

Case Communications

XLR N5000

Command Line Interface (CLI)

User's Guide Rev 1.0



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Contact

Case Communications Ltd

Tel. : 0845 643 0800

E-mail : support@casecomms.com

Homepage : <http://www.casecomms.com>

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APPENDIX A. Pin Assignment of Telco Connectors

1 Conventions

This document uses the following conventions:

convention	description
boldface font	Commands, command options, and keywords are in boldface .
< <i>italic</i> >	Arguments for which you supply values are in <i>italics</i> and angle brackets.
[]	Elements in square brackets are optional.
{ x y z }	Alternative keywords are grouped in braces and separated by vertical bars
< x y z >	Alternative values are grouped in angle brackets and separated by vertical bars.
screen font	sessions and information the system displays are in screen font.
boldface screen font	Information you must enter is in boldface screen font.
<i>italic screen font</i>	Arguments for which you supply values are in italic screen font.
^	^ The symbol ^ represents the key labeled Control—for example, the key combination ^D in a screen display means hold down the Control key while you press the D key.
#	A pound sign (#) at the beginning of a line of code indicates a comment line.

Notes use the following conventions:

> Note <	Means <i>reader take note</i> . Notes contain helpful suggestions or references to material not covered in the publication.
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2 Command-Line Interfaces

This section describes command modes and functions that allow you to configure and manage the XLR N5000 using the CLI.

2.1 Accessing the CLI

You can access the CLI from a console terminal connected to “CONSOLE” port or through a telnet session.

After connecting through the console port or a telnet session, you see this display (You may have to press Enter key more than once to allow the console to synchronize with the device.).

[Example 2-1] logging into the CLI

```
Enter password: (Press Enter key)
N5000>
```

To access the CLI, enter the password for the CLI at the “Enter Password:” prompt (press the enter key after typing password).

> **Note** <

- The password is case sensitive and password characters are not echoed to the terminal.
- The default login password is “**password**”.

2.2 Accessing the Privileged Mode

The CLI has two modes of operation: normal and privileged. Both are password-protected.

Use normal-mode commands for everyday system monitoring. Use privileged commands for system configuration and basic troubleshooting.

After you log in, the system enters normal mode, which gives you access to normal-mode commands only. You can enter privileged mode by entering the **enable** command followed by the admin password. Privileged mode is indicated by the word “enable” in the system prompt. To return to normal mode, enter the **exit** command at the prompt.

[Example 2-2] accessing the privileged mode

```
N5000> enable
Enter password: (Press Enter key)
N5000> (enable)
```

> **Note** <

- The admin password is case sensitive and password characters are not echoed to the terminal.
- The default password for privileged mode is “**password**”.

Using Command-Line Processing

CLI commands are not case sensitive. You can abbreviate commands and parameters as long as they contain enough letters to be different from any other currently available commands or parameters. You can scroll through the last 20 commands stored in the history buffer and enter or edit the command at the prompt.

Keystrokes

keystroke	description
Ctrl-A	Jumps to the first character of the command line.
Ctrl-B or the left arrow key	Moves the cursor back one character.
Ctrl-C	Escapes and terminates prompts and tasks.
Ctrl-D	Deletes the character at the cursor.
Ctrl-E	Jumps to the end of the current command line.
Ctrl-F or the right arrow key	Moves the cursor forward one character.
Ctrl-K	Deletes from the cursor to the end of the command line.
Ctrl-L	Clears the screen.
Ctrl-N or the down arrow key	Enters next command line in the history buffer.
Ctrl-P or the up arrow key	Enters previous command line in the history buffer.
Ctrl-U	Deletes from the cursor to the beginning of the command line.
Ctrl-W	Deletes the last word typed.
Delete key or Backspace key	Erases a mistake when entering a command; reenter the command after using this key.

> **Note** <

- Arrow keys are only supported on terminals that are ANSI compatible, such as the VT100.

2.4 Using History Substitution

Commands that you enter during each terminal session are stored in a history buffer, which stores the last 20 commands you entered during a terminal session. History substitution allows you to access these commands without retyping them by using special abbreviated commands.

History Substitution Commands

command	description
!!	Repeats the most recent command.
!n	Repeats command n.

[Example 2-3] repeating command 2

```
N5000> history
1 help
2 history
N5000> !2

history
1 help
2 history
3 history

N5000>
```

2.5 Using Command Completion Features

Using Keyword Lookup

Use the keyword-lookup function to display a list of valid keywords and arguments for a command. To display the matches, enter a space after the last parameter and press **Tab** twice. (If only one matches, press **Tab** once to display)

Using Partial Keyword Lookup

Use the partial keyword-lookup function to display a list of commands that begin with a specific set of characters. To display the matches, press **Tab** twice immediately after the last parameter. (If only one matches, press **Tab** once to display)

Using Command Completion

Use the command completion function to complete a command or keyword. When you enter a unique partial character string and press **Tab**, the system completes the command or keyword on the command line. For example, if you enter **co** at the privileged prompt and press **Tab**, the system completes the command as **copy** because it is the only command that matches the criteria.

If no completion can be done, no action is carried out and the system returns to the prompt and the last command. The cursor appears immediately after the keyword, allowing you to enter additional information.

2.6 Getting Command Help with Question Mark

At any time during a CLI session, you can display a help message by typing a question mark

(?) at the prompt.

You can use `command.syntax help` to display a list of command, keyword, or argument options that are available for the command that you have entered. To use `command.syntax help`, enter a question mark (?) in the place of a keyword or argument, *including* a space before the question mark. The CLI will display a list of available command options.

2.7 Abbreviating Commands

You can abbreviate commands by typing the minimum number of characters that uniquely match a command. For example, you can type **sh** to execute the **show** command because the characters “sh” are unique to that command.

If you do not type enough unique characters, the CLI display an “Ambiguous command” error message (in this case, because the CLI cannot differentiate between the **exit** and **enable** commands if you type the character “e”)

[Example 2-4] abbreviating commands

```
N5000> e
Error: Ambiguous command
N5000> en
Enter password:
```

3 System Management

This section describes the commands for managing and displaying system-rated information.

3.1 set system

To configure system-rated information.

Usage

```

set system hostname    <host name>
set system description <description>
set system passwd
set system adminpasswd
set system time       <day_of_week> <mm/dd/yyyy> <hh:mm:ss>
set system bootconfig { config0 | config1 }
set system bootimage  { image0 | image1 }
set system baudrate   <baudrate>
set system auto-logout <timeout>
  
```

Arguments

keyword	Description
hostname	Name for the system. Used in CLI prompt and in SNMP as sysName. <host name> : A case.sensitive string of 1 - 15 characters (not including tabs, spaces, double quotes(""))
description	Description for the system. <description> : A case.sensitive string of 1 - 31 characters (not including tabs, spaces, double quotes(""))
passwd	Configures a new login password. The password must be a case. sensitive string of 5 . 10 characters, not including spaces, tabs or any of {,;,\^*''''.&><}
adminpasswd	Configures a new administrative password. The password must be a case. sensitive string of 5 . 10 characters, not including spaces, tabs or any of {,;,\^*''''.&><}

time	The system date and time. Used in system log as time field.
bootconfig	Startup configuration file of system
bootimage	Firmware file that will be loaded when the system reboots.
baudrate	Baud rate of the console port. Valid rate are 9600, 19200 and 38400. The default is 38400.
auto-logout	Number of minutes until the system disconnects an idle session or telnet session automatically. <timeout>: Valid values are 0 to 10,000 minutes. The default value is 20 minutes. Setting the value to 0 disables the automatic disconnection of sessions.

> **Note** <

- ? A change to password takes effect after re-login to the CLI.
- ? A change to auto-logout takes effect immediately.
- ? A change to baudrate takes effect after rebooting.

Confirmation

See also, "[show system](#)", "[restart system](#)".

Examples

Example 3-1] changing host name

```
N5000> (enable) set system hostname Branch-1
Branch-1> (enable)
```

[Example 3-2] changing description

```
N5000> (enable) set system description Casetest
N5000> (enable)
```

[Example 3-3] setting system time

```
N5000> (enable) set system time fri 09/22/2006 13:08:30
Fri Sep 22 13:08:30 2006
N5000> (enable)
```

3.2 show system

To display system-rated information.

Usage

show system

Confirmation

See also, "[set system](#)", "[restart s ystem](#)".

Examples

[Example 3-4] displaying the system information

```
N5000> (enable) show system
-----
System Information
-----
Model Name           XLR N5000
Host Name            XLR N5000
Description          XLR N5000
Current Time         Fri Dec 14 18:00:52 2007
Uptime (d,h:m:s)    0,0:6:0
Boot Configuration   config0
Current Configuration config0
Boot Firmware        image0
Current Firmware     image0
Auto Logout          20 minute(s)
Baudrate             38400
```

Output Fields

keyword	description
Model Name	Device model name of this system.
Host Name	Name of this system.
Description	Description of this system.
Current Time	Current time of day in the system clock.
Uptime (d, h:m:s)	Number of uninterrupted days, hours, minutes, and seconds the system has been up and running.
Boot Configuration	Configuration area that will be used in the next booting.
Current Configuration	Configuration area that has been used by now.
Boot Firmware	Firmware file that will be loaded in the next booting.
Current Firmware	Firmware file that has been used by now.
Auto Logout	Number of minutes until the system disconnects an idle session or telnet session automatically
Baudrate	Baud rate of the console port.

3.3 restart system

To reboot the system.

Usage

restart system

Confirmation

See also, "[set system](#)", "[show system](#)".

