GAM
CLI User's Guide
Software Version 1.2.0

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About this guide

PURPOSE This guide gives specific information on how to operate and use the management functions of the GAM.

AUDIENCE The guide is intended for use by network administrators who are responsible for operating and maintaining network equipment; consequently, it assumes a basic working knowledge of general switch functions, the Internet Protocol (IP), and Simple Network Management Protocol (SNMP).

CONVENTIONS The following conventions are used throughout this guide:

NOTE: Emphasizes important information or highlights related features or instructions.

CAUTION: Alerts you to a potential hazard that could cause loss of data or damage the GAM or other equipment.

WARNING: Alerts you to a potential hazard that could cause personal injury.

RELATED PUBLICATIONS The following publications describe how to install and get started with the GAM:

GAM-Installation and Activation Guide-180-0186-001
GAM-Quick Installation Guide-180-0193-001

Contents

1 Getting started

The command-line interface (CLI) is a text-based interface. There are two ways to access the CLI: using a direct connection to the RJ-45 Ethernet port on the front panel, or using an inband IP/VLAN.

1.1 Logging in for the first time

The first time you log in, use the following credentials:

- IP address: 192.168.10.1 Note: Software versions prior to 1.1.x use the address 192.168.1.1
- Username: admin
- Password: no password by default

1.2 Getting online help

- Press the “tab” key to see a list of all available commands. For example:

```
GAM#
clear     configure  copy      delete    dir       disable    do
dot1x     enable     erps      exit      firmware  ghn        help
ip        ipv6       link-oam  logout    more      no         ping
platform  ptp        reboot    reload    rfc2544   send       show
terminal  veriphy
```

- Press the “?” key to see a list of all available commands and descriptions. For example:

```
GAM# ?
   clear       Clear
   configure    Enter configuration mode
   copy        Copy from source to destination
   delete       Delete one file in flash: file system
   dir         Directory of all files in flash: file system
   disable      Turn off privileged commands
   do          To run exec commands in the configuration mode
   dot1x        IEEE Standard for port-based Network Access Control
   enable       Turn on privileged commands
   erps        Ethernet Ring Protection Switching
   exit        Exit from EXEC mode
   firmware     Firmware upgrade/swap
   ghn         G.hn
   help        Description of the interactive help system
   ip          IPv4 commands
   ipv6        IPv6 configuration commands
   link-oam     Link OAM configuration
   logout       Exit from EXEC mode
   more        Display file
   no          Delete trace hunt string
   ping        Send ICMP echo messages
   platform     Platform configuration
   ptp         Misc non persistent 1588 settings
   reboot       Reboot G.hn Endpoint
   reload       Reload system.
   rfc2544      RFC2544 performance tests
   send        Send a message to other tty lines
   show        Display statistics counters.
   terminal     Set terminal line parameters
   veriphy      VeriPHY keyword
```

2 Global commands

clear statistics

Clear statistics for one or more interfaces.

Syntax

```
clear statistics <port_type> <v_port_type_list>
```

Parameters

`<port_type>`	Specify the port type: `10GigabitEthernet`.
`<port_type_list>`	List of one or more port numbers. Specify a range of ports in the format: `a-b`. For example: `1-10`. Use commas to separate port numbers and ranges. For example: `1,2,5-10`.

Command mode

User EXEC mode.

Privilege level

15

Example

```
GAM# clear statistics 10GigabitEthernet 1/1-2
```

controller announcement period

Configures the frequency of domain controller announcements.

Syntax

```
controller announcement period [ <v_period> ]
```

Parameters

`<v_period>`	Controller announcement period. Range: 1 to 60 minutes. Default: 5.

Command mode

Global configuration mode (`config`).

Privilege level

15

Example

```
GAM(config)# controller announcement period 15
```

controller announcement url

Configures the announcement URL of the domain controller. Announcements can be set to up to four controllers.

Syntax

```
controller announcement url <target> <url_file>

no controller announcement url <target>
```

Parameters

`<target>`	Controller entry number. Range: 1 to 4.
`<url_file>`	Controller url and filename.

Command mode

Global configuration mode (config).

Privilege level

15

Example

```
GAM(config)# controller announcement url 2
http://device:device@192.169.99.190:8080/device/announcement/request
```

configure terminal

Changes from user EXEC mode to global configuration mode.

Syntax

```
configure terminal
```

Example

```
GAM# configure terminal
GAM(config)#
```

exit

Exit from the current mode. If executed in User EXEC mode, this command exits the CLI.

Syntax

```
exit
```

Parameters

None.

Command mode

Global configuration mode (`config`) or any submode.

User EXEC mode.

Privilege level

0

Example

```
GAM (config)# exit
GAM# exit
```

show alarm

Shows active alarms and conditions.

Syntax

```
show alarm { active | log }
```

Parameters

active	Show active alarms.
log	Show the alarm log.

Command mode

User EXEC mode.

Privilege level

0

Example

```
GAM# show alarm active
Sev  SvAff  Entity     Alarm          Occurrence Date/Time      Description
---  -----  ----------  ---------------  -------------------------  -----------
MJ   YES    CPE-2      LOS            1969-12-31T19:01:36-05:00  Endpoint (CPE)
loss of signal (missing)
MJ   YES    CPE-11     HWMISMAT        2020-11-20T09:32:24-05:00  Hardware
Mismatch (unknown or unsupported endpoint model)
MN   NO     CPE-4      LOS            1969-12-31T19:01:36-05:00  Endpoint (CPE)
loss of signal (missing)
MN   NO     CPE-6      HWMISMAT        2020-11-23T13:22:17-05:00  Hardware
Mismatch (unknown or unsupported endpoint model)
MN   NO     CPE-9      HWMISMAT        2020-11-20T09:32:24-05:00  Hardware
Mismatch (unknown or unsupported endpoint model)
```

show history

Display the session command history.

Syntax

```
show history
```

Parameters

None.

Command mode

User EXEC mode.

Privilege level

0

Example

```
GAM# show history
show evc statistics
show green-ethernet EEE
show green-ethernet EEE interface GigabitEthernet
show history
```

help

Shows a description of the interactive help system.

Syntax

```
help
```

Parameters

None.

Command mode

User EXEC mode.

Privilege level

0

Example

```
GAM# help
Help may be requested at any point in a command by entering
a question mark '?'.If nothing matches, the help list will
be empty and you must backup until entering a '?' shows the
available options.
Two styles of help are provided:
1. Full help is available when you are ready to enter a
command argument (e.g. 'show ?') and describes each possible
argument.
2. Partial help is provided when an abbreviated argument is entered
and you want to know what arguments match the input
(e.g. 'show pr?'.)
```

logout

Exit from EXEC mode.

Syntax

```
logout
```

Parameters

None.

Command mode

User EXEC mode.

Privilege level

0

Example

```
GAM# logout

press ENTER to get started
```

end

Switch to User EXEC mode.

Syntax

end

Command mode

Global configuration mode (config).

Privilege level

0

Example

```
GAM(config)# end
```

3 Security

3.1 Authentication, Authorization, and Accounting

aaa accounting

Sets the accounting method for user sessions.

Syntax

```
aaa accounting { console | telnet | ssh } tacacs { [ commands <priv_lvl> ] [ exec ] }
```

```
no aaa accounting{ console | telnet | ssh }
```

Parameters

`tacacs`	Uses a TACACS+ server for accounting.
`console`	Enables TACACS+ accounting for console sessions.
`telnet`	Enables TACACS+ accounting for Telnet sessions.
`ssh`	Enables TACACS+ accounting for SSH sessions.
`commands <priv_lvl>`	Enables accounting for commands and sets the privilege level at which accounting applies. Accounting is not recorded for commands below this level. By default, accounting is not recorded for commands. Range: 0 to 15.
`exec`	Enables accounting for logins.

Command mode

Global configuration mode (`config`).

Privilege level

15

Example

```
GAM(config)# aaa accounting ssh tacacs commands 5
GAM(config)# no aaa accounting
```

aaa authentication login

Configures the method used to authenticate user logins. By default, local authentication is used for all login types.

If configuring an external server for authentication (RADIUS or TAACS+), more than one method can be defined in case the primary service is offline or unreachable. The services are tried in the order specified until a user login is accepted or rejected. When using an external server it is recommended that local is specified as the last option to ensure login is possible when the remote server is down.

Syntax

```
aaa authentication login { console | telnet | ssh | http } { { local | radius | tacacs }
                         [ { local | radius | tacacs } [ { local | radius | tacacs } ] ] }
```

```
no aaa authentication login { telnet | ssh | http }
```

Parameters

`console`	Authenticate console port logins.
`telnet`	Authenticate Telnet logins.
`ssh`	Authenticate SSH logins.
`http`	Authenticate HTTP logins to the web interface.
`local`	Use the local database on the GAM for authentication.
`radius`	Use an external RADIUS server for authentication.
`tacacs`	Use an external TACACS+ server for authentication.

Command mode

Global configuration mode (`config`).

Privilege level

15

Example

Setting Telnet logins to use the local database on the GAM for login authentication:

```
GAM(config)# aaa authentication login telnet local
```

Setting Telnet logins to first use RADIUS, then TACACS+, and then finally the local database on the GAM for login authentication:

```
GAM(config)# aaa authentication login telnet radius tacacs local
```

aaa authorization

When enabled, requires authorization before commands can be executed.

Syntax

```
aaa authorization { console | telnet | ssh } tacacs { [ commands <priv_lvl> ] [ config commands ] }
```

```
no aaa authorization { console | telnet | ssh }
```

Parameters

`tacacs`	Use a TACACS+ server to retrieve command authorization for the user..
`console`	Activate command authorization for console sessions.
`telnet`	Activate command authorization for Telnet sessions.
`ssh`	Activate command authorization for SSH sessions.
`commands <priv_lvl>`	Sets the privilege level at which command execution requires authorization. Users can execute commands with a privilege level below this level without authorization. Range: 0 to 15.
`config commands`	Require authorization for global configuration mode (`config`) commands.

Command mode

Global configuration mode (`config`).

Privilege level

15

Example

Setting console port sessions to require authorization for EXEC mode commands with privilege 11 or greater:

```
GAM(config)# aaa accounting console commands 11
```

Setting Telnet sessions to require authorization for commands with EXEC mode and global configuration mode commands with privilege 5 or greater:

```
GAM(config)# aaa accounting telnet commands 5 config commands
```

show aaa

Shows the currently active AAA settings.

Syntax

```
show aaa
```

Parameters

None

Command mode

User EXEC mode.

Privilege level

15

Example

```
GAM# show aaa
Authentication :
  console : local
  telnet  : local
  ssh     : local
  http    : local
Authorization :
  console : no, commands disabled
  telnet  : no, commands disabled
  ssh     : no, commands disabled
Accounting :
  console : no, commands disabled, exec disabled
  telnet  : no, commands disabled, exec disabled
  ssh     : no, commands disabled, exec disabled
```

3.2 RADIUS server

The GAM can use a RADIUS server for the authentication of user logins and to store accounting information.

The GAM supports to up to five RADIUS servers, allowing for redundancy in the case of server failure or networking issues. Servers are used in the order that they are defined.

radius-server attribute

Sets a RADIUS server attribute.

The **no** command clears a RADIUS attribute.

Syntax

```
radius-server attribute 32 <line1-255>

radius-server attribute 4 <ipv4_ucast>

radius-server attribute 95 <ipv6_ucast>

no radius-server attribute {32 | 4 | 95}
```

Parameters

<line1-255>	NAS-Identifier of the GAM (attribute 32). This is included in all Access-Requests send to the RADIUS server. If blank, then no NAS-Identifier is sent. Length: 1 to 253 characters.
<ipv4_ucast>	IPv4 unicast address (attribute 4). This address is included in all Access-Requests send to the RADIUS server. If blank, then the IP address assigned to the outgoing interface on the GAM is sent. Format: **x.x.x.x**, where **x** is a decimal number from 0 to 255.
<ipv6_ucast>	IPv6 unicast address (attribute 95). This address is included in all Access-Requests send to the RADIUS server. If blank, then the IP address assigned to the outgoing interface on the GAM is sent. Format: **xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx**, where **x** is a hexadecimal number from 0 to F.

Command mode

Global configuration mode (`config`).

Privilege level

15

Example

```
GAM(config)# radius-server attribute 4 10.10.10.10
```

radius-server deadtime

Sets a global value for deadtime. This is used by all servers that do not have a custom value set with the command `radius-server host`.

Deadtime is the interval at which the GAM sends test user messages to non-responding servers that are flagged as dead to determine if they are now reachable.

The **no** command sets the deadtime to the default value 0.

Syntax

```
radius-server deadtime <minutes>

no radius-server deadtime
```

Parameters

<minutes>	Interval between sending test messages. Range: 1 to 1440 minutes. Default: 0

Command mode

Global configuration mode (`config`).

Privilege level

15

Example

```
GAM(config)# radius-server host deadtime 15
```

radius-server timeout

Sets a global value for timeout. This is used by all servers that do not have a custom value set with the command `radius-server host`.

Sets the global timeout. This defines the amount of time the GAM waits for a RADIUS server to respond to a request before retransmitting. When this time expires, the RADIUS server is considered to be dead, and the GAM attempts to use the next configured server.

The **no** command sets the timeout to the default value 5 seconds.

Syntax

```
radius-server timeout <seconds>
no radius-server timeout
```

Parameters

<seconds>	Interval to wait before retransmitting an unacknowledged request. Range: 1 to 1000 seconds. Default: 5.

Command mode

Global configuration mode (`config`).

Privilege level

15

Example

```
GAM(config)# radius-server timeout 25
```

radius-server retransmit

Sets a global value for retransmit. This is used by all servers that do not have a custom value set with the command `radius-server host`.

Retransmit defines the number of times a RADIUS request is retransmitted to a server that is not responding. If the server does not respond after the last retransmit, it is considered to be dead.

The **no** command sets the retransmit number to the default value 3.

Syntax

```
radius-server timeout <retries>
no radius-server timeout
```

Parameters

`<retries>`	Number of times to retransmit an unacknowledged request. Range: 1 to 1000. Default: 3.

Command mode

Global configuration mode (`config`).

Privilege level

15

Example

```
GAM(config)# radius-server timeout 25
```

radius-server key

Sets a global shared secret. This is used by all servers that do not have a custom value set with the command `radius-server host`.

The **no** command removes the global shared secret key.

Syntax

```
radius-server host key { [unencrypted ] <unencrypted_key> | encrypted <encrypted_key> }
```

```
no radius-server host key { [unencrypted ] <unencrypted_key> | encrypted <encrypted_key> }
```

Parameters

`[unencrypted ] <unencrypted_key`	The shared secret plain text the GAM uses to communicate with the RADIUS server. **Important:** After you set the shared secret key, the GAM automatically encrypts it and will only display the encrypted password when using a show command or when saving the startup config. Range: 1 to 63 characters (excluding space).
`encrypted <encrypted_key>`	The encryptied key in hexadecimal.

Command mode

Global configuration mode (`config`).

Privilege level

15

Example

```
GAM(config)# radius-server key unencrypted mySecretKey
GAM(config)# no radius-server host key
GAM(config)# radius-server key encrypted 68b324492b678f889dd7405b91444cabf3515474[...]
```

radius-server host

Configures a connection to a RADIUS server. The GAM supports up to five RADIUS servers. Servers are used in the order that they are defined. Settings for `auth-port`, `acc-port`, `timeout`, `retransmit`, and `key` override any global RADIUS settings.

Syntax

```
radius-server host <host_name> [ auth-port <auth_port> ] [ acct-port <acct_port> ] [ timeout <seconds> ]
[ retransmit <retries> ] [ key { [unencrypted ] <unencrypted_key> | encrypted <encrypted_key> } ]

no radius-server host <host_name> [ auth-port <auth_port> ] [ acct-port <acct_port> ] [ timeout <seconds> ]
[ retransmit <retries> ] [ key { [unencrypted ] <unencrypted_key> | encrypted <encrypted_key> } ]
```

Parameters

`<host_name>`	Identifies the RADIUS server. Specify a fully-qualified host name or the server's IP address in either IPv4 or IPv6 format.
`auth-port <auth_port>`	UDP port number on the RADIUS server for authentication. Specify 0 to disable authentication. Range: 0 to 65535. Default: 1812.
`acct-port <acct_port>`	UDP port number on the RADIUS server for accounting. Specify 0 to disable accounting. Range: 0 to 65535. Default: 1813.
`timeout <seconds>`	Interval to wait before retransmitting an unacknowledged request. Range: 1 to 1000 seconds. Overrides the global settings defined with `radius-server timeout`. If no value is specified, the global setting is used.
`retransmit <retries>`	Number of times a RADIUS request is retransmitted to a server that is not responding. If the server does not respond after the last retransmit it is considered to be dead. Overrides the global settings defined with `radius-server retransmit`. If no value is specified, the global setting is used.
`[unencrypted ] <unencrypted_key>`	The shared secret plain text the GAM uses to communicate with the RADIUS server. **Important:** After you set the shared secret key, the GAM automatically encrypts it and will only display the encrypted password when using a show command or when saving the startup config. Range: 1 to 63 characters (excluding space).
`encrypted <encrypted_key>`	The encryptied key in hexadecimal.

