90 Redundancy Setting

<table>
<tr><td colspan="2">The following command is to enable or disable the auto configuration data synchronize between NC1 and NC2.</td></tr>
<tr><td colspan="2"><b>CLI(config rdn)# set sync</b> &lt;<i>option</i>&gt;</td></tr>
<tr><td colspan="2">The following command is to define the synchronization period.</td></tr>
<tr><td colspan="2"><b>CLI(config rdn)# set sync</b> &lt;<i>period</i>&gt;</td></tr>
<tr><td colspan="2">The following command is to display the redundancy setting information.</td></tr>
<tr><td colspan="2"><b>CLI(config rdn)# show</b></td></tr>
<tr><td colspan="2">The following command is to manually synchronize the configuration data between NC1 and NC2.</td></tr>
<tr><td colspan="2"><b>CLI(config rdn)# sync</b></td></tr>
<tr><th>Parameters</th><th>Task</th></tr>
<tr><td>&lt;<i>option</i>&gt;</td><td>Enable or disable redundancy auto synchronizations.
<b>Valid values:</b> enabled, disabled</td></tr>
<tr><td>&lt;<i>period</i>&gt;</td><td>The information of System configuration synchronization period between NC1 and NC2.
<b>Valid values:</b> 30 ~ 3600 seconds.
<b>Default values:</b> 300</td></tr>
</table>

Example 106Display the redundancy setting between NC1 and NC2

```
CLI(config rdn)# set sync 300
OK

CLI(config rdn)# set sync enabled
OK

CLI(config rdn)# show

Current State:      Active
Auto Sync Control:  Enabled
Sync Period:        300 (second)
```

Chapter 8Diagnosis and Performance Monitoring

This chapter describes the filtering rule in different network layer.

This chapter contains the following sections:

- Performance Monitoring on System and Network Interface
- Performance Monitoring on ADSL Subscriber Interface
- Performance Monitoring on SHDSL Subscriber Interface
- Monitoring System Alarms
- OAM and Loop Diagnostic Test on Subscriber Interface
- Network Ping Test
- Monitoring the System Environment
- Monitoring the System Performance

Performance Monitoring on System and Network Interface

Enter to the “**status perf**” sub-group directory to display performance parameters on the Network interface.

```
CLI# status perf
CLI(status perf)#
```

Table 9-91 shows the commands to display the performance parameters on system and network interface of NE. 8 shows the usage of its command as well as its related parameters.

Table 9-91 Performance Monitoring on System and Network Interface

The following command is to viewing the performance parameters on the Network interface.
CLI(status perf)# show nc

Example 107Display the performance parameters on network interface

```
CLI(STA-PERF)# show nc
   interface      unicast   broadcast   multicast   discard     error
 ----------------  ----------  ----------  ----------  ----------  ----------
   UGE-01  inPkts         0          0          0          0          0
        outPkts         0          3          0          0          0
   UGE-02  inPkts         0          0          0          0          0
        outPkts         0          0          0          0          0
   LC-01   inPkts      6218         84          0          0          0
        outPkts      6281          1          0          0          0
   LC-02   inPkts      9448         88          0          0          0
        outPkts      9522          1          0          0          0
   LC-03   inPkts      5912         80          0          0          0
        outPkts      5976          1          0          0          0

   LC-04   inPkts        79         83          0          0          0
        outPkts        78         78          0          0          0

   interface      pause/RX    pause/TX
 ----------------  ----------  ----------
    UGE-01  pkts          0          0
```

```
UGE-02  pkts           0           0
```

Performance Monitoring on ADSL Subscriber Interface

Enter to the "**status perf**" sub-group directory to display performance parameters on the ADSL Subscriber interface.

```
CLI# status perf
CLI(status perf)#
```

Table 9-92 shows the commands to display the performance parameters on subscriber interface of NE. 8 shows the usage of its command as well as its related parameters.

Table 9-92 Performance Monitoring on ADSL Subscriber Interface

Use this command to view the performance parameters on the specified ADSL line port.

CLI(status perf)# show current *<port-id> <side>*

Parameters	Task
<port-id>	Identify the port id of the system wish to display the performance parameters with associated time period. **Type:** Mandatory **Valid values:** See the Section "Port Interface Indication" of 3.
<side>	Identify the performance parameters display on Near-End or Far-End, show both if not specify. **Type:** Optional **Valid values:** near, far

Example 108Display the performance parameters on subscriber interface

```
CLI(status perf)# show current 1.1.2

[UserCells/1.1.2]
          Curr15Min   Prev15Min   Curr1Day   Prev1Day
          --------    --------    --------   --------
     rxCells    0         0          0          3
     txCells    0         0          0          0

[Perf/NE/1.1.2]
          Curr15Min   Prev15Min   Curr1Day   Prev1Day
          --------    --------    --------   --------
        UAS     0         0          0       8627
       LOFs     0         0          0         30
       LOSs     0         0          0          0
       LPRs     0         0          0          0
      INITs     0         0          0          6
    FullINITs     0         0          0          6
         ES     0         0          0          0
        SES     0         0          0          0
         CV     0         0          0          0

[Perf/FE/1.1.2]
          Curr15min   Prev15Min   Curr1Day   Prev1Day
          --------    --------    --------   --------
        UAS     0         0          0       8577
       LOFs     0         0          0          8
```

```
LOSs     0         0         0         7
LPRs     0         0         0       8329
 ES    0         0         0       144
 SES     0         0         0        45
 CV    0         0         0       1618
```

Performance Monitoring on SHDSL Subscriber Interface

Enter to the "**status perf**" sub-group directory to display performance parameters on the SHDSL Subscriber interface.

```
CLI# status perf
CLI(status perf)#
```

Table 9-93 shows the commands to configure the performance parameters on SHDSL subscriber interface of NE. 8 shows the usage of its command as well as its related parameters.

Table 9-93 Performance Monitoring on SHDSL Subscriber Interface

The following command is to view the performance parameters on specific SHDSL line port.

CLI(status perf)# show current *<port-id>* *<side>*

The following command is to show the shdsl line historical performance data (15 minutes per interval).

CLI(status perf)# show history-15-min *<port-id>* *<start-interval>*

The following command is to show the shdsl line historical performance data (1day per interval).

CLI(status perf)# show history-1-day *<port-id>*

Parameters	Task
<port-id>	Identify the port id of the system wish to perform the link monitoring, the define line port must operate in running status. **Type:** Mandatory **Valid values:** See the Section "Port Interface Indication" of 3.
<start-interval>	This specifies the adsl line historical performance data (15 minutes per interval). **Type:** Mandatory **Valid values:** 1 ~ 96
<side>	Identify the given performance parameter value in Near-End or Far-End side, CLI Ex will apply the same performance parameter value for Near-End and Far-End if not specify. **Type:** Optional **Valid values:** near, far

Example 109Display the performance parameters on SHDSL subscriber interface

```
CLI(status perf)# show current 1.6 near


[UserCells/1.6]
        Curr15Min    Prev15Min    Curr1Day    Prev1Day
         --------     --------     --------     --------
    rxCells   52980      267862     22000803          0
    txCells       0           0          0            0


[Perf/NE/1.6]
  Current 15 Min Elapsed :   178 seconds
  Current 1 Day Elapsed  : 73978 seconds


        Curr15Min    Prev15Min    Curr1Day    Prev1Day
         --------     --------     --------     --------
      UAS      0           0          44           0
     LOFs      0           0           0           0
     LOSs      0           0           0           0
     LPRs      0           0           0           0
```

```
       INITs    0        0        1        0
   FailINITs     0        0        0        0
         ES    0        0        0        0
        SES     0        0        0        0
         CV    0        0        0        0
```

Monitoring System Alarms

This section explains how to monitor alarms with CLI Ex, which includes viewing current and historical alarm data.

The CLI Ex detects and reports system alarms generated by the DAS4-Series and the adjacent network. You can use CLI Ex to monitor alarms at a card, port, or network level and view alarm with severities.

Enter to the "**status alarm**" sub-group directory to monitor system alarms.

```
CLI# status alarm
CLI(status alarm)#
```

Table 9-94 shows the commands to configure the diagnostic the system alarm of NE. 8 ~8 shows the usage of its command as well as its related parameters.

Table 9-94 Viewing the System Alarm

The following command is to determine if the NE reports the current alarm on the CLI Ex in real-time.

CLI(status alarm)# reportconsole{*on* | *off*}

The following command is to view the current alarm data.

CLI(status alarm)# show current

The following command is to view the historical alarm data in detail.

CLI(status alarm)# show history detail <*serial-number*>

The following command is to view the historical alarm data in sequence.

CLI(status alarm)# show history{*ascendant* | *descendant*}

The following command is to view the setting of reportconsole

CLI(status alarm)# show reportconsole

The following command is to view the detailed description of the condition happen to the entity indicated by <*unit*>.

CLI(status alarm)# show detail <*unit*>

The following command is to view the status of system relay-in alarm inputput function.

CLI(status alarm)# show input

The following command is to view the status of system relay-in alarm output function.

CLI(status alarm)# show output

Parameters	Task
{*on* | *off*}	This specifies to let the NE report the current alarm on the CLI Ex in real-time or not. **Type:** Mandatory **Valid value:** on, off
<*serial-number*>	This specifies to let the NE report detail information of the alarm history on the CLI Ex by serial number. **Type:** Mandatory **Valid value:** 1~2147483647
{ *ascendant* | *descendant* }	This specifies to let the NE report the alarm history on the CLI Ex in sequence. **Type:** Mandatory **Valid value:** *ascendant*, *descendant*
{*unit*}	This indicates the entity on IP-DSLAM. **Type:** Mandatory **Valid value:** All the alarm unit on IP-DSLAM (see 8)

Example 110Viewing the active alarm on NE via Console Port (RS232 port)

```
CLI(status alarm)# reportconsole on
OK

CLI# Alarm <10121> ( 0x00082000 | LOS | COMM_PROBLEM ) at THU NOV 08 15:28:39 2007
CLI#
```

NOTE 8 shows the active alarm on NE via Console Port (RS232 port) when the loop between the NE and the ADSL CPE is broken.

Example 111Viewing the current active alarm on NE

```
CLI(status alarm)# show current
        unit      on-line type  planned type alarm   last change     severity
   -----------  ------------  ------------  ---  ----------------  --------
```

```
      shelf       shelf       shelf   -  11-07-07 11:42:49     none
       LC01   adslModule   adslModule   v  11-08-07 09:39:01    major
LC01/port01     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port02     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port03     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port04     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port05     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port06     adslPort     adslPort   -  11-08-07 09:39:42     none
LC01/port07     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port08     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port09     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port10     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port11     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port12     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port13     adslPort     adslPort   v  11-08-07 09:39:30    minor
LC01/port14     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port15     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port16     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port17     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port18     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port19     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port20     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port21     adslPort     adslPort   -  11-08-07 09:39:45     none
LC01/port22     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port23     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port24     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port25     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port26     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port27     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port28     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port29     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port30     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port31     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port32     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port33     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port34     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port35     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port36     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port37     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port38     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port39     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port40     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port41     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port42     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port43     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port44     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port45     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port46     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port47     adslPort     adslPort   v  11-08-07 09:39:01     info
LC01/port48     adslPort     adslPort   v  11-08-07 09:39:30    minor
       LC02     noEntity     noEntity   v  11-07-07 11:43:00     none
```

```
     LC03      noEntity      noEntity    v  11-07-07 11:43:00      none
     LC04      noEntity      noEntity    v  11-07-07 11:43:00      none
       NC     cpuModule     cpuModule    v  11-08-07 11:21:05      major
     UGE1       ugePort       ugePort    -  11-07-07 15:40:45      none
     UGE2      noEntity       ugePort    v  11-07-07 11:42:49      info
   powerA   powerModule   powerModule    v  11-07-07 11:43:23      major
   powerB   powerModule   powerModule    -  11-07-07 11:42:57      none
      fan     fanModule     fanModule    v  11-07-07 11:43:26      major
    relay      noEntity   relayModule    v  11-07-07 11:42:49      major
relayin-1   relayInPort   relayInPort    -  11-08-07 10:42:08      none
relayin-2   relayInPort   relayInPort    v  11-07-07 11:42:49      info
relayin-3   relayInPort   relayInPort    v  11-07-07 11:42:49      info
relayin-4   relayInPort   relayInPort    v  11-07-07 11:42:49      info
```

8 shows the current active alarm on NE. It is noted that the notation "v" in the colume "alarm" indicates an alarm occurs on the corresponding "unit". 8 also shows "last change" time instance and the "severity" of the current active alarm.

Example 112Display the detailed description of an alarm

```
CLI(status alarm)# show detail LC02

Detail alarm list is:
     alarm name       severity              description
  ----------------------  --------  -----------------------------------------
           MISMATCH     major  Planned type and on-line type mismatched
        HW_INFO_INV     major                 Hardware version invalid
```

8 shows the CLI command to inspect the details of a current active alarm which include the alarm condition ("alarm name") and its description ("description").

Example 113Display the history of alarms

```
CLI(status alarm)# show history ascendant

History Table
[Alarm history]
  serial-number     unit      severity     occur time
  -------------  ------------  --------  -----------------
         1        UGE1     info  07-07-08 15:35:57
         2        UGE2     info  07-07-08 15:35:57
         3        LC01    major  07-07-08 15:35:57
         4        LC02    major  07-07-08 15:35:57
         5        LC03    major  07-07-08 15:35:57
         6        LC04    major  07-07-08 15:35:57
         7      powerA     major  07-07-08 15:35:57
         8      powerB     major  07-07-08 15:35:57
         9         fan     major  07-07-08 15:35:57
        10        relay     major  07-07-08 15:35:57
```

```
11   alarmInput1      info  07-07-08 15:35:57
12   alarmInput2      info  07-07-08 15:35:57
13   alarmInput3      info  07-07-08 15:35:57
14   alarmInput4      info  07-07-08 15:35:57
15         LC01      none  07-07-08 15:35:57
16         LC02      none  07-07-08 15:35:57
17         LC03      none  07-07-08 15:35:57
18         LC04      none  07-07-08 15:35:57
19           NC     major  07-07-08 15:35:57
20         LC01     major  07-07-08 15:36:04
21         LC02     major  07-07-08 15:36:04
22         LC03     major  07-07-08 15:36:04
23           NC      none  07-07-08 15:36:04
24       powerA      none  07-07-08 15:36:05
25       powerB      none  07-07-08 15:36:05
26  alarmOutput1      info  07-07-08 15:36:09
27         LC01     major  07-07-08 15:36:13
28         LC02     major  07-07-08 15:36:15
29         LC03     major  07-07-08 15:36:17
30   LC01/port01   warning  07-07-08 15:36:30
31   LC01/port02   warning  07-07-08 15:36:30
32   LC01/port03   warning  07-07-08 15:36:30
33   LC01/port04   warning  07-07-08 15:36:30
34   LC01/port05   warning  07-07-08 15:36:30
35   LC01/port06   warning  07-07-08 15:36:30
36   LC01/port07   warning  07-07-08 15:36:30
37   LC01/port08   warning  07-07-08 15:36:30
38   LC01/port09   warning  07-07-08 15:36:30
39   LC01/port10   warning  07-07-08 15:36:30
40   LC01/port11   warning  07-07-08 15:36:30
41   LC01/port12   warning  07-07-08 15:36:30
42   LC01/port13   warning  07-07-08 15:36:30
43   LC01/port14   warning  07-07-08 15:36:30
44   LC01/port15   warning  07-07-08 15:36:30
45   LC01/port16   warning  07-07-08 15:36:30
46   LC01/port17   warning  07-07-08 15:36:30
                        .............
```

Example 114Display the detail information of alarm history by serial number

```
CLI(status alarm)# show history detail 21

unit: powerB
current online-type      : powerModule
current planned-type     : powerModule
previous online-type     : noEntity
previous planned-type    : powerModule

[Detail alarm history]
      alarm name     severity  state             description
   ----------------- -------- --------- --------------------------------------
```

```
        MISSING   major   cleared             Module is missing
```

Example 115Display the status of alarm input

```
CLI(status alarm)# show input
                              admin    normal   current
 index            name              state    state    state
------- ------------------------------- -------- -------- --------
    1                 Alarm_Input   enabled    opened    opened
    2             << not defined >>  disabled    opened       n/a
    3             << not defined >>  disabled    opened       n/a
    4             << not defined >>  disabled    opened       n/a
```

Example 116Display the status of alarm output

```
CLI(status alarm)#   show output

name              : Alarm_Output
alarm severities    : major
admin state         : enabled
current state       : enabled
```

OAM and Loop Diagnostic Test on Subscriber Interface

In order to diagnose and fix problem, the NE supports to perform the ATM Operation, Administration, and Maintenance (OAM) F5 diagnosis at data connection layer and the ADSL loop diagnosis at physical layer, respectively.

ATM OAM F5 VC Diagnosis

Via ATM OAM F5 loopback diagnosis, the operator is able to diagnose the health of existant ATM VC connection between the NE and ADSL CPE in intrest.