Examples

[Example 3-5] restarting the system

```
N5000> (enable) restart system
Are you sure to restart WHOLE system (y/n) [n]? y
```

4 Module Management

This section describes a list of commands that configure and display generic information about modules in the system.

The XLR N5000 can have up to 16 modules and each module can operate independently to provide various kinds of service.

4.1 set module

To configure modules in the system.

Usage

set module <module nums> **description** <description>

set module <module nums> **devicetype** {co|rt}

set module <module nums> **devicemode** <binding|separate>

Arguments

keyword	Description
<module nums>	Numbers of module <module nums> : 1...16, all You can enter multiple modules, each separated by commas. You can also enter consecutive modules, separated by dash. If you enter all keyword in this argument, all module are set to the same value that you supply. For example, - set module 1,2,16 - set module 3-5,7-15 - set module 1,3,5-9,12,14-16 - set module all
description	Description for the module. <description> : A case.sensitive string of 1 - 23 characters (not including tabs, spaces, double quotes(""))
devicetype	Device Type of the Module co : The module operates as a "Central Office" device.
rt : The module operates as a "Remote Terminal" device.	
devicemode	Device Mode of the Module It is effective only in the EFMC module. binding : all PME's are bound to "s0" port. separate : PME-0 and 1 are bound to "s0" port. PME-2 and 3 are bound to "s1" port.

> Note <

The new configuration is effective only for the modules, which are running currently.

Confirmation

See also, "[show module](#)", "[restart module](#)"

Examples

[Example 4-1] configuring description of module 2

```
N5000> (enable) set module 2 description Case-office-12
N5000> (enable)
```

[Example 4-2] configuring device type of all module to a Central Office device.

```
N5000> (enable) set module all devicetype co
N5000> (enable)
```

4.2 show module

To display information of modules in the system.

Usage

show module <module nums>

Arguments

keyword	description
<module nums>	Numbers of module 1...16, all You can enter multiple modules, each separated by commas. You can also enter consecutive modules, separated by dash. If you enter all keyword in this argument, information of all

module are displayed.
For example,

- show module 1,2,16
- show module 3-5,7-15
- show module 1,3,5-9,12,14-16
- show module all

> Note <

This command shows the configuration and status of the modules running currently.

Confirmation

See also, [“set module”](#), [“restart module”](#).

Examples

[Example 4-3] displaying information of all modules

N500 (enable) show Module All					
num	dt	dm	description	Type firmware	uptime
4	co	se	N-500_line_Module	0x34 efmc 1.0.0.bin	0, 00:17:57
5	co	se	N-500_line_Module	0x34 efmc 1.0.0.bin	0, 00:17:59
7	co	se	N-500_line_Module	0x34 efmc 1.0.0.bin	0, 00:18:00

Output Fields

keyword	description
num	Module number.
dt	Operational mode.
dm	Binding mode or Separate mode
description	Description.
type	Type of module. 0x34 : EFMC device
firmware	Boot firmware name and version.
uptime	Elapsed time since the module has been up.

4.3 restart module

To restart module.

Usage

restart module <module nums>

Arguments

keyword	description
<module nums>	<p>Numbers of module 1...16, all</p> <p>You can enter multiple modules, each separated by commas.</p> <p>You can also enter consecutive modules, separated by dash.</p> <p>If you enter all keyword in this argument, all module will restart.</p> <p>For example,</p> <ul style="list-style-type: none">- restart module 1,2,16- restart module 3-5,7-15- restart module 1,3,5-9,12,14-16- restart module all

Confirmation

See also, ["set module"](#), ["show module"](#).

Examples

[Example 4-4] restarting module 3, 4, 5 and 8.

```
N5000> (enable) restart module 3-5,8
N5000> (enable)
```

5 Interface Management

This section describes the commands for managing and displaying network interface information.

5.1 set interface

To configure interface.

Usage

set interface m1 ip *<ip addr>* *<netmask>* [*<broadcast>*]

set interface m1 gw *<ip addr>*

Arguments

keyword	Description
m1	The XLR N5000 has one interface, m1. Multiple interfaces will be supported in the future.
ip	IP address to be assigned to the interface, in-dot-decimal notation. <i><ip></i> : IP address. <i><netmask></i> : subnet mask. (Optional) <i><broadcast></i> : broadcast address.
gw	Default gateway IP address, in-dot-decimal notation. <i><ip addr></i> : IP address of a default gateway.

Confirmation

See also, "[show interface](#)"

Examples

[Example 5-1] assigning the IP address to the interface m1

```
N5000> (enable) set interface m1 ip 192.168.0.21 255.255.255.0
N5000> (enable)
```

5.2 show interface

To display interface information.

Usage

show interface

Confirmation

See also, "[set interface](#)"

Examples

[Example 5-2] displaying information of the interface m1

```
N5000> (enable) show interface
-----
m1 (00:d0:04:01:ff:21)
ip 192.168.0.21 netmask 255.255.255.0 broadcast 192.168.0.255
gw 192.168.0.254
-----
N5000> (enable)
```

Output Fields

keyword	description
m1 ()	Interface name and MAC address.
ip	IP address of this interface.
gw	IP address of default gateway. If this interface does not have default gateway, this field is not printed.

6 PME Management

This section describes a list of commands that configure and display information for 2BASE-TL Physical Medium Entity (PME).

Each XLR N5000 2BASE-TL module has a maximum of four 2BASE-TL PMEs and supports an aggregation of four bonded PMEs. These PMEs are bonded to the 2BASE-TL port, s0.

6.1 set pme

To configure PMEs of 2BASE-TL modules.

Usage

set pme	<module nums/pme nums>	annex	{ a b }
set pme	<module nums/pme nums>	maxrate	<rate>
set pme	<module nums/pme nums>	minrate	<rate>
set pme	<module nums/pme nums>	targetmargin	<margin>
set pme	<module nums/pme nums>	powerbackoff	{auto <value>}

Arguments

keyword	Description
<module nums/pme nums>	Module numbers and PME numbers must be separated with a slash character, "/". Numbers of module : 1...16, all You can enter multiple modules, each separated by commas. You can also enter consecutive modules, separated by dash. If you enter all keyword in this argument, all module are set to the same value that you supply. Numbers of PME : 1...3, all You can enter multiple PMEs, each separated by commas. You can also enter consecutive PMEs, separated by dash. If you enter all keyword in this argument, all PME in the module are set to the same value that you supply.
annex	Transmission type of PME. a : North American specific requirements. b : European specific requirements.
maxrate	The maximum link-rate of PME. If it is less or equal than minrate , it is set to minrate automatically. <rate> : 192~5696 [Kbps]
minrate	The minimum line-rate of PME. If it is greater or equal than maxrate , it is set to maxrate automatically. <rate> : 192~5696 [Kbps]
targetmargin	The target noise margin of PME. <margin>: 0~21 [dB]
powerbackoff	The power-backoff mode and value. auto : The power-backoff value is determined automatically. <value> : The power-backoff value is forced to be set by user. 0~9 [dB]

Confirmation

See also, "[show pme](#)", "[restart pme](#)".

> Note <

- The new configuration is effective only for the modules which are running currently.
- To apply the changed configuration, the PME must be restarted.

Examples

[Example 6-1] configuring data rate of the PME1 and 2 in the module 7

```
N5000> (enable) set      pme 7/1,2 minrate 4096
N5000> (enable) set      pme 7/1,2 maxrate 5696
N5000> (enable) restart pme 7/1,2
N5000> (enable)
```

[Example 6-2] configuring transmission type of all PME in all module.

```
N5000> (enable) set      pme all/all annex b
N5000> (enable) restart pme all/all
N5000> (enable)
```

[Example 6-3] configuring power back-off of PME 0,1,2 in the module 3

```
N5000> (enable) set pme 3/0-2 powerbackoff 3
N5000> (enable) set pme 3/0-2 powerbackoff auto
N5000> (enable) restart pme 3/0-2
N5000> (enable)
```

[Example 6-4] configuring target noise margin of the PME1,2,3 in module 7,10

```
N5000> (enable) set pme 7,10/1-3 targetmargin 6
N5000> (enable) restart pme 7,10/1-3
N5000> (enable)
```

6.2 show pme

To display information about 2BASE-TL PME's.

Usage

show pme <module nums/pme nums>

Arguments

keyword	description
<module nums/pme nums>	<p>Module numbers and PME numbers must be separated with a slash character, "/".</p> <p>Numbers of module : 1...16, all You can enter multiple modules, each separated by commas.</p> <p>You can also enter consecutive modules, separated by dash. If you enter all keyword in this argument, all module are selected. Numbers of PME : 1...3, all</p> <p>You can enter multiple PME's, each separated by commas. You can also enter consecutive PME's, separated by dash. If you enter all keyword in this argument, all PME in the module are selected.</p>

>Note <

This command shows the configuration and status of the modules running currently.

Confirmation

See also, ["set pme"](#), ["restart pme"](#).