Command mode

Global configuration mode (`config`).

Privilege level

15

Examples

Configuring the connection to RADIUS server at the address 10.10.10.20:

```
GAM(config)# radius-server host 10.10.10.20 auth-port 55 acct-port 25 timeout 15
retransmit 25 key unencrypted MySecretKey
```

show radius-server

Shows configuration settings for all defined RADIUS servers.

Syntax

```
show radius-server
```

Parameters

None.

Command mode

User EXEC mode.

Privilege level

15

Example

```
GAM# show radius-server
Global RADIUS Server Timeout     : 5 seconds
Global RADIUS Server Retransmit   : 3 times
Global RADIUS Server Deadtime    : 0 minutes
Global RADIUS Server Key         :
Global RADIUS Server Attribute 4  :
Global RADIUS Server Attribute 95 :
Global RADIUS Server Attribute 32 :
RADIUS Server #1:
  Host name  : a
  Auth port  : 1812
  Acct port  : 1813
  Timeout    :
  Retransmit :
  Key        :
RADIUS Server #2:
  Host name  : 10.10.10.10
  Auth port  : 1812
  Acct port  : 1813
  Timeout    :
  Retransmit :
  Key        :
RADIUS Server #3:
  Host name  : 10.15.10.10
  Auth port  : 1812
  Acct port  : 1813
  Timeout    :
  Retransmit :
  Key        :
```

show radius-server statistics

Shows statistics for all defined RADIUS servers.

Syntax

```
show radius-server statistics
```

Parameters

None.

Command mode

User EXEC mode.

Privilege level

15

Example

```
GAM# show radius-server statistics
Global RADIUS Server Timeout     : 5 seconds
Global RADIUS Server Retransmit   : 3 times
Global RADIUS Server Deadtime    : 0 minutes
Global RADIUS Server Key         :
Global RADIUS Server Attribute 4  :
Global RADIUS Server Attribute 95 :
Global RADIUS Server Attribute 32 :
RADIUS Server #1:
  Host name  : a
  Auth port  : 1812
  Acct port  : 1813
  Timeout    :
  Retransmit :
  Key       :
RADIUS Server #2:
  Host name  : 10.10.10.10
  Auth port  : 1812
  Acct port  : 1813
  Timeout    :
  Retransmit :
  Key       :
RADIUS Server #1 (0.0.0.0:1812) Authentication Statistics:
Rx Access Accepts:                0   Tx Access Requests:               0
Rx Access Rejects:                0   Tx Access Retransmissions:         0
Rx Access Challenges:             0   Tx Pending Requests:               0
Rx Malformed Acc. Responses:       0   Tx Timeouts:                      0
Rx Bad Authenticators:            0
Rx Unknown Types:                 0
Rx Packets Dropped:               0
State:                       Ready
Round-Trip Time:                  0 ms

RADIUS Server #1 (0.0.0.0:1813) Accounting Statistics:
Rx Responses:                     0   Tx Requests:                    0
Rx Malformed Responses:           0   Tx Retransmissions:               0
Rx Bad Authenticators:            0   Tx Pending Requests:              0
Rx Unknown Types:                 0   Tx Timeouts:                    0
Rx Packets Dropped:               0
State:                       Ready
Round-Trip Time:                  0 ms

RADIUS Server #2 (10.10.10.10:1812) Authentication Statistics:
Rx Access Accepts:                0   Tx Access Requests:               0
Rx Access Rejects:                0   Tx Access Retransmissions:         0
Rx Access Challenges:             0   Tx Pending Requests:               0
Rx Malformed Acc. Responses:       0   Tx Timeouts:                      0
Rx Bad Authenticators:            0
Rx Unknown Types:                 0
Rx Packets Dropped:               0
State:                       Ready
Round-Trip Time:                  0 ms

RADIUS Server #2 (10.10.10.10:1813) Accounting Statistics:
Rx Responses:                     0   Tx Requests:                    0
Rx Malformed Responses:           0   Tx Retransmissions:               0
Rx Bad Authenticators:            0   Tx Pending Requests:              0
Rx Unknown Types:                 0   Tx Timeouts:                    0
Rx Packets Dropped:               0
State:                       Ready
Round-Trip Time:                  0 ms
```

3.3 TACACS+ server

tacacs-server deadtime

Sets a global value for deadtime that is common for all TACACS+ servers.

Deadtime is the interval at which the GAM sends messages to servers that are flagged as dead to determine if they are now reachable. This command only applies when more than one TACACS+ server is configured.

The **no** command sets the deadtime to the default value 0.

Syntax

```
tacacs-server deadtime <minutes>

no tacacs-server deadtime
```

Parameters

`<minutes>`	Interval between sending messages to dead server. Specify 0, to disable this feature. Range: 1 to 1440 minutes. Default: 0.

Command mode

Global configuration mode (`config`).

Privilege level

15

Examples

Setting the deadtime to 15 minutes:

```
GAM(config)# tacacs-server deadtime 15
```

tacacs-server timeout

Sets a global value for timeout that is common for all TACACS+ servers.

This defines the amount of time the GAM waits for a TACACS+ server to respond to a request before it is considered to be dead. The GAM then attempts to use the next configured server.

The **no** command sets the timeout to the global timeout value. Default value is 5 seconds.

Syntax

```
tacacs-server timeout <seconds>

no tacacs-server timeout
```

Parameters

<seconds>	Maximum time to wait for a reply from a TACACS+ server. Range: 1 to 1000 seconds. Default 5.

Command mode

Global configuration mode (`config`).

Privilege level

15

Example

```
GAM(config)# tacacs-server timeout 25
```

tacacs-server host

Configures a connection to a TACACS+ server. The GAM supports up to five TACACS+ servers. Servers are used in the order that they are defined. Settings for `port`, `timeout`, and `key` override any global TACACS+ settings.

Syntax

```
tacacs-server host <host_name> [ port <port> ] [ timeout <seconds> ] [ key { [ unencrypted ] <unencrypted_key> | encrypted <encrypted_key> } ]
```

```
no tacacs-server host [ port <port> ]
```

Parameters

`<host_name>`	Identifies the TACACS+ server. Specify a fully-qualified host name, or the TACACS+ server IP address in either IPv4 or IPv6 format.
`<port>`	TCP port number on the TACACS+server for authentication. Range: 1 to 65535. Default: 49
`timeout <seconds>`	Interval to wait before for a reply from the server before it is considered to be dead. Overrides the global setting defined with `tacacs-server timeout`. If no value is specified, the global setting is used. Range: 1 to 1000 seconds.
`[unencrypted ] <unencrypted_key`	The shared secret plain text the GAM uses to communicate with the TACACS+ server. **Important:** After you set the shared secret key, the GAM automatically encrypts it and will only display the encrypted password when using a show command or when saving the startup config. Range: 1 to 63 characters (excluding space).
`encrypted <encrypted_key>`	The encrypted key in hexadecimal.

Command mode

Global configuration mode (`config`).

Privilege level

15

Examples

Configuring the connection to the TACACS+ server at the address 10.10.10.20:

```
GAM(config)# tacacs-server host 10.10.10.20 port 55  timeout 15 key unencrypted_MySecretKey
```

tacacs-server key

Sets a global shared secret. This is used by all TACACS+ servers that do not have a custom value set with the command `tacacs-server host`.

The **no** command removes the global shared secret key.

Syntax

```
tacacs-server key { [ unencrypted ] <unencrypted_key> | encrypted <encrypted_key> }
```

```
no tacacs-server key
```

Parameters

`[unencrypted ] <unencrypted_key`
: The shared secret plain text the GAM uses to communicate with the TACACS+ server.

  Important: After you set the shared secret key, the GAM automatically encrypts it and will only display the encrypted password when using a show command or when saving the startup config. Range: 1 to 63 characters (excluding space).

`encrypted <encrypted_key>`
: The encrypted key in hexadecimal.

Command mode

Global configuration mode (`config`).

Privilege level

15

Examples

Setting the global shared TACACS+ shared secret:

```
GAM(config)# tacacs-server key unencrypted 100
```

show tacacs-server

Shows configuration settings for all defined TACACS+ servers.

Syntax

```
show tacacs-server
```

Parameters

None.

Command mode

User EXEC mode.

Privilege level

15

Example

```
GAM# show tacacs-server
Global TACACS+ Server Timeout     : 5 seconds
Global TACACS+ Server Deadtime    : 0 minutes
Global TACACS+ Server Key        :
TACACS+ Server #1:
  Host name  : 10.10.10.20
  Port      : 55
  Timeout    : 15 seconds
  Key       :
91278fbb67b3dd872a3b7dc4c1d53e534b39ee4b92ddbba6b0fd383485a02b64290dae5fa8c001
c4171af05f66c1f387f7425c923f68a8212a96c1cd71156474
```

3.4 Access management

access management

Controls access to the GAM via telnet/SSH, SNMP, or to the web interface based on the IP address and VLAN of clients.

Up to 16 access management entries can be defined. Each entry can specify a VLAN, and IPv4 or IPv6 address (or address range) from which client connections are accepted.

Access management is disabled by default.

Syntax

```
access management

access management <access_id> <access_vid> <start_addr> [ to <end_addr> ]
                  { [ web ] [ snmp ] [ telnet ] | all }
```

Parameters

`<access_id>`	ID of access management entry. Range: 1 to 16.
`<access_vid>`	The VLAN ID for the access management entry. Range: 1 to 4094.
`<start_addr>`	IPv4/IPv6 address. This is the starting address if defining a range with the `to` option.
`to <end_addr>`	End address of the range.
`web`	Web interface.
`snmp`	SNMP service.
`telnet`	TELNET/SSH service.
`all`	All services.

Command mode

Global configuration mode (`config`).

Privilege level

15

Usage

Access management is disabled by default.

Example

Enabling access management:

```
GAM(config)# access management
```

Define access management entry 1 which allows access for all devices from the IP address range 192.168.10.1 to 192.168.101.254:

```
GAM(config)# access management 1 1 192.168.101.1 192.168.101.254 all
```

show access management

Shows access management statistics for all interfaces or for a specific management entry.

Syntax

```
show access management [ statistics | <access_id_list> ]
```

Parameters

`statistics`	Statistics data.
`<access_id_list>`	ID of an access management entry. Range: 1 to 16.

Command mode

Global configuration mode (`config`).

Privilege level

15

Examples

```
GAM(config)# show access management
Switch access management mode is disabled

W: WEB/HTTPS
S: SNMP
T: TELNET/SSH

Idx VID  Start IP Address              End IP Address               W S T
--- ---  ------------------------------ ------------------------------ - - -
1   1    192.168.101.1                  192.168.101.254                Y N N
```

```
GAM# show access management 11

Access Management Statistics:
-----------------------------
HTTPReceive:0 Allow:0 Discard:0
HTTPS Receive:0 Allow:0 Discard:0
SNMPReceive:0 Allow:0 Discard:0
TELNETReceive:0 Allow:0 Discard:0
SSH Receive:0 Allow:0 Discard:0
```

```
GAM# show access management statistics

Access Management Statistics:
-----------------------------
HTTP     Receive:         0    Allow:         0    Discard:         0
HTTPS    Receive:         0    Allow:         0    Discard:         0
SNMP     Receive:         0    Allow:         0    Discard:         0
TELNET   Receive:         0    Allow:         0    Discard:         0
SSH      Receive:         0    Allow:         0    Discard:         0
```

3.5 Access-list

access-list rate-limiter

Rate limiter.

Syntax

```
access-list rate-limiter [ <1~16> ] { pps <0-3276700> | 100kbps <0-10000> }
no access-list rate-limiter<1-16>{< pps ><0-3276700>|<100kbps ><0-10000>}
```

```
no access-list rate-limite< pps ><0-3276700>
no access-list rate-limiter<100kbps ><0-10000>
```

Parameters

100kbps	100 kilobits per second
<RateLimiterList : 1~16>	Rate limiter ID
<PpsRate : 0-3276700>	Rate value
<0-10000>	Rate value

Example

```
GAM(config)# access-list rate-limiter 10 pps 1000000
GAM(config)#
```

default access-list rate-limiter

Sets all access-list rate-limiters, or a specific access-list rate-limiter to the default value 10.

Syntax

```
default access-list rate-limiter [ <rate_limiter_list> ]
```

Parameters

<rate_limiter_list>	Rate limiter ID. Range: 1 to 32. Default: 10.

Example

```
GAM(config)# default access-list rate-limiter
GAM(config)#
```

access-list ace

Access list entry.

Syntax

```
access-list ace{ update<1-512> | <1-512> } [action< deny | filter | permit >]
no access-list ace [update]<1~256>

access-list ace{ update<1-512> | <1-512> } [dmac-type < any | broadcast | multicast | unicast >]

access-list ace{ update<1-512> | <1-512> } [frametype < any | arp | etype | ipv4 | ipv4-icmp | ipv4-tcp
| ipv4-udp | ipv6 | ipv6-icmp | ipv6-tcp | ipv6-udp >]

access-list ace{ update<1-512> | <1-512> } [ ingress] [ ingress { switch <1-16> | switchport { <1-53>
| <1~53> } | interface { <port_type> <port_type_id> | <port_type> <port_type_list> } | any } ]

access-list ace{ update<1-512> | <1-512> } [ logging [ disable ] ]

access-list ace{ update<1-512> | <1-512> } [ lookup [ disable ] ]

access-list ace{ update<1-512> | <1-512> } [ mirror [ disable ] ]

access-list ace{ update<1-512> | <1-512> } [ next { <1-256> | last } ]

access-list ace{ update<1-512> | <1-512> } [ policy <0-255> [ policy-bitmask <0x0-0xFF> ] ]

access-list ace{ update<1-512> | <1-512> } [ rate-limiter { <1-16> | disable } ]
```

```
access-list ace{ update<1-512> | <1-512> } [redirect { switchport { <1-53> | <1~53> } | interface
{ <port_type> <port_type_id> | <port_type> <port_type_list> } | disable } ]

access-list ace{ update<1-512> | <1-512> } [shutdown]

access-list ace{ update<1-512> | <1-512> } [ tag { tagged | untagged | any } ]

access-list ace{ update<1-512> | <1-512> } [ tag-priority { <0-7> | any } ]

access-list ace{ update<1-512> | <1-512> }[ vid { <1-4095> | any } ]
```

Parameters

action	Access list action.
dmac-type	The type of destination MAC address.
frametype	Frame type.
ingress	Ingress.
logging	Logging frame information.
lookup	Second lookup.
mirror	Mirror frame to destination mirror port.
next	Insert the current ACE before the next ACE ID.
policy	Policy.
rate-limiter	Rate limiter.
redirect	Redirect frame to specific port.
shutdown	Shutdown incoming port.
tag	Tag.
tag-priority	Tag priority.
vid	VID field.
deny	Deny.
filter	Filter.
permit	Permit.
any	Ignore the type of destination MAC address.
broadcast	Broadcast destination MAC address.
multicast	Multicast destination MAC address.
unicast	Unicast destination MAC address.
any	Ignore the frame type.
arp	Frame type of ARP.
etype	Frame type of etype.
ipv4	Frame type of IPv4.
ipv4-icmp	Frame type of IPv4 ICMP.
ipv4-tcp	Frame type of IPv4 TCP.
ipv4-udp	Frame type of IPv4 TCP.
ipv6	Frame type of IPv4.
ipv6-icmp	Frame type of IPv6 ICMP.
ipv6-tcp	Frame type of IPv6 TCP.

ipv6-udp	Frame type of IPv6 UDP.
<1-16>	Switch ID.
<1-53>	Swithport ID.
interface	Select an interface to configure.
<port_type>	Port type: Fast, Giga or 10GigabitEthernet..
<port_type_id>	Port ID: swtich-no or port-no.
<port_type>	Port type: Fast, Giga or 10GigabitEthernet.
<port_type_list>	List of port IDs. For example: 1/1,3-5;2/2-4,6.
any	Ignore the ingress interface.
<0-255>	Policy ID.
policy-bitmask	The bitmask for policy ID.
<0x0-0xFF>	The value of policy bitmask.
<1-4095>	The value of VID field.
<0-7>	The value of tag priority.

Example

```
GAM(config)# access-list ace 10 action deny
GAM(config)#
```

clear access list

Clears access list ace statistics.

Syntax

```
clear access-list ace statistics
```

Parameters

ace	Access list entry
statistics	Traffic statistics

Example

```
GAM# clear access-list ace statistics
GAM#
```

show access-list

Access list.