Enter to the “**diag**” group directory with “**oam**” command to perform the OAM F5 VC diagnostic.

```
CLI# diag
CLI(diag)#
```

Table 9-95 shows the commands to configure OAM F5 VC diagnosis test of NE. 8 shows the usage of its command as well as its related parameters.

Table 9-95 OAM F5 VC Diagnosis Test

The following command is to testing the OAM F5 on both End-to-End and Segment-to-Segment.

CLI(diag)# oam set F5 *<port-id> <vpi> <vci>* **both**

The following command is to testing the OAM F5 on End-to-End only.

CLI(diag)# oam set F5 *<port-id> <vpi> <vci>* **end-to-end**

The following command is to testing the OAM F5 on Segment-to-Segment only.

CLI(diag)# oam set F5 *<port-id> <vpi> <vci>* **seg-to-seg**

Parameters	Task
<port-id>	Identify the port id of the system wish to perform the OAM F5, the define VC must existed at defines line port. **Type:** Mandatory **Valid values:** See the Section "Port Interface Indication" of 3.
<vpi>	Defines the VPI (Virtual Path Identifier) value. **Type:** Mandatory **Valid values:** 0 ~ 255
<vci>	Defines the VCI (Virtual Channel Identifier) value. **Type:** Mandatory **Valid values:** 1 ~ 65535 (1 ~ 31 are reserved)

8 shows the OAM F5 diagnostic. When the xDSL CPE echos to the OAM F5 cells, the CLI Ex shows "**alive**". On the other hand, check both xDSL physical layer and ATM layer setting if shows "**OAM timeout**" otherwise.

Example 117Diagnosing the OAM F5 in ATM layer of Subscriber interface

```
CLI(diag oam )# set F5 1.1.2 0 35 both
Port 1.1.2 pvc 0/35: alive.
OK

CLI(diag oam )# set F5 1.1.1 0 35 both
Port 1.1.1 pvc 0/35: OAM timeout.
OK
```

ADSL Loop Diagnosis (DELT <Dual-Ended Line Test>)

The DELT loop diagnosis function provides mechanism to measure the ADSL loop quality. This action will interrupt the ADSL connection. However, more detailed inform are gathered in comparison with the aforementioned loop monitoring function.

This function is available on ADSL2 and ADSL2+ connection only, the ADSL CPE who did not complied with ITU-T standard G.992.3, G.992.4, and G.992.5 may not be able to perform the loop diagnostics.

Enter to the "**diag**" group directory with "**delt**" command to perform the ADSL loop diagnostic.

```
CLI# diag
CLI(diag)#
```

Table 9-96 shows the commands to configure ADSL loop diagnostic test of NE. 8 shows the usage of its command as well as its related parameters.

Table 9-96 ADSL Loop Diagnosis

The following command is to start the ADSL loop diagnosis (DELT) process on the specific ADSL line port.

CLI(diag delt)# loopdiag start *<port-id> <profile-name>*

The following command is to manually terminate the ADSL loop diagnosis (DELT) process.

CLI(diag delt)# loopdiag stop

The following command is to view the test result of DELT

CLI(diag delt)# loopdiag show

Parameters	Task
<port-id>	Identify the port id of the system wish to perform the loop diagnostic, the define line port must operate in run-time status. **Type:** Mandatory **Valid values:** See the Section "Port Interface Indication" of 3.
<profile-name>	This specifies the ADSL connection profile of the specific ADSL line port. **Type:** Mandatory **Valid values:** String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').

Example 118Diagnosing the ADSL loop performance via DELT

```
CLI(diag delt)# start 1.6 ADSL_P6
OK

CLI(diag delt)# show
Loop diag result:
Port  1. 6

Used Profile:  "ADSL_P6"
                    ATU-C  ATU-R
Attainable Rate(Kbps)   26204.0 1296.0
Loop Attenuation(dB)    0.7   0.0
Signal Attenuation(dB)  0.0   0.0
SnrMargin(dB)           6.0   0.0
TxPower(dBm)            12.3  12.2
H(f) logarithmic representation( Hlog(f) )
DS            Unit: dB
[  1]  -77.0  -35.0  -39.0  -39.0  -44.0  -47.0  -44.0  -44.0
[  9]  -47.0  -47.0  -44.0  -47.0  -53.0  -47.0  -47.0  -47.0
[ 17]  -46.0  -53.0  -50.0  -54.0  -54.0  -46.0  -44.0  -40.0
[ 25]  -38.0  -35.0  -34.0  -30.0  -28.0  -26.0  -23.0  -21.0
[ 33]  -19.0  -17.0  -15.0  -13.0  -11.0   -9.0   -7.0   -6.0
[ 41]   -5.0   -4.0   -4.0   -3.0   -3.0   -3.0   -2.0   -2.0
[ 49]   -2.0   -2.0   -2.0   -2.0   -2.0   -1.0   -1.0   -1.0
[ 57]   -1.0   -1.0   -1.0   -1.0   -1.0    0.0    0.0    0.0
[ 65]    0.0    0.0    0.0    0.0    0.0    0.0    1.0    1.0
[ 73]    1.0    1.0    1.0    1.0    1.0    1.0    1.0    1.0
[ 81]    1.0    2.0    2.0    2.0    2.0    2.0    2.0    2.0
[ 89]    2.0    2.0    2.0    2.0    2.0    2.0    2.0    2.0
...
...
[441]   -1.0   -1.0   -1.0   -1.0   -1.0   -1.0   -1.0   -1.0
[449]   -1.0   -1.0   -1.0   -2.0   -2.0   -2.0   -2.0   -2.0
[457]   -2.0   -2.0   -2.0   -2.0   -3.0   -3.0   -3.0   -3.0
```

```
[465]   -3.0   -3.0   -3.0   -3.0   -4.0   -4.0   -4.0   -4.0
[473]   -4.0   -4.0   -5.0   -5.0   -5.0   -5.0   -5.0   -6.0
[481]   -6.0   -6.0   -6.0   -6.0   -7.0   -7.0   -7.0   -7.0
[489]   -8.0   -8.0   -8.0   -8.0   -9.0   -9.0   -9.0   -9.0
[497]  -10.0  -10.0  -10.0  -11.0  -11.0  -11.0  -11.0  -12.0
[505]  -12.0  -12.0  -12.0  -13.0  -13.0  -13.0  -13.0  -13.0

US            Unit: dB
[  1]  -34.0    N/A    N/A    N/A  -71.0  -61.0  -18.0   -8.0
[  9]    0.0    3.0    3.0    3.0    4.0    4.0    4.0    4.0
[ 17]    3.0    3.0    2.0    2.0    1.0    0.0   -1.0   -2.0
[ 25]   -3.0   -4.0   -5.0   -5.0   -6.0   -7.0   -8.0   -9.0
[ 33]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
[ 41]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
[ 49]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
[ 57]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A

Quiet Line Noise PSD ( QLN(f) )
DS            Unit: dB
[  1] -120.0 -140.0 -141.0 -141.0 -141.0 -141.0 -141.0 -141.0
[  9] -141.0 -141.0 -141.0 -141.0 -141.0 -141.0 -141.0 -141.0
[ 17] -141.0 -140.0 -140.0 -140.0 -139.0 -140.0 -140.0 -139.0
[ 25] -138.0 -138.0 -137.0 -136.0 -134.0 -134.0 -132.0 -130.0
[ 33] -129.0 -127.0 -125.0 -124.0 -124.0 -122.0 -121.0 -121.0
[ 41] -120.0 -119.0 -119.0 -118.0 -119.0 -119.0 -119.0 -119.0
[ 49] -119.0 -118.0 -119.0 -119.0 -118.0 -118.0 -118.0 -118.0
[ 57] -118.0 -118.0  -97.0 -117.0 -117.0 -117.0 -118.0 -118.0
[ 65] -118.0 -117.0 -117.0 -117.0 -117.0 -116.0 -117.0 -117.0
[ 73] -117.0 -117.0 -117.0 -117.0 -116.0 -116.0 -117.0 -117.0
[ 81] -117.0 -117.0 -117.0 -117.0 -117.0 -116.0 -117.0 -117.0
[ 89] -116.0 -116.0 -116.0 -116.0 -116.0 -116.0 -117.0 -116.0
...
...
[441] -113.0 -113.0 -114.0 -114.0 -113.0 -114.0 -114.0 -114.0
[449] -113.0 -114.0 -114.0 -114.0 -114.0 -113.0 -114.0 -114.0
[457] -113.0 -114.0 -114.0 -114.0 -114.0 -114.0 -114.0 -114.0
[465] -114.0 -114.0 -115.0 -115.0 -114.0 -114.0 -114.0 -114.0
[473] -115.0 -115.0 -114.0 -115.0 -114.0 -114.0 -114.0 -115.0
[481] -115.0 -115.0 -114.0 -114.0 -115.0 -115.0 -115.0 -114.0
[489] -116.0 -115.0 -115.0 -116.0 -115.0 -115.0 -115.0 -115.0
[497] -116.0 -116.0 -116.0 -115.0 -115.0 -115.0 -115.0 -115.0
[505] -115.0 -116.0 -115.0 -116.0 -116.0 -116.0 -116.0 -116.0

US            Unit: dB
[  1]    N/A -117.0 -118.0 -119.0 -118.0 -118.0 -117.0 -117.0
[  9] -113.0 -113.0 -114.0 -111.0 -114.0 -113.0 -113.0 -112.0
[ 17] -115.0 -115.0 -115.0 -113.0 -115.0 -116.0 -108.0 -113.0
[ 25] -116.0 -114.0 -115.0 -117.0 -116.0 -117.0 -117.0 -118.0
[ 33] -118.0 -118.0 -119.0 -119.0 -118.0 -118.0 -118.0 -118.0
[ 41] -119.0 -120.0 -118.0 -119.0 -118.0 -120.0 -120.0 -118.0
[ 49] -118.0 -118.0 -118.0 -118.0 -118.0 -119.0 -119.0 -118.0
[ 57] -119.0 -119.0 -118.0 -118.0 -118.0 -118.0 -118.0 -118.0

SNR(f)

DS          Unit: dB
[  1]   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
[  9]   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
[ 17]   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
[ 25]   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
[ 33]   0.0  31.0  32.0  32.0  34.0  35.0  36.0  38.0
[ 41]  40.0  41.0  43.0  44.0  45.0  46.0  48.0  49.0
[ 49]  50.0  52.0  52.0  53.0  54.0  54.0  56.0  57.0
[ 57]  57.0  57.0  44.0  58.0  59.0  59.0  58.0  59.0
[ 65]  60.0  59.0  60.0  60.0  60.0  60.0  60.0  61.0
[ 73]  61.0  61.0  61.0  61.0  61.0  61.0  62.0  61.0
[ 81]  61.0  61.0  61.0  61.0  61.0  61.0  61.0  61.0
[ 89]  61.0  61.0  62.0  61.0  61.0  61.0  61.0  61.0
...
...
[441]  55.0  55.0  55.0  54.0  55.0  55.0  55.0  54.0
[449]  55.0  55.0  54.0  55.0  54.0  54.0  54.0  54.0
[457]  54.0  54.0  54.0  54.0  54.0  54.0  54.0  53.0
[465]  54.0  53.0  54.0  53.0  54.0  53.0  53.0  53.0
[473]  53.0  53.0  53.0  52.0  53.0  52.0  53.0  52.0
[481]  52.0  52.0  51.0  51.0  52.0  51.0  51.0  51.0
[489]  50.0  50.0  50.0  50.0  49.0  49.0  49.0  48.0
[497]  48.0  46.0  45.0  43.0  43.0  42.0  42.0  41.0
[505]  41.0  38.0  38.0  38.0  37.0  32.0  32.0  25.0

US          Unit: dB
[  1]   N/A   N/A   N/A   N/A   N/A   N/A   N/A  30.0
[  9]  36.0  42.0  44.0  46.0  49.0  49.0  51.0  51.0
[ 17]  52.0  52.0  53.0  53.0  54.0  55.0  56.0  55.0
[ 25]  56.0  55.0  54.0  52.0  51.0  48.0  44.0  39.0
[ 33]   N/A   N/A   N/A   N/A   N/A   N/A   N/A   N/A
[ 41]   N/A   N/A   N/A   N/A   N/A   N/A   N/A   N/A
[ 49]   N/A   N/A   N/A   N/A   N/A   N/A   N/A   N/A
[ 57]   N/A   N/A   N/A   N/A   N/A   N/A   N/A   N/A

CLI(diag delt)# stop
OK

CLI(diag delt)# show
Loop diag result:
Port  1. 6

Used Profile:  "ADSL_P6"
                        ATU-C  ATU-R
Attainable Rate(Kbps)   26204.0 1296.0
Loop Attenuation(dB)    0.7   0.0
Signal Attenuation(dB)  0.0   0.0
```

```
SnrMargin(dB)          6.0   0.0
TxPower(dBm)            12.3  12.2
H(f) logarithmic representation( Hlog(f) )
DS            Unit: dB
[  1]  -77.0  -35.0  -39.0  -39.0  -44.0  -47.0  -44.0  -44.0
[  9]  -47.0  -47.0  -44.0  -47.0  -53.0  -47.0  -47.0  -47.0
[ 17]  -46.0  -53.0  -50.0  -54.0  -54.0  -46.0  -44.0  -40.0
[ 25]  -38.0  -35.0  -34.0  -30.0  -28.0  -26.0  -23.0  -21.0
[ 33]  -19.0  -17.0  -15.0  -13.0  -11.0   -9.0   -7.0   -6.0
[ 41]   -5.0   -4.0   -4.0   -3.0   -3.0   -3.0   -2.0   -2.0
[ 49]   -2.0   -2.0   -2.0   -2.0   -2.0   -1.0   -1.0   -1.0
[ 57]   -1.0   -1.0   -1.0   -1.0   -1.0    0.0    0.0    0.0
[ 65]    0.0    0.0    0.0    0.0    0.0    0.0    1.0    1.0
[ 73]    1.0    1.0    1.0    1.0    1.0    1.0    1.0    1.0
[ 81]    1.0    2.0    2.0    2.0    2.0    2.0    2.0    2.0
[ 89]    2.0    2.0    2.0    2.0    2.0    2.0    2.0    2.0
...
...
[441]   -1.0   -1.0   -1.0   -1.0   -1.0   -1.0   -1.0   -1.0
[449]   -1.0   -1.0   -1.0   -2.0   -2.0   -2.0   -2.0   -2.0
[457]   -2.0   -2.0   -2.0   -2.0   -3.0   -3.0   -3.0   -3.0
[465]   -3.0   -3.0   -3.0   -3.0   -4.0   -4.0   -4.0   -4.0
[473]   -4.0   -4.0   -5.0   -5.0   -5.0   -5.0   -5.0   -6.0
[481]   -6.0   -6.0   -6.0   -6.0   -7.0   -7.0   -7.0   -7.0
[489]   -8.0   -8.0   -8.0   -8.0   -9.0   -9.0   -9.0   -9.0
[497]  -10.0  -10.0  -10.0  -11.0  -11.0  -11.0  -11.0  -12.0
[505]  -12.0  -12.0  -12.0  -13.0  -13.0  -13.0  -13.0  -13.0

US            Unit: dB
[  1]  -34.0    N/A    N/A    N/A  -71.0  -61.0  -18.0   -8.0
[  9]    0.0    3.0    3.0    3.0    4.0    4.0    4.0    4.0
[ 17]    3.0    3.0    2.0    2.0    1.0    0.0   -1.0   -2.0
[ 25]   -3.0   -4.0   -5.0   -5.0   -6.0   -7.0   -8.0   -9.0
[ 33]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
[ 41]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
[ 49]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
[ 57]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A

Quiet Line Noise PSD ( QLN(f) )
DS            Unit: dB
[  1] -120.0 -140.0 -141.0 -141.0 -141.0 -141.0 -141.0 -141.0
[  9] -141.0 -141.0 -141.0 -141.0 -141.0 -141.0 -141.0 -141.0
[ 17] -141.0 -140.0 -140.0 -140.0 -139.0 -140.0 -140.0 -139.0
[ 25] -138.0 -138.0 -137.0 -136.0 -134.0 -134.0 -132.0 -130.0
[ 33] -129.0 -127.0 -125.0 -124.0 -124.0 -122.0 -121.0 -121.0
[ 41] -120.0 -119.0 -119.0 -118.0 -119.0 -119.0 -119.0 -119.0
[ 49] -119.0 -118.0 -119.0 -119.0 -118.0 -118.0 -118.0 -118.0
[ 57] -118.0 -118.0  -97.0 -117.0 -117.0 -117.0 -118.0 -118.0
[ 65] -118.0 -117.0 -117.0 -117.0 -117.0 -116.0 -117.0 -117.0
[ 73] -117.0 -117.0 -117.0 -117.0 -116.0 -116.0 -117.0 -117.0
[ 81] -117.0 -117.0 -117.0 -117.0 -117.0 -116.0 -117.0 -117.0
[ 89] -116.0 -116.0 -116.0 -116.0 -116.0 -116.0 -117.0 -116.0
...
...
[441] -113.0 -113.0 -114.0 -114.0 -113.0 -114.0 -114.0 -114.0
[449] -113.0 -114.0 -114.0 -114.0 -114.0 -113.0 -114.0 -114.0
[457] -113.0 -114.0 -114.0 -114.0 -114.0 -114.0 -114.0 -114.0
[465] -114.0 -114.0 -115.0 -115.0 -114.0 -114.0 -114.0 -114.0
[473] -115.0 -115.0 -114.0 -115.0 -114.0 -114.0 -114.0 -115.0
[481] -115.0 -115.0 -114.0 -114.0 -115.0 -115.0 -115.0 -114.0
[489] -116.0 -115.0 -115.0 -116.0 -115.0 -115.0 -115.0 -115.0
[497] -116.0 -116.0 -116.0 -115.0 -115.0 -115.0 -115.0 -115.0
[505] -115.0 -116.0 -115.0 -116.0 -116.0 -116.0 -116.0 -116.0

US          Unit: dB
[  1]    N/A -117.0 -118.0 -119.0 -118.0 -118.0 -117.0 -117.0
[  9] -113.0 -113.0 -114.0 -111.0 -114.0 -113.0 -113.0 -112.0
[ 17] -115.0 -115.0 -115.0 -113.0 -115.0 -116.0 -108.0 -113.0
[ 25] -116.0 -114.0 -115.0 -117.0 -116.0 -117.0 -117.0 -118.0
[ 33] -118.0 -118.0 -119.0 -119.0 -118.0 -118.0 -118.0 -118.0
[ 41] -119.0 -120.0 -118.0 -119.0 -118.0 -120.0 -120.0 -118.0
[ 49] -118.0 -118.0 -118.0 -118.0 -118.0 -119.0 -119.0 -118.0
[ 57] -119.0 -119.0 -118.0 -118.0 -118.0 -118.0 -118.0 -118.0

SNR(f)

DS          Unit: dB
[  1]    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
[  9]    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
[ 17]    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
[ 25]    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
[ 33]    0.0   31.0   32.0   32.0   34.0   35.0   36.0   38.0
[ 41]   40.0   41.0   43.0   44.0   45.0   46.0   48.0   49.0
[ 49]   50.0   52.0   52.0   53.0   54.0   54.0   56.0   57.0
[ 57]   57.0   57.0   44.0   58.0   59.0   59.0   58.0   59.0
[ 65]   60.0   59.0   60.0   60.0   60.0   60.0   60.0   61.0
[ 73]   61.0   61.0   61.0   61.0   61.0   61.0   62.0   61.0
[ 81]   61.0   61.0   61.0   61.0   61.0   61.0   61.0   61.0
[ 89]   61.0   61.0   62.0   61.0   61.0   61.0   61.0   61.0
...
...
[441]   55.0   55.0   55.0   54.0   55.0   55.0   55.0   54.0
[449]   55.0   55.0   54.0   55.0   54.0   54.0   54.0   54.0
[457]   54.0   54.0   54.0   54.0   54.0   54.0   54.0   53.0
[465]   54.0   53.0   54.0   53.0   54.0   53.0   53.0   53.0
[473]   53.0   53.0   53.0   52.0   53.0   52.0   53.0   52.0
[481]   52.0   52.0   51.0   51.0   52.0   51.0   51.0   51.0
[489]   50.0   50.0   50.0   50.0   49.0   49.0   49.0   48.0
[497]   48.0   46.0   45.0   43.0   43.0   42.0   42.0   41.0
[505]   41.0   38.0   38.0   38.0   37.0   32.0   32.0   25.0

US          Unit: dB
```

```
[ 1]    N/A    N/A    N/A    N/A    N/A    N/A    N/A   30.0
[ 9]   36.0   42.0   44.0   46.0   49.0   49.0   51.0   51.0
[ 17]   52.0   52.0   53.0   53.0   54.0   55.0   56.0   55.0
[ 25]   56.0   55.0   54.0   52.0   51.0   48.0   44.0   39.0
[ 33]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
[ 41]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
[ 49]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
[ 57]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
```