Example

```
N5000> (enable) show pme all / all
```

M/p	anx	minr	maxr	mgn	pbof	state	rate	snr	lat	pam	txpw	span	uptime
7/0	B/G	192	5696	3	auto	data	5696	18	2	32	13.5	0	0.00:01:38
7/1	B/G	192	5696	3	auto	data	5696	20	0	32	7.5	0	0.00:06:03
7/2	B/G	192	5696	3	auto	data	5696	20	0	32	8.5	0	0.00:01:04
7/3	B/G	192	5696	3	auto	data	5696	19	0	32	7.5	0	0, 00:01:14
13/0	B/G	192	5696	3	auto	ready	-	-	0	-			
13/1	B/G	192	5696	3	auto	idle	-	-	0	-			
13/2	B/G	192	5696	3	auto	idle	-	-	0	-			
13/3	B/G	192	5696	3	auto	idle	-	-	0	-			

Output Fields

keyword	description
m/p	module number/PME number
anx	DSL transmission mode A/F, B/G
minr	Minimum link-rate 192 ~ 5696 [Kbps]
max	Maximum link-rate 192 ~ 5696 [Kbps]
mgn	Target Noise Margin 0 ~ 21 [dB]
pbof	Power back-off value. auto , 0 ~ 9 [dB]
state	state of DSL modem. idle : it is not ready to handshake.

ready : it is ready to handshake.
init : it is being initialized.
data : it is ready to transfer data.

rate	Current link-rate Minimum Rate < rate < Maximum Rate
snr	Current SNR margin
lat	Current loop attenuation
pam	Negotiated constellation 16 : TC-PAM16 32 : TC-PAM32
txpw	Current transmit power.
span uptime	Elapsed time since the span has been up.

>Note <

This command shows the configuration and status of the modules currently running.

When the device is used in **rt** operational mode, the PME configuration of the rt device displays with “-“, since the co device supply these values to rt device.

6.3 restart pme

To restart the 2BASE-TL PMEs

Usage

restart pme <module nums/pme nums>

Arguments

keyword	description
<module nums/pme nums>	<p>Module numbers and PME numbers must be separated with a slash character, "/".</p> <p>Numbers of module : 1...16, all</p> <p>You can enter multiple modules, each separated by commas.</p> <p>You can also enter consecutive modules, separated by dash.</p> <p>If you enter all keyword in this argument, all module are selected.</p>

Numbers of PME : 1...3, all
 You can enter multiple PMEs, each separated by commas.
 You can also enter consecutive PMEs, separated by dash.
 If you enter **all** keyword in this argument, all PME in the module are selected.

Confirmation

See also, "[set pme](#)", "[show pme](#)".

Examples

[Example 6-7] restarting PME 0,1 in the module 7.

```
N5000> (enable) restart pme 7/0,1
N5000> (enable)
```

[Example 6-8] restarting all PME in the module 7 and 13.

```
N5000> (enable) restart pme 7,13/all
N5000> (enable)
```

7 Port Management

This section describes a list of commands that configure and display information about ports which have generic Ethernet attributes. Their physical layer may have any type of transmission technology: 2BASE-TL (using telephone wires), 100/1000BASE-X using fiber optic lines as well as original 10/100/1000BASE-T using twisted pair coppers.,

Each module has several ports uniquely identified by its name. All commands related the port such as “port”, “vlan” or “qos” can be accessed by its name. [Table 7-1] shows all port names currently supported.

[Table 7-1] Port Names

port name	description	related module
u0	uplink 0	module 0
u1	uplink 1	module 0
e0	ethernet port 0	EFMC module
s0	subscriber port 0	EFMC module
s1	subscriber port 1 (separate mode)	EFMC module

7.1 set port

Usage

set port *<module nums/port names>* **pvid** *<pvid>*

set port *<module nums/port names>* **type** { **access** | **trunk** }

set port *<module nums/port names>* **priority** *<priority>*

set port *<module nums /port names>* **classifier** { **port** | **dot1p** | **dscp** }

set port *<module nums/port names>* **linkmode** { **auto** | **full** | **half** } [{ **10** | **100** | **1G** }]

set port *<module nums/port names>* **flowcontrol** { **enable** | **disable** }

set port *<module nums/port names>* **timer_tick** { **8** | **32** | **128** | **512** }

set port *<module nums/port names>* **sq_tokens** *<sq0>* *<sq1>* *<sq2>* *<sq3>*

set port *<module nums/port names>* **wq_tokens** *<wq0>* *<wq1>* *<wq2>* *<wq3>*

Arguments

keyword	Description
<code><module nums /port names></code>	<p>Module numbers and Port names must be separated with a slash character, “/”.</p> <p>Numbers of module : 1...16, all</p> <p>You can enter multiple modules, each separated by commas. You can also enter consecutive modules, separated by dash. If you enter all keyword in this argument, all module are selected.</p> <p>Names of Port : Refer to [Table 7-1]</p> <p>You can enter multiple Ports, each separated by commas.</p> <p>If you enter all keyword in this argument, all port in the module are selected.</p>
<code>pvid</code>	<p>Default VLAN ID of the port.</p> <p>The default value is 1.</p> <p><code><vid></code> : An integer in the range of 1 ~ 4094.</p>
<code>type</code>	<p>It determines how the port to process the VLAN tag of incoming and outgoing packets.</p> <p>access : When the port receives an untagged packet, it adds a PVID to the packet. And it receives a tagged packet, it replaces an original VLAN ID with a PVID. All packet leaving from the access port are untagged.</p> <p>trunk : When the port receives an untagged packet, it adds a PVID to the packet. And it receives a tagged packet, it remains the original VLAN tag. All packet leaving from the trunk port are tagged. But if the VLAN ID of the packet is equal to the PVID of the egress port, the tag is removed.</p>
<code>priority</code>	<p>The Priority of the Port.</p> <p>It is used as a QoS classifier when the “classifier” is set to “port”.</p> <p><code><priority></code> : An integer in the range 0 ~ 7.</p>
<code>classifier</code>	Quality of Service (QoS) Classifier.
<p>If a frame is received by the port, priority of the frame is determined by this field.</p> <p>port: use the port’s priority.</p> <p>dot1p: use the priority field in the VLAN TAG..</p> <p>dscp : use the Ipv4 Type of Service (TOS)/DiffServ field.</p>	
<code>linkmode</code>	<p>The link mode of the port.</p> <p>To configure the link mode : auto, full, half</p> <p>To configure the link speed : 10, 100, 1G</p> <p>If you enter auto, you don’t need to supply { 10 100 1G }</p> <p>*It doesn’t effective for the subscriber port. (ex, s0 or s1).</p>
<code>flowcontrol</code>	<p>Enable or Disable flow control back pressure on this port.</p> <p>*It doesn’t effective for the subscriber port. (ex, s0 or s1)</p>

timer_tick	For every “timer_tick” count down, tokens will be added to the token bucket of the queue controller. Its unit is micro-second. For more detail, refer to “Chapter 10 QoS Management” .
sq_tokens	The number of tokens will be added to each strict priority queue every “timer_tick”. For more detail, refer to “Chapter 10 QoS Management” .
wq_tokens	The number of tokens will be added to each weight queue every “timer_tick”. For more detail, refer to “Chapter 10 QoS Management” .

> Note <

The new configuration is effective only for the modules currently running.

Confirmation

See also, [“show port”](#)

Examples

[Example 7-1] configuring the PVID of s0,e0 in the module 2 to 10.

```
N5000> (enable) set port 2/s0,e0 pvid 10
N5000> (enable)
```

[Example 7-2] configuring the type of e0 in all module to trunk.

```
N5000> (enable) set port all/e0 type trunk
```

```
N5000> (enable)
```

[Example 7-3] configuring the priority of u0, u1 in the module 0 to 7.

```
N5000> (enable) set port 0/u0,u1 priority 7
N5000> (enable)
```

[Example 7-4] configuring the classifier of all port to dot1p.

```
N5000> (enable) set port all/all classifier dot1p
N5000> (enable)
```

7.2 show port

To display information of ports.

Usage

show port <module nums/port names>

Arguments

keyword	description
<module nums /port names>	<p>Module numbers and Port names must be separated with a slash character, “/”.</p> <p>Numbers of module : 1...16, all</p> <p>You can enter multiple modules, each separated by commas. You can also enter consecutive modules, separated by dash. If you enter all keyword in this argument, all module are selected.</p> <p>Names of Port : Refer to [Table 7-1]</p> <p>You can enter multiple Ports, each separated by commas.</p> <p>If you enter all keyword in this argument, all port in the module are selected.</p>

> Note <

This command shows the configuration and status of the modules running currently.

Confirmation

See also, [“set port”](#).

Examples

[Example 7-5] displaying the configuration and status of all port.

```
N5000> (enable) show port all/all
-----
m/p typ  pvid class pp tim SQ0 SQ1 SQ2 SQ3 WQ0 WQ1 WQ2 WQ3 lkmod fc state
-----
0/u0 acc  1  port  0  -  -  -  -  -  -  -  -  -  auto d 100/F
0/u1 acc  1  port  0  -  -  -  -  -  -  -  -  -  auto d down
5/s0 acc  1  port  0  8  0  0  0  0  1  1  1  1  -  -  down
5/s1 acc  1  port  0  8  0  0  0  0  1  1  1  1  -  -  down
5/e0 acc  1  port  0  8  0  0  0  0  1  1  1  1  auto d down
9/s0 acc  1  port  0  8  0  0  0  0  1  1  1  1  -  - 11392
9/s1 acc  1  port  0  8  0  0  0  0  1  1  1  1  -  -  down
9/e0 acc  1  port  0  8  0  0  0  0  1  1  1  1  auto d down
-----
```

Output Fields

keyword	description
Typ	Access or Trunk
pvid	The PVID of this port.
class	The classifier of this port.
Pp	Port priority.
Tim	Timer Tick.
SQ0...3	The number of tokens assigned to each Strict Queue.
WQ0...3	The number of tokens assigned to each Weight Queue.
lkmod	The link mode of this port
fc	The flow control mode of this port.
state	The current state of this port. The state of "s0" port is sum of link rates of all PME.