Syntax

```
show access-list [ interface [ <port_type> <port_type_list> ] ] [ rate-limiter [ <1~16> ] ] [ ace statistics
[ <1~256> ] ]
```

```
show access-list ace-status [ static ] [ link-oam ] [ loop-protect ] [ dhcp ] [ ptp ] [ upnp ] [ arp-inspection ]
[ mep ] [ ipmc ] [ ip-source-guard ] [ ip-mgmt ] [ conflicts ]
```

```
show access-list ace-status [ static ] [ link-oam ] [ loop-protect ] [ dhcp ] [ ptp ] [ upnp ] [ arp-inspection ]
[ evc ] [ mep ] [ ghn ] [ ipmc ] [ ip-source-guard ] [ ip-mgmt ] [ tt-loop ] [ y1564 ] [ ztp ] [ conflicts ]
[ switch <switch_list> ]
```

Parameter.

interface	Select an interface to configure
<port_type>	Port type: Fast, Giga or 10GigabitEthernet.
<port_type_list>	List of Port IDs. For example: 1/1,3-5;2/2-4,6.
rate-limiter	Rate limiter.
<1~16>	Rate limiter ID.
ace	Access list entry.
statistics	Traffic statistics.
<1~256>	ACE ID.
ace-status	Local ACEs status.
static	ACEs that are manually configured by users.
link-oam	ACEs that are configured by the Link OAM module.
loop-protect	ACEs that are configured by the Loop Protect module.
dhcp	ACEs that are configured by the DHCP module.
ptp	ACEs that are configured by the PTP module.
upnp	ACEs that are configured by the UPnP module.
arp-inspection	ACEs that are configured by the ARP Inspection module.
mep	ACEs that are configured by the MEP module.
ipmc	ACEs that are configured by the IPMC module.
ip-source-guard	ACEs that are configured by the IP Source Guard module.
ip-mgmt	ACEs that are configured by the IP Management module.
conflicts	ACEs that are not applied to the hardware due to hardware limitations.
evc	ACEs that are configured by EVC module
ghn	ACEs that are configured by G.hn module
tt-loop	ACEs that are configured by Traffic Test Loop module
y1564	ACEs that are configured by Y.1564 module
ztp	ACEs that are configured by ZTP module
<switch_list>	List of switch IDs: For example: 1,3-5,6

Example

```
GAM# show access-list ace statistics rate-limiter

Switch access-list ace number: 0

Switch access-list rate limiter ID 1 is 1 pps
Switch access-list rate limiter ID 2 is 1 pps
Switch access-list rate limiter ID 3 is 1 pps
Switch access-list rate limiter ID 4 is 1 pps
Switch access-list rate limiter ID 5 is 1 pps
Switch access-list rate limiter ID 6 is 1 pps
Switch access-list rate limiter ID 7 is 1 pps
Switch access-list rate limiter ID 8 is 1 pps
Switch access-list rate limiter ID 9 is 1 pps
Switch access-list rate limiter ID 10 is 1 pps
Switch access-list rate limiter ID 11 is 1 pps
Switch access-list rate limiter ID 12 is 1 pps
Switch access-list rate limiter ID 13 is 1 pps
Switch access-list rate limiter ID 14 is 1 pps
Switch access-list rate limiter ID 15 is 1 pps
Switch access-list rate limiter ID 16 is 1 pps
GAM#
```

3.6 PPPOE

pppoe forward

Enables or disables PPPOE forwarding.

Syntax

```
pppoe forward
```

```
no pppoe forward
```

Example

```
GAM(config)# pppoe forward
```

show pppoe forward statistics

Show PPPOE forward statistics.

Syntax

```
show pppoe forward [statistics]
```

Example

```
GAM(config)# show pppoe forward statistics
Switch PPPoE information option is disabled
Switch PPPoE information policy is replace
Switch PPPoE information access node ID is undefined (blank)
Switch PPPoE information indexes are 0-based

Server Statistics:
------------------
Transmit to Server       : 0        Transmit Error           : 0
Receive from Server      : 0

Client Statistics:
------------------
Transmit to Client       : 0        Transmit Error           : 0
Receive from Client      : 0        Receive Agent Tag        : 0
Replace Agent Tag        : 0        Keep Agent Tag           : 0
Drop Agent Tag           : 0        Add Agent Tag            : 0
```

show pppoe discovery statistics

Show PPPOE discovery statistics.

Syntax

```
show pppoe discovery statistics
```

Example

```
GAM(config)# show pppoe discovery statistics
Port                   : G.hn 1/1
-------------------------------------------------

Rx Discovery Initiation (PADI)         : 0         Tx Discovery Initiation (PADI)        :
0
Rx Discovery Offer (PADO)              : 0         Tx Discovery Offer (PADO)             : 0
Rx Discovery Request (PADR)            : 0         Tx Discovery Request (PADR)           : 0
Rx Discovery Session-Termination (PADS) : 0        Tx Discovery Session-termination (PADS):
0
Rx Discovery Termination (PADT)        : 0         Tx Discovery Termination (PADT)       :
0

Port                   : G.hn 1/2
-------------------------------------------------

Rx Discovery Initiation (PADI)         : 0         Tx Discovery Initiation (PADI)        :
0
Rx Discovery Offer (PADO)              : 0         Tx Discovery Offer (PADO)             : 0
Rx Discovery Request (PADR)            : 0         Tx Discovery Request (PADR)           : 0
Rx Discovery Session-Termination (PADS) : 0        Tx Discovery Session-termination (PADS):
0
Rx Discovery Termination (PADT)        : 0         Tx Discovery Termination (PADT)       :
0
```

pppoe information access-node-id

Configures the PPPOE information access node ID.

Syntax

```
pppoe information access-node-id <access_node_id>
```

Parameters

<access_node_id>	Access node ID.

Example

```
GAM(config)# pppoe information access-node-id
```

pppoe information index base

Configures the PPPOE agent information index base.

Syntax

```
pppoe information index base <index_base>
```

Parameters

<index_base>	Sets the agent information index base. Specify 1 for 1-based or 0 for 0-based.

Example

```
GAM(config)# pppoe information index base 1
```

pppoe information policy

Configures the PPPOE agent information policy. When PPPoE forward information mode operation is enabled, if the agent receives a PPPoE discovery message that already contains agent information it will enforce the policy. The 'Replace' policy is invalid when PPPoE information mode is disabled.

Syntax

```
pppoe information policy { drop | keep | replace }
```

Parameters

drop	Drop the packet when a PPPoE Discovery message that already contains agent information is received.
keep	Keep the original agent information when a PPPoE Discovery message that already contains it is received.
replace	Replace the original agent information when a PPPoE Discovery message that already contains it is received.

Example

```
GAM(config)# pppoe information policy drop
```

3.7 dot1x

dot1x

IEEE Standard for port-based Network Access Control.

Syntax

```
dot1x< authentication>< timer>< inactivity> <10-1000000>
no dot1x authentication timer inactivity
```

```
dot1x <authentication>< timer>< re-authenticate> <1-3600>
no dot1x authentication timer re-authenticate

dot1x <feature> { [ guest-vlan ] [ radius-qos ] [ radius-vlan ] }
no dot1x feature { [ guest-vlan ] [ radius-qos ] [ radius-vlan ] }

dot1x <guest-vlan> <1-4095 | supplicant >
no dot1x guest-vlan [supplicant]

dot1x <max-reauth-req> <1-255>
no dot1x max-reauth-req

dot1x < re-authenticate | system-auth-control >
no dot1x re-authentication
no dot1x system-auth-control

dot1x timeout quiet-period <10-1000000>
no dot1x timeout quiet-period

dot1x timeout tx-period <1-65535>
no dot1x timeout tx-period
```

Parameters

authentication	Authentication.
feature	Globally enables/disables a dot1x feature functionality.
guest-vlan	Guest VLAN.
max-reauth-req	Guest VLAN ID used when entering the Guest VLAN.
re-authentication	Set reauthentication state.
system-auth-control	Set the global NAS state.
timeout	Timeout.
timer	Timer.
inactivity	Time in seconds between check for activity on successfully authenticated MAC addresses.
re-authenticate	The period between re-authentication attempts in seconds.
<10-1000000>	Seconds.
<1-3600>	Seconds.
guest-vlan	Globally enables/disables state of guest-vlan.
radius-qos	Globally enables/disables state of RADIUS-assigned QoS.
radius-vlan	Globally enables/disables state of RADIUS-assigned VLAN.
<1-4095>	The number of times a Request Identity EAPOL frame is sent without response before considering entering the Guest VLAN.
supplicant	The switch remembers if an EAPOL frame has been received on the port for the life-time of the port. Once the switch considers whether to enter the Guest VLAN, it will first check if this option is enabled or disabled. If disabled (unchecked; default), the switch will only enter the Guest VLAN if an EAPOL frame has not been received on the port for the life-time of the port. If enabled (checked), the switch will consider entering the Guest VLAN even if an EAPOL frame has been received on the port for the life-time of the port.
<1-255>	Number of times.
quiet-period	Time in seconds before a MAC-address that failed authentication gets a new authentication chance.

tx-period	the time between EAPOL retransmissions.
<10-1000000>	Seconds.
<1-65535>	Seconds.

Example

```
GAM(config)# dot1x authentication timer re-authenticate 1000
GAM(config)#
GAM(config)# dot1x guest-vlan supplicant
GAM(config)#
GAM(config)# dot1x timeout tx-period 1000
GAM(config)#
```

dot1x initialize interface

IEEE Standard for port-based Network Access Control.

Syntax

```
dot1x initialize interface <port_type ><port_type_list>
```

Parameters

initialize	Force re-authentication immediately.
interface	Interface.
<port_type >	10GigabitEthernet or G.hn.
<port_type_list>	Port list in 1/1-2 for 10GigabitEthernet, 1/1-24 for G.hn.

Example

```
GAM# dot1x initialize interface 10GigabitEthernet 1/1
GAM#
```

clear dot1x

Clears the statistics counters.

Syntax

```
clear dot1x statistics
```

```
clear dot1x < interface >< 10GigabitEthernet | G.hn >< PORT_LIST >
```

Parameters

interface	Interface number
GigabitEthernet	1 Gigabit Ethernet Port (local management)
10GigabitEthernet	10 Gigabit Ethernet Port SFP+
G.hn	G.hn Ethernet Port 1-24
PORT_LIST	1-2 for 10GigabitEthernet, 1 GigabitEthernet, 1-24 for G.hn. (GAM is standalone. Always put 1/ before the port numbers)

Example

```
GAM# clear dot1x statistics interface G.hn 1/1-24
GAM#
```

show dot1x statistics

Displays dot1x statistics.

Syntax

```
show dot1x statistics { eapol | radius | all } [ interface <port_type> <port_type_list> ]
```

Parameters

statistics	Shows statistics for either EAPOL or RADIUS.
all	Show all DOT1x statistics.
eapol	Show EAPOL statistics.
radius	Show Backend Server statistics.
<port_type >	10GigabitEthernetor G.hn.
<port_type_list>	Port list in 1/1-5 for GigabitEthernet, 1/1 for G.hn.

Example

```
GAM# show dot1x statistics radius
Rx AccessRx Other Rx Auth. Rx Auth. TxMAC
InterfaceChallengesRequests SuccessesFailures ResponsesAddress
-------------------------------------------------------------------------------
GigabitEthernet 1/1 0 0 0 0 0 -
GigabitEthernet 1/2 0 0 0 0 0 -
GigabitEthernet 1/3 0 0 0 0 0 -
GigabitEthernet 1/4 0 0 0 0 0 -
GigabitEthernet 1/5 0 0 0 0 0 -
G.hn 1/1 0 0 0 0 0 -
G.hn 1/2 0 0 0 0 0 -
GAM#
```

3.8 Local user security

enable

Modify enable password parameters.

Syntax

```
enable password [ <level> <1-15> ] <word32>
no enable password [ level <1-15> ]

enable secret { 0 | 5 } [< level> <1-15> ] <word32>
no enable secret [ level <1-15> ]
```

Parameters

password	Assign the privileged level clear password.
secret	Assign the privileged level secret.

WORD	The UNENCRYPTED (cleartext) password.
level	Set exec level password.
<1-15>	Level number.
0	Specifies an UNENCRYPTED password will follow.
5	Specifies an ENCRYPTED secret will follow.

Example

```
GAM(config)# enable password level 10 999
GAM(config)#
```

enable

Turn on privileged mode commands.

Syntax

```
Enable <1-15>
```

Parameters

<0-15>	Choose privileged level.

Example

```
GAM# enable 10
GAM#
```

disable

Turn off privileged mode commands.

Syntax

```
disable <0-15>
```

Parameters

<0-15>	NONE.

Example

```
GAM# disable 10
GAM#
```

privilege

Command privilege parameters

Syntax

```
privilege <mode_name> level <privilege> <cmd>
```

Parameters

<mode_name>	Time in seconds between check for activity on learned MAC addresses.

level	Set privilege level of command.
<privilege>	<0-15> Privilege level.
<cmd>	Initial valid words and literals of the command to modify. Length: 128 characters.

Example

```
GAM(config)# privilege config-vlan level 15 mpls
GAM(config)#
```

show privilege

Syntax

show privilege

Example

```
GAM# show privilege
GAM#
```

show user-privilege

Users privilege configuration

Syntax

show user-privilege

Example

```
GAM# show user-privilege
username admin privilege 15 password none
GAM#
```

show users

Display information about terminal lines.

Syntax

show users myself

Parameters

myself	Display information about mine.

Example

```
GAM# show users myself
Line is con 0.
 * You are at this line now.
 Connection is from Console.
 User name is admin.
 Privilege is 15.
 Elapsed time is 0 day 0 hour 33 min 23 sec.
 Idle time is 0 day 0 hour 0 min 0 sec.

GAM#
```

username

Establish User Name Authentication.

Syntax

username <word31> privilege <0-15> password {encrypted <word4-44> | unencrypted <line31>| none }
no username <word31>

Parameters

advertising-duration	Set advertising duration.
<Username : word31>	User name allows letters, numbers and underscores.
privilege	Set user privilege level.
<privilegeLevel : 0-15>	User privilege level.
password	Specify the password for the user.
encrypted	Specifies an ENCRYPTED password will follow.
none	NULL password.
unencrypted	Specifies an UNENCRYPTED password will follow.
<Password : line31>	The UNENCRYPTED (Plain Text) user password. Any printable characters including space is accepted. Notice that you have no change to get the Plain Text. password after this command. The system will always display the ENCRYPTED password.
<Password : word4-44>	The ENCRYPTED (hidden) user password. Notice the ENCRYPTED password will be decoded by the system internally. You cannot directly use it as like the Plain Text, and it is not human-readable text normally.

Example

```
GAM(config)# username admin privilege 15 password none
GAM(config)#
```

3.9 port security

port-security

Enable/disable port security globally.

Syntax

```
port-security [aging [time <10-10000000>]]
no port-security
no port-security aging
no port-security aging time
```

Parameters

aging	Time in seconds between check for activity on learned MAC addresses.
time	Time in seconds between check for activity on learned MAC addresses.
<10-10000000>	Seconds.

Example

```
GAM(config)# port-security agin time 1000
GAM(config)#
```

show port-security

Syntax

```
show port-security port [ interface <port_type> <port_type_list> ]
show port-security switch [ interface <port_type> <port_type_list> ]
```

Parameters

port	Show MAC Addresses learned by Port Security
switch	Show Port Security status.
Interface	None.
<port_type >	10GigabitEthernet or G.hn.
<port_type_list>	Port list in 1/1-2 for 10GigabitEthernet, 1/1-24 for G.hn.

Example

```
GAM# show port-security interface G.hn 1/1
Users:
  P = Port Security (Admin)
  8 = 802.1X
  V = Voice VLAN

Interface  Users Limit Current Violating Violation Mode State
---------- ----- ----- ------- --------- -------------- -------------
G.hn 1/1   ---    N/A      0       N/A Disabled      No users

Aging disabled
Hold time: 300 seconds
GAM#
```

3.10 RMON

rmon

Remote Monitoring.