NOTE It is suggested to view the graphical presentation of the DELT diagnosis via the AMS LCT or AMS client.

ADSL Link Monitoring

The ADSL link monitoring function provides the records of ADSL loop characteristics and Quite Line Noise (QLN) measured during the last training. It is noted that the measured results are only available in the show-time.

Enter to the "**diag**" group directory with "**portmon**" command to perform the ADSL link monitoring.

```
CLI# diag
CLI(diag)#
```

Table 9-97 shows the commands to configure ADSL link monitoring of NE. 8 shows the usage of its command as well as its related parameters.

Table 9-97 ADSL Link Monitoring

The following command is to start the link monitoring process on the specific ADSL line port.	
CLI(diag portmon)# start *<port-id>*	
The following command is to manually terminate the ADSL link monitoring process.	
CLI(diag portmon)# stop	
The following command is to view the ADSL loop charactertics	
CLI(diag portmon)# show	
Parameters	**Task**
<port-id>	Identify the port id of the system wish to perform the link monitoring, the define line port must operate in running status. **Type:** Mandatory **Valid values:** See the Section "Port Interface Indication" of 3.

Example 119Display the ADSL loop charactertics (H(f)) and QLN

```
CLI(diag portmon)# start 1.6
OK

CLI(diag portmon)# show
Port monitor result:
Port  1. 6

H(f) logarithmic representation( Hlog(f) )
DS          Unit: dB
```

```
[  1]  -77.0  -37.0  -39.0  -41.0  -41.0  -43.0  -44.0  -44.0
[  9]  -47.0  -47.0  -46.0  -47.0  -43.0  -46.0  -44.0  -47.0
[ 17]  -44.0  -47.0  -53.0  -51.0  -48.0  -41.0  -45.0  -40.0
[ 25]  -37.0  -36.0  -32.0  -30.0  -28.0  -25.0  -23.0  -21.0
[ 33]  -19.0  -17.0  -15.0  -13.0  -11.0   -9.0   -7.0   -6.0
[ 41]   -5.0   -4.0   -4.0   -3.0   -3.0   -3.0   -2.0   -2.0
[ 49]   -2.0   -2.0   -2.0   -2.0   -2.0   -1.0   -1.0   -1.0
[ 57]   -1.0   -1.0   -1.0   -1.0   -1.0    0.0    0.0    0.0
[ 65]    0.0    0.0    0.0    0.0    0.0    0.0    1.0    1.0
[ 73]    1.0    1.0    1.0    1.0    1.0    1.0    1.0    1.0
[ 81]    1.0    2.0    2.0    2.0    2.0    2.0    2.0    2.0
[ 89]    2.0    2.0    2.0    2.0    2.0    2.0    2.0    2.0
...
...
[441]   -1.0   -1.0   -1.0   -2.0   -1.0   -2.0   -2.0   -2.0
[449]   -2.0   -2.0   -2.0   -2.0   -2.0   -2.0   -2.0   -2.0
[457]   -3.0   -3.0   -3.0   -3.0   -3.0   -3.0   -3.0   -3.0
[465]   -3.0   -4.0   -4.0   -4.0   -4.0   -4.0   -4.0   -4.0
[473]   -4.0   -4.0   -5.0   -5.0   -5.0   -5.0   -5.0   -5.0
[481]   -5.0   -5.0   -5.0   -6.0   -6.0   -6.0   -6.0   -6.0
[489]   -6.0   -6.0   -6.0   -7.0   -7.0   -7.0   -7.0   -7.0
[497]   -7.0   -7.0   -7.0   -7.0   -7.0   -7.0   -7.0   -8.0
[505]   -8.0   -8.0   -8.0   -8.0   -8.0   -8.0   -8.0   -8.0

US          Unit: dB
[  1]  -32.0    N/A    N/A  -68.0  -66.0  -59.0  -18.0   -8.0
[  9]    0.0    3.0    3.0    3.0    4.0    4.0    4.0    4.0
[ 17]    3.0    3.0    2.0    2.0    1.0    0.0   -1.0   -2.0
[ 25]   -3.0   -4.0   -5.0   -5.0   -6.0   -7.0   -8.0   -9.0
[ 33]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
[ 41]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
[ 49]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
[ 57]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A

Quiet Line Noise PSD ( QLN(f) )
DS          Unit: dB
[  1]  -54.0 -110.0 -124.0 -134.0 -133.0 -144.0 -146.0 -146.0
[  9]  -35.0  -35.0  -31.0  -35.0 -144.0  -30.0 -146.0  -35.0
[ 17] -146.0  -35.0  -63.0  -52.0  -38.0 -130.0  -23.0 -128.0
[ 25] -112.0 -107.0  -89.0  -78.0  -68.0  -54.0  -44.0  -33.0
[ 33] -149.0 -139.0 -128.0 -118.0 -109.0 -100.0  -92.0  -85.0
[ 41]  -80.0  -76.0  -73.0  -70.0  -69.0  -68.0  -67.0  -66.0
[ 49]  -65.0  -65.0  -64.0  -63.0  -63.0  -62.0  -61.0  -61.0
[ 57]  -60.0  -60.0  -59.0  -58.0  -58.0  -57.0  -57.0  -56.0
[ 65]  -55.0  -55.0  -54.0  -54.0  -53.0  -53.0  -52.0  -52.0
[ 73]  -51.0  -51.0  -50.0  -50.0  -49.0  -49.0  -48.0  -48.0
[ 81]  -48.0  -47.0  -47.0  -46.0  -46.0  -46.0  -46.0  -45.0
[ 89]  -45.0  -45.0  -45.0  -44.0  -44.0  -44.0  -44.0  -44.0
...
...
[441]  -61.0  -62.0  -62.0  -63.0  -62.0  -63.0  -63.0  -63.0
```

```
[449]  -64.0  -64.0  -65.0  -65.0  -66.0  -66.0  -67.0  -67.0
[457]  -68.0  -68.0  -69.0  -69.0  -70.0  -70.0  -71.0  -71.0
[465]  -72.0  -73.0  -73.0  -74.0  -74.0  -75.0  -75.0  -76.0
[473]  -77.0  -77.0  -78.0  -78.0  -79.0  -80.0  -80.0  -80.0
[481]  -81.0  -82.0  -82.0  -83.0  -84.0  -84.0  -85.0  -85.0
[489]  -86.0  -86.0  -87.0  -88.0  -88.0  -88.0  -89.0  -89.0
[497]  -90.0  -90.0  -91.0  -91.0  -92.0  -92.0  -92.0  -93.0
[505]  -93.0  -93.0  -93.0  -93.0  -94.0  -94.0  -94.0  -93.0

US            Unit: dB
[  1]  -86.0    N/A    N/A -140.0 -131.0  -95.0 -145.0  -93.0
[  9]  -53.0  -42.0  -40.0  -38.0  -36.0  -35.0  -35.0  -36.0
[ 17]  -38.0  -40.0  -44.0  -47.0  -51.0  -56.0  -61.0  -65.0
[ 25]  -69.0  -74.0  -78.0  -82.0  -87.0  -91.0  -95.0  -98.0
[ 33]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
[ 41]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A

[ 49]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
[ 57]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A

CLI(diag portmon)# stop
OK
CLI(diag portmon)# show
Port monitor result:
Port  1. 6

H(f) logarithmic representation( Hlog(f) )
DS            Unit: dB
[  1]  -77.0  -37.0  -39.0  -41.0  -41.0  -43.0  -44.0  -44.0
[  9]  -47.0  -47.0  -46.0  -47.0  -43.0  -46.0  -44.0  -47.0
[ 17]  -44.0  -47.0  -53.0  -51.0  -48.0  -41.0  -45.0  -40.0
[ 25]  -37.0  -36.0  -32.0  -30.0  -28.0  -25.0  -23.0  -21.0
[ 33]  -19.0  -17.0  -15.0  -13.0  -11.0   -9.0   -7.0   -6.0
[ 41]   -5.0   -4.0   -4.0   -3.0   -3.0   -3.0   -2.0   -2.0
[ 49]   -2.0   -2.0   -2.0   -2.0   -2.0   -1.0   -1.0   -1.0
[ 57]   -1.0   -1.0   -1.0   -1.0   -1.0    0.0    0.0    0.0
[ 65]    0.0    0.0    0.0    0.0    0.0    0.0    1.0    1.0
[ 73]    1.0    1.0    1.0    1.0    1.0    1.0    1.0    1.0
[ 81]    1.0    2.0    2.0    2.0    2.0    2.0    2.0    2.0
[ 89]    2.0    2.0    2.0    2.0    2.0    2.0    2.0    2.0
...
...
[441]   -1.0   -1.0   -1.0   -2.0   -1.0   -2.0   -2.0   -2.0
[449]   -2.0   -2.0   -2.0   -2.0   -2.0   -2.0   -2.0   -2.0
[457]   -3.0   -3.0   -3.0   -3.0   -3.0   -3.0   -3.0   -3.0
[465]   -3.0   -4.0   -4.0   -4.0   -4.0   -4.0   -4.0   -4.0
[473]   -4.0   -4.0   -5.0   -5.0   -5.0   -5.0   -5.0   -5.0
[481]   -5.0   -5.0   -5.0   -6.0   -6.0   -6.0   -6.0   -6.0
[489]   -6.0   -6.0   -6.0   -7.0   -7.0   -7.0   -7.0   -7.0
[497]   -7.0   -7.0   -7.0   -7.0   -7.0   -7.0   -7.0   -8.0
[505]   -8.0   -8.0   -8.0   -8.0   -8.0   -8.0   -8.0   -8.0
```

```
US          Unit: dB
[  1]  -32.0    N/A    N/A  -68.0  -66.0  -59.0  -18.0   -8.0
[  9]    0.0    3.0    3.0    3.0    4.0    4.0    4.0    4.0
[ 17]    3.0    3.0    2.0    2.0    1.0    0.0   -1.0   -2.0
[ 25]   -3.0   -4.0   -5.0   -5.0   -6.0   -7.0   -8.0   -9.0
[ 33]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
[ 41]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
[ 49]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
[ 57]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A

Quiet Line Noise PSD ( QLN(f) )
DS          Unit: dB
[  1]  -54.0 -110.0 -124.0 -134.0 -133.0 -144.0 -146.0 -146.0
[  9]  -35.0  -35.0  -31.0  -35.0 -144.0  -30.0 -146.0  -35.0
[ 17] -146.0  -35.0  -63.0  -52.0  -38.0 -130.0  -23.0 -128.0
[ 25] -112.0 -107.0  -89.0  -78.0  -68.0  -54.0  -44.0  -33.0
[ 33] -149.0 -139.0 -128.0 -118.0 -109.0 -100.0  -92.0  -85.0
[ 41]  -80.0  -76.0  -73.0  -70.0  -69.0  -68.0  -67.0  -66.0
[ 49]  -65.0  -65.0  -64.0  -63.0  -63.0  -62.0  -61.0  -61.0
[ 57]  -60.0  -60.0  -59.0  -58.0  -58.0  -57.0  -57.0  -56.0
[ 65]  -55.0  -55.0  -54.0  -54.0  -53.0  -53.0  -52.0  -52.0
[ 73]  -51.0  -51.0  -50.0  -50.0  -49.0  -49.0  -48.0  -48.0
[ 81]  -48.0  -47.0  -47.0  -46.0  -46.0  -46.0  -46.0  -45.0
[ 89]  -45.0  -45.0  -45.0  -44.0  -44.0  -44.0  -44.0  -44.0
...
...
[441]  -61.0  -62.0  -62.0  -63.0  -62.0  -63.0  -63.0  -63.0
[449]  -64.0  -64.0  -65.0  -65.0  -66.0  -66.0  -67.0  -67.0
[457]  -68.0  -68.0  -69.0  -69.0  -70.0  -70.0  -71.0  -71.0
[465]  -72.0  -73.0  -73.0  -74.0  -74.0  -75.0  -75.0  -76.0
[473]  -77.0  -77.0  -78.0  -78.0  -79.0  -80.0  -80.0  -80.0
[481]  -81.0  -82.0  -82.0  -83.0  -84.0  -84.0  -85.0  -85.0
[489]  -86.0  -86.0  -87.0  -88.0  -88.0  -88.0  -89.0  -89.0
[497]  -90.0  -90.0  -91.0  -91.0  -92.0  -92.0  -92.0  -93.0
[505]  -93.0  -93.0  -93.0  -93.0  -94.0  -94.0  -94.0  -93.0

US          Unit: dB
[  1]  -86.0    N/A    N/A -140.0 -131.0  -95.0 -145.0  -93.0
[  9]  -53.0  -42.0  -40.0  -38.0  -36.0  -35.0  -35.0  -36.0
[ 17]  -38.0  -40.0  -44.0  -47.0  -51.0  -56.0  -61.0  -65.0
[ 25]  -69.0  -74.0  -78.0  -82.0  -87.0  -91.0  -95.0  -98.0
[ 33]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
[ 41]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
[ 49]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
[ 57]    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
```

NOTE It is suggested to view the graphical presentation of the ADSL loop characteristics and QLN via the AMS LCT or AMS client.