8 EFMOAM Management

This section describes a list of commands that configure and display information about OAM (Operation, Administration and Maintenance) defined in the EFM (Ethernet in the First Mile) Standards.

8.1 set efmoam

To configure information about EFM OAM.

Usage

set efmoam <module nums> { **enable** | **disable** }

Arguments

keyword	Description
<module nums>	Numbers of module : 1...16, all You can enter multiple modules, each separated by commas. You can also enter consecutive modules, separated by dash. If you enter all keyword in this argument, all module are selected.
enable	Enable the EFM OAM function. The module performs the discovery function and periodically generates the Information PDU and checks the received Information PDU.
disable	Disable the EFM OAM function.

> Note <

The new configuration is effective only for the modules, which are currently running.

Confirmation

See also, "[show efmoam](#)".

Examples

[Example 8-1] enabling EFM OAM function of Module 3 and 7.

```
N5000> (enable) set efmoam 3,7 enable
```

```
N5000> (enable)
```

[Example 8-2] disabling EFM OAM function of all module.

```
N5000> (enable) set efmoam all disable
N5000> (enable)
```

8.2 show efmoam

To display information about EFM OAM.

Usage

show efmoam <module nums>

Arguments

keyword	Description
<module nums>	Numbers of module : 1...16, all You can enter multiple modules, each separated by commas. You can also enter consecutive modules, separated by dash. If you enter all keyword in this argument, all module are selected.

>Note <

This command shows the configuration and status of the modules currently running.

Confirmation

See also, "[set efmoam](#)".

Examples

[Example 8-3] displaying information of EMF OAM of all module.

```
N5000> (enable) show efmoam all
-----
m/p      admin state op mode   discovery state  parserstate  mux state
-----
5/s0     enabled   active  linkFault  forward      forward
5/s1     enabled   active  linkFault  forward      forward
9/s0     enabled   active  sendAny    forward      forward
9/S1     enabled   active  linkFault  forward      forward
N5000> enable
```

Output Fields

keyword	description
m/p	Module number/Port name
admin state	Administrative state. enabled or disabled
op mode	Operational Mode. active : Mode of Central Office device. It performs the discovery function actively. passive : Mode of Remote Terminal device.
discovery state	Current discovery state. linkFault , passiveWait , sendLocal , sendLocalRemote , sendLocalRemoteOK or sendAny
parser state	Current state of the Parser. forward , loopback or discard .
mux state	Current state of the Multiplexer. forward or discard .

[Example 8-4] displaying information of EMF OAM of module 9.

```
N5000> (enable) show efmoam 9
-----
EFMOAM information of Module 9/s0
-----
Admin state                enabled
Station mode (local/remote) active/passive
Local discovery state      sendAny
Remote discovery state     stable
Keepalive interval (sec)   1
Keepalive timeout (sec)   10
PDU size                   1522
Parser state (local/remote) forward/forward
Multiplexer state (local/remote) forward/forward
Local MAC address          00:d0:84:ff:ff:09
Remote MAC address         00:d0:84:00:02:3f
-----
EFMOAM information of Module 9/s1
-----
Admin state                enabled
Station mode (local/remote) active/-
Local discovery state      linkFault
Remote discovery state     -
Keepalive interval (sec)   1
Keepalive timeout (sec)   10
PDU size                   1522
Parser state (local/remote) forward/-
Multiplexer state (local/remote) forward/-
Local MAC address          00:d0:84:ff:ff:09
Remote MAC address         -
-----
N5000> (enable)
```

Output Fields

keyword	description
Admin state	Administrative state. enabled or disabled
Station mode (local/remote)	Operational mode of local and remote. active or passive
Local discovery state	Current discovery state of local. linkFault , passiveWait , sendLocal , sendLocalRemote , sendLocalRemoteOK or sendAny
Remote discovery state	Current discovery state of remote. unsatisfied , discovering or stable
parser state (local/remote)	Current Parser state of local and remote. forward , loopback or discard .
Multiplexer state (local/remote)	Current Multiplexer state of local and remote. forward or discard .
Local MAC address	The MAC address of local
Remote MAC address	The MAC address of remote

9 VLAN Management

This section describes a list of commands that configure and displays information about IEEE 802.1Q VLAN

The XLR N5000 supports IEEE 802.1Q VLAN operating mode (also known as tagged-VLAN mode) and a full 4096 VLANs can be operated simultaneously in the system. Port-based VLAN's are also supported by assigning an internal VLAN which contains two or more ports together allowing them have the same group in the system.

Any port in the system can be set as either an, "access" or "trunk", port which determines how the port processes the VLAN tag of an incoming and outgoing packets. Refer to [Table 9-1].

[Table 9-1] Actions of port according to its type.

Type	Incoming Packet type	Ingress Port Action	Egress Port Action
Access	Untagged	adds a new TAG with a PVID	removes TAG unconditionally
	Tagged	replaces an original VLAN ID with a PVID	
Trunk	Untagged	adds a new TAG with a PVID	If the VLAN ID is equal to its PVID, removes a TAG. Otherwise, remains the TAG.
	Tagged	bypass	

9.1 set vlan

To configure information about 802.1Q VLANs.

Usage

set vlan <vid> **add** <module nums/port names>

set vlan <vid> **description** <description>

Arguments

keyword	Description
<vid>	IEEE 802.1Q VLAN identifier

An integer in the range 1 ~ 4094.	
add	Creation of new VLAN group. Addition of VLAN members to an existing VLAN group. Maximum number of VLAN groups are 256.
<module nums/port names>	Module numbers and Port names must be separated with a slash character, "/". Numbers of module : 1...16, all You can enter multiple modules, each separated by commas. You can also enter consecutive modules, separated by dash. If you enter all keyword in this argument, all module are selected. Names of Port : Refer to [Table 7-1] You can enter multiple Ports, each separated by commas. If you enter all keyword in this argument, all port in the module are selected.

description	Description of VLAN group. <description> : 1 ~ 31 consecutive characters.
--------------------	--

Confirmation

See also, "[clear vlan](#)", "[show vlan](#)".

Examples

[Example 9-1] adding the port e0,s0 in the module 2 to the VLAN group 10.

```
N5000> (enable) set vlan 10 add 2/e0,s0
N5000> (enable)
```

9.2 clear vlan

To remove members from the existing VLAN group.

Usage

clear vlan <vid> <module nums/port names>

Arguments

keyword	Description
<vid>	IEEE 802.1Q VLAN identifier An integer in the range 1 ~ 4094.
<module nums/port names>	Module numbers and Port names must be separated with a slash character, "/". Numbers of module : 1...16, all You can enter multiple modules, each separated by commas. You can also enter consecutive modules, separated by dash. If you enter all keyword in this argument, all module are selected. Names of Port : Refer to [Table 7-1] You can enter multiple Ports, each separated by commas. If you enter all keyword in this argument, all port in the module are selected.

Confirmation

See also, "[set vlan](#)", "[show vlan](#)".

Examples

[Example 9-2] removing the port s0 in the module 4 from the VLAN group 10.

```
N5000> (enable) clear vlan 10 4/s0
N5000> (enable)
```

9.3 show vlan

To display information about 802.1Q VLANs.

Usage

show vlan

Confirmation

See also, [“set vlan”](#), [“clear vlan”](#).

Output Fields

keyword	description
vid	VLAN Identifier.
description	Description of this VLAN group.
member(s)	Member(s) of this VLAN group.

>Note<

This command shows the VLAN members of the modules running currently.

Examples

[Example 9-3] displaying VLAN groups.

```
N5000> (enable) show vlan
-----
vid          description          member(s)
-----
1            default              0/u0 0/u1 3/s0 3/e0 7/s0 7/e0
                13/s0 13/e0
10           vlan-0010            3/s0 3/e0 7/s0 7/e0 13/s0 13/e0
-----
```

10 QoS Management

This section describes the QoS(Quality Of Service) features of the N5000, which meets real time application standards for Video and Voice streaming.

10.1 Quality of Service

The QoS allows you to control and classify the traffic coming into the device as well as enhancing the functionality to allow certain traffic types to be handled differently according to their need. There can be various requirements for QoS, for example Voice, Video, Database and Web Browsing services.

Voice Service

Voice service can be highly compressed using standards such as G.729 and can be sent using small amounts of bandwidth, but voice always requires consistent (constant) and predictable bandwidth. The reason is that voice tends to be sensitive to "latency" and "jitter". Herein "latency" is meant to be "inter-packet delay" and "jitter" to be "variation in inter-packet delay". Therefore the most critical QoS parameter for voice service should be "*Limited Delay*".

"Limited Delay" is to limit the time that packet stays inside the device. In other words, the packet should be output from the device within the certain time and once it exceeds the limited time, the packets will be discarded. Therefore by having this term, "Limited Delay", we can support voice by limiting the delay and jitter.

Video Service

Video traffic has very similar characteristics to voice but it requires more bandwidth and a guarantee of minimum bandwidth to provide continuous video images. For instance, let us consider a PC which receives video images from a video server. Most of them have built-in buffering which minimizes network fluctuations in order to provide seamless images. However the bandwidth must be preserved, if it were to fall below a certain level then video could not be transmitted, Consequently the most critical QoS parameter for video service is "*Minimum Bandwidth*".

"Minimum Bandwidth" is the bandwidth to guarantee continuous video stream at least inside the equipment, even when congestion occurred.

Database Service

Database services such as ERP do not require very much bandwidth and are not sensitive to delays. With this kind of service, it is okay to set lower priority than voice services which are sensitive to delay.