Syntax

```
rmon alarm <1-65535> <word255> <1-2147483647> { absolute | delta } rising-threshold
<-2147483648-2147483647> [ <0-65535> ] falling-threshold <-2147483648-2147483647> [ <0-65535> ]
{ [ rising | falling | both ] }
no rmon alarm <1-65535>
```

```
rmon alarm <1-65535> { ifInOctets | ifInUcastPkts | ifInNUcastPkts | ifInDiscards | ifInErrors |
ifInUnknownProtos | ifOutOctets | ifOutUcastPkts | ifOutNUcastPkts | ifOutDiscards | ifOutErrors } <uint>
<1-2147483647> { absolute | delta } rising-threshold <-2147483648-2147483647> [ <0-65535> ]
falling-threshold <-2147483648-2147483647> [ <0-65535> ] { [ rising | falling | both ] }
no rmon alarm <1-65535>
```

```
rmon event <1-65535> [ log ] [ trap <word127> ] { [ description <line127> ] }
no rmon event <1-65535>
```

Parameters

alarm	Configure an RMON alarm.
event	Configure an RMON event.
<1-65535>	Alarm entry ID.
<word255>	MIB object to monitor.
<1-2147483647>	Sample interval.
absolute	Test each sample directly.
delta	Test delta between samples.
rising-threshold	Configure the rising threshold.
<-2147483648-2147483647>	Rising threshold value
<0-65535>	Event to fire on rising threshold crossing.
falling-threshold	Configure the falling threshold.
<-2147483648-2147483647>	Falling threshold value.
rising	Trigger alarm when the first value is larger than the rising threshold.
falling	Trigger alarm when the first value is less than the falling threshold.
both	Trigger alarm when the first value is larger than the rising threshold or less than the falling threshold (default).
ifInOctets	The total number of octets received on the interface, including framing characters.
ifInUcastPkts	The number of uni-cast packets delivered to a higher-layer protocol.
ifInNUcastPkts	The number of broad-cast and multi-cast packets delivered to a higher-layer protocol.
ifInDiscards	The number of inbound packets that are discarded even the packets are normal.
ifInErrors	The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.
ifInUnknownProtos	The number of the inbound packets that were discarded because of the unknown or un-support protocol.
ifOutOctets	The number of octets transmitted out of the interface , including framing characters.
ifOutUcastPkts	The number of uni-cast packets that request to transmit.
ifOutNUcastPkts	The number of broad-cast and multi-cast packets that request to transmit.
ifOutDiscards	The number of outbound packets that are discarded event the packets is normal.

ifOutErrors	The The number of outbound packets that could not be transmitted because of errors.
<uint>	ifIndex.
<1-2147483647>	Sample interval.
absolute	Test each sample directly.
delta	Test delta between samples.
rising-threshold	Configure the rising threshold.

Example

```
GAM(config)# rmon alarm 10000 ifInErrors 10 9999 absolute rising-threshold 0
falling-threshold 0 both
GAM(config)#
```

show rmon

RMON statistics.

Syntax

show rmon alarm [<1~65535>]

show rmon event [<1~65535>]

show rmon history [<1~65535>]

show rmon statistics [<1~65535>]

Parameters

alarm	Display the RMON alarm table.
event	Display the RMON event table.
history	Display the RMON history table.
statistics	Display the RMON statistics table.
<1~65535>	Alarm entry list.

Example

```
GAM# show rmon alarm
GAM#
```

3.11 SNMP

access

Access configuration.

Syntax

snmp-server access <word32> model { v1 | v2c | v3 | any } level { auth | noauth | priv } [read <word255>] [write <word255>]

no snmp-server access <word32> model { v1 | v2c | v3 | any } level { auth | noauth | priv }

Parameters

<GroupName : word32>	group name.
model	security model.
model	security model.
any	any security model.
v1	v1 security model.
v2c	v2c security model.
v3	v3 security model.
level	security level.
auth	authNoPriv Security Level.
noauth	noAuthNoPriv Security Level.
priv	authPriv Security Level.
read	specify a read view for the group.
write	specify a write view for the group.
<ViewName : word255>	read view name.
<WriteName : word255>	write view name.

Example

```
GAM(config)# snmp-server access text model v2c level noauth write text
GAM(config)#
```

community

Set the SNMP community.

Syntax

```
snmp-server community v2c <word127> [ ro | rw ]
no snmp-server community v2c

snmp-server community v3 <word127> [ <ipv4_addr> <ipv4_netmask> ]
no snmp-server community v3 <word127>
```

Parameters

v2c	SNMPv2c.
<word127>	Community word.
ro	Read only.
rw	Read write.
v3	SNMPv3.
<word127>	Community word.
<ipv4_addr>	IPv4 address.
<ipv4_netmask>	IPv4 netmask.

Example

```
GAM(config)# snmp-server community v2c text
GAM(config)#
```

contact

Set the SNMP server's contact string.

Syntax

```
snmp-server contact <line255>
no snmp-server contact
```

Parameters

contact	Set the SNMP server's contact string.
<line255>	contact string.

Example

```
GAM(config)# snmp-server contact text
GAM(config)#
```

engine-id

Set SNMP engine ID.

Syntax

```
snmp-server engine-id local <word10-32>
no snmp-server engined-id local
```

Parameters

local	Set SNMP local engine ID.
<word10-32>	Local engine ID.

Example

```
GAM(config)# snmp-server engine-id local 1234567891
GAM(config)#
```

host

Set SNMP host's configurations.

Syntax

```
snmp-server host <word32>
no snmp-server host <word32>
```

Parameters

<word32>	Name of the host configuration.

Example

```
GAM(config)# snmp-server host text
GAM(config-snmps-host)#
```

location

Set the SNMP server's location string.

Syntax

```
snmp-server location <line255>
no snmp-server location
```

Parameters

<line255>	Location string.

Example

```
GAM(config)# snmp-server location text
GAM(config)#
```

security-to-group

Security-to-group configuration.

Syntax

```
snmp-server security-to-group model { v1 | v2c | v3 } name <word32> group <word32>
no snmp-server security-to-group model { v1 | v2c | v3 } name <word32>
```

Parameters

model	Security model.
v1	v1 security model.
v2c	v2c security model.
v3	v3 security model.
name	Security user.
<word32>	Security user name.
group	Security group.
<word32>	Security group name.

Example

```
GAM(config)# snmp-server security-to-group model v2c name text group text
GAM(config)#
```

trap

Trap configuration.

Syntax

```
snmp-server trap
no snmp-server trap
```

Example

```
GAM(config)# snmp-server trap
GAM(config)#
```

user

SNMPv3 user configuration.

Syntax

```
snmp-server user <word32> engine-id <word10-32> [ { md5 <word8-32> | sha <word8-40> } [ priv { des | aes } <word8-32> ] ]
no snmp-server user <word32> engine-id <word10-32>
```

Parameters

<word32>	Username.
engine-id	Engine ID.
<word10-32>	Engine ID octet string.
md5	Set MD5 protocol.
<word8-32>	MD5 password.
sha	Set SHA protocol.
<word8-40>	SHA password.
priv	Set Privacy.
des	Set DES protocol.
aes	Set AES protocol.
<word8-32>	Set privacy password.

Example

```
GAM(config)# snmp-server user text engine-id 1234567891 md5 12345678 priv aes
12345678
GAM(config)#
```

version

Set the SNMP server's version.

Syntax

```
snmp-server version { v1 | v2c | v3 }
no snmp-server version
```

Parameters

v1	SNMPv1.

v2c	SNMPv2c.
v3	SNMPv3.

Example

```
GAM(config)# snmp-server version v2c
GAM(config)#
```

view

MIB view configuration.

Syntax

```
snmp-server view <word32> <word255> { include | exclude }
no snmp-server view <word32> <word255>
```

Parameters

<word32>	MIB view name.
<word255>	MIB view OID.
include	Include in the view.
exclude	Excluded from the view.

Example

```
GAM(config)# snmp-server view text .1 include
GAM(config)#
```

show snmp

Display SNMP configurations.

Syntax

```
show snmp
show snmp access [ <word32> { v1 | v2c | v3 | any } { auth | noauth | priv } ]
show snmp community v3 [ <word127> ]
show snmp host [ <word32> ] [ system ] [ switch ] [ interface ] [ aaa ]
show snmp security-to-group [ { v1 | v2c | v3 } <word32> ]
show snmp user [ <word32> <word10-32> ]
show snmp view [ <word32> <word255> ]
```

Parameters

access	Access configuration.
<word32>	Name.
v1	v1 security model.
v2c	v2c security model.
v3	v3 security model.

any	any security model.
auth	authNoPriv Security Level.
noauth	noAuthNoPriv Security Level.
priv	authPriv Security Level.
Community	Community.
v3	SNMPv3.
< word127>	Specify community name.
host	Set SNMP host's configurations.
system	System event group.
switch	Switch event group.
interface	Interface event group.
aaa	AAA event group.
security-to-group	security-to-group configuration.
user	User.
< word10-32>	Security Engine ID.
view	MIB view configuration.
<word255>	MIB view OID.

Example

```
GAM# show snmp

SNMP Configuration
SNMP Mode : enabled
SNMP Version: 2c
Read Community : public
Write Community: private
Trap Mode : disabled
Trap Version: 1

SNMPv3 Communities Table:
Community: public
Source IP: 0.0.0.0
Source Mask : 0.0.0.0

Community: private
Source IP: 0.0.0.0
Source Mask : 0.0.0.0


SNMPv3 Users Table:
User Name: default_user
Engine ID: 800007e5017f000001
-- more --, next page: Space, continue: g, quit: ^C
```

3.12 web

web

Web.

Syntax

```
web privilege group <cword> level { [ cro <0-15> ] [ crw <0-15> ] [ sro <0-15> ] [ srw <0-15> ] }
no web privilege group [ <cword> ] level
```

Parameters

privilege	Web privilege.
group	Web privilege group.
CWORD	Valid words are: 'Aggregation' 'Debug' 'Dhcp_Client' 'Diagnostics' 'EEE' 'EPS' 'ERPS' 'ETH_LINK_OAM' 'EVC' 'Green_Ethernet' 'IP2' 'IPMC_Snooping' 'LACP' 'LLDP' 'Loop_Protect' 'MAC_Table' 'MEP' 'MVR' 'Maintenance' 'Mirroring' 'NTP' 'PTP' 'Ports' 'Private_VLANs' 'QoS' 'RPC' 'Security' 'Spanning_Tree' 'System' 'Timer' 'UPnP' 'VCL' 'VLAN_Translation' 'VLANs' 'Voice_VLAN' 'sFlow'
level	Web privilege group level.
cro	Configuration Read-only level.
crw	Configuration Read-write level.
sro	Status/Statistics Read-only level.
srw	Status/Statistics Read-write level.

Example

```
GAM(config)# web privilege group ptp level sro 10\
GAM(config)#
```

4 Link Aggregation

4.1 Static

aggregation

Physical link grouping.

Syntax

```
aggregation < mode > { [ smac ] [ dmac ] [ ip ] [ port ] }
no aggregation mode
```

Parameters

mode	Traffic distribution mode.
dmac	Destination MAC affects the distribution.
ip	IP address affects the distribution.
port	IP port affects the distribution.
smac	Source MAC affects the distribution.

Example

```
GAM(config)# aggregation mode ip port
GAM(config)#
```

show aggregation

Aggregation port configuration.

Syntax

```
show aggregation [ mode ]
```

Parameters

mode	Traffic distribution mode.

Example

```
GAM# show aggregation mode
Aggregation Mode:

SMAC: Enabled
DMAC: Disabled
IP : Enabled
Port: Enabled
GAM#
```

4.2 LACP

lacp

Link aggregation control protocol settings.

Syntax

```
lacp< system-priority ><1-65535>
no lacp system-priority <1-65535>
```

Parameters

system-priority	System priority.
<1-65535>	Priority value, lower means higher priority.

Example

```
GAM(config)# lacp system-priority 10000
GAM(config)#
```

```
GAM(config)# no lacp system-priority 10000
GAM(config)#
```

clear lacp

Clear LACP statistics.

Syntax

```
Clear< lacp> statistics
```

Parameters

statistics	Clear all LACP statistics

Example

```
GAM# clear lacp statistics
GAM#
```

show lacp

LACP configuration/status.

Syntax

```
show lacp { internal | statistics | system-id | neighbor }
```

Parameters

internal	Internal LACP configuration.
neighbor	Neighbor LACP status.
statistics	Internal LACP statistics.
system-id	LACP system ID.

Example

```
GAM# show lacp internal
PortMode KeyRole TimeoutPriority
-------------------------------------
1DisabledAutoActiveFast32768
2DisabledAutoActiveFast32768
3DisabledAutoActiveFast32768
4DisabledAutoActiveFast32768
5DisabledAutoActiveFast32768
6DisabledAutoActiveFast32768
7DisabledAutoActiveFast32768
GAM#
```

5 Protection EPS/EPRS

5.1 Linear protection EPS

eps

Ethernet Protection Switching. G.8031

Syntax

```
eps <uint> 1plus1 { bidirectional | { unidirectional [ aps ] } }
no eps <uint>

eps <uint> command { lockout | forced | manualp | manualw | exercise | freeze | lockoutlocal }
no eps <uint> command

eps <uint> domain { port | evc } architecture { 1plus1 | 1for1 } work-flow { <uint> | <port_type>
<port_type_id> } protect-flow { <uint> | <port_type> <port_type_id> }

eps <uint> holdoff <uint>
no eps <uint> holdoff

eps <uint> mep-work <uint> mep-protect <uint> mep-aps <uint>

eps <uint> revertive { 10s | 30s | 5m | 6m | 7m | 8m | 9m | 10m | 11m | 12m }
no eps <uint> revertive
```

Parameters

1plus1	EPS 1+1 architecture.
bidirectional	EPS 1+1 bidirectional protection type.
unidirectional	EPS 1+1 unidirectional protection type.
aps	EPS 1+1 unidirectional with APS protection type.
command	EPS command.
lockout	Lockout of protection.
forced	Force switch normal traffic to protection.
manualp	Manual switch normal traffic to protection.
manualw	Manual switch normal traffic to working.
exercise	Exercise signal.
freeze	Local Freeze of EPS.
lockoutlocal	Local lockout of EPS.
domain	The domain of the EPS.
port	This EPS is protecting in the Port domain.
evc	This EPS is protecting in the EVC domain.
architecture	The EPS architecture.
1plus1	The architecture is 1 plus 1.
1for1	The architecture is 1 for 1.
work-flow	The working flow instance that the EPS is related to.

<uint>	The working flow instance number when not in the port domain.
<port_type>	Port type: 10GigabitEthernet
<port_type_id>	Port ID: switch-no/port-no.
protect-flow	The protecting flow instance that the EPS is related to.
<uint>	The protecting flow instance number when not in the port domain.
holdoff	Hold off timer.
<uint>	The hold off timer value in 100 ms. Max 10 sec.
mep-work	Working MEP instance.
<uint>	Working MEP instance number.
mep-protect	Protecting MEP instance.
<uint>	Protecting MEP instance number.
mep-aps	APS MEP instance.
<uint>	APS MEP instance number.
revertive	Revertive EPS.
10/30s	WTR is 10/30 sec.
5-12m	WTR is 5-12 min.

Example

```
GAM(config)# eps 10 1plus1 bidirectional
GAM(config)#
```

clear eps

Clears Ethernet Protection Switching G.8031.

Syntax

```
clear eps < uint > wtr
```

Parameters

<uint>	The EPS instance number.
wtr	Wait To Restore. this will clear the wait to restore timer and revert to primary path right away.

Example

```
GAM# clear eps 3 wtr
GAM#
```

show eps

Ethernet Protection Switching.

Syntax

```
show eps [ <range_list> ] [ detail ]
```

Parameters

<Inst : range_list>	The range of EPS instances.
detail	Show detailed state including configuration information.

Example

```
GAM# show eps detail
EPS state is:
InstStateWstatePstateTxAps r bRxAps r bFopPmFopCmFopNrFopNoAps
EPS Configuration is:
InstDomArchiWflowPflowWmepPmepAPSmepDirectRevertWtrHoldAps
GAM#
```

5.2 Ring protection EPRS

erps

Ethernet Ring Protection Switching.

Syntax

erps <1-64> command { force | manual | clear } { port0 | port1 }

Parameters

<1-64>	ERPS group number.
command	Administrative Command.
clear	Clear command.
force	Force command.
manual	Manual command.
port0	ERPS Port 0 interface.
port1	ERPS Port 1 interface.

Example

```
GAM# erps 10 command clear port0
GAM#
```

erps

Ethernet Ring Protection Switching. G.8032

Syntax

erps <1-64> guard <10-2000>
no erps <1-64>

erps <1-64> holdoff <0-10000>
no erps <1-64> holdoff

erps <1-64> { { major [interconnect] } | { sub [interconnect <1-64>] [virtual-channel] } } port0 interface <port_type> < PORT_ID> port1 interface <port_type> < PORT_ID >
no erps <1-64> command [port0] [port1]

```
erps <1-64> mep port0 sf <1-100> aps <1-100> port1 sf <1-100> aps <1-100>
no erps <1-64> mep

erps <1-64> revertive <1-12>
no erps <1-64> revertive

erps <1-64> rpl { owner | neighbor } { port0 | port1 }
no erps <1-64> rpl

erps <1-64> topology-change propagate
no erps <1-64> topology-change propagate

erps <1-64> version { 1 | 2 }
no erps <1-64> version

erps <1-64> vlan { none | [ add | remove ] <vlan_list> }
no erps <1-64> vlan
```

Parameters

guard	Guard.
holdoff	Holdoff.
major	Major ring.
mep	MEP.
revertive	Revertive.
rpl	Ring Protection Link.
sub	Sub-ring.
topology-change	Topology Change.
version	Version.
vlan	VLAN.
<1-64>	ERPS group number.
<10-2000>	Guard time in ms.
0-10000	Holdoff time in ms.
1-64	Major ring group number.
PORT_ID	Port ID in 1/1-2.
port0	ERPS Port 0 interface.
sf	Signal Fail.
1-100	Index of Port SignalFail MEP.
aps	Automatic Protection Switching.
1-100	Index of Port APS MEP.
port1	ERPS Port 1 interface.
1-12	Wait-to-restore time in minutes.
neighbor	Neighbor role.
owner	Owner role.
propagate	Propagate.
1	ERPS version 1.
2	ERPS version 2.

one	Do not include any VLANs.
add	Add to set of included VLANs.
remove	Remove from set of included VLANs.
<vlan_list>	List of VLANs.