Loop SELT Test (Single End Loop Test)

The SELT loop function diagnosis function is to estimate the distance of the DSL connection from the NE to the subscriber's location without connecting a subscriber device.

Enter to the "**diag**" group directory with "**selt**" command to perform the SELT link monitoring.

```
CLI# diag selt
CLI(diag selt)#
```

Table 9-98 shows the commands to configure SELT link monitoring of NE. 8 shows the usage of its command as well as its related parameters.

Table 9-98 SELT Link Monitoring

The following command is to start the SELT process on the specific ADSL line port.	
CLI(diag selt)# start *<port-id>*	
The following command is to view the SELT result.	
CLI(diag selt)# show	
Parameters	**Task**
<port-id>	Identify the port id of the system wish to perform the link monitoring, the define line port must operate in running status. **Valid values:** See the Section "Port Interface Indication" of 3.

Example 120Diagnosing the run-time ADSL line port loop performance

```
CLI(diag selt)# start 1.6
OK: But the result displays by diag selt show.

CLI(diag selt)# show

Port single end loop test result: Port  1. 6


  Cable Type: 24 AWG
  Loop Length: 13468 (ft.)
```

Please refer to ITU-T 992.3 for the details of SELT.

Network Ping Test

The "**ping**" command is a very common method for troubleshooting the accessibility of devices. It uses a series of ICMP (Internet Control Message Protocol) Echo messages to determine if the NE can reach the target or not.

To diagnose the remote hosts using the "ping" command at the prompt for CLI#. (From UGE or MGE)

Table 9-99 shows the commands to set network ping test. 8 shows the usage of its command as well as its related parameters.

Table 9-99 Network Ping Test

The following command is to send the ICMP Echo message to target host.

CLI# ping *<hostname>*

Parameters	Task
<hostname>	Defines IP address or hostname of the target host to reply ICMP Echo message. **Type:** Mandatory **Valid values:** 0.0.0.0 ~ 255.255.255.255 | string (Reference to Appedix E)

Example 121Using Ping command to test the remote host status

```
CLI# ping 192.168.192.1

192.168.192.1 PING Statistics: 5 packets transmitted, 5 packets received
```

Monitoring the System Environment

In the hardware monitoring list dialog, you can monitor the temperature and voltage status of any specific card module.

Enter to the “**status**” group directory with proper command to perform the system environment monitoring.

```
CLI# status
CLI(status)#
```

Table 9-100 shows the commands to display the system environment monitoring.8 shows the usage of its command as well as its related parameters.

Table 9-100 System Environment Monitoring

The following command is to display the system ventilation fan speed information.

CLI(status)# fanspeed show

The following command is to display the temperature of specific line card.

CLI(status)# temp show lc *<lc-id>*

The following command is to display the temperature of network card.

CLI(status)# temp show nc

The following command is to display the voltage of fan module.

CLI(status)# voltage show fan

The following command is to display the voltage of specific line card.

CLI(status)# voltage show lc *<lc-id>*

The following command is to display the voltage of network card.

CLI(status)# voltage show nc

Parameters	Task
<lc-id>	Identify the slot range of the line card **Type:** Mandatory **Valid values:** See the Section "Port Interface Indication" of 3.

Example 122Display the performance monitor of the system environment

```
CLI(status)# fanspeed show


  fan  fan speed (rpm)     fan status
  ---  ---------------  ------------------
    1          4428  FAILED (2880~4320)
    2          4551  FAILED (2880~4320)



CLI(status)# temp show lc 1
Temperature of LC 1 (centigrade)
        sensor         temperature  threshold-high  threshold-low
  ---------------------  -----------  --------------  -------------
  sensor1 (g767 local )        43           95            5
  sensor2 (g767 remote)         41           95            5
  sensor3 (max6652 #1 )         37           95            -
  sensor4 (max6652 #1 )         34           95            -



CLI(status)# temp show nc
Temperature of network card 1 (centigrade).
        sensor         temperature  threshold-high  threshold-low
  ---------------------  -----------  --------------  -------------
  sensor1 (g767 local )        40           95            5
  sensor2 (g767 remote)         35           95            5
  sensor3 (max6652 #1 )         35           95            -



CLI(status)# voltage show fan
```

```
  fan tray (5V)     : 4.97 V
  low threshold     : 4.00 V
  high threshold    : 5.00 V


CLI(status)# voltage show lc 1

LC 1
  voltage of the first max6652
        item        voltage  threshold-high  threshold-low
    ---------------  -------  --------------  -------------
    voltage (1.2 V)    1.17         1.31           1.08
    voltage (12  V)   11.78        13.19          10.88
    voltage (1.8 V)    1.77         1.98           1.63
    voltage (3.2 V)    3.15         3.51           2.89
  voltage of the second max6652
        item        voltage  threshold-high  threshold-low
    ---------------  -------  --------------  -------------
    voltage (1.5 V)    1.47         1.64           1.35
    voltage ( 0  V)   0.00         0.00           0.00
    voltage (2.5 V)    2.49         2.75           2.27
    voltage (3.2 V)    3.15         3.51           2.89


CLI(status)# voltage show nc
Voltage of network card 1
      item        voltage  threshold-high  threshold-low
  ---------------  -------  --------------  -------------
  voltage (1.25V)     1.22         1.36          1.13
  voltage (2.5 V)    2.48         2.75          2.25
  voltage (1.8 V)    1.77         1.98          1.63
  voltage (3.3 V)    3.28         3.61          2.99
```

Monitoring the System Performance

Enter to the “**status**” group directory with proper command to perform the system environment monitoring.

```
CLI# status
CLI(status)#
```

Table 9-101 shows the commands to display the system performance parameters.8 shows the usage of its command as well as its related parameters.

Table 9-101 System Performance Monitoring

The following command is to show adsl line historical performance data (15 minutes per interval).

CLI(status)# perf show history-15-min *<port-id> <start-interval>*

The following command is to show adsl line historical performance data (1day per interval).

CLI(status)# perf show history-1-day *<port-id>*

The following command is to show those VLANs on specific line cards that currently are allowed to forward broadcast packets.

CLI(status)# broadcast dsfilter show [*<slot-range>*]

The following command is to display LACP status.

CLI(status)# lacp show

The following command is to display line card status.

CLI(status)# lcstatus show

The following command is to display RSTP status.

CLI(status)# rstp show [*bridge* | *uge*]

The following command is to display the system up time.

CLI(status)# time show

Parameters	Task
<port-id>	Identify the port id of the system wish to perform the link monitoring, the define line port must operate in running status. **Type:** Mandatory **Valid values:** See the Section "Port Interface Indication" of 3.
<start-interval>	This specifies the adsl line historical performance data (15 minutes per interval). **Type:** Mandatory **Valid values:** 1 ~ 96
<slot-range>	Identify the slot range of the line card **Type:** Mandatory **Valid values:** See the Section "Port Interface Indication" of 3.
[*bridge* | *uge*]	This specifies the Rapid Spanning Tree Protocol status **Type:** Mandatory **Valid value:** bridge, uge

Example 123Display the performance monitor of the system

```
CLI(status)# perf show history-15-min 1.6 5
Port: 1.6  interval: 5/96
    rxCells:        0   txCells:        0


          Near End   Far End
         --------- ---------
      UAS        0        0
     LOFs        0        0
     LOSs        0        0
     LPRs        0        0
       ES        0        0
      SES        0        0
       CV        0        0
    INITs        0      ----
 FailINITs        0      ----

Port: 1.6  interval: 6/96
```

```
      rxCells:        0   txCells:        0

              Near End   Far End
             --------- ---------
          UAS        0        0
         LOFs        0        0
         LOSs        0        0
         LPRs        0        0
           ES        0        0
          SES        0        0
           CV        0        0
        INITs        0     ----
     FailINITs        0     ----

Port: 1.6  interval: 7/96
      rxCells:        0   txCells:        0

              Near End   Far End
             --------- ---------
          UAS        0        0
         LOFs        0        0
         LOSs        0        0
         LPRs        0        0
           ES        0        0
          SES        0        0
           CV        0        0
        INITs        0     ----
     FailINITs        0     ----

Port: 1.6  interval: 8/96
      rxCells:        0   txCells:        0

              Near End   Far End
             --------- ---------
          UAS        0        0
         LOFs        0        0
         LOSs        0        0
         LPRs        0        0
           ES        0        0
          SES        0        0
           CV        0        0
        INITs        0     ----
     FailINITs        0     ----

CLI(status)# broadcast dsfilter show 1
Down stream broadcast filters
    No any filter.


CLI(status)# lacp show
```

```
  LACP              : disabled


CLI(status)# lcstatus show

Line card status
  LC  type    status
  --  -----  ----------
   1   ADSL     active
   2  SHDSL      active
   3   ADSL     active
   4   ADSL     active


CLI(status)# rstp show

[bridge]
  oper status                   : disabled
  force version                 : RSTP
  bridge ID                     : 0x8000-00:11:f5:dc:7a:17
  bridge priority               : 32768
  bridge hello time             : 2 sec
  bridge forward delay          : 15 sec
  bridge max age                : 20 sec
  bridge message age            : 0 sec
  bridge Tx hold count          : 3
  root path cost                : 0
  root port ID                  : 0x0000
  root bridge ID                : 0x8000-00:11:f5:dc:7a:17
  root bridge priority          : 0x8000
  topology change count         : 0
  time since last topology change   : 0 sec
  root hello time               : 2 sec
  root forward delay            : 15 sec
  root max age                  : 20 sec
  designated bridge ID          : 0x8000-00:11:f5:dc:7a:17
  designated port ID            : 0x0000


[UGE 1]
  STP admin status              : enabled
  STP oper status               : enabled
  port ID                       : 0x8001
  port priority                 : 128
  STP state                     : broken
  role                          : disabled
  admin path cost               : 0 (default)
  oper path cost                : 20000
  admin non-STP                 : no
  admin edge port               : no
  oper edge port                : no
  admin P2P MAC              : auto
  oper P2P MAC              : yes
  send RSTP BPDU              : yes
  mcheck                    : no
  root bridge ID             : 0x8000-00:11:f5:dc:7a:17
  root bridge priority        : 0x8000
  root hello time            : 2 sec
  root forward delay          : 15 sec
  root max age               : 20 sec
  designated bridge ID          : 0x8000-00:11:f5:dc:7a:17
  designated port ID          : 0x8001


CLI(status)# time show

  system uptime    : 120:56:43
  system datetime   : 2007-10-31 11:08:42 GMT+8
```

Appendix AAbbreviations and Acronyms

The abbreviations and acronyms used in this document.

Table A-1 Abbreviations and Acronyms Table

Abbreviations	Full Name
AAL	ATM Adaptation Layer
ADSL	Asymmetric Digital Subscriber line
ATM	Asynchronous Transfer Mode
ATU-C	ADSL Transceiver Unit at the central office end
ATU-R	ADSL Transceiver Unit at the remote end
CV	Coding Violation
DSCP	Differentiated Service Code Point
DSLAM	Digital Subscriber line Access Multiplexer
ES	Error Seconds
EOA	Ethernet over ATM
GBIC	Gigabit Interface Converter
GE	Gigabit Ethernet
IP	Internet Protocol
LAN	Local Area Network
LOF	Loss of Frame
LOS	Loss of Signal
LPR	Loss of Power
OAM	Operation, Administration, and Maintenance
PSD	Power Spectral Density
PVC	Permanent Virtual Channel
SFP	Small Form Pluggable
SNR	Signal-to Noise Ratio
SNMP	Simple Network Management Protocol
UAS	Unavailable Seconds
UBR	Unspecified Bit Rate
VC	Virtual Channel
VCI	Virtual Channel Identify
VCL	Virtual Channel Link
VLAN	Virtual Local Area Network
VP	Virtual Path
VPI	Virtual Path Identifier
WAN	Wide Area Network
xDSL	ADSL/SHDSL

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Appendix BAlarm Definition

Table B-1 Alarm Definition

NE Model	Module Name	Alarm Name	Default Severity	Alarm Description
All	noEntity	EMPTY	No	Neither plan type nor on-line type configured
DAS4192	CPU Module	MISSING	Major	CPU Module is off-line
		TEMP	Major	Temperature is over the threshold
		VOL	Major	Voltage is below the threshold
		MISMATCH	Major	Planned type and online type are mismatched
		TCA_DHCP_BC	Warning	DHCP broadcast request rate threshold-crossing alert
	ADSL Module	MISSING	Major	ADSL module is off-line
		TEMP	Major	Temperature is over the threshold
		VOL	Major	Voltage is below the threshold
		MISMATCH	Major	Planned type and online type are mismatched
		NOT_OPERABLE	Major	ADSL line card is not operable
	Power Module	MISSING	Major	Power module is off-line
		NOT_OPERABLE	Major	Power card is not operable
	Fan Module	MISSING	Major	Fan module is off-line
		FAN1_SPEED	Major	Fan1 speed is below the threshold
		FAN2_SPEED	Major	Fan2 speed is below the threshold
		VOL	Major	Voltage is below the threshold
	ADSL Port	ES_NE_15_MIN	Minor	15 min near end ES is over threshold
		SES_NE_15_MIN	Minor	15 min near end SES is over threshold
		UAS_NE_15_MIN	Minor	15 min near end UAS is over threshold
		ES_FE_15_MIN	Minor	15 min far end ES is over threshold
		SES_FE_15_MIN	Minor	15 min far end SES is over threshold
		UAS_FE_15_MIN	Minor	15 min far end UAS is over threshold
		ES_NE_1_DAY	Minor	1 day near end ES is over threshold
		SES_NE_1_DAY	Minor	1 day near end SES is over threshold
		UAS_NE_1_DAY	Minor	1 day near end UAS is over threshold
		ES_FE_1_DAY	Minor	1 day far end ES is over threshold
		SES_FE_1_DAY	Minor	1 day far end SES is over threshold
		UAS_FE_1_DAY	Minor	1 day far end UAS is over threshold
		LOS	Minor	Loss of signal
		LOF	Minor	Loss of frame
		LPWR	Warning	CPE loss of power
		GEN_LINE_INIT_FAIL	Minor	Generic line initialization failure
		CONFIG_ERROR	Minor	Line initialization failure - configuration error
		HIGH_BIT_RATE	Minor	Line initialization failure - high bit rate
		COMM_PROBLEM	Minor	Line initialization failure - communication problem
		NO_PEER_DETECTED	Minor	No peer detected
		TRAINING	Warning	Port is under training
		NO_CONFIG	Information	Port is not configured
		PS_L2_MANUAL	Information	ADSL2/ADSL2+ Power State transfers to L2 by manual mode

NE Model	Module Name	Alarm Name	Default Severity	Alarm Description
DAS4192	ADSL Port	PS_L2_AUTO	Information	ADSL2/ADSL2+ Power State transfers to L2 by automatic mode
		PS_L3_CO	Information	ADSL2/ADSL2+ Power State transfers to L3 by CO side
		PS_L3_CPE	Information	ADSL2/ADSL2+ Power State transfers to L3 by CPE side
		ILLEGAL_IP	Warning	Packets with illegal IP addresses have been dropped
		ILLEGAL_MAC	Warning	duplicated MAC addresses from different line ports are made out
		DISABLED	Information	The port is disabled
	GE Port	MISSING	Major	GE Port is off-line
		NOT_OPERABLE	Major	GE Port is not operable
		STP_LEARN	Information	GE port is transited to STP-learning state
		STP_BLOCK	Information	GE port is transited to STP-blocking state
		DISABLED	Information	GE port is disabled
	Alarm Relay Module	MISSING	Major	Alarm relay module is off-line
	Alarm Relay Port	MISSING	Major	Alarm relay port is off-line
		RELAY_ABNORMAL	Major	The alarm relay port is under abnormal status
		DISABLED	Information	The alarm repay port is disabled
	SHDSL Module	MISSING	Major	SHDSL module is off-line
		TEMP	Major	Temperature is over the threshold
		VOL	Major	Voltage is below the threshold
		MISMATCH	Major	Planned type and online type are mismatched
		NOT_OPERABLE	Major	Line card is not operable
	SHDSL Port	TCA_ES_NE_15_MIN	Minor	15-min near end ES is over the threshold
		TCA_SES_NE_15_MIN	Minor	15-min near end SES is over the threshold
		TCA_UAS_NE_15_MIN	Minor	15-min near end UAS is over the threshold
		TCA_CRC_NE_15MIN	Minor	15-min near end CRC is over the threshold
		TCA_LOSW_NE_15MIN	Minor	15-min near end LOSW is over the threshold
		TCA_SNR_NE	Minor	Near end SNR margin is over the threshold
		TCA_ATTN_NE	Minor	Near end loop attenuation is over the threshold
		OPI	Information	Operation state change indication
		LOS	Minor	Loss of signal (FOH lost bit)
		SEGA	Minor	Segment anomaly - CRC anomaly (FOH sega bit)
		LPR	Minor	Loss of power - power status (FOH ps bit)
		SEGD	Minor	Segment defect - LOSW defect (FOH segd bit)
		PBO_NE	Minor	Near end enhanced power back off
		DEVFAULT_NE	Minor	Near end device fault - Diagnostic or self-test fault
		DCCONT_NE	Minor	Near end DC continuity fault - interfere with span powering
		LOSW_NE	Minor	Near end LOSW failure
		INI_CFG_NE	Minor	Near end indicates Far end not able to support requested configuration
		INI_PROTOCOL_NE	Minor	Near end indicates incompatible protocol used by Far end
		NOPEER	Minor	No peer detected
		PBO_FE	Minor	Far end enhanced power back off
		DEVFAULT_FE	Minor	Far end device fault - Diagnostic or self-test fault
		DCCONT_FE	Minor	Far end DC continuity fault - interfere with span powering