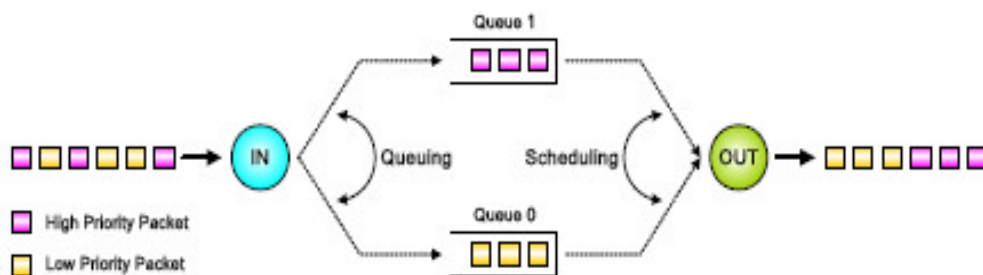
Web Browsing Service

Is not sensitive to Latency and Jitter or packet Loss. However, with TCP, frequent packet loss causes heavy retransmission of traffic with resulting in overload of networks. Therefore in this kind of service, it should be Okay to set QoS parameter to be a lower priority than delay-sensitive traffic. And by using Weighted Random Early Discard (WRED), overload of network can be prevented due to frequent packet loss.

10.2 General QoS Mechanism

In order to provide full QoS, we can classify the mechanism in two categories.

- Traffic Classification (Queuing)
- Traffic Scheduling



[Figure 10-1] General QoS Mechanism

Queuing classifies packets coming into the input port and forwards them to proper queue of the output ports. This assignment of packets is called “classifier” and [Figure 10-1] shows the example of using the packet’s priority as a classifier.

As shown in [Figure 10-1], the packets having different priorities get mingled and come into an input port. These packets get classified into Queue 1 (high priority) and Queue 0 (low priority) and saved separately.

Scheduling extracts packets from output port queue according to the Scheduling Rules. The scheduling rules illustrated in [Figure 10-1] handle the high priority queue first. With the result, the sequence of packets to be output shows high priority packets get output first before low priority packets.

10.3 Traffic Classifiers of the N5000

The XLR N5000 supports three different kinds of Traffic Classifiers as follows.

- Priority of the Input Port
- Priority field in the VLAN Tag (IEEE802.1p)
- DSCP/TOS field in the IP header

Priority of the Input Port

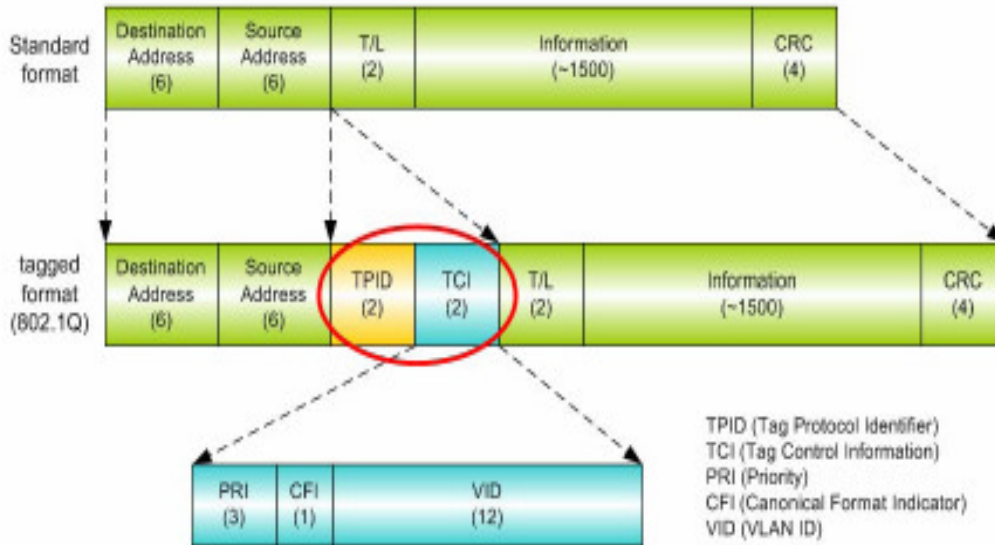
The XLR N5000 has its own priority per port and this priority corresponds to priority level set one each port. For instance, by giving "s0" Port priority 7 and "s1" Port priority 1, then the packets coming into "s0" port are handled with higher priority than packets coming into "s1" port with lower priority inside XLR N5000.

Priority field in the VLAN Tag (IEEE802.1p)

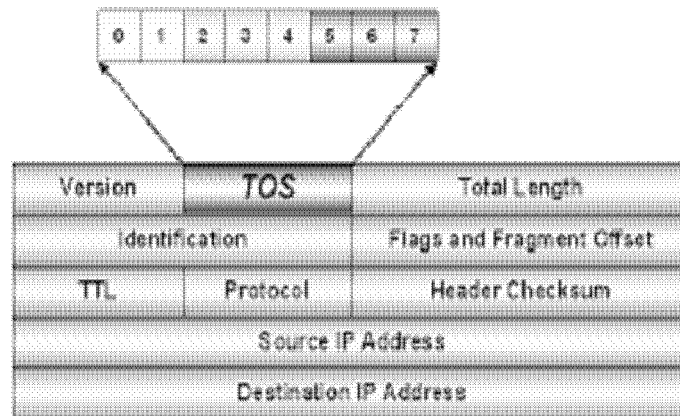
In shown in [Figure 10-2], IEEE802.1Q frame has VLAN Tag containing 3 bits of priority field. The XLR N5000 can use this field as a Traffic Classifier.

DSCP/TOS field in the IP header

In shown [Figure 10-3], among IP packet header consisting with 20 bytes, 1 byte is used as Type of Service (TOS). And this is also known as DiffServe Code Point (DSCP) field. By extracting 3 bits out of DSCP/TOS field can use it as a Traffic Classifier.



[Figure 10-2] IEEE802.1Q Frame Format



[Figure 10-3] IP Packet Header

10.4 Output Queuing of the N5000

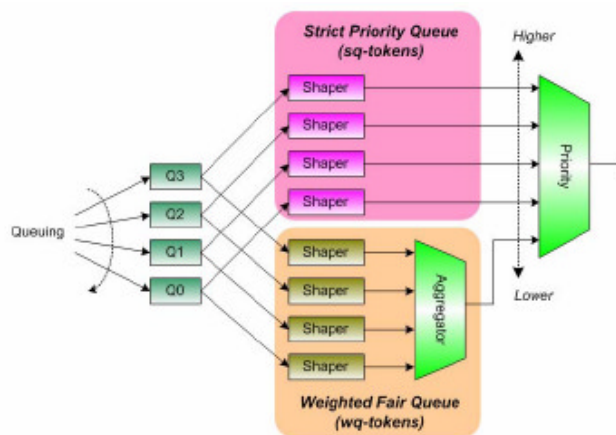
Once Traffic Classifier chosen, the number of output queue can be defined to save the packets in accordance with their priority. Generally higher value of priority means relatively higher priority. The XLR N5000 provides four queues per output port and the correlation with the priority of packets and output queue is the following.

- Packet Priority 7 and 6 ➔ Output Queue 3
- Packet Priority 5 and 4 ➔ Output Queue 2
- Packet Priority 3 and 2 ➔ Output Queue 1
- Packet Priority 1 and 0 ➔ Output Queue 0

In short, if the priority of incoming packet is ether 5 or 4, this packet is buffered in Output Queue 2. And if the priority of incoming packet is ether 1 or 0, the packet is saved in Output Queue 0.

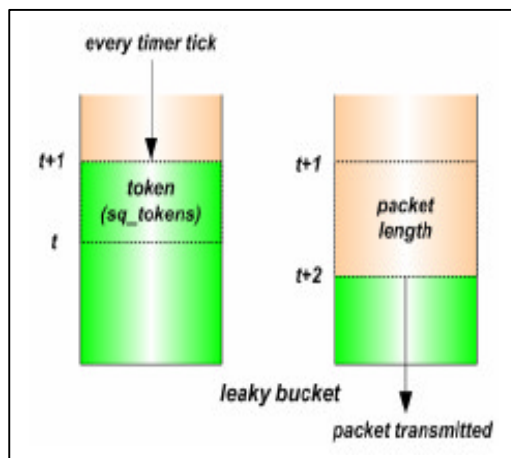
10.5 Traffic Scheduling of the N5000

In the XLR N5000, there are two kinds of queue, one is for strict priority and the other is for weighted fair queuing. For the strict priority scheme, Queue 3 is served first and then Queue 2 followed by Queue 1 and 0. For the weighted fair queuing scheme, the user can assign the ratio for Queue 3, 2, 1 and 0.



[Figure 10-4] Classifying and Scheduling

The **strict queue** can be also used to limit its maximum transmission rate. It is implemented using a leaky bucket algorithm. Transmission rate of each queue is controlled by two parameters: token (in byte) and timer tick (in micro-second). The token is replenished and accumulated into the leaky bucket on every timer tick, and subtracted from the bucket whenever a packet is transmitted from the bucket with the size of packet length. If a packet is ready to be transmitted but there's no token remained in the bucket, the packet should wait until the same size of token is replenished by the next or consecutive timer ticks. If you set timer tick to 512 and token to 64 for some queue, it has the capacity to transmit up to 1 Mbps (64×8 (bits) / 512 micro-second) of traffic. [Table 10-1] describes the queue output rate criteria and [Table 10-2] describes some of examples for the various setting rate.