Example

```
GAM(config)# erps 10 mep port0 sf 20 aps 20 port1 sf 50 aps 50
GAM(config)#
GAM(config)# erps 10 topology-change propagate
GAM(config)#
```

clear erps

Clears Ethernet Ring Protection Switching statistics.

Syntax

```
clear erps statistics

clear erps [<group_num>] statistics
```

Parameters

1-64	ERPS group numbers. A list or range can be used. (e.g. 1,3,9 or 1-20). If no group numbers are provided, statistics for all groups are cleared**.**
statistics	Clear ERPS statistics.

Example

```
GAM# clear erps 5 statistics
GAM#
```

show erps

Ethernet Ring Protection Switching.

Syntax

```
show erps [ <1-64> ] [ detail | statistics ]
```

Parameters

1~64	Zero or more ERPS group numbers.
detail	Show detailed information.
statistics	Show statistics.

Example

```
GAM# show erps detail
% No ERPS groups configured.
GAM#
```

5.3 Service OAM

mep

Service OAM. Maintenance Entity Point

Syntax

```
mep <uint> [ mip ] { up | down } domain { port | evc } flow <uint> level <0-7> interface <port_type> <port_type_id>
no mep <uint>

mep <uint> ais [ fr1s | fr1m ] [ protect ]
no mep <uint> ais

mep <uint> aps <0-7> [ multi | uni ] { laps | { raps [ octet <uint> ] } }
no mep <uint> aps

mep <uint> cc <0-7> [ fr300s | fr100s | fr10s | fr1s | fr6m | fr1m | fr6h ]
no mep <uint> cc

mep <uint> client domain { evc | vlan }


mep <uint> client flow <uint> level <0-7> [ ais-prio [ <0-7> | ais-highest ] ] [ lck-prio [ <0-7> | lck-highest ] ]
no mep <uint> client-flow { <uint> | all }

mep <uint> dm <0-7> [ multi | { uni mep-id <uint> } ] [ oneway | twoway ] [ rdtrp | flow ] interval <uint> last-n <uint>
no mep <uint> dm

mep <uint> dm{ns | overflow-reset | proprietary | syncronized }
no mep <uint> dm ns
no mep <uint> dm overflow-reset
no mep <uint> dm proprietary
no mep <uint> dm syncronized

mep <uint> lb <0-7> [ dei ] [ multi | { uni { { mep-id <uint> } | { mac <mac_addr> } } } ] count <uint> size <uint> interval <uint>
no mep <uint> lb

mep <uint> lck [ fr1s | fr1m ]
no mep <uint> lck

mep <uint> level <0-7>


mep <uint> lm <0-7> [ multi | uni ] [ single | dual ] [ fr10s | fr1s | fr6m | fr1m | fr6h ] [ flr <uint> ]
no mep <uint> lm

mep <uint> lt <0-7> { { mep-id <uint> } | { mac <mac_addr> } } ttl <uint>
no mep <uint> lt

mep <uint> meg-id <word> { itu | itu-cc | { ieee [ name <word> ] } }


mep <uint> mep-id <uint>


mep <uint> peer-mep-id <uint> [ mac <mac_addr> ]
no mep <uint> peer-mep-id { <uint> | all }
```

```
mep <uint> tst <0-7> [ dei ] mep-id <uint> [ sequence ] [ all-zero | all-one | one-zero ] rate <uint>
size <uint>
no mep <uint> tst
```

```
mep <uint> tst {rx | tx}
no mep <uint> tst rx
```

```
mep <uint> {vid <vlan_id>| voe}
no mep <uint> voe
```

Parameters

<Inst : uint>	The MEP instance number.
ais	Alarm Indication Signal
fr1s	Frame rate is 1 f/s.
fr1m	Frame rate is 1 f/min.
protect	The AIS can be used for protection. At the point of state change three AIS PDU is transmitted as fast as possible.
aps	Automatic Protection Switching protocol.
<0-7>	Priority in case of tagged OAM. In the EVC domain this is the COS-ID.
multi	OAM PDU is transmitted with multicast MAC. Must me 'multi' in case of RAPS.
uni	OAM PDU is transmitted with unicast MAC. The MAC is taken from peer MEP MAC database. Only possible in case of LAPS.
laps	Linear Automatic Protection Switching protocol.
raps	Ring Automatic Protection Switching protocol.
octet	Then last OCTET in the multivast MAC. Only possible in case of RAPS.
<uint>	Last OCTET value
cc	Continuity Check.
<0-7>	Priority in case of tagged OAM. In the EVC domain this is the COS-ID.
fr300s	Frame rate is 300 f/s.
fr100s	Frame rate is 100 f/s.
fr10s	Frame rate is 10 f/s.
fr1s	Frame rate is 1 f/s.
fr6m	Frame rate is 6 f/min.
fr1m	Frame rate is 1 f/min.
fr6h	Frame rate is 6 f/hour.
client	Transport layer Client.
domain	Domain.
evc	EVC Domain.
vlan	Vlan Domain
<Cflow : uint>	none
level	The MEG level on the client layer.
<Level : 0-7>	The MEG level value.
ais-prio	AIS injection priority.

lck-prio	LCK injection priority.
<Aisprio : 0-7>	AIS injection priority value.
ais-highest	Request the highest possible AIS priority.
<Lckprio : 0-7>	LCK injection priority value.
lck-highest	Request the highest possible LCK priority.
dm	Delay Measurement.
<0-7>	Priority in case of tagged OAM. In the EVC domain this is the COS-ID.
multi	OAM PDU is transmitted with multicast MAC.
uni	OAM PDU is transmitted with unicast MAC. The MAC is taken from peer MEP MAC database.
mep-id	Peer MEP-ID for unicast DM. The MAC is taken from peer MEP MAC database.
<uint>	Peer MEP-ID value.
oneway	One way Delay Measurement based on 1DM PDU transmission.
twoway	Two way Delay Measurement based on DMM/DMR PDU.
rdtrp	The two way delay is calculated as round trip delay. The far end residence time is not subtracted.
flow	The two way delay is calculated as round trip symmetrical flow delay. The far end residencetime is subtracted.
interval	Interval between PDU transmission in 10ms. Min value is 10.
<uint>	Interval value.
last-n	The last N dalays used for average last N calculation. Min value is 10.
<uint>	The last N value.
ns	Nano Seconds
overflow-reset	Reset all Delay Measurement results on total delay counter overflow.
proprietary	Proprietary Delay Measurement.
syncronized	Near enad and far end is real time syncronized.
lb	Loop Back.
<0-7>	Priority in case of tagged OAM. In the EVC domain this is the COS-ID.
dei	Drop Eligible Indicator in case of tagged OAM.
multi	OAM PDU is transmitted with multicast MAC.
uni	OAM PDU is transmitted with unicast MAC. The MAC is taken from peer MEP MAC database.
mep-id	Peer MEP-ID for unicast LB. The MAC is taken from peer MEP MAC database.
<uint>	Peer MEP-ID value
mac	Loop Back unicast MAC to be used in case of LB against MIP.
<mac_addr>	Loop Back target unicast MAC value.
count	The number of LBM PDU to send in one loop test. The value 0 indicate infinite transmission (test behaviour). This is HW based LBM/LBR and Requires VOE.
<uint>	Number of LBM PDU to send value.
size	The number of bytes in the LBM PDU Data Pattern TLV

<uint>	The number of bytes in the LBM PDU Data Pattern TLV
interval	The interval between transmitting LBM PDU. in case 'count' != 0 this is in 10ms and max is 100. In case 'count' == 0 this is in 1us and max is 10.000.
<uint>	The interval between transmitting LBM PDU.
lck	Locked Signal.
fr1s	Frame rate is 1 f/s.
fr1m	Frame rate is 1 f/min.
level	The MEG level of the MEP.
<0-7>	The MEG level value.
lm	Loss Measurement.
<0-7>	Priority in case of tagged OAM. In the EVC domain this is the COS-ID.
multi	OAM PDU is transmitted with multicast MAC.
uni	OAM PDU is transmitted with unicast MAC. The MAC is taken from peer MEP MAC database. In case of LM there is only one peer MEP.
single	Single ended LM is based on LMM/LMR PDU.
dual	Dual ended LM is based on CCM PDU.
fr10s	Frame rate is 10 f/s.
fr1s	Frame rate is 1 f/s.
fr6m	Frame rate is 6 f/min.
fr1m	Frame rate is 1 f/min.
fr6h	Frame rate is 6 f/hour.
flr	The Frame Loss Ratio interval.
<uint>	The Frame Loss Ratio interval value.
lt	Link Trace.
<0-7>	Priority in case of tagged OAM. In the EVC domain this is the COS-ID.
mep-id	Peer MEP-ID for Link Trace target unicast MAC. The MAC is taken from peer MEP MAC database.
<uint>	Peer MEP-ID value.
mac	Link Trace target unicast MAC to be used in case of LT against MIP.
<mac_addr>	Link Trace target unicast MAC value.
ttl	Time To Live.
<uint>	Time To Live value.
meg-id	The ITU/IEEE MEG-ID.
<word>	The MEG-ID string. The max is 16 characters.
itu	The MEG-ID has ITU format (ICC - UMC). The meg-id max is 13 characters.
itu-cc	The MEG-ID has ITU Contry Code format (CC - ICC - UMC). The meg-id max is 15 characters
ieee	The MEG-ID (Short MA Name) has IEEE Character String format. The meg-id max is 16 characters.
name	Only relevant for IEEE. The MAID is with Maintenance Domain Name.

<word>	Maintenance Domain Name string. The max is 16 characters.
mep-id	The MEP-ID.
<uint>	The MEP-ID value.
peer-mep-id	The peer MEP-ID.
<uint>	The peer MEP-ID value.
mac	The peer MAC. this will be overwritten by any learned MAC - through CCM reception.
<mac_addr>	The peer MAC string.
tst	Test Signal
<0-7>	Priority in case of tagged OAM. In the EVC domain this is the COS-ID.
dei	Drop Eligible Indicator in case of tagged OAM.
mep-id	Peer MEP-ID for unicast TST. The MAC is taken from peer MEP MAC database.
<uint>	Peer MEP-ID value.
sequence	Enable sequence number in TST PDU.
all-zero	Test pattern is set to all zero.
all-one	Test pattern is set to all one.
one-zero	Test pattern is set to 10101010.
rate	The TST frame transmission bit rate - in Mega bits pr. second. Limit on Caracal is 400 Mbps. Limit on Serval is 1Gbps.
<uint>	Transmission rate value.
size	The TST frame size. This is entered as the wanted size (in bytes) of a un-tagged frame containing TST OAM PDU - including CRC (four bytes). Example when 'Size' = 64 => Un-tagged frame size = DMAC(6) + SMAC(6) + TYPE(2) + TST PDU LENGTH(46) + CRC(4) = 64 bytes. The transmitted frame will be four bytes longer for each tag added - 8 bytes in case of a tunnel EVC. The transmitting frame rate will be adjusted according to the actually transmitted frame size to obtain correct transmission bit rate.
<uint>	Frame size value.
rx	Receive Test Signal.
tx	Transmit Test Signal.
vid	The MEP VID.
<vlan_id>	The MEP VID value.
voe	MEP is VOE based.
mip	This MEP instance is a half-MIP.
up	This MEP is a UP-MEP.
down	This MEP is a Down-MEP.
domain	The domain of the MEP.
port	This MEP is a Port domain MEP.
evc	This MEP is a EVC domain MEP.
flow	The flow instance that the MEP is related to.
<uint>	The flow instance number when not in the port domain.
level	The MEG level of the MEP.
<0-7>	The MEG level value.

interface	The recidence port of the MEP.
<port_type>	Port type: Fast, Giga or 10GigabitEthernet.
<port_type_id>	Port ID: swtich-no or port-no.

Example

```
GAM(config)# mep 10 client flow 10 level 7 ais-prio 3 lck-prio 4
GAM(config)#
```

clear mep

Maintenance Entity Point.

Syntax

Clear<mep> <uint>< lm | dm | tst >

Parameters

<uint>	The MEP instance. dm Clear DM measuring information.
lm	Clear LM measuring information.
tst	Clear TST measuring information.

Example

```
GAM# clear mep 2 dm
GAM#
```

show mep

Maintenance Entity Point.

Syntax

show mep [<range_list>] [peer | cc | lm | dm | lt | lb | tst | aps | client | ais | lck] [detail]

Parameters

<Inst : range_list>	The range of MEP instances.
ais	Show AIS state.
aps	Show APS state.
cc	Show CC state.
client	Show Client state.
detail	Show detailed state including configuration information.
dm	Show DM state.
lb	Show LB state.
lck	Show LCK state.
lm	Show LM state.
lt	Show LT state.

peer	Show peer mep state.
tst	Show TST state.

Example

```
GAM# show mep cc
GAM#
```

6 Loop Protection

6.1 Proprietary loop protection

loop-protect

Loop protection configuration.

Syntax

```
loop-protect
no loop-protect

loop-protect action { [ shutdown ] [ log ] }
no loop-protect shutdown-time

loop-protect shutdown-time <0-604800>
no loop-protect transmit-time
```

Parameters

action	Action if loop detected.
shutdown	Shutdown port.
log	Generate log.
shutdown-time	Loop protection shutdown time interval.
<0-604800>	Shutdown time in second.

Example

```
GAM(config)# loop-protecttransmit-time 5
GAM(config)#
```

show loop-protect

Loop protection configuration.

Syntax

```
show loop-protect [ interface <port_type> <port_type_list> ]
```

Parameters

interface	Interface status and configuration.
<port_type >	10GigabitEthernet or G.hn.
<port_type_list>	Port list in 1/1-2 for 10GigabitEthernet, 1/1-24 for G.hn.

Example

```
GAM# show loop-protect

Loop Protection Configuration
=====================================
Loop Protection: Enable
Transmission Time : 1 sec
Shutdown Time: 180 sec

10GigabitEthernet 1/1
------------------------------
 Loop protect mode is enabled.
 Actions are both of shutdown and log.
```

```
 Transmit mode is enabled.
 No loop.
 The number of loops is 0.
 Status is down.

10GigabitEthernet 1/2
------------------------------
 Loop protect mode is enabled.
-- more --, next page: Space, continue: g, quit: ^C No loop.
```

6.2 Spanning tree

aggregation	Aggregation mode
edge	Edge ports
mode	STP protocol mode
mst	STP bridge instance
recovery	The error recovery timeout
transmit	BPDUs to transmit

aggregation

Aggregation mode.

Syntax

```
spanning-treeaggregation
no spanning-tree aggregation
```

Example

```
GAM(config)# spanning-treeaggregation
GAM(config-stp-aggr)#
```

edge

Edge ports.

Syntax

```
spanning-tree edge bpdu-filter
no spanning-tree edge

spanning-tree edge bpdu-guard
no spanning-tree edge bpdu-guard
```

Parameters

bpdu-filter	Enable BPDU filter (stop BPDU tx/rx).
bpdu-guard	Enable BPDU guard.

Example

```
GAM(config)# spanning-tree edge bpdu-filter
GAM(config)#
```

mode

STP protocol mode.

Syntax

```
spanning-tree mode { stp | rstp | mstp }
no spanning-tree mode
```

Parameters

mstp	Multiple Spanning Tree (802.1s).
rstp	Rapid Spanning Tree (802.1w).
stp	802.1D Spanning Tree.

Example

```
GAM(config)# spanning-tree mode stp
GAM(config)#
```

mst

STP bridge instance.

Syntax

```
spanning-tree mst <0-7> priority <0-61440>
no spanning-tree mst <0-7> priority

spanning-tree mst <0-7> vlan <vlan_list>
no spanning-tree mst <0-7> vlan

spanning-tree mst forward-time <4-30>
no spanning-tree mst forward-time

spanning-tree mst max-age <6-40> [ forward-time <4-30> ]
no spanning-tree mst max-age
```

```
spanning-tree mst max-hops <6-40>
no spanning-tree mst max-hops

spanning-tree mst name <word32> revision <0-65535>
no spanning-tree mst name
```

Parameters

<Instance : 0-7>	instance0-7 (CIST=0, MST2=1)
forward-time	Delay between port states.
max-age	Max bridge age before timeout.
max-hops	MSTP bridge max hop count.
name	Name keyword.
priority	Priority of the instance.
vlan	VLAN keyword.
<0-61440>	Range in seconds.
<vlan_list>	Range of VLANs.
<4-30>	Range in seconds.
<6-40>	Range in seconds.
<word32>	Name of the bridge.
revision	Revision keyword.
<0-65535>	Revision number.