NE Model	Module Name	Alarm Name	Default Severity	Alarm Description
DAS4192	SHDSL Port	LOSW_FE	Minor	Far end LOSW failure
		INI_CFG_FE	Minor	Far end indicates Near end not able to support requested configuration
		INI_PROTOCOL_FE	Minor	Far end indicates incompatible protocol used by Near end
		DISABLED	Information	The port is disabled
DAS4672	CPU Module	MISSING	Major	CPU Module is off-line
		TEMP	Major	Temperature is over the threshold
		VOL	Major	Voltage is below the threshold
		MISMATCH	Major	Planned type and online type are mismatched
		NOT_OPERABLE	Major	CPU card is not operable
		TCA_DHCP_BC	Warning	DHCP broadcast request rate threshold-crossing alert
		STANDBY	Information	Running in standby mode
		HW_VERSION	Major	Hardware version is inconsistent
		SWAP	Information	Standby CPU module has been changed as active.
	ADSL Module	MISSING	Major	ADSL module is off-line
		TEMP	Major	Temperature is over the threshold
		VOL	Major	Voltage is below the threshold
		MISMATCH	Major	Planned type and online type are mismatched
		NOT_OPERABLE	Major	Line card is not operable
	Fan Module	MISSING	Major	Fan module is off-line
		FAN1_SPEED	Major	Fan1 speed is below the threshold
		FAN2_SPEED	Major	Fan2 speed is below the threshold
		FAN3_SPEED	Major	Fan3 speed is below the threshold
		VOL	Major	Voltage is below the threshold
	ADSL Port	ES_NE_15_MIN	Minor	15 min near end ES is over the threshold
		SES_NE_15_MIN	Minor	15 min near end SES is over the threshold
		UAS_NE_15_MIN	Minor	15 min near end UAS is over the threshold
		ES_FE_15_MIN	Minor	15 min far end ES is over the threshold
		SES_FE_15_MIN	Minor	15 min far end SES is over the threshold
		UAS_FE_15_MIN	Minor	15 min far end UAS is over the threshold
		ES_NE_1_DAY	Minor	1 day near end ES is over the threshold
		SES_NE_1_DAY	Minor	1 day near end SES is over the threshold
		UAS_NE_1_DAY	Minor	1 day near end UAS is over the threshold
		ES_FE_1_DAY	Minor	1 day far end ES is over the threshold
		SES_FE_1_DAY	Minor	1 day far end SES is over the threshold
		UAS_FE_1_DAY	Minor	1 day far end UAS is over the threshold
		LOS	Minor	Loss of signal
		LOF	Minor	Loss of frame
		LPWR	Warning	CPE Loss of power
		GEN_LINE_INIT_FAIL	Minor	Generic line initialization failure
		CONFIG_ERROR	Minor	Line initialization failure - configuration error
		HIGH_BIT_RATE	Minor	Line initialization failure - high bit rate
		COMM_PROBLEM	Minor	Line initialization failure - communication problem
		NO_PEER_DETECTED	Minor	No peer detected
		TRAINING	Warning	Port is under training
		NO_CONFIG	Information	Port is not configured
	ADSL Port	PS_L2_MANUAL	Information	ADSL2/ADSL2+ Power State transfers to L2 by manual mode.
		PS_L2_AUTO	Information	ADSL2/ADSL2+ Power State transfers to L2 by automatic mode.
		PS_L3_CO	Information	ADSL2/ADSL2+ Power State transfers to L3 by CO side
		PS_L3_CPE	Information	ADSL2/ADSL2+ Power State transfers to L3 by CPE side
		ILLEGAL_IP	Warning	Packets with illegal IP addresses have been dropped
		ILLEGAL_MAC	Warning	duplicated MAC addresses from different line ports are made out
		DISABLED	Information	The port is disabled
	GE Port	MISSING	Major	GE Port is off-line

NE Model	Module Name	Alarm Name	Default Severity	Alarm Description
DAS4672	GE Port	NOT_OPERABLE	Major	GE Port is not operable
		STP_LEARN	Information	GE port is transited to STP-learnning state
		STP_BLOCK	Information	GE port is transited to STP-blocking state
		DISABLED	Information	GE port is disabled
	Alarm Relay Module	MISSING	Major	Alarm relay module is off-line
	Alarm Relay Port	MISSING	Major	Alarm relay port is off-line
		RELAY_ABNORMAL	Major	The alarm relay port is under abnormal status
		DISABLED	Information	The port is disabled
	SHDSL Module	MISSING	Major	SHDSL module is off-line
		TEMP	Major	Temperature is over the threshold
		VOL	Major	Voltage is below the threshold
		MISMATCH	Major	Planned type and online type are mismatched
		NOT_OPERABLE	Major	Line card is not operable
	SHDSL Port	ES_NE_15_MIN	Minor	15-min near end ES is over the threshold
		SES_NE_15_MIN	Minor	15-min near end SES is over the threshold
		UAS_NE_15_MIN	Minor	15-min near end UAS is over the threshold
		TCA_CRC_NE_15MIN	Minor	15-min near end CRC is over the threshold
		TCA_LOSW_NE_15MIN	Minor	15-min near end LOSW is over the threshold
		TCA_SNR_NE	Minor	Near end SNR margin is over the threshold
		TCA_ATTN_NE	Minor	Near end loop attenuation is over the threshold
		OPI	Minor	Operation state change indication
		LOS	Minor	Loss of signal (FOH lost bit)
		SEGA	Minor	Segment anomaly - CRC anomaly (FOH sega bit)
		LPR	Minor	Loss of power - power status (FOH ps bit)
		SEGD	Minor	Segment defect - LOSW defect (FOH segd bit)
		PBO_NE	Minor	Near end enhanced power back off
		DEVFAULT_NE	Minor	Near end device fault - Diagnostic or self-test fault
		DCCONT_NE	Minor	Near end DC continuity fault - interfere with span powering
		LOSW_NE	Minor	Near end LOSW failure
		INI_CFG_NE	Minor	Near end indicates Far end not able to support requested configuration
		INI_PROTOCOL_NE	Minor	Near end indicates incompatible protocol used by Far end
		NOPEER	Minor	No peer detected
		PBO_FE	Minor	Far end enhanced power back off
		DEVFAULT_FE	Minor	Far end device fault - Diagnostic or self-test fault
		DCCONT_FE	Minor	Far end DC continuity fault - interfere with span powering
		LOSW_FE	Minor	Far end LOSW failure
		INI_CFG_FE	Minor	Far end indicates Near end not able to support requested configuration
		INI_PROTOCOL_FE	Minor	Far end indicates incompatible protocol used by Near end
		DISABLED	Information	The port is disabled
	Chassis	PWR1_FAIL	Warning	Power1 failed
		PWR2_FAIL	Warning	Power2 failed
		PWR1_NOT_OPERABLE	Major	Power1 is not operable
		PWR2_NOT_OPERABLE	Major	Power2 is not operable

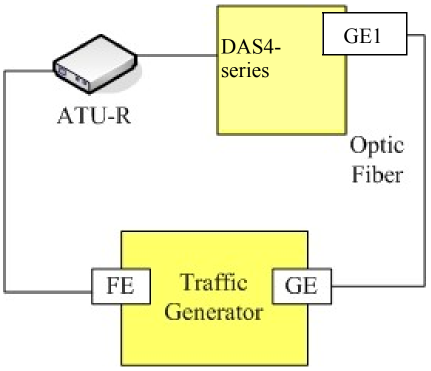
Appendix CQuick Configuration Guide for CLI commands

This appendix contains the following "How to" for the operator to be familiar with the DAS4-series product.

HowTo 1. How to configure to provide a unicast/broadcast and bridged data service on the DAS4-series IP-DSALM
HowTo 2. How to configure to provide a multicast and bridged data service on the DAS4-series IP-DSALM
HowTo 3. How to configure to provide a Trunk CoS Mapping on the DAS4-series IP-DSALM
HowTo 4. How to backup and restore the NE Configuration
HowTo 5. How to download the NE firmware via the out-band port

HowTo 1. How to configure to provide a unicast/broadcast and bridged data service on the DAS4-series IP-DSALM

Environment



Set Up via CLI commands

Step	Procedure and steps of parameter value (Procedure with blue background, Steps with yellow background)

StepAdd a A Add xDSL line profile to system..

Follow the procedures in Section “Configuring the xDSL Profile” of Chapter 4 to set the profiles by CLI commands as follows

Add Line Profile

Step1-1-1 Add ADSL Line Profile

Step1-1-2 Add ADSL Line Profile– Transmission Rate

Step1-1-3 Add ADSL Line Profile– SNR Margin

Step1-1-4 Add ADSL Line Profile– PSD

Step1-1-5 Add ADSL Line Profile– Power Management

Step1-1-6 Add ADSL Line Profile– INP(interleave)

Add PM Threshold Profile (optional)

Step1-2-1 Add ADSL PM Threshold Profile

Add Traffic Policing Profile

Step1-3-1 Add Traffic Policing Profile

Show ADSL Line Profile

Please see the CLI setting as follows.

Add Line Profile

Step1-1-1 Add ADSL Line Profile

```
CLI# config profile adsl-line add  ADSL_CONF
OK
```

Step1-1-2 Add ADSL Line Profile– Transmission Rate

```
CLI# config profile adsl-line set adaptive-rate ADSL_CONF 64 2976 64 29984
OK
```

Step1-1-3 Add ADSL Line Profile– SNR Margin

```
CLI# config profile adsl-line set snr-margin ADSL_CONF us 6 0 31
OK
CLI# config profile adsl-line set snr-margin ADSL_CONF ds 6 0 31
OK
```

Step1-1-4 Add ADSL Line Profile– PSD

```
CLI# config profile adsl-line set psd ADSL_CONF 0 0
OK
```

Step1-1-5 Add ADSL Line Profile– Power Management

```
CLI# config profile adsl-line set pwr-mgt ADSL_CONF l2 manual 32 29984
OK
```

Step1-1-6 Add ADSL Line Profile– INP(interleave)

```
CLI# config profile adsl-line set line-mode ADSL_CONF interleave 6 6 0 0
OK
```

```
CLI# config profile adsl-alarm show PM
profile [PM]: enabled
   side-end  15min-es  15min-ses  15min-uas  1day-es  1day-ses  1day-uas
   --------  --------  ---------  ---------  -------  --------  --------
   near end       15         15         15        15        15        15
    far end       15         15         15        15        15        15
```

Add Traffic Policing Profile

Step1-3-1 Add Traffic Policing Profile

```
CLI#  config profile metering set Traffic-Policing 1  AF11
OK

CLI#  config profile metering show

Traffic Policing  [Traffic-Policing]
   CIR (Mbps)  action
   ----------  ---------
            1  DSCP-AF11
```

Show ADSL Line Profile

```
CLI# config profile adsl-line enable ADSL_CONF
OK

CLI# config profile adsl-line show ADSL_CONF

profile [ADSL_CONF]
   status        : enabled
   line mode     : interleave
   rate mode     : adaptive
                                   up-stream   down-stream
                                  -----------  -----------
   fast rate (min/max)           :     64/2976     64/29984 kbps
   interleave rate (min/max)     :     64/2976     64/29984 kbps
   interleave max delay          :           6            6 ms
   interleave min INP symbol time:           0            0
   target SNR margin             :         6.0          6.0 dB
   min./max. SNR margin          :    0.0/31.0     0.0/31.0 dB
   down/up shift SNR margin      :    3.0/20.0     3.0/20.0 dB
   down/up shift time            :   1000/1000    1000/1000 sec
   PSD                           :         0.0          0.0 dBm/Hz
   power management setting:
      L2-mode   L2-min-rate  L2-max-rate   CPE L3
     ---------  -----------  -----------  --------
        manual      32 kbps   29984 kbps  accepted
```

Step2	Assign ADSL line profile to a ADSL subscriber and enable it.
	Follow the procedures in Section “Configuring the ADSL Line Port” of Chapter 5 to modify the configuration of target ADSL port by CLI commands as follows. **Assign ADSL line profile** **Step2-1** ADSL Port Configuration

Step2-1 ADSL Port Configuration

```
CLI# config port set adsl-line-profile 1.21 ADSL_CONF
OK

CLI# config port enable 1.21
OK

CLI# config port show 1.21
port: 1.1.21
  admin status      : enabled
  oper status       : up
  cfg. profile      : "ADSL_CONF"
  alarm profile     : ""
  traffic policing  : ""
  circuit ID        : "IP_DSLAM-172.17.192.1-00:00:00:00:00:00 atm 1/21:0.0"
  remote ID         : ""
  power state       : L0
  line standard     : G.992.5 Annex A

  [physical status]
            item       US     DS
    ---------------- ------ ------
     attainable rate   1342   30640  kbps
       attenuation     0.0     0.0  dB
        SNR margin     6.3     8.5  dB
      output power    12.1    12.6  dBm

  [channel status]
            item       US     DS
    ---------------- ------ ------
           Tx rate    1345   29209  kbps
    interleave delay     0       0  ms
    CRC block length    78     255  ms
     INP symbol time   0.00    0.00  DMT symbol
```

Step3

Add an IP traffic profile to system.

Follow the procedures in Section "Configuring the IP Traffic Profile" of Chapter 4 to set the following profiles

Add IP Traffic Profile

Step3-1 Add xDSL IP Traffic Profile

Step3-1 Add xDSL IP Traffic Profile

```
CLI# config profile ip-traffic set ADSL_IPTRA no-limit 29984 low forward
OK

CLI# config profile ip-traffic show

profile [ADSL_IPTRA]
  index            : 1
  US rate          : no Limit
  DS rate          : 29984 (kbps)
  VC priority      : low
  broadcast filter : forward
```

Step4

Set tag mode of NC/LC. (optional)

Follow the procedures in Section "Network Interface Administrating" of Chapter 6 to set the tag mode of NC/LC

Set the tag mode of NC

Step4-1 Set the tag mode of NC

Set the tag mode of target LC

Step4-2 Set the tag mode of target LC

Step4-1 Set the tag mode of NC

```
CLI# config nc set tagged-mode untagged-only
This operation will save configuration and reboot system. Are you sure? (Y/N) y
Saving...
OK
```

Step4-2 Set the tag mode of target LC

```
CLI# config lc set tagged-mode 1 untagged-only
LC1 will be reset. Are you sure? (Y/N) Y
OK
```

Step5	Create a bidirectional PVC between IP-DSLAM and ATU-R
	Follow the procedures in Section “VC-to-VLAN Connection Management” of Chapter 7 to modify the configuration the bidirectional PVC between IP-DSLAM and ATU-R by CLI commands as follows. **Add xDSL VC-to-VLAN Configuration** **Step5-1-1** xDSL VC-to-VLAN Setting – Add Vcvlan **Step5-1-2** xDSL VC-to-VLAN Setting – IP Traffic, 802.1Q/1P, MAC Limit **Step5-1-3** xDSL VC-to-VLAN Setting – Service Type

Step5-1-1 xDSL VC-to-VLAN Setting –Add Vcvlan

```
CLI# config ucast  add vcvlan 1.21 8 35
OK
```

Step5-1-2 xDSL VC-to-VLAN Setting –IP Traffic, 802.1Q/1P, MAC Limit

```
CLI# config ucast set vcvlan 1.21 8 35 0 ADSL_IPTRAF bridged 100 4
OK
```

Step5-1-3 xDSL VC-to-VLAN Setting – Service Type

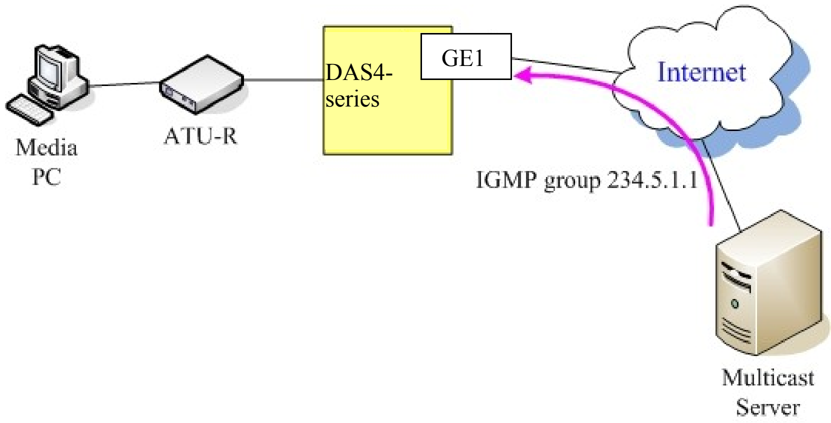
```
CLI# config ucast set servicetypestaticip 1.21 8 35 1.1.1.1 1
OK

CLI# config ucast enable vcvlan 1.21 8 35
OK

CLI# config ucast show vcvlan 1.21
Port  1.21
 # VPI  VCI  IP-traffic prof  VLAN 1p MAC RFC2684     next-hop      admin   oper
 - --- ----- ---------------- ---- -- --- ------- ---------------- -------- ----
 1   8    35     DSL_IPTRAF  100  0   1 bridged                  enabled   up
```