[Figure 10-5] Leaky bucket and token

Criteria	Description
timer_tick	For the timer_tick, there are four options 8/32/128/512 us. Refer to the "Chapter 7 Port Management" .
sq_tokens	On every timer_tick, sq_tokens are added to the bucket. Refer to the "Chapter 7 Port Management" .

[Table 10-1] Queue Output Rate Criteria

timer_tick (us)	sq_tokens	Maximum Output Rate
8	100	100 Mbps
32	40	10 Mbps
512	64	1 Mbps
512	16	256 Kbps
512	4	64 Kbps
512	1	16 Kbps

[Table 10-2] Rate Settings for Various Scenarios

The **weighted queue** can be used to assign its transmission ratio. [Table 10-3] illustrates the output rates of each queue in accordance with its token ratio.

wq_tokens	Minimum Output Rate
wq_tokens[3] = 0	-
wq_tokens[2] = 5	50% of the Link Bandwidth
wq_tokens[1] = 3	30% of the Link Bandwidth
wq_tokens[0] = 2	20% of the Link Bandwidth

[Table 10-3] Rate Assignment of each Weighted Queue

10.6 set qos

To configure the priority mapping of IEEE802.1p and DSCP code.

Usage

```
set qos dot1p-map <priority map>
set qos dscp-map <codes> <priority>
```

Arguments

Keyword	Description
dot1p	IEEE802.1p priority mapping
<priority map>	New value of IEEE802.1p priority and these must be separated with a comma character, “,”.
dscp-map	DSCP priority mapping
<codes>	Code value of DSCP : 0 ... 63 You can enter multiple codes, each separated by commas. You can also enter consecutive codes, separated by dash.
<priority>	Priority for DSCP code(s).

Confirmation

See also, “[show qos](#)”.

Examples

[Example 10-1] Reversing the incoming IEEE 802.1p priority.

```
N5000> (enable) set qos dot1p-map 7,6,5,4,3,2,1,0
N5000> (enable) show qos
-----
802.1p  priority map:
      0->7  1->6  2->5  3->4  4->3  5->2  6->1  7->0
-----
N5000> (enable)
```

[Example 10-2] DSCP code mapping

DSCP code 0 (best effort) ➔ priority 0

DSCP code 10~38 (AF) ➔ priority 2

DSCP code 46 (EF) ➔ priority 7

```
N5000> (enable) set qos dscp-map 0 0
N5000> (enable) set qos dscp-map 10-38 2
N5000> (enable) set qos dscp-map 46 7
N5000> (enable) show qos
-----
DSCP priority map : 0 1 2 3 4 5 6 7 8 9
-----
      0 | 0 0 0 0 0 0 0 0 0 0
      1 | 2 2 2 2 2 2 2 2 2 2
      2 | 2 2 2 2 2 2 2 2 2 2
      3 | 2 2 2 2 2 2 2 2 2 0
      4 | 0 0 0 0 0 0 7 0 0 0
      5 | 0 0 0 0 0 0 0 0 0 0
      6 | 0 0 0 0
-----
N5000> (enable)
```

10.7 show qos
To display information about QoS.

Usage
show qos

Confirmation
See also, "[set qos](#)".

Output Fields

keyword	description
802.1p priority map	IEEE 802.1p priority mapping table
DSCP priority map	DSCP codes priority mapping table

Examples
[Example 10-3] displaying QoS information.

```
N5000> (enable) show qos
-----
802.1p priority map:
0->7 1->6 2->5 3->4 4->3 5->2 6->1 7->0
DSCP priority map : 0 1 2 3 4 5 6 7 8 9
-----
      0 | 0 0 0 0 0 0 0 0 0 0
      1 | 2 2 2 2 2 2 2 2 2 2
      2 | 2 2 2 2 2 2 2 2 2 2
      3 | 2 2 2 2 2 2 2 2 2 0
      4 | 0 0 0 0 0 0 7 0 0 0
      5 | 0 0 0 0 0 0 0 0 0 0
      6 | 0 0 0 0
-----
N5000> (enable)
```

11 Configuration Management

This section describes a list of commands you can use to manage the system configuration. The XLR N5000 supports two configurations. These configurations are stored in two banks of the system's non.volatile memory. A file can be stored in either bank (0 or 1). You can use the "**show system**" command to display the bank.

When the system starts, it loads the startup configuration that is selected by "**set system bootconfig**" command. If this configuration is empty, the system is started with the default settings.

11.1 show config

To display the system or stored configuration,

Usage

show config

show config <config name>

show config system

show config module <module num>

Arguments

keyword	Description
<i>none</i>	Display the running configuration.
<config name>	Display the stored configuration in non.volatile memory. config0 : configuration bank 0 config1 : configuration bank 1
system	Display the system configuration of the running one.
module	Display the module configuration of the running one. <module num> : integer number of 1 ~ 16.

Confirmation

See also, "[set system](#)", "[write](#)", "[copy](#)", "[clear config](#)".

Examples

[Example 11-1] displaying the system configuration of the running one.

```
N5000> (enable) show config system
# System
set system hostname N5000
set system description N5000
~set system passwd $1$$I2o9Z7NcvQAKp7wyCTlia0
~set system adminpasswd $1$$I2o9Z7NcvQAKp7wyCTlia0
~set system bootconfig config0
~set system bootimage image0
set system auto-logout 20
#
# Interface
set interface m1 ip 172.16.0.21 255.255.255.0
#
# Port
set port 0/u0 pvid 1
set port 0/u0 type access
set port 0/u0 priority 0
set port 0/u0 doubletag disable
set port 0/u0 maxrate unlimit
set port 0/u0 classifier port
set port 0/u0 linkmode auto
set port 0/u0 flowcontrol disable
set port 0/u1 pvid 1
set port 0/u1 type access
set port 0/u1 priority 0
set port 0/u1 doubletag disable
set port 0/u1 maxrate unlimit
set port 0/u1 classifier port
set port 0/u1 linkmode auto
set port 0/u1 flowcontrol disable
#
# VLAN
set vlan 1 add 0/u0,u1
#
# Restart Module
restart module all
#
# fan
set fan speed auto
set fan temp 48
#
# log
set log server disable
#
N5000> (enable)
```

11.2 copy commands for configuration

To upload or download a system configuration to or from memory bank or FTP/TFTP server.

Usage

```
copy ftp <config name>
copy tftp <config name>
copy <config name> ftp
copy <config name> tftp
copy <src config name> <dst config name>
```

Arguments

keyword	Description
<config name>	Specifies the configuration in the non.volatile memory bank. <config name> : config0 , config1
ftp	Allows user to copy to or from a FTP server.
tftp	Allows user to copy to or from a TFTP server.
<src config name>	Specifies the source configuration. <src config name> : config0 , config1
<dst config name>	Specifies the destination configuration. <dst config name> : config0 , config1

> Note <

When a “config” is going to be copied to another host by TFTP, the file, whose name is input in the CLI, must exist on the TFTP server in advance.

Confirmation

See also, [“set system”](#), [“write”](#), [“show config”](#), [“clear config”](#).

Examples

[Example 11-2] moving a configuration file to the FTP server.

```
N5000> (enable) copy config0 ftp
FTP Server IP address? 192.168.0.18
User name? casecomms
Password? (password is not echoed)
File Location? /tftpboot/config0.n5000
Are you sure to copy local to remote (y/n) [n]? y
.
Finish network upload. (4520 bytes)
N5000> (enable)
```

[Example 11-3]

Downloading a configuration file from a TFTP server to the bank 1.

```
N5000> (enable) copy tftp config1
TFTP Server IP address? 192.168.0.18
File Name? config0.n5000
Are you sure to copy config0.n5000 to local (y/n) [n]? y
#
Verifying...OK.
Writing...OK.
N5000> (enable)
```

[Example 11-4] Copying a configuration file from the bank 0 to the bank 1.

```
N5000> (enable) copy config0 config1
Are you sure to copy config0 to config1 (y/n) [n]? y
N5000> (enable)
```

11.3 write command

To save the current configuration to the non - volatile memory.

Usage

write <config name>

Arguments

keyword	Description
<config name>	Specifies the configuration in the non.volatile memory bank. <config name> : config0, config1

Confirmation

See also, "[set system](#)", "[copy](#)", "[show config](#)", "[clear config](#)".

Examples

[Example 11-5] saving the current configuration to the bank 1.

```
N5000> (enable) write config1
N5000> (enable)
```

11.4 clear config

To erase the configuration in the non - volatile memory bank.

Usage

clear config <config name>

Arguments

Keyword	Description
<config name>	Specifies the configuration in the non.volatile memory bank. <config name> : config0 , config1

Confirmation

See also, "[set system](#)", "[write](#)", "[show config](#)", "[copy](#)".

Examples

[Example 11-6] erasing the configuration of the bank 1.

```
N5000> (enable) clear config config1
This command will clear config1.
Do you want to continue (y/n) [n]? y
N5000> (enable)
```

12 Software Image Management

This section describes a list of commands you can use to manage the system software and line module boot image. The system software image runs on the controller module which controls and manages the XLR N5000 system, while the line module boot image runs on each line module. Both images are stored in non-volatile memory on the controller module and handled by the commands described in this chapter.

The XLR N5000 can hold two independent system software images, which are stored in two banks (bank 0 or 1) of the system's non-volatile memory. You can use the "**show system**" command to display the bank. When the system is started, it loads the startup image that is selected by "**set system bootimage**" command. As well as system software images, XLR N5000 has several boot images for line modules. As various kinds of line module can be accommodated, you have to check the appropriate line module boot image installed in the system before a line module is inserted. Each line module boot image can be selected independently by "**set image**" command.

12.1 set image

To assign a boot image to the line module.