Example

```
GAM(config)# spanning-tree mst 7 vlan 10
GAM(config)#
```

recovery

The error recovery timeouts.

Syntax

```
spanning-tree recovery interval <30-86400>
no spanning-tree recovery interval
```

Parameters

interval	The interval.
<30-86400>	Range in seconds.

Example

```
GAM(config)# spanning-tree recovery interval 50
GAM(config)#
```

transmit

BPDUs to transmit.

Syntax

spanning-tree transmit hold-count <1-10>
no spanning-tree transmit hold-count<1-10>

Parameters

hold-count	Max number of transmit BPDUs per sec.
<1-10>	1-10 per sec. Default: 6.

Example

```
GAM(config)# spanning-tree transmit hold-count 5
GAM(config)#
```

clear spanning-tree

Clear STP Bridge.

Syntax

clear < spanning-tree>< detected-protocols >

clear < spanning-tree>< detected-protocols > < interface ><port_type> <port_type_list>

clear < spanning-tree> < statistics >< interface ><port_type> <port_type_list>

Parameters

detected-protocols	Set the STP migration check
statistics	STP statistics
interface	Choose port
<port_type>	10GigabitEthernet or G.hn
<port_type_list>	Port list in 1/1-2 for 10GigabitEthernet, 1/1-24 for G.hn

Example

```
GAM# clear spanning-tree detected-protocols interface 10GigabitEthernet 1/1-2
GAM#
```

show spanning-tree

STP Bridge.

Syntax

show spanning-tree [summary | active | { interface <port_type> <port_type_list> } | { detailed [interface <port_type> <port_type_list>] } | { mst [configuration | { <0-7> [interface <port_type> <port_type_list>] }] }]

Parameters

summary	STP summary.
active	STP active interfaces.
interface	Choose port.

<port_type>	Port type: 10GigabitEthernet.
<port_type_list>	List of port IDs. For example: 1/1,3-5;2/2-4,6.
detailed	STP statistics.
interface	List of port type and port ID, ex, Fast 1/1 Gigabit 2/3-5 Gigabit 3/2-4 Tengigabit 4/6.
mst	Configuratio.
configuration	STP bridge instance no (0-7, CIST=0, MST2=1).
<0-7>	Choose port.
<port_type >	10GigabitEthernet or G.hn.
<port_type_list>	Port list in 1/1-5 for GigabitEthernet, 1/1 for G.hn.

Example

```
GAM# show spanning-tree active ?
 |Output modifiers
 <cr>
GAM# show spanning-tree active
CIST Bridge STP Status
Bridge ID : 32768.00-0A-C6-50-03-20
Root ID : 32768.00-0A-C6-50-03-20
Root Port : -
Root PathCost: 0
Regional Root: 32768.00-0A-C6-50-03-20
Int. PathCost: 0
Max Hops: 20
TC Flag : Steady
TC Count: 0
TC Last : -
PortPort RoleStatePriPathCostEdgeP2PUptime
---------------------------------------------------------------------
GAM#
```

7 Layer-3

7.1 IPv4

ip

Internet Protocol.

Syntax

```
ip arp inspection [check-vlan]
no ip arp inspection

ip arp inspection entry interface <port_type> <port_type_id> <vlan_id> <mac_ucast> <ipv4_ucast>
no ip arp inspection entry interface <port_type> <port_type_id> <vlan_id> <mac_ucast> <ipv4_ucast>

ip arp inspection logging { deny | permit | all }


ip arp inspection translate [ interface <port_type> <port_type_id> <vlan_id> <mac_ucast> <ipv4_ucast> ]


ip arp inspection trust


ip arp inspection [vlan <vlan_list>] [logging { deny | permit | all }]
no ip arp inspection vlan <vlan_list> [logging]

ip dhcp relay [information { option | policy { drop | keep | replace } }]
no ip dhcp relay [information {option| policy }]

ip dhcp relay information access-node-id <access_node_id>
no ip dhcp relay information access-node-id <access_node_id>

ip dhcp relay information index base <index_base>
no dhcp relay information index base <index_base>

ip dhcp snooping [trust]
no ip dhcp snooping

ip dns proxy
no ip dns proxy

ip helper-address <ipv4_ucast>
no ip helper-address

ip http {secure-redirect | secure-server }
no ip http secure-redirect
no ip http secure-server

ip igmp host-proxy [ leave-proxy ]
no ip igmp host-proxy [ leave-proxy ]

ip igmp snooping
no ip igmp snooping

ip igmp snooping compatibility { auto | v1 | v2 | v3 }

ip igmp snooping filter <word16>

ip igmp snooping immediate-leave

ip igmp snooping last-member-query-interval <0-31744>
```

```
ip igmp snooping max-groups <1-10>

ip igmp snooping mrouter

ip igmp snooping priority <0-7>

ip igmp snooping querier { election | address <ipv4_ucast> }

ip igmp snooping query-interval <1-31744>

ip igmp snooping query-max-response-time <0-31744>

ip igmp snooping robustness-variable <1-255>

ip igmp snooping unsolicited-report-interval <0-31744>

ip igmp snooping vlan <vlan_list>
no ip igmp snooping vlan [ <vlan_list> ]

ip igmp ssm-range <ipv4_mcast> <4-32>
no ip igmp ssm-range

ip igmp unknown-flooding
no ip igmp unknown-flooding

ip name-server { <ipv4_ucast> | dhcp [ interface vlan <vlan_id> ] }
no ip name-server

ip route <ipv4_addr> <ipv4_netmask> <ipv4_addr>
no ip route <ipv4_addr> <ipv4_netmask> <ipv4_addr>

ip routing
no ip routing

ip source binding interface <port_type> <port_type_id> <vlan_id> <ipv4_ucast> <ipv4_netmask>
no ip source binding interface <port_type> <port_type_id> <vlan_id>
<ipv4_ucast>{ <ipv4_netmask>|<mac_ucast>}

ip source binding interface <port_type> <port_type_id> <vlan_id> <ipv4_ucast> <mac_ucast>

ip ssh
no ip ssh

ip verify source
no ip verify source

ip verify source limit <0-2>
no ip verify source

ip verify source translate
no ip verify source
```

Parameters

profile	IPMC profile configuration.
arp	Address Resolution Protocol.
dhcp	Dynamic Host Configuration Protocol.
dns	Domain Name System.
helper-address	DHCP relay server.
http	Hypertext Transfer Protocol.
Igmp	Internet Group Management Protocol.
name-server	Domain Name System.
route	Add IP route.

routing	Enable routing for IPv4 and IPv6.
source	Source command.
ssh	Secure Shell.
verify	Verify command.
inspection	ARP inspection.
check-vlan	ARP inspection VLAN mode config.
entry	arp inspection entry.
interface	arp inspection entry interface config.
<port_type>	Port type: Fast, Giga or 10GigabitEthernet..
<port_type_id>	Port ID: swtich-no or port-no..
<vlan_id>	Select a VLAN id to configure.
<mac_ucast>	Select a MAC address to configure.
<ipv4_ucast>	Select an IP Address to configure.
logging	ARP inspection logging mode config.
deny	Log denied entries.
permit	Log permitted entries.
all	Log all entries.
translate	ARP inspection translate all entries.
trust	ARP inspection trust config.
vlan	ARP inspection vlan setting.
<vlan_list>	ARP inspection vlan list.
relay	DHCP relay agent configuration.
information	DHCP information option(Option 82).
option	DHCP option.
information	DHCP information option(Option 82).
policy	Policy for handling the receiving DHCP packet already include the information option.
drop	Drop the package when receive a DHCP message that already contains relay information.
keep	Keep the original relay information when receive a DHCP message that already contains it.
replace	Replace the original relay information when receive a DHCP message that already contains it.
snooping	DHCP snooping.
trust	DHCP Snooping trust config.
proxy	DNS proxy service.
secure-redirect	Secure HTTP web rediction.
secure-server	Secure HTTP web server.
snooping	Snooping IGMP.
compatibility	Interface compatibility.
auto	Compatible with IGMPv1/IGMPv2/IGMPv3.

v1	Forced IGMPv1.
v2	Forced IGMPv2.
v3	Forced IGMPv3.
filter	Access control on IGMP multicast group registration.
<word16>	Profile name: Up to 16 characters.
immediate-leave	Immediate leave configuration.
last-member-query-interval	Last Member Query Interval in tenths of seconds.
<0-31744>	0 - 31744 tenths of seconds.
max-groups	IGMP group throttling configuration.
<1-10>	Maximun number of IGMP group registration.
mrouter	Multicast router port configuration.
priority	Interface CoS priority.
<0-7>	CoS priority ranges from 0 to 7.
querier	IGMP Querier configuration.
election	Act as an IGMP Querier to join Querier-Election.
address	IGMP Querier address configuration.
query-interval	Query Interval in seconds.
<1-31744>	1 - 31744 seconds.
query-max-response-time	Query Response Interval in tenths of seconds.
<0-31744>	0 - 31744 tenths of second.
robustness-variable	Robustness Variable.
<1-255>	Packet loss tolerance count from 1 to 255.
unsolicited-report-interval	Unsolicited Report Interval in seconds.
vlan	IGMP VLAN.
ssm-range	IPv4 address range of Source Specific Multicast.
<ipv4_mcast>	Valid IPv4 multicast address.
<4-32>	Prefix length ranges from 4 to 32.
unknown-flooding	Flooding unregistered IPv4 multicast traffic.
<ipv4_ucast>	A valid IPv4 unicast address.
dhcp	Dynamic Host Configuration Protocol.
interface	Select an interface to configure.
vlan	VLAN Interface.
<vlan_id>	VLAN identifier(s): VID.
<ipv4_addr>	Network.
<ipv4_netmask>	Netmask.
<ipv4_addr>	Gateway.
binding	ip source binding.
interface	ip source binding entry interface config.
<port_type>	Port type: Fast, Giga or 10GigabitEthernet..

<port_type_id>	Port ID: swtich-no or port-no..
<vlan_id>	Select a VLAN ID to configure.
<ipv4_ucast>	Select an IP Address to configure.
<ipv4_netmask>	Select a subnet mask to configure.
<mac_ucast>	Select a MAC address to configure.
source	Verify source.
limit	Limit command.
<0-2>	Limit value.
translate	IP verify source translate all entries.

Example

```
GAM(config)# ip route 192.168.1.1 255.255.255.0 192.168.1.100
GAM(config)#
```

clear ip

Clear Interface Internet Protocol config commands.

Syntax

clear < **ip**> < arp >

clear < **ip**> dhcp { relay | snooping | forward } < statistics >

clear < **ip**> < dhcp >< relay / snooping >< statistics >

clear < **ip**> < dhcp >< snooping >< statistics >< interface > < 10GigabitEthernet/G.hn >< PORT_LIST >

clear < **ip**> < igmp >< snooping >< statistics >

clear < **ip**> < igmp >< snooping >< vlan > < vlan_list >< statistics >

clear <**ip**>< statistics>< system >

clear <**ip**>< statistics>< interface >< vlan >< vlan_list >

clear <**ip**>< statistics>< icmp >

clear <**ip**>< statistics>< icmp-msg ><0~255>

Parameters

arp	Clear ARP cache.
dhcp	Dynamic Host Configuration Protocol.
igmp	Internet Group Management Protocol.
statistics	Traffic statistics.
relay	DHCP relay agent configuration.
snooping	DHCP snooping.
Interface	Interface.
GigabitEthernet	1 Gigabit Ethernet Port.
10GigabitEthernet	10G SFP+
G.hn	G.hn Port.

vlan	Search by VLAN.
<vlan_list>	VLAN identifier(s): VID.

Example

```
GAM# clear ip dhcp snooping statistics
GAM#
```

show ip

Internet Protocol.

Syntax

```
show ip arp

show ip arp inspection [ interface <port_type> <port_type_list> | vlan <vlan_list> ]

show ip arp inspection entry [ dhcp-snooping | static ] [ interface <port_type> <port_type_list> ]

show ip dhcp forward statistics

show ip dhcp relay [ statistics ]

show ip dhcp snooping [ statistics ] [ interface <port_type> <port_type_list> ]

show ip http server secure status

show ip igmp snooping [ vlan <vlan_list> ] [ group-database [ interface <port_type> <port_type_list> ]
[ sfm-information ] ] [ detail ]

show ip igmp snooping mrouter [ detail ]

show ip interface brief

show ip name-server

show ip route

show ip source binding [ dhcp-snooping | static ] [ interface <port_type> <port_type_list> ]

show ip ssh

show ip statistics [ system ] [ interface vlan <vlan_list> ] [ icmp ] [ icmp-msg <0~255> ]

show ip verify source [ interface <port_type> <port_type_list> ]
```

Parameters

arp	Address Resolution Protocol.
inspection	ARP inspection.
interface	ARP inspection entry interface config.
<port_type>	Port type: Fast, Giga or 10GigabitEthernet.
<port_type_list>	List of Port IDs: For example: 1/1,3-5;2/2-4,6.
vlan	VLAN configuration.
<vlan_list>	Select a VLAN id to configure.
entry	ARP inspection entries.
dhcp-snooping	Learn from dhcp snooping.
static	Static entries.
dhcp	Dynamic Host Configuration Protocol.

relay	DHCP relay agent configuration.
statistics	Traffic statistics.
snooping	DHCP snooping.
http	Hypertext Transfer Protocol.
server	HTTP web server.
secure	Secure.
status	Status.
igmp	Internet Group Management Protocol.
snooping	Snooping IGMP.
vlan	Search by VLAN
<vlan_list>	VLAN identifier(s): VID
group-database	Multicast group database from IGMP
sfm-information	Including source filter multicast information from IGMP
detail	Detail running information/statistics of IGMP snooping
mrouter	Multicast router port status in IGMP
detail	Detail running information/statistics of IGMP snooping
interface	IP interface status and configuration.
brief	Brief IP interface status.
name-server	Domain Name System.
route	Display the current ip routing tabl.
binding	IP source binding.
dhcp-snooping	Learn from DHCP snooping.
ssh	Secure Shell.
system	IPv4 system traffic.
icmp	IPv4 ICMP traffic.
icmp-msg	IPv4 ICMP traffic for designated message type.
<0~255>	ICMP message type ranges from 0 to 255.
verify	Verify command.
source	Verify source.

Example

```
GAM# show ip statistics system

IPv4 statistics:

Rcvd:411 total in 36226 bytes
 273 local destination, 0 forwarding
 0 header error, 0 address error, 0 unknown protocol
 0 no route, 0 truncated, 138 discarded
Sent:0 total in 0 byte
 0 generated, 0 forwarded
 0 no route, 0 discarded
Frags: 0 reassemble (0 reassembled, 0 couldn't reassemble)
 0 fragment (0 fragmented, 0 couldn't fragment)
 0 fragment created
Mcast: 411 received in 36226 bytes
 0 sent in 0 byte
Bcast: 273 received, 0 sent
GAM#
```

7.2 IPv6

ipv6

IPv6 configuration commands

Syntax

ipv6< mld >< host-proxy >[< leave-proxy >]
no ipv6 mld host-proxy [leave-proxy]

ipv6< mld >< snooping >[< vlan > <vlan_list>]
no ipv6 mld snooping [vlan <vlan_list>]

ipv6< mld >< ssm-range ><ipv6_mcast>
no ipv6 mld ssm-range

ipv6< mld >< unknown-flooding >
no ipv6 mld unknown-flooding

ipv6< route >< X:X:X:X::X/<0-128>>

no ipv6 route <ipv6_subnet> { <ipv6_ucast> | interface vlan <vlan_id> <ipv6_linklocal> }

Parameters

mld	Multicast Listener Discovery.
route	Configure static routes.
host-proxy	MLD proxy configuration.
snooping	Snooping MLD.
ssm-range	IPv6 address range of Source Specific Multicast.
unknown-flooding	Flooding unregistered IPv6 multicast traffic.
leave-proxy	MLD proxy for leave configuration.
vlan	MLD VLAN.
<vlan_list>	VLAN identifier(s): VID.

<ipv6_mcast>	Valid IPv6 multicast address.
X:X:X:X::X/<0-128>	IPv6 prefix x:x::y/z.

Example

```
GAM(config)# ipv6 mld host-proxy leave-proxy
GAM(config)#
GAM(config)# ipv6 mld snooping vlan 23
GAM(config)#
```

clear ipv6

Clear IPv6 configuration.

Syntax

Clear< ipv6>< mld>< snooping>

Clear< ipv6>< mld>< snooping>< statistics >

Clear< ipv6>< mld>< snooping>< vlan ><vlan_list><statistics>

Clear< **ipv6**>< statistics>

Clear< **ipv6**>< statistics>< system >

Clear< **ipv6**>< statistics> <interface>< vlan> <vlan_list>

Clear< **ipv6**>< statistics>< icmp >

Clear< **ipv6**>< statistics>< icmp-msg> <0~255>

Parameters

mld	Multicast Listener Discovery.
statistics	Traffic statistics.
snooping	Snooping MLD.
statistics	Running MLD snooping counters.
vlan	Search by VLAN.
<vlan_list>	VLAN identifier(s): VID.
icmp	IPv6 ICMP traffic.
icmp-msg	IPv6 ICMP traffic for designated message type.
interface	Select an interface to configure.
system	IPv6 system traffic.
< 0~255>	ICMP message type ranges from 0 to 255.