HowTo 2. How to configure to provide a multicast and bridged data service on the DAS4-series IP-DSALM

Environment



Set Up via CLI commands

Step	Procedure and example of parameter value (Procedure with blue background, Example with yellow background)
StepAdd a A	Add a TV (multicast) channel profile to system.
	Follow the procedures in Section “TV Channel Profile” to set the profiles by CLI commands as follows **Add TV Channel Profile** (Please refer the corresponding OID definition in Table F-108) **Step1-1** Add xDSL TV Channel Profile
	Please see the CLI setting as follows. **Add xDSL TV Channel Profile** **Step1-1** Add xDSL TV Channel Profile CLI# **config profile mcast add TV1** OK CLI# **config profile mcast set TV1 234.5.1.1 29984 high** OK CLI# **config profile mcast enable TV1** OK CLI# **config profile mcast show** profile [TV1] grouip-ip rate(kbps) priority status --------------- ---------- -------- -------- 234.5.1.1 29984 high enabled

<table>
<tr><td rowspan="3">Step 2</td><td>Create a multicast service profile and assign multicast channel profile to a service profile.</td></tr>
<tr><td>Follow the procedures in Section “Multicast Service Profile” to set the profiles by CLI commands as follows
<b>Add Subscribe Sets of Multicast Channel into Service Profile</b> (Please refer the corresponding OID definition in Table F-109)
<b>Step2-1</b> Add Subscribe Sets of Multicast Channel into Service Profile</td></tr>
<tr><td>Please see the CLI setting as follows.
<b>Add Subscribe Sets of Multicast Channel into Service Profile</b>
<b>Step2-1</b> Add Subscribe Sets of Multicast Channel into Service Profile
<pre>
CLI# config profile mservice add TVg1
OK

CLI# config profile mservice subscribe TVg1 TV1
OK

CLI# config profile mservice show

Profile [TVg1]
   Mcast Profile: "TV1",
</pre></td></tr>
</table>

Step 3	Setup as same as steps 1~4 in HowTo 1 via CLI.
Step 4	Create a mcau (multicast conditional access unit) on xDSL subscriber.
	Follow the procedures in Section "Multicast Channel Configuration" to create a mcau on xDSL subscriber. by CLI commands as follows (Please refer the corresponding OID definition in Table F-110) **Add xDSL Multicast Channel Setting** **Step4-1** Add xDSL Multicast Channel Setting
	Add xDSL Multicast Channel Setting **Step4-1** Add xDSL Multicast Channel Setting

```
CLI# config mcau set 1.1 0 32 300 4 TVg1
OK

CLI# config mcau enable 1.1
OK

CLI# config mcau show 1.1

                          channel
port ID   VPI/VCI   VLAN  limit        service-profile          status
-------  ---------  ----  -----  -------------------------------  --------
   1. 1    0/   32   300     4                         TVg1   enabled
```

Step 5

Enable IGMP snoopy/proxy functions on IP-DSLAM.

Follow the procedures in Section “IGMP snooping/IGMP proxy Configuration” to enable IGMP snoopy/proxy functions on IP-DSLAM by CLI commands as follows (Please refer the corresponding OID definition in Table F-111)

Add IGMP Snooping or IGMP Proxy Setting depending on the application environment

Step5-1(a) Add IGMP Snooping Setting

Step5-1(b) Add IGMP Proxy Setting

Add IGMP Snooping Setting

Step5-1(a) Add IGMP Snooping Setting

```
CLI# config igmp snooping set immediate-leave enabled
OK

CLI# config igmp snooping set response-interval 300
OK

CLI# config igmp snooping set retrials 3
OK

CLI# config igmp snooping set aging-time 600
OK

CLI# config igmp version query v2
OK

CLI# config igmp version report-leave v2
OK

CLI# config igmp set stateful flow
OK

CLI# config igmp enable snooping
OK

CLI# config igmp show

IGMP proxy
  status              : disabled
  immediate leave     : enabled
  retrials            : 3
  response interval   : 300   in 1/10 sec

IGMP snooping
  status              : enabled
  immediate leave     : enabled
  aging time          : 600   sec
  retrials            : 3
  response interval   : 300   in 1/10 sec

  IGMP version
  query version       : v2
  report/leave version  : v2
```

Add IGMP Proxy Setting

Step5-1(b) Add IGMP Proxy Setting

```
CLI# config igmp proxy set immediate-leave enabled
OK

CLI# config igmp proxy set response-interval 300
OK

CLI# config igmp proxy set retrials 3
OK

CLI# config igmp version query v2
OK

CLI# config igmp version report-leave v2
OK

CLI# config igmp enable proxy
OK

CLI# config igmp show

IGMP proxy
   status              : enabled
   immediate leave     : enabled
   retrials            : 3
   response interval   : 300   in 1/10 sec

   IGMP snooping
   status              : disabled
   immediate leave     : enabled
   aging time          : 600   sec
   retrials            : 2
   response interval   : 100   in 1/10 sec

   IGMP version
   query version       : v2
   report/leave version   : v2

   Stateful
   level               : none - show nothing
```

The aging time setting should be lager to prevent the spooned multicast IP MAC from being aged out.

HowTo 3. How to configure to provide a Trunk CoS Mapping on the DAS4-series series IP-DSALM

Set Up via CLI

<table>
<tr><th>Step</th><th>Procedure and example of parameter value (Procedure with blue background, Example with yellow background)</th></tr>
<tr><td rowspan="3">Step 1</td><td>Add a Trunk CoS Mapping and DSCP Re-mapping to system.</td></tr>
<tr><td>Follow the procedures in Section “CoS Configuration” to add a Trunk CoS Mapping and DSCP Re-mapping to system by CLI commands as follows (Please refer the corresponding OID definition in Table F-112)
<b>Add Trunk CoS Mapping and DSCP Re-mapping</b>
<b>Step1-1</b> Add Trunk CoS Mapping and DSCP Re-mapping</td></tr>
<tr><td>Please see the CLI setting as follows.
<b>Add Trunk CoS Mapping and DSCP Re-mapping</b>
<b>Step1-1</b> Add Trunk CoS Mapping and DSCP Re-mapping

```
CLI# config diffserv mapping 0 AF11
OK

CLI# config diffserv mapping 1 BE
OK

CLI# config diffserv mapping 2 AF11
OK

CLI# config diffserv mapping 3 AF21
OK

CLI# config diffserv mapping 4 AF21
OK

CLI# config diffserv mapping 5 AF31
OK

CLI# config diffserv mapping 6 AF31
OK

CLI# config diffserv mapping 7 EF
OK

CLI# config diffserv enable
OK

CLI# config diffserv show

DiffServ: enabled
DiffServ 802.1p and DSCP mapping:
  802.1p  :  0    1    2    3    4    5    6    7
    DSCP   : AF11  BE  AF11 AF21 AF21 AF31 AF31  EF
```

</td></tr>
</table>

HowTo 4. How to backup and restore the NE Configuration

Set Up via CLI

NE provides NC/ADSL LC backup and restore related CLI commands to backup or restore the NE configuration via FTP. The backup procedures are as following:

1. **Step 1** Open the DOS prompt window (or environment) on personal computer (PC).
2. **Step 2** Go to the directory where the backup file is saved, and then login the
3. DAS4-Series by FTP
4. **Step 3** Get the configuration file from NE to the target partition via FTP by following
5. commands:

```
ftp> cd cfg:
ftp> get default.cfg
or
ftp> put default.cfg
```

It is noted that login device via FTP must be used the read-write authorization. The default username/password is **admin/admin**.

It is noted that the NE configuration is saved in “default.cfg” on the NE. The operator can backup the “default.cfg” and save it with a different filename on the local host. However, the operator has to restore (by the ftp “put” command) the NE configuration with filename of “default.cfg”.

12. The following example shows how to backup the configurations from NE.

```
D:\>ftp 10.12.3.160
Connected to 10.12.3.160.
220-=====================================================================-
220-              Welcome to the IP-DSLAM FTP Server               -
220-                                             -
220- CAUTION: It's your responsibility to use the FTP service correctly -
220-        , please put the right files into the right file system.  -
220 =====================================================================-
User (10.12.3.160:(none)): admin
331 Password required
Password:
230 User logged in
ftp> cd cfg:
250 Changed directory to "cfg:/"
ftp> get default.cfg D:\DSLAM-TPE-4.txt
200 Port set okay
150 Opening BINARY mode data connection
226 Transfer complete
ftp: 152231 bytes received in 0.45Seconds 335.31Kbytes/sec.
ftp> bye
```

```
221 Bye...see you later

D:\>
```

13. The following example shows how to restore the configurations to NE.

```

D:\>ftp 10.12.3.160
Connected to 10.12.3.160.
220-=====================================================================-
220-              Welcome to the IP-DSLAM FTP Server               -
220-                                                -
220- CAUTION: It's your responsibility to use the FTP service correctly -
220-        , please put the right files into the right file system.  -
220 =====================================================================-
User (10.12.3.160:(none)): admin
331 Password required
Password:
230 User logged in
ftp> cd cfg:
250 Changed directory to "cfg:/"
ftp> put DSLAM-TPE-4.cfg default.cfg
200 Port set okay
150 Opening BINARY mode data connection
226- CAUTION:Please wait for 120 seconds or check the Flash LED -
226 Transfer complete
ftp: 152231 bytes sent in 0.80Seconds 191.01Kbytes/sec.
ftp> bye
221 Bye...see you later
```

HowTo 5. How to download the NE firmware via the out-band port

The NE supports to use FTP to download the NE firmware from a local host (PC, for example) to the NE via the out-band port (i.e. nme). To this end, this section depicts the procedures on the local host side and the NE side as follows.

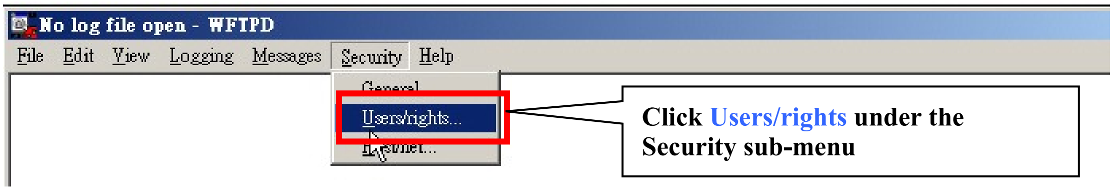
On the local host side:

The local host should be equipped with a FTP Server（WFTP for example）and the NE firmware in demand. The configuration of WFTP is as follows.

14. **Step 1** Execute the wftp32.exe
15. **Step 2** Click Users/rights under the Security sub-menu. (Refers to Figure 1)
16. **Step 3** Click New User to create username and password. (Refers to Figure 2)
17. **Step 4** Input the full path in "Home Directory" and finish it by clicking 'Done'.
18. (Refers to Figure 2)
19.

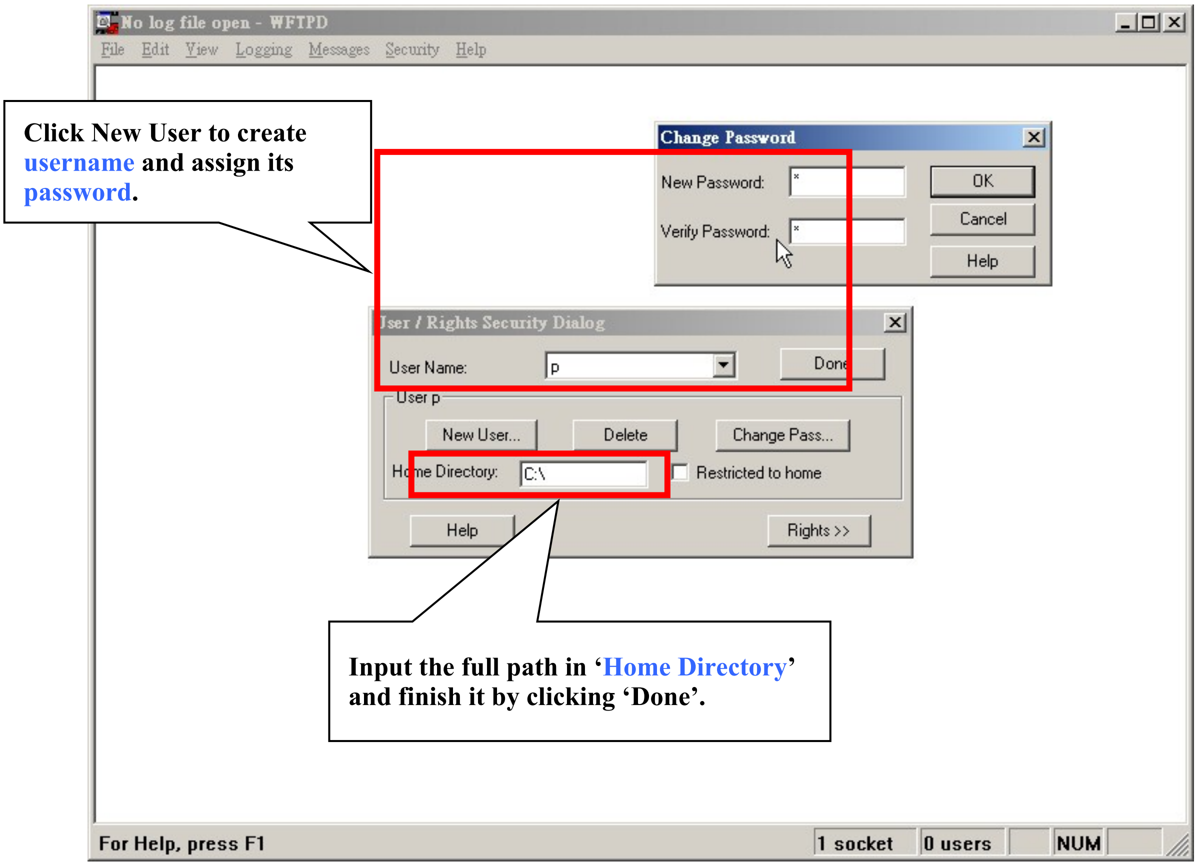
NOTE The NE firmware must be placed in the "Home Directory" of host PC as set in Figure 2. Otherwise, the NE will fail to download the NE firmware.

Figure 1 The setting of WFTP: To open the Users/rights dialog



Click Users/rights under the Security sub-menu

Figure 2 The setting of WFTP: Create User and assign its password.



Click New User to create username and assign its password.

Input the full path in 'Home Directory' and finish it by clicking 'Done'.

On the NE side:

Example 1depicts the procedure on the NE side.

Step 1 Power up the NE and press any key to enter the "VxWorks Boot" mode.

Step 2 Change the boot configuration by the command 'c'. (Refers to Example 1)

Step 3 Change to the values marked in red rectangles as shown in Example 1.
(Refers Table 1 for the description of the mandatory parameters in Example 1)

Step 4 Enter command 'p' to show and confirm the new setting of NE boot configuration as shown in Example 2.

Step 5 Enter command '@' to load the NE firmware from the local host and execute it.

After loading the firmware from the local host via FTP, the boot partition must be changed to 'opCodeA' or 'opCodeB' . Such that the NE reboots from the non-volatile memory instead of the local host.

For the related commands, please refers them to Chapter 3 in "IP-DSLAM System Configuration Guide" or Chapter 13 in "LCT Software Operation Guide"

NOTE If the operator does not press any key. The NE will load NE firmware from the partition 'opCodeA' or 'opCodeB' of its non-volatile memory)

NOTE A summarization of commands use in the [VxWorks Boot] mode.
- 'p' : Show the current setting
- 'c' : Change the setting
- '@' : Start to load the NE firmware and execute it.