This command is NOT supported in this release.

Usage

set image <module nums> <image name>

Arguments

Keyword	Description
<module nums>	Numbers of module : 1...16, all You can enter multiple modules, each separated by commas. You can also enter consecutive modules, separated by dash. If you enter all keyword in this argument, all module are selected.
<image name>	Image name to be applied to a specified module.

User can see image names by using the "**show image**" command.

Confirmation

See also, "[set system](#)", "[show image](#)", "[clear image](#)", "[copy](#)".

Examples

[Example 12-1] assigning boot image to all line module.

```
N5000> (enable) set image all efmc4.1.0.0.bin
N5000> (enable)
```

12.2 show image

To display the information about the stored software image.

Usage

show image

Confirmation

See also, [“set system”](#), [“set image”](#), [“clear image”](#), [“copy”](#).

Examples

[Example 12-2] displaying software image information

```
N5000> (enable) show image
-----
System Image : image0 n5000.1.0.0.bin 21:10 12/14/2007
Line Module Boot Image(s)
-----
efmc.1.0.0.bin
Mapping Table of Line Modules and Boot Image
-----
1 : efmc.1.0.0.bin          2 : efmc.1.0.0.bin
3 : efmc.1.0.0.bin          4 : efmc.1.0.0.bin
5 : efmc.1.0.0.bin          6 : efmc.1.0.0.bin
7 : efmc.1.0.0.bin          8 : efmc.1.0.0.bin
9 : efmc.1.0.0.bin         10 : efmc.1.0.0.bin
11 : efmc.1.0.0.bin         12 : efmc.1.0.0.bin
13 : efmc.1.0.0.bin         14 : efmc.1.0.0.bin
15 : efmc.1.0.0.bin         16 : efmc.1.0.0.bin
-----
```

Output Fields

keyword	description
System Image	The information of the system image. bank number, image version and build time.
Line Module Boot Image(s)	list of boot image(s) of the line module.
Mapping Table of Line Modules and Boot Image	Mapping table of the module number and image.

12.3 clear image

To delete the line module boot image. System software image can not be deleted.

This command is NOT supported in this release.

Usage

`clear image <image name>`

Confirmation

See also, [“set system”](#), [“set image”](#), [“show image”](#), [“copy”](#).

Examples

[Example 12-3] delete line module boot image

```
N5000> (enable) clean image efmc4.1.0.0.bin
N5000> (enable)
```

12.4 copy commands for software image

To download software from the FTP/TFTP server.

Usage

`copy ftp sys_image`

`copy ftp lm_image`

`copy tftp sys_image`

`copy tftp lm_image`

Arguments

keyword	Description
<code>ftp</code>	Allows you to copy from a FTP server.
<code>tftp</code>	Allows you to copy from a TFTP server.
<code>sys_image</code>	Specifies the system image area in non-volatile memory. If the current boot image is image0, it indicates the image1. And also, if the current boot image is image1, it indicates the image0.
<code>lm_image</code>	Specifies the line module image area in non-volatile memory. This argument is NOT supported in this release.

>Note <

When copying the system image from FTP/TFTP server to the XLR N5000, you must change the boot image bank and restart the system to apply new features to the system. Refer to “**set system**” and “**restart system**” command. When copying the line module image from FTP/TFTP server to N5000, you must restart the modules to apply new features to the module. Refer to “**restart module**” command.

Confirmation

See also, [“set system”](#), [“set image”](#), [“show image”](#), [“clear image”](#).

Examples

[Example 12-4] Upgrading system software and applying it to the system.

```
N5000> (enable) show system
-----
System Information
-----
Model Name           XLR N5000
Host Name            XLR N5000
Description          XLR N5000
Current Time         Mon Dec 17 18:53:15 2007
Uptime (d,h:m:s)    0,9:31:24
Boot Configuration   config0
Current Configuration config0
```


13 SNMP Management

This feature is NOT supported in this release.

14 Log Management

This section describes a list of commands that set, display and clear system logs.

14.1 set log

To configure the system log.

Usage

set log server { enable | disable }

set log server ip *<ip addr>*

set log server facility *<level>*

set log server severity *<level>*

set log action *<event>* { **send** | **trap** | **clear** }

Arguments

keyword	Description
server	The external server which will receive log messages generated by the XLR N5000. enable : It enables the XLR N5000 to send log messages to specified server. disable : It disables the function for the N5000 to send log messages to the external server.
ip	The IP address of the external log server. <i><ip addr></i> : The dotted format of IP address.
facility	The facility level of log messages. <i><level></i> : The integer number of 0 ~ 7.
severity	The severity level of log messages. <i><level></i> : The integer number of 0 ~ 7.
action	The type of action for specified event. : send or trap <i><event></i> : fan.fail , fan.recover , module.fail , module.insert , port.down , port.up , pme.down or pme.up send : The type of action is sending log messages. trap : The type of action is trapping log messages. clear : Removing action from action-list.

Confirmation

See also, "[show log](#)", "[clear log](#)"

Examples

[Example 14-1] configuring the log server.

```
N5000> (enable) set log server ip 172.16.0.55
N5000> (enable) set log server facility 1
N5000> (enable) set log server severity 1
N5000> (enable) set log action fan.fail send
N5000> (enable) set log action fan.fail trap
N5000> (enable) set log action module.fail trap
N5000> (enable) set log server enable
N5000> (enable)
```

14.2 show log

To display configuration for log.

Usage

show log

Confirmation

See also, [“show log dump”](#), [“set log”](#), [“clear log”](#)

Examples

[Example 14-2] displaying the current configuration of log

```
N5000> (enable) show log
-----
remote logging :    enabled
remote log server : 172.16.0.55
facility/severity :  local1.alert(1)
-----
event action
```

```
-----
fan.fail          send/trap
fan.recover       -
module.fail       trap
module.insert     -
port.down         -
port.up           -
pme.down          -
pme.up            -
-----
N5000> (enable)
```

14.3 show log dump

To display the system logs.

Usage

show log dump [<lines>]

Arguments

keyword	Description
<lines>	(Optional) Number of dump log entries to display. If you do not enter <lines>, dump 20 log entries.

Confirmation

See also, [“set log”](#), [“show log”](#), [“clear log”](#)

Examples

[Example 14-3] displaying all system log

```
N5000> (enable) show log dump
Dec 18 09:34:37 N5000 nexlogd: nexlogd, version 1.0, started
Dec 18 09:34:42 N5000 nexlogd: port 0/u0: up; 100 Mbps, full-duplex
Dec 18 09:34:49 N5000 nexlogd: module 7: inserted
Dec 18 09:34:51 N5000 nexlogd: module 13: inserted
```

```
Dec 18 09:34:53 N5000 nexlogd: module 3: inserted
Dec 18 09:35:22 N5000 nexlogd: pme 7/0: up; 5696 Kbps
Dec 18 09:35:22 N5000 nexlogd: pme 7/1: up; 5696 Kbps
Dec 18 09:35:22 N5000 nexlogd: pme 7/2: up; 5696 Kbps
Dec 18 09:35:22 N5000 nexlogd: pme 7/3: up; 5696 Kbps
Dec 18 09:35:23 N5000 nexlogd: port 7/s0: up
N5000> (enable)
```

[Example 14-4] displaying the only one system log

```
N5000> (enable) show log dump 1
Dec 18 09:35:23 N5000 nexlogd: port 7/s0: up
N5000> (enable)
```

14.4 clear log

To remove the system logs.

Usage

clear log

Confirmation

See also, ["set log"](#), ["show log"](#), ["show log dump"](#)

Examples

[Example 14-5] clear all system log.

```
N5000> (enable) clear log
This command will clear all system log.
Do you want to continue (y/n) [n]? y
All system log cleared.
N5000> (enable)
```

15 Statistics Management

This section describes the commands that display and clear various kinds of statistics of the XLR N5000.

15.1 show statistics

To display PME and OAM Port statistics.

Usage

show statistics port <module nums/port names>

show statistics pme <module nums/pme nums>

show statistics oam <module nums>

Arguments

keyword	Description
<module nums/port names>	Module numbers and Port names must be separated with a slash character, "/". Numbers of module : 1...16, all You can enter multiple modules, each separated by commas. You can also enter consecutive modules, separated by dash. If you enter all keyword in this argument, the statistics of modules which are currently running will be displayed. Names of Port : Refer to [Table 7-1] You can enter multiple Ports, each separated by commas. If you enter all keyword in this argument, the statistics of all port will be displayed.
<module nums/pme nums>	Module numbers and PME numbers must be separated with a slash character, "/". Numbers of module : 1...16, all You can enter multiple modules, each separated by commas. You can also enter consecutive modules, separated by dash.

If you enter **all** keyword in this argument, the statistics of modules which are currently running will be displayed.
Numbers of PME : 1...3, all
You can enter multiple PMEs, each separated by commas.
You can also enter consecutive PMEs, separated by dash.
If you enter **all** keyword in this argument, the statistics of all PME will be displayed.

port	Display statistics of the specified port.
pme	Display statistics of the specified PME. This argument is NOT supported in this release.
oam	Display statistics of EFM-OAM of the specified module. This argument is NOT supported in this release.

> Note <

When multiple modules or ports are selected, the summary of statistics is displayed. When only one port is selected, the statistics are displayed in more detail.