Example

```
GAM# clear ipv6 mld snooping vlan 100 statistics
GAM#
GAM# clear ipv6 statistics icmp-msg 200
GAM#
```

show ipv6

IPv6 configuration commands.

Syntax

show ipv6 interface [vlan <vlan_list> { brief | statistics }]

show ipv6 mld snooping [vlan <vlan_list>] [group-database [interface <port_type> <port_type_list>] [sfm-information]] [detail]

show ipv6 mld snooping mrouter [detail]

show ipv6 neighbor [interface vlan <vlan_list>]

show ipv6 route [interface vlan <vlan_list>]

show ipv6 statistics [system] [interface vlan <vlan_list>] [icmp] [icmp-msg <0~255>]

Parameters

1~64	Zero or more ERPS group numbers.
interface	Iinterface to configure.
vlan	IPv6 interface VLAN.
<vlan_list>	IPv6 interface VLAN list.
brief	Brief summary of IPv6 status and configuration.
statistics	Traffic statistics.
mld	Multicast Listener Discovery.
snooping	Snooping MLD.
vlan	Search by VLAN.
<vlan_list>	VLAN identifier(s): VID.
group-database	Multicast group database from MLD.
interface	Search by port.
<port_type>	Port type: Fast, Giga or 10GigabitEthernet.
<port_type_list>	List of Port ID. For example: 1/1,3-5;2/2-4,6.
sfm-information	Include source filter multicast information from MLD.
detail	Detail running information/statistics of MLD snooping.
mrouter	Multicast router port status in MLD.
neighbor	IPv6 neighbors.
route	IPv6 routes.
statistics	Traffic statistics.
system	IPv6 system traffic.
icmp	IPv6 ICMP traffic.
icmp-msg	IPv6 ICMP traffic for designated message type.
<0~255>	ICMP message type. Range 0 to 255.

Example

```
GAM# show ipv6 statistics system

IPv6 statistics:

Rcvd:2 total in 112 bytes
 0 local destination, 0 forwarding
 0 header error, 0 address error, 0 unknown protocol
 0 no route, 0 truncated, 2 discarded
Sent:8 total in 512 bytes
 14 generated, 0 forwarded
 3 no route, 0 discarded
Frags: 0 reassemble (0 reassembled, 0 couldn't reassemble)
 0 fragment (0 fragmented, 0 couldn't fragment)
 0 fragment created
Mcast: 2 received in 112 bytes
 8 sent in 512 bytes
Bcast: 0 received, 0 sent
GAM#
```

7.3 ipmc commands

ipmc

IPv4/IPv6 multicast configuration.

Syntax

ipmc < profile >[< word16>]
no ipmc profile <word16>

ipmc< range > < word16><ipv4_mcast | ipv6_mcast>
no ipmc range <word16>

Parameters

profile	IPMC profile configuration.
range	A range of IPv4/IPv6 multicast addresses for the profile.
< word16>	Name. Length: 16 characters.
<ipv4_mcast>	Valid IPv4 multicast address.
<ipv6_mcast>	Valid IPv6 multicast address.

Example

```
GAM(config)# ipmc profile test
GAM(config-ipmc-profile)#
```

show ipmc

IPv4/IPv6 multicast configuration.

Syntax

show ipmc profile [<word16>] [detail]

show ipmc range [<word16>]

Parameters

profile	IPMC profile configuration.
range	A range of IPv4/IPv6 multicast addresses for the profile.
< word16>	Profile name. Length: 16 characters.
detail	Detailed information for a profile.

Example

```
GAM# show ipmc range
GAM#
```

8 LLDP

lldp

Link Layer Discovery Ptrotocol. .

Syntax

```
lldp holdtime <2-10>
no lldp holdtime

lldp med datum { wgs84 | nad83_navd88 | nad83_mllw }
no lldp med datum

lldp med fast <1-10>
no lldp med fast

lldp med location-tlv altitude { meters | floors } <word11>
no lldp med location-tlv altitude

lldp med location-tlv civic-addr { country | state | county | city | district | block | street |
leading-street-direction | trailing-street-suffix | street-suffix | house-no | house-no-suffix |
landmark | additional-info | name | zip-code | building | apartment | floor | room-number | place-type
| postal-community-name | p-o-box | additional-code } <string250>
no lldp med location-tlv civic-addr { country | state | county | city | district | block | street |
leading-street-direction | trailing-street-suffix | street-suffix | house-no | house-no-suffix |
landmark | additional-info | name | zip-code | building | apartment | floor | room-number | place-type
| postal-community-name | p-o-box | additional-code }

lldp med location-tlv elin-addr <dword25>
no lldp med location-tlv elin-addr

lldp med location-tlv latitude { north | south } <word8>
no lldp med location-tlv latitude

lldp med location-tlv longitude { west | east } <word9>
no lldp med location-tlv longitude

lldp med media-vlan policy-list <range_list>
no lldp med media-vlan-policy <0~31>

lldp med media-vlan-policy <0-31> { voice | voice-signaling | guest-voice-signaling | guest-voice |
softphone-voice | video-conferencing | streaming-video | video-signaling } { tagged <vlan_id> | untagged }
[ l2-priority <0-7> ] [ dscp <0-63> ]
no lldp med media-vlan-policy <0~31>

lldp med transmit-tlv [ capabilities ] [ location ] [ network-policy ]


lldp reinit <1-10>
no lldp reinit

lldp timer <5-32768>
no lldp timer

lldp tlv-select { management-address | port-description | system-capabilities | system-description |
system-name }
no lldp tlv-select { management-address | port-description | system-capabilities | system-description
| system-name }

lldp transmission-delay <1-8192>
no lldp transmission-delay
```

lldp transmit

Parameters

holdtime	Sets LLDP hold time (The neighbor switch will discarded the LLDP information after "hold time" multiplied with "timer" seconds).
med	Media Endpoint Discovery.
reinit	LLDP TX reinitialization delay in seconds.
timer	Sets LLDP TX interval (The time between each LLDP frame transmitted in seconds).
tlv-select	Optional TLVs to transmit.
transmission-delay	Sets LLDP transmision-delay.LLDP transmission delay. The amount of time that the transmission of LLDP frames will be delayed after LLDP configuration has changed (in seconds).
<2-10>	2-10 seconds.
<1-10>	1-10 seconds.
<5-32768>	5-32768 seconds.
<1-8192>	1-8192 seconds.
management-address	Enable/Disable transmission of management address.
port-description	Enable/Disable transmission of port description.
system-capabilities	Enable/Disable transmission of system capabilities.
system-description	Enable/Disable transmission of system description.
system-name	Enable/Disable transmission of system name.
datum	Datum (geodetic system) type.
fast	Number of times to repeat LLDP frame transmission at fast start.
location-tlv	LLDP-MED Location Type Length Value parameter.
media-vlan-policy	Use the media-vlan-policy to create a policy, which can be assigned to an interface.
nad83_mllw	Mean lower low water datum 1983.
nad83_navd88	North American vertical datum 1983.
wgs84	World Geodetic System 1984.
civic-addr	Civic address information and postal information.
country	The two-letter ISO 3166 country code in capital ASCII letters - Example: DK, DE or US.
state	National subdivisions (state, canton, region, province, prefecture).
county	County, parish, gun (Japan), district.
city	City, township, shi (Japan) - Example: Copenhagen.
district	City division, borough, city district, ward, chou (Japan).
block	Neighbourhood, block.
street	Street - Example: Poppelvej.
leading-street-direction	Leading street direction - Example: N.
trailing-street-suffix	Trailing street suffix - Example: SW.
street-suffix	Street suffix - Example: Ave, Platz.
house-no	House number - Example: 21.

house-no-suffix	House number suffix - Example: A, 1/2.
landmark	Landmark or vanity address - Example: Columbia University.
additional-info	Additional location info - Example: South Wing.
name	Name (residence and office occupant) - Example: Flemming Jahn.
zip-code	Postal/zip code - Example: 2791.
building	Building (structure) - Example: Low Library.
apartment	Unit (Apartment, suite) - Example: Apt 42.
floor	Floor - Example: 4.
room-number	Room number - Example: 450F.
place-type	Place type - Example: Office.
postal-community-name	Postal community name - Example: Leonia.
p-o-box	Post office box (P.O. BOX) - Example: 12345.
additional-code	Additional code - Example: 1320300003.
<string250>	Value for the corresponding selected civic address.
elin-addr	Emergency Location Identification Number, (e.g. E911 and others), such as defined by TIA or NENA.
<dword25>	ELIN value
north	Setting latitude direction to north.
south	Setting latitude direction to south.
<word8>	Latitude degrees (0.0000-90.0000).
policy-list	Assignment of policies.
<range_list>	Policies to assign to the interface.
<0-31>	Policy id for the policy which is created.
voice	Create a voice policy.
voice-signaling	Create a voice signaling policy.
guest-voice-signaling	Create a guest voice signaling policy.
guest-voice	Create a guest voice policy.
softphone-voice	Create a softphone voice policy.
video-conferencing	Create a video conferencing policy.
streaming-video	Create a streaming video policy.
video-signaling	Create a video signaling policy.
tagged	The policy uses tagged frames.
<vlan_id>	The VLAN the policy uses tagged frames.
untagged	The policy uses un-tagged frames.
l2-priority	Layer 2 priority.
<0-7>	Priority 0-7
dscp	Differentiated Services Code Point.
<0-63>	DSCP value 0-63.

Example

```
GAM(config)# lldp holdtime 5
GAM(config)#
GAM(config)# lldp med fast 5
GAM(config)#
```

clear lldp

Clears LLDP statistics.

Syntax

Clear< lldp >< statistics>

Clear< lldp >< statistics><|>< begin | exclude | include >< LINE >

Parameters

statistics	Clears LLDP statistics.
Output modifiers	
begin	Begin with the line that matches.
exclude	Exclude lines that match.
include	Include lines that match.
LINE	String to match output lines.

Example

```
GAM# clear lldp statistics | include LINE
GAM#
```

show lldp

Display LLDP neighbor information.

Syntax

show lldp med media-vlan-policy [<0~31>]

show lldp med remote-device [interface <port_type> <port_type_list>]

show lldp neighbors [interface <port_type> <port_type_list>]

show lldp statistics [interface <port_type> <port_type_list>]

Parameters

med	Display LLDP-MED neighbor information.
neighbors	Display LLDP neighbor information.
statistics	Display LLDP statistics information.
media-vlan-policy	Display media VLAN policies.
remote-device	Display remote device LLDP-MED neighbors information.
<0~31>	List of policies.
Interface	None.

<port_type >	10GigabitEthernetor G.hn.
<port_type_list>	Port list in 1/1-5 for GigabitEthernet, 1/1 for G.hn.

Example

```
GAM# show lldp med media-vlan-policy
No policies defined
GAM#
```

9 MAC table

mac

MAC table entries/configuration.

Syntax

```
mac address-table aging-time <0,10-1000000>
no mac address-table aging-time <0,10-1000000>

mac address-table static <mac_addr> vlan <vlan_id> interface <port_type> <port_type_list>
no mac address-table static <mac_addr> vlan <vlan_id> interface <port_type> <port_type_list>
```

Parameters

action	Action if loop detected.
address-table	MAC Address Table.
aging-time	MAC address aging time.
<0,10-1000000>	Aging time in seconds. A value of 0 disables aging.
static	Static MAC address.
<mac_addr>	48 bit MAC address: xx:xx:xx:xx:xx:xx.
vlan	VLAN keyword.
<vlan_id>	VLAN IDs. Range: 1-4095.
interface	Select an interface to configure.
<port_type>	Port type: Fast, Giga or G.hn..
<port_type_list>	List of port IDs. For example: 1/1,3-5;2/2-4,6.

Example

```
GAM(config)# mac address-table aging-time 100
GAM(config)#
```

clear mac

Clear the MAC address table.

Syntax

```
Clear< mac>< address-table>
```

Parameters

address-table	Flush MAC Address table.

Example

```
GAM# clear mac address-table
GAM#
```

show mac

MAC address table information.

Syntax

```
show mac address-table [ conf | static | aging-time | { { learning | count } [ interface <port_type>
<port_type_list> ] } | { address <mac_addr> [ vlan <vlan_id> ] } | vlan <vlan_id> | interface <port_type>
<port_type_list> ]
```

Parameters

address-table	Mac Address Table.
conf	User added static mac addresses.
static	All static mac addresses.
aging-time	Aging time.
learning	Learn/disable/secure state.
count	Total number of mac addresses.
interface	Select an interface to configure.
<port_type>	Port type: Fast, Giga or G.hn.
<port_type_list>	List of port IDs. For example: 1/1,3-5;2/2-4,6.
address	MAC address lookup.
<mac_addr>	48 bit MAC address: xx:xx:xx:xx:xx:xx.
vlan	VLAN lookup

Example

```
GAM# show mac address-table static
GAM#
```

10 VLAN management

10.1 interface

Select an interface to configure.

Syntax

```
interface <port_type> <port_type_list>

interface<vlan> <vlan_list>
no interface<vlan>< vlan_list >
```

Parameters

<port_type>	10GigabitEthernet
vlan	VLAN interface configurations.
<vlan_list>	List of VLAN interface numbers, 1-4095.
<port_type_list>	Port list in 1/1 for GigabitEthernet, 1/1-2 for 10GigabitEthernet 1/1-24 for G.hn.

Example

```
GAM(config)# interface vlan1000
GAM(config-if-vlan)#
```

10.2 Port VLAN

vlan

VLAN commands.

Syntax

```
vlan <vlan_list>

vlan ethertype s-custom-port <0x0600-0xffff>
no vlan { [ ethertype s-custom-port ] | <vlan_list> }

vlan protocol { { eth2 { <0x600-0xffff> | arp | ip | ipx | at } } | { snap { <0x0-0xffffff> | rfc_1042
| snap_8021h } <0x0-0xffff> } | { llc <0x0-0xff> <0x0-0xff> } } group <word16>
no vlan protocol { { eth2 { <0x600-0xffff> | arp | ip | ipx | at } } | { snap { <0x0-0xffffff> | rfc_1042
| snap_8021h } <0x0-0xffff> } | { llc <0x0-0xff> <0x0-0xff> } } group <word16>
```

Parameters

<vlan_list>	VLAN IDs 1-4095.
ethertype	Ether type for Custom S-ports.
protocol	Protocol-based VLAN commands.
s-custom-port	Custom S-ports configuration .
<0x0600-0xffff>	Ether type (Range: 0x0600-0xffff> .
eth2	Ethernet-based VLAN commands.
<0x600-0xffff>	Ether Type(Range: 0x600 - 0xFFFF).

arp	Ether Type is ARP.
ip	Ether Type is IP.
ipx	Ether Type is IPX.
at	Ether Type is AppleTalk.
snap	SNAP-based VLAN group.
<0x0-0xffffff>	SNAP OUI (Range 0x000000 - 0XFFFFFF).
rfc_1042	SNAP OUI is rfc_1042.
snap_8021h	SNAP OUI is 8021h.
<0x0-0xffff>	PID (Range: 0x0 - 0xFFFF).
llc	LLC-based VLAN group.
<0x0-0xff>	DSAP (Range: 0x00 - 0xFF).
<0x0-0xff>	SSAP (Range: 0x00 - 0xFF).
group	Protocol-based VLAN group commands.
<word16>	Group Name (Range: 1 - 16 characters).

Example

```
GAM(config)# vlan ethertype s-custom-port 0x0800
GAM(config)#
```

show vlan

VLAN status.

Syntax

```
show vlan [ id <vlan_list> | name <vword32> | brief ]
```

```
show vlan protocol [ eth2 { <0x600-0xffff> | arp | ip | ipx | at } ] [ snap { <0x0-0xffffff> | rfc_1042 | snap_8021h } <0x0-0xffff> ] [ llc <0x0-0xff> <0x0-0xff> ]
```

Parameters

id	VLAN status by VLAN ID.
<vlan_list>	VLAN IDs 1-4095.
name	VLAN status by VLAN name.
<vword32>	A VLAN name.
brief	VLAN summary information.
protocol	Protocol-based VLAN status.
eth2	Ethernet protocol based VLAN status.
<0x600-0xffff>	Ether Type.Range: 0x600 - 0xFFFF.
arp	Ether Type is ARP.
ip	Ether Type is IP.
ipx	Ether Type is IPX.
at	Ether Type is AppleTalk.
snap	SNAP-based VLAN status.