Example 1 Change the setting of [VxWorks Boot]

```
[VxWorks Boot]: c

'.' = clear field;  '-' = go to previous field;  ^D = quit

boot device          : opCodeA rtl
processor number     : 0
host name            : MCI2021
file name            : am00xx.enc am0031.enc
inet on ethernet (e) : 192.168.192.1 10.12.3.98
inet on backplane (b):
host inet (h)        : 10.12.3.11 10.12.3.92
gateway inet (g)     :
user (u)             : a p
ftp password (pw) (blank = use rsh): a p
flags (f)            : 0x0 ^
target name (tn)     :
startup script (s)   :
other (o)            : rtl
```

Example 2 Show the current setting of [VxWorks Boot]

```
[VxWorks Boot]: p

boot string          : 255
boot device          : rtl
unit number          : 0
processor number     : 0
host name            : MCI2021
file name            : am0031.enc
inet on ethernet (e) : 10.12.1.251
host inet (h)        : 10.12.3.92
user (u)             : p
ftp password (pw)    : p
flags (f)            : 0x0
other (o)            : rtl

[VxWorks Boot]: @
```

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Appendix DInternet Protocol Numbers Definition

Table D-2 Internet Protocol Numbers Definition

Decimal	Keyword	Protocol	References
0	HOPOPT	IPv6 Hop-by-Hop Option	[RFC1883]
1	ICMP	Internet Control Message	[RFC792]
2	IGMP	Internet Group Management	[RFC1112]
3	GGP	Gateway-to-Gateway	[RFC823]
4	IP	IP in IP (encapsulation)	[RFC2003]
5	ST	Stream	[RFC1190][RFC1819]
6	TCP	Transmission Control	[RFC793]
7	CBT	CBT	[Ballardie]
8	EGP	Exterior Gateway Protocol	[RFC888][DLM1]
9	IGP	any private interior gateway	[IANA]
10	BBN-RCC-MON	BBN RCC Monitoring	[SGC]
11	NVP-II	Network Voice Protocol	[RFC741][SC3]
12	PUP	PUP	[PUP][XEROX]
13	ARGUS	ARGUS	[RWS4]
14	EMCON	EMCON	[BN7]
15	XNET	Cross Net Debugger	[IEN158][JFH2]
16	CHAOS	Chaos	[NC3]
17	UDP	User Datagram	[RFC768][JBP]
18	MUX	Multiplexing	[IEN90][JBP]
19	DCN-MEAS	DCN Measurement Subsystems	[DLM1]
20	HMP	Host Monitoring	[RFC869][RH6]
21	PRM	Packet Radio Measurement	[ZSU]
22	XNS-IDP	XEROX NS IDP	[ETHERNET][XEROX]
23	TRUNK-1	Trunk-1	[BWB6]
24	TRUNK-2	Trunk-2	[BWB6]
25	LEAF-1	Leaf-1	[BWB6]
26	LEAF-2	Leaf-2	[BWB6]
27	RDP	Reliable Data Protocol	[RFC908][RH6]
28	IRTP	Internet Reliable Transaction	[RFC938][TXM]
29	ISO-TP4	ISO Transport Protocol Class 4	[RFC905][RC77]
30	NETBLT	Bulk Data Transfer Protocol	[RFC969][DDC1]
31	MFE-NSP	MFE Network Services Protocol	[MFENET][BCH2]
32	MERIT-INP	MERIT Internodal Protocol	[HWB]
33	DCCP	Datagram Congestion Control Protocol	[RFC4340]
34	3PC	Third Party Connect Protocol	[SAF3]
35	IDPR	Inter-Domain Policy Routing Protocol	[MXS1]
36	XTP	XTP	[GXC]
37	DDP	Datagram Delivery Protocol	[WXC]
38	IDPR-CMTP	IDPR Control Message Transport Protocol	[MXS1]
39	TP++	TP++ Transport Protocol	[DXF]

Decimal	Keyword	Protocol	References
40	IL	IL Transport Protocol	[Presotto]
41	IPv6	Ipv6	[Deering]
42	SDRP	Source Demand Routing Protocol	[DXE1]
43	IPv6-Route	Routing Header for IPv6	[Deering]
44	IPv6-Frag	Fragment Header for IPv6	[Deering]
45	IDRP	Inter-Domain Routing Protocol	[Hares]
46	RSVP	Reservation Protocol	[Braden]
47	GRE	General Routing Encapsulation	[Li]
48	DSR	Dynamic Source Routing Protocol	[RFC4728]
49	BNA	BNA	[Salamon]
50	ESP	Encap Security Payload	[RFC2406]
51	AH	Authentication Header	[RFC2402]
52	I-NLSP	Integrated Net Layer Security TUBA	[GLENN]
53	SWIPE	IP with Encryption	[JI6]
54	NARP	NBMA Address Resolution Protocol	[RFC1735]
55	MOBILE	IP Mobility	[Perkins]
56	TLSP	Transport Layer Security Protocol	[Oberg]
57	SKIP	SKIP	[Markson]
58	IPv6-ICMP	ICMP for IPv6	[RFC1883]
59	IPv6-NoNxt	No Next Header for IPv6	[RFC1883]
60	IPv6-Opts	Destination Options for IPv6	[RFC1883]
61		any host internal protocol	[IANA]
62	CFTP	CFTP	[CFTP] [HCF2]
63		any local network	[IANA]
64	SAT-EXPAK	SATNET and Backroom EXPAK	[SHB]
65	KRYPTOLAN	Kryptolan	[PXL1]
66	RVD	MIT Remote Virtual Disk Protocol	[MBG]
67	IPPC	Internet Pluribus Packet Core	[SHB]
68		any distributed file system	[IANA]
69	SAT-MON	SATNET Monitoring	[SHB]
70	VISA	VISA Protocol	[GXT1]
71	IPCV	Internet Packet Core Utility	[SHB]
72	CPNX	Computer Protocol Network Executive	[DXM2]
73	CPHB	Computer Protocol Heart Beat	[DXM2]
74	WSN	Wang Span Network	[VXD]
75	PVP	Packet Video Protocol	[SC3]
76	BR-SAT-MON	Backroom SATNET Monitoring	[SHB]
77	SUN-ND	SUN ND PROTOCOL-Temporary	[WM3]
78	WB-MON	WIDEBAND Monitoring	[SHB]
79	WB-EXPAK	WIDEBAND EXPAK	[SHB]
80	ISO-IP	ISO Internet Protocol	[MTR]
81	VMTP	VMTP	[DRC3]
82	SECURE-VMTP	SECURE-VMTP	[DRC3]

Decimal	Keyword	Protocol	References
83	VINES	VINES	[BXH]
84	TTP	TTP	[JXS]
85	NSFNET-IGP	NSFNET-IGP	[HWB]
86	DGP	Dissimilar Gateway Protocol	[DGP][ML109]
87	TCF	TCF	[GAL5]
88	EIGRP	EIGRP	[CISCO][GXS]
89	OSPFIGP	OSPFIGP	[RFC1583][JTM4]
90	Sprite-RPC	Sprite RPC Protocol	[SPRITE][BXW]
91	LARP	Locus Address Resolution Protocol	[BXH]
92	MTP	Multicast Transport Protocol	[SXA]
93	AX.25	AX.25 Frames	[BK29]
94	IPIP	IP-within-IP Encapsulation Protocol	[JI6]
95	MICP	Mobile Internetworking Control Protocol	[JI6]
96	SCC-SP .	Semaphore Communications Sec. Protocol	[HXH]
97	ETHERIP	Ethernet-within-IP Encapsulation	[RFC3378]
98	ENCAP	Encapsulation Header	[RFC1241,RXB3]
99	GMTP	GMTP	[RXB5]
100	IFMP	Ipsilon Flow Management Protocol	[Hinden]
101	PNNI	PNNI over IP	[Callon]
102	PIM	Protocol Independent Multicast	[Farinacci]
103	ARIS	ARIS	[Feldman]
104	SCPS	SCPS	[Durst]
105	QNX	QNX	[Hunter]
106	A/N	Active Networks	[Braden]
107	IPComp	IP Payload Compression Protocol	[RFC2393]
108	SNP	Sitara Networks Protocol	[Sridhar]
109	Compaq-Peer	Compaq Peer Protocol	[Volpe]
110	IPX-in-IP	IPX in IP	[Lee]
111	VRRP	Virtual Router Redundancy Protocol	[RFC3768]
112	PGM	PGM Reliable Transport Protocol	[Speakman]
113		any 0-hop protocol	[IANA]
114	L2TP	Layer Two Tunneling Protocol	[Aboba]
115	DDX	D-II Data Exchange (DDX)	[Worley]
116	IATP	Interactive Agent Transfer Protocol	[Murphy]
117	STP	Schedule Transfer Protocol	[JMP]
118	SRP	SpectraLink Radio Protocol	[Hamilton]
119	UTI	UTI	[Lothberg]
120	SMP	Simple Message Protocol	[Ekblad]
121	SM	SM	[Crowcroft]
122	PTP	Performance Transparency Protocol	[Welzl]
123	ISIS over IPv4		[Przygienda]
124	FIRE		[Partridge]
125	CRTP	Combat Radio Transport Protocol	[Sautter]

Decimal	Keyword	Protocol	References
126	CRUDP	Combat Radio User Datagram	[Sautter]
127	SSCOPMCE		[Waber]
128	IPLT		[Hollbach]
129	SPS	Secure Packet Shield	[McIntosh]
130	PIPE	Private IP Encapsulation within IP	[Petri]
131	SCTP	Stream Control Transmission Protocol	[Stewart]
132	FC	Fibre Channel	[Rajagopal]
133	RSVP-E2E-IGNORE		[RFC3175]
134	Mobility Header		[RFC3775]
135	UDPLite		[RFC3828]
136	MPLS-in-IP		[RFC4023]
137	manet	MANET Protocols	[RFC-ietf-manet-iana-07.txt]
138	HIP	Host Identity Protocol	[RFC5201]
139		Unassigned	[IANA]
140-252		Use for experimentation and testing	[RFC3692]
253		Use for experimentation and testing	[RFC3692]
254	Reserved		[IANA]
255	Reserved		[IANA]

Appendix EInvalid IP Address Definition

Table E-3 Invalid IP Address Definition

Restrictions	Range	Descriptions
Format error	x.x.x.255 0.x.x.x x.x.x.0	This indicates the invalid IP format
Reserved	224.0.0.0~239.255.255.255 127.0.0.0~127.255.255.255 172.31.254.0 ~ 172.31.254.67	This indicates the IP addresses to be reserved for specific usage, such as NME IP, UGE IP, gateway IP, Root-IP and interface IP.
Muilticast	224.0.1.0~239.255.255.255	This indicates the IP addresses to be reserved for the multicast application, such as IGMP, vedio on demand (MOD).
Netmask	255.255.255.254 255.255.255.255 255.0.0.1 0.0.0.0	This indicates the IP addresses to be reserved for IP netmask.

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Appendix FMIB files of DAS4 Series

Table F-102 The mapping of ADSL line profile related parameters and their corresponding OID

Parameters	MIB File	OID-number	OID-Name	Task
Profile Name	rfc2662	.1.3.6.1.2.1.10.94.1.1.14.1.1	adslLineConfProfileName	This specifies the ADSL line profile name **Type:** Mandatory **Valid values:** String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').
Upstream Min Rate	rfc2662	.1.3.6.1.2.1.10.94.1.1.14.1.25 .1.3.6.1.2.1.10.94.1.1.14.1.26	adslAturChanConfFastMinTxRate (see Note [1]) or adslAturChanConfInterleaveMinTxRate (see Note [2])	Defines upstream minimum transmit rate, this parameter is available for adaptive and dynamic rate mode. **Type:** Mandatory **Valid values:** 64 ~ 2976 (multiple of 32 kbps) **Default value:** 64 kbps (due to profile generated)
Upstream Max Rate	rfc2662	.1.3.6.1.2.1.10.94.1.1.14.1.27 .1.3.6.1.2.1.10.94.1.1.14.1.28	adslAturChanConfFastMaxTxRate (see Note 1) or adslAturChanConfInterleaveMaxTxRate (see Note 2)	Defines upstream maximum transmit rate, this parameter is available for adaptive and dynamic rate mode. **Type:** Mandatory **Valid values:** 64 ~ 2976 (multiple of 32 kbps) **Default value:** 64 kbps (due to profile generated)
Downstream Min Rate	rfc2662	.1.3.6.1.2.1.10.94.1.1.14.1.11 .1.3.6.1.2.1.10.94.1.1.14.1.12	adslAtucChanConfFastMinTxRate (see Note 1) or adslAtucChanConfInterleaveMinTxRate (see Note 2)	Defines downstream minimum transmit rate, this parameter is available for adaptive and dynamic rate mode. **Type:** Mandatory **Valid values:** 64 ~ 29984 (multiple of 32 kbps) **Default value:** 64 kbps (due to profile generated)
Downstream Max Rate	rfc2662	.1.3.6.1.2.1.10.94.1.1.14.1.13 .1.3.6.1.2.1.10.94.1.1.14.1.14	adslAtucChanConfFastMaxTxRate (see Note 1) or adslAtucChanConfInterleaveMaxTxRate (see Note 2)	Defines downstream maximum transmit rate, this parameter is available for adaptive and dynamic rate mode. **Type:** Mandatory **Valid values:** 64 ~ 29984 (multiple of 32 kbps) **Default value:** 64 kbps (due to profile generated)
Upstream Min Rate	rfc2662	.1.3.6.1.2.1.10.94.1.1.14.1.25 .1.3.6.1.2.1.10.94.1.1.14.1.26	adslAturChanConfFastMinTxRate (see Note 1) or adslAturChanConfInterleaveMinTxRate (see Note 2)	Defines upstream transmit rate, this parameter is available for fixed rate mode. **Type:** Mandatory **Valid values:** 64 ~ 2976 (multiple of 32 kbps) **Default value:** 64 kbps (due to profile generated)
Downstream Min Rate	rfc2662	.1.3.6.1.2.1.10.94.1.1.14.1.11 .1.3.6.1.2.1.10.94.1.1.14.1.12	adslAtucChanConfFastMinTxRate (see Note 1) or adslAtucChanConfInterleaveMinTxRate (see Note 2)	Defines downstream transmit rate, this parameter is available for fixed rate mode. **Type:** Mandatory **Valid values:** 64 ~ 29984 (multiple of 32 kbps) **Default value:** 64 kbps (due to profile generated)
Upstream Downshift Time	rfc2662	.1.3.6.1.2.1.10.94.1.1.14.1.24	adslAturConfMinDownshiftTime	It defines the minimum time interval during which the upstream noise margin should stay below the Downshift SNR below the ATU-R triggers the SRA process to decrease the line rate. **Type:** Mandatory **Valid values:** 0 ~ 16384 (seconds) **Default value:** 0 sec (due to profile generated)
Upstream Upshift Time	rfc2662	.1.3.6.1.2.1.10.94.1.1.14.1.23	adslAturConfMinUpshiftTime	It defines the minimum time interval during which the upstream noise margin should stay above the Upshift SNR before the ATU-R triggers the SRA process to increase the line rate. **Type:** Mandatory **Valid values:** 0 ~ 16384 (seconds) **Default value:** 0 sec (due to profile generated)
Downstream Downshift Time	rfc2662	.1.3.6.1.2.1.10.94.1.1.14.1.10	adslAtucConfMinDownshiftTime	It defines the minimum time interval during which the downstream noise margin should stay below the Downshift SNR before the ATU-C

[1] Note . Applicable when the channel mode is fast path.

[2] Note . Applicable when the channel mode is interleaved path.

[3] Note . Applicable when applying to set the upstream SNR margin.

[4] Note . Applicable when applying to set the downstream SNR margin.