Confirmation

See also, "[clear statistics](#)"

Examples

[Example 15-1] displaying the statistics of all port.

```
N5000> (enable) show statistics port all / all
```

M/p	Rx packets	Rx errors	Tx packets	Tx errors
0/u0	525	0	630	0
0/u1	0	0	0	0
3/s0	0	0	0	0
7/s0	621	0	1714	0
7/e0	0	0	0	0
13/s0	0	0	0	0
13/e0	0	0	0	0

```
N5000> (enable)
```

Output Fields

keyword	description
m/p	module number / port name
rx packets	The number of received packet of this port.
rx errors	The number of rx packet error of this port.
tx packets	The number of transmit packet of this port.
tx errors	The number of tx packet error of this port.

[Example 15-2] displaying the OAM statistics of all module.

```
N5000> (enable) show statistics oam all
N5000> (enable)
```

Output Fields

keyword	description
num	Number of module.
txInfoPdu	Count of transmit information PDU from this port.
txEventPdu	Count of transmit event PDU from this port.
rxInfoPdu	Count of receive information PDU to this port
rxEventPdu	Count of receive event PDU to this port
rxUkCodes	Count of receive unknown code to this port
KaTimeOut	Count of keepalive timeout counter to this port

[Example 18-3] displaying statistics of all PME.

```
N5000> (enable) show statistics pme all/all
N5000> (enable)
```

Output Fields

keyword	description
m/p	Module number / PME number
CV	Code violation counter
ES	Errored seconds counter.
SES	Severely errored seconds counter
LOS	Loss of signal
UAS	Unavailable seconds counter

15.2 clear statistics

To clear statistics.

Usage

clear statistics port <module nums/port names>

clear statistics pme <module nums/pme nums>

clear statistics oam <module nums>

Arguments

keyword	Description
<i><module nums/port names></i>	<p>Module numbers and Port names must be separated with a slash character, “/”.</p> <p>Numbers of module : 1...16, all</p> <p>You can enter multiple modules, each separated by commas. You can also enter consecutive modules, separated by dash. If you enter all keyword in this argument, the statistics of all module which are currently running will be cleared.</p> <p>Names of Port : Refer to [Table 7-1]</p> <p>You can enter multiple Ports, each separated by commas. If you enter all keyword in this argument, the statistics of all port will be cleared.</p>
<i><module nums/pme nums></i>	<p>Module numbers and PME numbers must be separated with a slash character, “/”.</p> <p>Numbers of module : 1...16, all</p> <p>You can enter multiple modules, each separated by commas. You can also enter consecutive modules,</p>
	<p>separated by dash. If you enter all keyword in this argument, the statistics of all module which are currently running will be cleared.</p> <p>Numbers of PME : 1...3, all</p> <p>You can enter multiple PMEs, each separated by commas. You can also enter consecutive PMEs, separated by dash. If you enter all keyword in this argument, the statistics of all PME will be cleared.</p>
port	Clear statistics of the specified port.
pme	Clear statistics of the specified PME. This argument is NOT supported in this release.
oam	Clear statistics of EFM-OAM of the specified module. This argument is NOT supported in this release.

Examples

[Example 15-4] clearing the statistics of port s0 in module 7.

```
N5000> (enable) clear statistics port 7/s0
N5000> (enable)
```

[Example 15-5] clearing the statistics of all port in module 13.

```
N5000> (enable) clear statistics port 13/all
N5000> (enable)
```

[Example 15-6] clearing the statistics of all port in all module.

```
N5000> (enable) clear statistics port all/all
N5000> (enable)
```

16 FAN Management

The XLR N5000 has 6 FANs built-in for the system-cooling. For convenience of installing and de-installing, these FANs are grouped into two parts.

FAN Module 1 and FAN Module 2 and each module has 3 FANs.

In addition, the FAN's RPM is controlled automatically, depending on the surrounding temperature, so as to maximize the life of the FAN. This section describes the commands to configure the FAN controller.

16.1 set fan

To set the fan controller.

Usage

set fan speed { **auto** | **max** | **zero** | *<speed>* }

set fan temp *<temperature>*

Arguments

keyword	Description
speed	<p>auto : If current temperature is higher or equal than threshold, FANs run. Otherwise, FANs stop.</p> <p>max : The FANs run with the maximum speed, 12, regardless of the current temperature.</p> <p>zero : The FANs stop regardless of the current temperature.</p> <p><i><speed></i> : The speed of the FAN. 5 ~ 12.</p>
temp	The threshold temperature for running the FANs. 25? ~ 50?

Confirmation

See also, "[show fan](#)"

Examples

[Example 16-1] setting the threshold temperature to 45? .

```
N5000> (enable) set fan temp 45
N5000> (enable)
```

[Example 16-2] setting the speed of FANs to 7.

```
N5000> (enable) set fan speed 7
N5000> (enable)
```

16.2 show fan

To display information for the FAN controller.

Usage

show fan

Confirmation

See also, "[set fan](#)"

Examples

[Example 16-3] displaying the configuration of the FAN controller.

```
N5000> (enable) show fan
-----
target temperature :          45 0c
current temperature :          47 0c
auto fan speed :              yes
current fan speed :           8
FM1 RPMs (0/1/2) :           2490/2550/2520
FM2 RPMs (0/1/2) :           2490/2520/2550
-----
N5000> (enable)
```

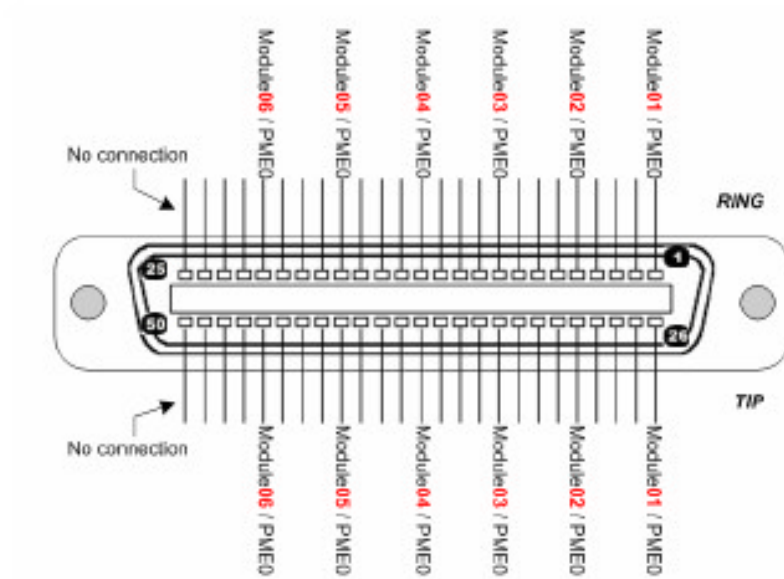
Output Fields

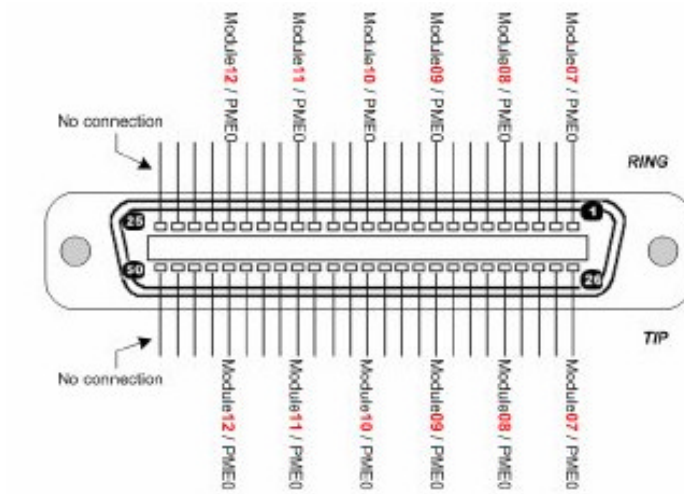
keyword	description
target temperature	The threshold temperature for running FANs.
current temperature	The current temperature of the system.
auto fan speed	yes : The FAN speed is auto. no : The FAN speed is set by user.
current fan speed	The current FAN speed..
FM1 RPMs (0/1/2)	The RPM of each FAN in the FAN Module 1.
FM2 RPMs (0/1/2)	The RPM of each FAN in the FAN Module 2.

APPENDIX A. Telco Connector Pin Assignments

There are 3 Telco connectors at the back panel of N5000 and following figure shows the pin assignment of each connector.

[Figure A-1] Pin Assignment of P0 ~ P23 connector





[Figure A-2] Pin Assignment of P24 ~ P47 connector

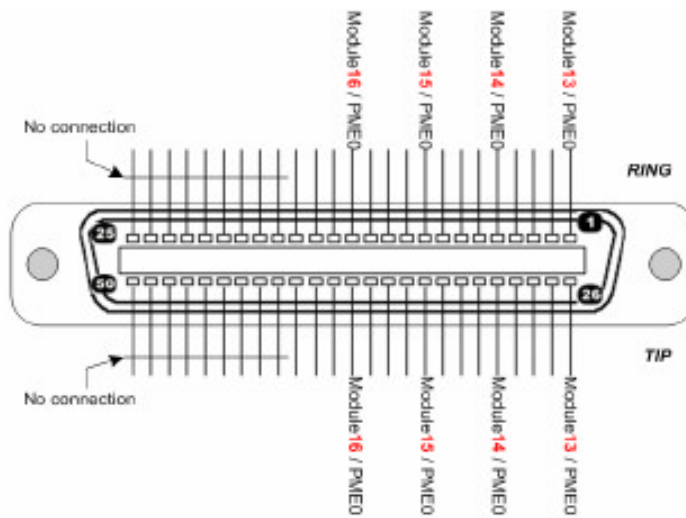


Figure A-3 Pin Assignments of P24 – P47 connector