Table F-103 The mapping of PM Threshold profile related parameters and their corresponding OID

Parameters	MIB File	OID-number	OID-Name	Task
Name	rfc2662	.1.3.6.1.2.1.10.94.1.1.15.1.1	adslLineAlarmConfProfileName	This specifies the PM Threshold (performance alarm) profile name **Type:** Mandatory **Valid values:** String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').
15-Min/CO: ES or 15-Min/RT: ES	rfc2662	.1.3.6.1.2.1.10.94.1.1.15.1.6 or .1.3.6.1.2.1.10.94.1.1.15.1.15	adslAtucThresh15MinESs or adslAturThresh15MinESs	When the keyword "*near*" is set, This field indicates the threshold of Errored Seconds (ES) on the CO (Central Office) side during the last 15 minutes. When the threshold is set to 10, the NE launches a trap (alarm) if the count of specific errors exceeds 10 during the last 15 minutes. When the keyword "*far*" is set, This field indicates the threshold of Errored Seconds (ES) on the RT side (CPE) during the last 15 minutes. When the threshold is set to 10, the NE launches a trap (alarm) if the count of specific errors exceeds 10 during the last 15 minutes. **Type:** Mandatory **Valid values:** 0 ~ 900 **Default value:** 0 (due to profile generated)
15-Min/CO: SES or 15-Min/RT: SES	rfc3440	.1.3.6.1.2.1.10.94.3.1.23.1.2 or .1.3.6.1.2.1.10.94.3.1.23.1.4	adslAtucThreshold15MinSesL or adslAturThreshold15MinSesL	When the keyword "*near*" is set, This field indicates the threshold of Errored Seconds (SES) on the CO (Central Office) side during the last 15 minutes. When the threshold is set to 10, the NE launches a trap (alarm) if the count of specific errors exceeds 10 during the last 15 minutes. When the keyword "*far*" is set, This field indicates the threshold of Severely Errored Seconds (SES) on the RT side (CPE) during the last 15 minutes. When the threshold is set to 10, the NE launches a trap (alarm) if the count of specific errors exceeds 10 during the last 15 minutes. **Type:** Mandatory **Valid values:** 0 ~ 900 **Default value:** 0 (due to profile generated)
15-Min/CO: UAS or 15-Min/RT: UAS	rfc3440	.1.3.6.1.2.1.10.94.3.1.23.1.3 or .1.3.6.1.2.1.10.94.3.1.23.1.5	adslAtucThreshold15MinUasL or adslAturThreshold15MinUasL	When the keyword "*near*" is set, This field indicates the threshold of Unavailable Seconds (UAS) on the CO (Central Office) side during the last 15 minutes. When the threshold is set to 10, the NE launches a trap (alarm) if the count of specific errors exceeds 10 during the last 15 minutes. When the keyword "*far*" is set, This field indicates the threshold of Unavailable Seconds (UAS) on the RT side (CPE) during the last 15 minutes. When the threshold is set to 10, the NE launches a trap (alarm) if the count of specific errors exceeds 10 during the last 15 minutes. **Type:** Mandatory **Valid values:** 0 ~ 900 **Default value:** 0 (due to profile generated)
1-Day/CO: ES or	askeyADSL	.1.3.6.1.4.1.3646.1300.2.2.1.1.1.1 or	adslAtucThreshold1DayEsL or	When the keyword "*near*" is set, This field indicates the threshold of

Table F-104 The mapping of Traffic Policing profile related parameters and their corresponding OID

Parameters	MIB File	OID-number	OID-Name	Task
Name	ASKEY-QOS-MIB	.1.3.6.1.4.1.3646.1300.2.16.3.1.1.1	trafficPolicingName	This specifies the traffic policing profile name **Type:** Mandatory **Valid values:** String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').
Upstream CIR (Mbps)	ASKEY-QOS-MIB	.1.3.6.1.4.1.3646.1300.2.16.3.1.1.2	trafficPolicingCIR	Defines the committed information rate of traffic policing profile. **Type:** Mandatory **Valid values:** 1 ~ 1000 (mbps)
Action to Out-profile Packets	ASKEY-QOS-MIB	.1.3.6.1.4.1.3646.1300.2.16.3.1.1.4	trafficPolicingAction	This identifies to which value will DSCP be replace, drop packets or do nothing when user’s upstream traffic exceeds CIR. **Type:** Mandatory **Valid values:** no-action(0) | drop(1) | BE(2) | AF11(3) | AF12(4) | AF13(5) | AF21(6) | AF22(7) | AF23(8) | AF31(9) | AF32(10) | AF33(11) | AF41(12) | AF42(13) | AF43(14) | EF(15)

Table F-105 The mapping of ADSL port configuration parameters and their corresponding OID

Parameters	MIB File	OID-number	OID-Name	Task
Administrative State	rfc2233	.1.3.6.1.2.1.2.2.1.7	ifAdminStatus	This specifies the desired state of the interface. **Type:** Mandatory **Valid values:** Enable | Disable
Line Profile	rfc2662	.1.3.6.1.2.1.10.94.1.1.1.1.4	adslLineConfProfile	This specifies the ADSL line profile name **Type:** Mandatory **Valid values:** String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').
PM Threshold (Profile)	rfc2662	.1.3.6.1.2.1.10.94.1.1.1.1.5	adslLineAlarmConfProfile	This specifies the PM Threshold (performance alarm) profile name **Type:** Mandatory **Valid values:** String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').
Traffic Policing (Profile)	ASKEY-QOS-MIB	.1.3.6.1.4.1.3646.1300.2.16.1.1.1.1	askeyQoSLineTrafficPolicing	This specifies the traffic policing profile name **Type:** Mandatory **Valid values:** String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').

Table F-106 The mapping of IP Traffic profile related parameters and their corresponding OID

Parameters	MIB File	OID-number	OID-Name	Task
Name	askeyVcVlan	.1.3.6.1.4.1.3646.1300.2.11.2.2.1.1	ipTrafficProfileName	This specifies the IP traffic profile name **Type:** Mandatory **Valid values:** String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').
Upstream Rate (Kbps)	askeyVcVlan	.1.3.6.1.4.1.3646.1300.2.11.2.2.1.2	ipTrafficProfileUsRateLimit	This specifies the rate limit for the upstream IP traffic on the PVC of a specific ADSL port where the IP traffic profile is applied to. **Type:** Mandatory **Valid values:** nolimit | 32k | 64k | 128k | 256k | 384k | 512k | 768k
Downstream Rate (Kbps)	askeyVcVlan	.1.3.6.1.4.1.3646.1300.2.11.2.2.1.3	ipTrafficProfileMaxDsRate	This specifies the rate limit for the downstream IP traffic on the PVC of a specific ADSL port where the IP traffic profile is applied to. **Type:** Mandatory **Valid values:** 0 ~ 29984 kbps (multiple of 32 kbps)
Downstream Priority Queue	askeyVcVlan	.1.3.6.1.4.1.3646.1300.2.11.2.2.1.4	ipTrafficProfileDsPriority	This defines the downstream priority of the PVC of a specific ADSL port where the IP traffic profile is applied to. It is noted that the lower the priority of the applied PVC, the higher the chance to get drop due to traffic congestion. **Type:** Mandatory **Valid values:** low(0) | medium(1) | high(2) | highest(3)
Downstream Broadcast	askeyVcVlan	.1.3.6.1.4.1.3646.1300.2.11.2.2.1.6	ipTrafficProfileDsBcastFilter	This specifies to drop or to forward downstream broadcast on the PVC of a specific ADSL port where the IP traffic profile is applied to. **Type:** Mandatory **Valid values:** drop(2) | forward(3)

Table F-107 The mapping of xDSL VC-to-VLAN Setting related parameters and their corresponding OID

Parameters	MIB File	OID-number	OID-Name	Task
VPI	askeyVcVlan	.1.3.6.1.4.1.3646.1300.2.11.1.1.1	vcVlanEntryVpi	Defines the VPI (Virtual Path Identifier) value. **Type:** Mandatory **Valid values:** 0 ~ 255
VCI	askeyVcVlan	.1.3.6.1.4.1.3646.1300.2.11.1.1.2	vcVlanEntryVci	Defines the VCI (Virtual Channel Identifier) value. **Type:** Mandatory **Valid values:** 1 ~ 65535 (1 ~ 31 are reserved)
Administrative State	askeyVcVlan	.1.3.6.1.4.1.3646.1300.2.11.1.1.13	vcVlanEntryRowStatus	This specifies the desired state of the vc-vlan connection. **Type:** Mandatory **Valid values:** Enable | Disable
RFC2684 Mode	askeyVcVlan	.1.3.6.1.4.1.3646.1300.2.11.1.1.6	vcVlanEntryRfc2684Mode	This specifies the RFC2684 encapsulation mode for the packet on the PVC. **Type:** Mandatory **Valid values:** routed mode | bridged mode
IP Traffic Profile	askeyVcVlan	.1.3.6.1.4.1.3646.1300.2.11.1.1.8	vcVlanEntryIPTrafficProfile	Defines the created IP traffic profile name. **Type:** Mandatory **Valid values:** The name of “IP traffic profile”
802.1Q/1P: VLAN ID	askeyVcVlan	.1.3.6.1.4.1.3646.1300.2.11.1.1.3	vcVlanEntryVlanId	This specifies the VLAN-ID value of VLAN-tag to be added to the upstream traffic on the PVC. **Type:** Mandatory **Default value:** 1 **Valid values:** 1 ~ 4093
802.1Q/1P: User Priority	askeyVcVlan	.1.3.6.1.4.1.3646.1300.2.11.1.1.4	vcVlanEntry8021pPriority	This specifies the User Priority of VLAN-tag to be added to the upstream traffic on the PVC when it is in the RFC 2684 bridged mode. **Type:** Mandatory **Default value:** 0 **Valid values:** 0 ~ 7 (low ~ high)
802.1P: User Priority	askeyVcVlan	.1.3.6.1.4.1.3646.1300.2.11.1.1.4	vcVlanEntry8021pPriority	This specifies the User Priority of VLAN-tag to be added to the upstream traffic on the PVC when it is in the RFC 2684 routed mode. **Type:** Mandatory **Default value:** 0 **Valid values:** 0 ~ 7 (low ~ high)
Next-hop Name	askeyVcVlan	.1.3.6.1.4.1.3646.1300.2.11.1.1.7	vcVlanEntryRoutedModeNexthop	It specifies the Next-hop name. The NE will use ARP to get its corresponding MAC address. The NE then use this MAC address as the MAC DA of upstream Ethernet frame when the VC-VLAN connection is in the RFC 2684 routed mode. **Type:** Mandatory **Valid values:** The name of “ISP Server”
MAC Limit: MAC Count	askeyVcVlan	.1.3.6.1.4.1.3646.1300.2.11.1.1.5	vcVlanEntryMacLimit	Defines the limit of MAC address learned on the applied PVC when it is in the RFC 2684 bridged mode. It is noted that each xDSL line port allows maximum of 8 MAC addresses to be learned. **Type:** Mandatory **Default value:** 1 **Valid values:** 1 ~ 8
Service Type	askeyVcVlan	.1.3.6.1.4.1.3646.1300.2.11.1.1.9	vcVlanEntryServiceType	This specifies the service type to

Table F-108 The mapping of TV Channel Profile related parameters and their corresponding OID

Parameters	MIB File	OID-number	OID-Name	Task
Profile ID	askeyMcast	.1.3.6.1.4.1.3646.1300.2.5.1.2.1.1	mProfileId	This specifies the multicast channel profile identifier. **Type:** Mandatory **Valid values:**
Name	askeyMcast	.1.3.6.1.4.1.3646.1300.2.5.1.2.1.2	mProfileName	This specifies the multicast channel profile name **Type:** Mandatory **Valid values:** String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').
TV Channel IP Address	askeyMcast	.1.3.6.1.4.1.3646.1300.2.5.1.2.1.3	mProfileIpAddr	This specifies class D IP address of the multicast stream. **Type:** Mandatory **Valid values:** 224.0.1.0 ~ 239.255.255.255
Priority Queue	askeyMcast	.1.3.6.1.4.1.3646.1300.2.5.1.2.1.5	mProfilePriority	Defines the downstream forwarding priority of the multicast stream. **Type:** Mandatory **Valid values:** low(0)| medium(1)| high(2)| highest(3)
Downstream Rate (Kbps)	askeyMcast	.1.3.6.1.4.1.3646.1300.2.5.1.2.1.4	mProfileRate	Defines the downstream transmission rate limit of multicast stream. **Type:** Mandatory **Valid values:** 0 ~ 29984 kbps

Table F-109 The mapping of Multicast Service Profile related parameters and their corresponding OID

Parameters	MIB File	OID-number	OID-Name	Task
Name	askeyMcast	.1.3.6.1.4.1.3646.1300.2.5.3.2.1.1	mcastServiceProfileName	This specifies the multicast service profile name **Type:** Mandatory **Valid values:** String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').
TV Channel	askeyMcast	.1.3.6.1.4.1.3646.1300.2.5.3.2.1.2	mcastServiceProfileBitMap	This specifies the multicast group profile name. Each service profile may book a set of 800 program at most , we use 100 octets to save what it books. **Type:** Mandatory **Valid values:** String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').

Table F-110 The mapping of Multicast Channel Configuration related parameters and their corresponding OID

Parameters	MIB File	OID-number	OID-Name	Task
VPI	askeyMcast	.1.3.6.1.4.1.3646.1300.2.5.2.1.1	mConfigVpi	Defines the VPI (Virtual Path Identifier) value for multicast channel. **Type:** Mandatory **Default value:** 8 **Valid values:** 0 ~ 255
VCI	askeyMcast	.1.3.6.1.4.1.3646.1300.2.5.2.1.2	mConfigVci	Defines the VCI (Virtual Channel Identifier) value for multicast channel.. **Type:** Mandatory **Default value:** 35 **Valid values:** 1 ~ 65535 (1 ~ 31 are reserved)
VLAN ID	askeyMcast	.1.3.6.1.4.1.3646.1300.2.5.2.1.3	mConfigVlanId	This specifies the VLAN-ID value of VLAN-tag to be added to the upstream IGMP report packets on the PVC. **Type:** Mandatory **Default value:** 1 **Valid values:** 1 ~ 4093
Administrative State	askeyMcast	.1.3.6.1.4.1.3646.1300.2.5.2.1.6	mConfigRowStatus	This specifies the desired state of the interface. **Type:** Mandatory **Valid values:** Enable | Disable
Multicast Service Profile	askeyMcast	.1.3.6.1.4.1.3646.1300.2.5.2.1.5	mConfigServiceProfile	This specifies the multicast service profile. Internally, each line may book 256 program set, we use 256 bits to save what they booked **Type:** Mandatory **Valid values:** String of up to 32 characters ('0'~'9', 'A'~'Z', 'a'~'z', '-', '_', '.', '@').
Channel Limit: Channel Limit	askeyMcast	.1.3.6.1.4.1.3646.1300.2.5.2.1.4	mConfigStreamNum	This specifies the allowed number of multicast streams to be forwarded via the VC-to-VLAN connection. **Type:** Mandatory **Valid values:** 1~ 5

Table F-111 The mapping of IGMP snooping/IGMP proxy Configuration related parameters and their corresponding OID

Parameters	MIB File	OID-number	OID-Name	Task
Disable IGMP snooping and IGMP proxy / Enable IGMP snooping / Enable IGMP proxy	askeySystemMib	.1.3.6.1.4.1.3646.1300.2.1.16.3	askeySystemManagementIgmp	These three parameters correspond to the same OID "askeySystemManagementIgmp" As their names imply, the operator selects one among them. **Type:** Mandatory **Valid values:** enableIgmpsnoop(1), enableIgmpproxy(2),disableIgmp(3)
Enable IGMP snooping: MAC Aging Time (seconds)	askeyIgmpSnoop	.1.3.6.1.4.1.3646.1300.2.3.1.3	askeyMcastAgingTime	Defines the IGMP snooping aging time which the timeout period in seconds for aging out Multicast Groups dynamically learned with IGMP Snooping. Note that aging operates on a per interface per VLAN per multicast group basis. This interval is also used to age out ports that have received IGMP Router Query PDUs on a per VLAN basis. **Type:** Mandatory **Valid values:** 30 ~ 3600 (sec.) **Default value:** 300 (sec.)
Enable IGMP proxy: Robustness(Query Retry)	askeyIGMPproxy	.1.3.6.1.4.1.3646.1300.2.14.2	askeyIgmpProxyRobust	Defines the retry count for the NE to re-send IGMP Query message to the subscriber in the case that the subscriber does not respond. After sending "retry count" of IGMP Query messages, if he NE does not receive any response, the NE will treat the subscriber as 'leave' and hence will stop forwarding the multicast stream to the particular link. **Type:** Mandatory **Valid values:** 1 ~ 5 **Default value:** 3 (count.)
Enable IGMP proxy: Query Response Interval	askeyIGMPproxy	.1.3.6.1.4.1.3646.1300.2.14.3	askeyIgmpProxyQueryInterval	This specifies the period between the NE send 2 consecutive IGMP queries to the xDSL subscriber. **Type:** Mandatory **Valid values:** 1 ~ 30 (sec.) **Default value:** 30 (sec.)
Enable IGMP proxy: Immediate Leave	askeyIGMPproxy	.1.3.6.1.4.1.3646.1300.2.14.4	askeyIgmpProxyImmediatedLeaveEnable	This specifies to enable the "immediate leave" function or not.. **Type:** Mandatory **Valid values:** Enable | Disable

Table F-112 The mapping of Trunk CoS Mapping and DSCP Re-mapping related parameters and their corresponding OID

Parameters	MIB File	OID-number	OID-Name	Task
User Priority	askeySystemMib	.1.3.6.1.4.1.3646.1300.2.1.18.1.1.1	askeyCosQueueMapping8021p	This indicates the 802.1p user priority as configured in the VC-to-VLAN configuration **Type:** Mandatory **Valid values:** 0~7
Queue (Traffic Class)	askeySystemMib	.1.3.6.1.4.1.3646.1300.2.1.18.1.1.2	askeyCosQueueIndex	For a specified User Priority (802.1p) value of received Ethernet packet, this indicates the corresponding CoS queue on the uplink trunk GE port **Type:** Mandatory **Valid values:** 1~8
DiffServ Code Point (DSCP)	ASKEY-QOS-MIB	.1.3.6.1.4.1.3646.1300.2.16.2.2.1.1	diffServDSCP	For a specified User Priority (802.1p) value of received subscriber’s Ethernet packet, this indicates the new DSCP value on the subscriber’s IP frame to be forwarded via the uplink trunk GE port. **Type:** Mandatory **Valid values:** be (0) , af11 (1) , af12 (2) , af13 (3) , af21 (4) , af22 (5) , af23 (6) , af31 (7) , af32 (8) , af33 (9) , af41 (10) , af42 (11) , af43 (12) , ef (13)
Administrative State	ASKEY-QOS-MIB	.1.3.6.1.4.1.3646.1300.2.16.2.1	diffServAdminStatus	Enable or disable the DSCP Re-mapping function. **Type:** Mandatory **Valid values:** Enable(0) | Disable(2)