<0x0-0xffffff>	SNAP OUI (Range 0x000000 - 0XFFFFFF).
rfc_1042	SNAP OUI is rfc_1042.
snap_8021h	SNAP OUI is 8021h.
<0x0-0xffff>	PID (Range: 0x0 - 0xFFFF).
llc	LLC-based VLAN status.
<0x0-0xff>	DSAP (Range: 0x00 - 0xFF).
<0x0-0xff>	SSAP (Range: 0x00 - 0xFF).

Example

```
GAM# show vlan
VLAN      Name                          Interfaces
----      ----------------------------  ----------
1         default
2         VLAN0002                       G.hn 1/1-24
4000      VLAN4000                       Gi 1/1 10G 1/1-2 G.hn 1/13-15,18
GAM#
```

switchport

Set switching mode characteristics.

Syntax

```
switchport <vlan>< mapping ><1-7> <vlan_list><vlan_id>
no switchport vlan mapping <1-7>< vlan_list >
```

Parameters

vlan	VLAN translation.
mapping	Add VLAN translation entry into a group.
<group id : 1-7>	Group ID.

Example

```
GAM(config)# switchport vlan mapping 5 10 1000
GAM(config)#
```

show switchport

Display switching mode characteristics.

Syntax

```
show switchport forbidden [ { vid <vlan_id> } | { name <word> } ]
```

Parameters

forbidden	Lookup VLAN Forbidden port entry.
name	name - Show forbidden access for specific VLAN name.
vid	vid - Show forbidden access for specific VLAN ID.
<vlan_id>	VLAN ID.

<word>	VLAN name.

Example

```
GAM# show switchport forbidden
GAM#
```

svl

Shared VLAN Learning.

Syntax

svl fid <fid> vlan <vlan_list>

Parameters

fid	Filter ID keyword.
<fid>	1-4095.
vlan	VLAN keyword.

Example

```
GAM(config)# svl fid 333 vlan 1
GAM(config)#
```

svl

Shared VLAN Learning configuration.

Syntax

show svl { [fid [<fid_list>]] | [vlan [<vlan_list>]] }

Parameters

fid	Show a given FID.
vlan	Show a given VLAN ID
vid	vid - Show forbidden access for specific VLAN ID.
<vlan_id>	VLAN ID.

Example

```
GAM# show svl fid
FIDVLANs
---------------------------------
 3331,333
GAM#
```

10.3 Q in Q tunneling

switchport hybrid qinq

Enables support for Q-in-Q tunneling on an interface.

Syntax

```
switchport hybrid qinq
```

Example

```
GAM(config)# switchport hybrid qinq
```

switchport hybrid qinq cvid <cvid> svid <svid>

Encapsulate a C-VLAN into a outer VLAN. To do qinq, the cvid must exists first (subscriber VLAN).

Syntax

```
switchport hybrid qinq cvid <cvid> svid <svid>
```

Parameters

<cvid>	Sets the C-VLAN VID (C-VID) for this entry.
<svid>	Sets the S-VLAN VID (S-VID) for this entry.

Example

```
GAM(config)# switchport hybrid qinq cvid 100 svid 2810
GAM(config)#
```

10.4 Multicast VLAN Registration

mvr

Multicast VLAN Registration configuration.

Syntax

```
mvr
no mvr

mvr name <word16> channel <word16>
no mvr name <word16> channel

mvr name <word16> compatibility { auto | igmpv1 | igmpv2-mldv1 | igmpv3-mldv2 }
no mvr name <word16> compatibility { auto | igmpv1 | igmpv2-mldv1 | igmpv3-mldv2 }

mvr name <word16> frame priority <0-7>
no mvr name <word16> frame priority

mvr name <word16> frame tagged
no mvr name <word16> frame tagged

mvr name <word16> igmp-address <ipv4_ucast>
no mvr name <word16> igmp-address
```

```
mvr name <word16> last-member-query-interval <0-31744>
no mvr name <word16> last-member-query-interval

mvr name <word16> mode { dynamic | compatible }
no mvr name <word16> mode

mvr name <word16> type { source | { receiver [ remap-vid { none | <remap_vid> } ] } }
no mvr name <word16> type { source | { receiver [ remap-vid { none | <remap_vid> } ] } }

mvr name <mvr_name> { election | igmp-address <v_ipv4_ucast> | masquerade }
no mvr name <mvr_name> { election | igmp-address <v_ipv4_ucast> | masquerade }

mvr vlan <vlan_list> [ name <word16> ]
no mvr vlan <vlan_list>

mvr vlan <vlan_list> channel <word16>
no mvr vlan <vlan_list> channel

mvr vlan <vlan_list> frame priority <0-7>
no mvr vlan <vlan_list> frame priority

mvr vlan  <vlan_list> compatibility { auto | igmpv1 | igmpv2-mldv1 | igmpv3-mldv2 }
no mvr vlan  <vlan_list> compatibility { auto | igmpv1 | igmpv2-mldv1 | igmpv3-mldv2 }

mvr vlan <vlan_list> frame priority <cos_priority>
no mvr vlan <vlan_list> frame priority

mvr vlan <vlan_list> frame tagged
no mvr vlan <vlan_list> frame tagged

mvr vlan <vlan_list> igmp-address <ipv4_ucast>
no mvr vlan <vlan_list> igmp-address

mvr vlan <vlan_list> last-member-query-interval <0-31744>
no mvr vlan <vlan_list> last-member-query-interval

mvr vlan <vlan_list> mode { dynamic | compatible }
no mvr vlan <vlan_list> mode

mvr <vlan_list> type { source | { receiver [ rempap-vid { none | <remap_vid> } ] } }
no mvr name <vlan_list> type { source | { receiver [ rempap-vid { none | <remap_vid> } ] } }

mvr <vlan_list> { election | igmp-address <v_ipv4_ucast> | masquerade }
no mvr name <vlan_list> { election | igmp-address <v_ipv4_ucast> | masquerade }
```

Parameters

destination	Destination port. That is the port that traffic should be mirrored to.
name	MVR multicast name.
<word16>	MVR multicast VLAN name.
channel	MVR channel configuration.
<word16>	Profile name. Length: 16 characters.
frame	MVR control frame in TX.
priority	Interface CoS priority.
<0-7>	CoS priority ranges from 0 to 7.
tagged	Tagged IGMP/MLD frames will be sent.
igmp-address	MVR address configuration used in IGMP.
<ipv4_ucast>	A valid IPv4 unicast address MVR multicast VLAN name.
last-member-query-interval	Last Member Query Interval in tenths of seconds.

<0-31744>	0 - 31744 tenths of seconds.
mode	MVR mode of operation.
dynamic	Dynamic MVR operation mode.
compatibility	Compatible MVR operation mode.
type	MVR port role configuration.
source	MVR source port.
receiver	MVR receiver port.
vlan	MVR multicast VALN.
<vlan_list>	MVR multicast VLAN list.
channel	MVR channel configuration.
<word16>	Profile name. Length: 16 characters.
frame	MVR control frame in TX.
priority	Interface CoS priority.
<0-7>	CoS priority ranges from 0 to 7.
igmp-address	MVR address configuration used in IGMP.
<ipv4_ucast>	A valid IPv4 unicast address.
<vlan_list>	MVR multicast VLAN list.
last-member-query-interval	Last Member Query Interval in tenths of seconds.
<0-31744>	0 - 31744 tenths of seconds.
compatible	Compatible MVR operation mode.
type	MVR port role configuration.
source	MVR source port.
receiver	MVR receiver port.
remap-vid	Remap EP traffic with ce-vlan.
cos_priority	CoS priority. Range: 0. to 7.

Example

```
GAM(config)# mvr vlan 10 mode dynamic
GAM(config)#
```

clear mvr

Multicast VLAN Registration configuration.

Syntax

clear <mvr><statistics>

clear <mvr> <vlan ><vlan_list><statistics>

clear <mvr> < name >< word16><statistics>

Parameters

name	MVR multicast name

statistics	Running MVR protocol counters
vlan	MVR multicast vlan
< word16>	MVR multicast VLAN name
<vlan_list>	MVR multicast VLAN list

Example

```
GAM# clear mvr vlan 25 statistics
GAM#
```

show mvr

Multicast VLAN Registration configuration.

Syntax

```
show mvr [ vlan <vlan_list> | name <word16> ] [ group-database [ interface <port_type> <port_type_list> ]
[ sfm-information ] ] [ detail ]
```

Parameters

vlan	Search by VLAN.
<vlan_list>	MVR multicast VLAN list.
name	Search by MVR name.
<word16>	MVR multicast VLAN name.
group-database	Multicast group database from MVR.
interface	Search by port.
<port_type>	Port type: Fast, Giga or 10GigabitEthernet.
<port_type_list>	List of port IDs. For example: 1/1,3-5;2/2-4,6.
sfm-information	Including source filter multicast information from MVR.
detail	Detail information/statistics from MVR group database.

Example

```
GAM# show mvr vlan 10 detail

MVR is currently disabled, please enable MVR to start group registration.
% Invalid MVR IGMP VLAN 10.

% Invalid MVR MLD VLAN 10.

GAM#
```

10.5 pvlan commands

show pvlan

PVLAN status.

Syntax

```
show pvlan<range_list>
```

Parameters

<range_list>	PVLAN status by PVLAN ID.

Example

```
GAM# show pvlan 20
% Invalid PVLAN detected
GAM#
```

10.6 gvrp

gvrp

Set network name.

Syntax

```
gvrp

gvrp max-vlans <maxvlans>

gvrp time { [ join-time <jointime> ] [ leave-time <leavetime> ] [ leave-all-time <leavealltime> ] }*1
```

Parameters

max-vlans	Number of simultaniously VLANs that GVRP can control.
time	Config GARP protocol timer parameters. IEEE 802.1D-2004, clause 12.11.
join-time	Set GARP protocol parameter JoinTime.
leave-all-time	Set GARP protocol parameter LeaveAllTime.
leave-time	Set GARP protocol parameter LeaveTime.

Example

```
GAM(config)# gvrp max-vlans 333
GAM(config)# gvrp time join-time 10 leave-all-time 3000 leave-time 300
GAM(config)#
```

11 QoS

map

Global QoS Map/Table.

Syntax

```
qos map cos-dscp <0~7> dpl <0~1> dscp { <0-63> | { be | af11 | af12 | af13 | af21 | af22 | af23 | af31
| af32 | af33 | af41 | af42 | af43 | cs1 | cs2 | cs3 | cs4 | cs5 | cs6 | cs7 | ef | va } }
no qos map cos-dscp <0~7> dpl <0~1>

no qos map cos-tag cos <0~7> dpl <0~1>

qos map dscp-classify { <0~63> | { be | af11 | af12 | af13 | af21 | af22 | af23 | af31 | af32 | af33
| af41 | af42 | af43 | cs1 | cs2 | cs3 | cs4 | cs5 | cs6 | cs7 | ef | va } }
no qos map dscp-classify { <0~63> | { be | af11 | af12 | af13 | af21 | af22 | af23 | af31 | af32 | af33
| af41 | af42 | af43 | cs1 | cs2 | cs3 | cs4 | cs5 | cs6 | cs7 | ef | va } }

qos map dscp-cos { <0~63> | { be | af11 | af12 | af13 | af21 | af22 | af23 | af31 | af32 | af33 | af41
| af42 | af43 | cs1 | cs2 | cs3 | cs4 | cs5 | cs6 | cs7 | ef | va } } cos <0-7> dpl <dpl>
no qos map dscp-cos { <0~63> | { be | af11 | af12 | af13 | af21 | af22 | af23 | af31 | af32 | af33 |
af41 | af42 | af43 | cs1 | cs2 | cs3 | cs4 | cs5 | cs6 | cs7 | ef | va } }

qos map dscp-egress-translation { <0~63> | { be | af11 | af12 | af13 | af21 | af22 | af23 | af31 | af32
| af33 | af41 | af42 | af43 | cs1 | cs2 | cs3 | cs4 | cs5 | cs6 | cs7 | ef | va } } <0~1> to { <0-63>
| { be | af11 | af12 | af13 | af21 | af22 | af23 | af31 | af32 | af33 | af41 | af42 | af43 | cs1 | cs2
| cs3 | cs4 | cs5 | cs6 | cs7 | ef | va } }
no qos map dscp-egress-translation { <0~63> | { be | af11 | af12 | af13 | af21 | af22 | af23 | af31 |
af32 | af33 | af41 | af42 | af43 | cs1 | cs2 | cs3 | cs4 | cs5 | cs6 | cs7 | ef | va } } <0~1>

qos map dscp-ingress-translation { <0~63> | { be | af11 | af12 | af13 | af21 | af22 | af23 | af31 | af32
| af33 | af41 | af42 | af43 | cs1 | cs2 | cs3 | cs4 | cs5 | cs6 | cs7 | ef | va } } to { <0-63> | { be
| af11 | af12 | af13 | af21 | af22 | af23 | af31 | af32 | af33 | af41 | af42 | af43 | cs1 | cs2 | cs3
| cs4 | cs5 | cs6 | cs7 | ef | va } }
no qos map dscp-ingress-translation { <0~63> | { be | af11 | af12 | af13 | af21 | af22 | af23 | af31
| af32 | af33 | af41 | af42 | af43 | cs1 | cs2 | cs3 | cs4 | cs5 | cs6 | cs7 | ef | va } }
```

Parameters

cos-dscp	Map for cos to dscp.
dscp-classify	Map for dscp classify enable.
dscp-cos	Map for dscp to cos.
dscp-egress-translation	Map for dscp egress translation.
dscp-ingress-translation	Map for dscp ingress translation.
dpl	Specify drop precedence level.
<Dpl : 0~1>	Specific drop precedence level or range.
dscp	Specify DSCP.
<DscpNum : 0-63>	Specific DSCP.
af11	Assured Forwarding PHB AF11(DSCP 10).
af12	Assured Forwarding PHB AF12(DSCP 12).
af13	Assured Forwarding PHB AF13(DSCP 14).
af21	Assured Forwarding PHB AF21(DSCP 18)

af22	Assured Forwarding PHB AF22(DSCP 20)
af23	Assured Forwarding PHB AF23(DSCP 22)
af31	Assured Forwarding PHB AF31(DSCP 26)
af32	Assured Forwarding PHB AF32(DSCP 28)
af33	Assured Forwarding PHB AF33(DSCP 30)
af41	Assured Forwarding PHB AF41(DSCP 34)
af42	Assured Forwarding PHB AF42(DSCP 36)
af43	Assured Forwarding PHB AF43(DSCP 38)
be	Default PHB(DSCP 0) for best effort traffic
cs1	Class Selector PHB CS1 precedence 1(DSCP 8)
cs2	Class Selector PHB CS2 precedence 2(DSCP 16)
cs3	Class Selector PHB CS3 precedence 3(DSCP 24)
cs4	Class Selector PHB CS4 precedence 4(DSCP 32)
cs5	Class Selector PHB CS5 precedence 5(DSCP 40)
cs6	Class Selector PHB CS6 precedence 6(DSCP 48)
cs7	Class Selector PHB CS7 precedence 7(DSCP 56)
ef	Expedited Forwarding PHB(DSCP 46)
va	Voice Admit PHB(DSCP 44)

Example

```
GAM(config)# qos map cos-dscp 5 dpl 1 dscp 20
GAM(config)#
```

qce

QoS Control Entry.

Syntax

```
qos qce refresh
no qos qce <1~256>

qos qce { [ update ] } <1-256> [ { next <1-256> } | last ] [ ingress interface <port_type> <port_type_list> ]
[ tag { tagged | untagged | any } ] [ vid { <vlan_list> | any } ] [ pcp { <pcp> | any } ] [ dei { <0-1>
| any } ] [ smac { <mac_addr> | <oui> | any } ] [ dmac-type { unicast | multicast | broadcast | any } ]
[ frametype { any | { etype [ { <0x600-0x7ff,0x801-0x86dc,0x86de-0xffff> | any } ] } | { llc [ dsap { <0-0xff>
| any } ] [ ssap { <0-0xff> | any } ] [ control { <0-0xff> | any } ] } | { snap [ { <0-0xffff> | any } ] }
| { ipv4 [ proto { <0-255> | tcp | udp | any } ] [ sip { <ipv4_subnet> | any } ] [ dscp { <0~63> | { be
| af11 | af12 | af13 | af21 | af22 | af23 | af31 | af32 | af33 | af41 | af42 | af43 | cs1 | cs2 | cs3
| cs4 | cs5 | cs6 | cs7 | ef | va } | any } ] [ frag { yes | no | any } ] [ sport { <0~65535> | any } ]
[ dport { <0~65535> | any } ] } | { ipv6 [ proto { <0-255> | tcp | udp | any } ] [ sip { <ipv4_subnet>
| any } ] [ dscp { <0~63> | { be | af11 | af12 | af13 | af21 | af22 | af23 | af31 | af32 | af33 | af41
| af42 | af43 | cs1 | cs2 | cs3 | cs4 | cs5 | cs6 | cs7 | ef | va } | any } ] [ sport { <0~65535> | any } ]
[ dport { <0~65535> | any } ] } } ] [ action { [ cos { <0-7> | default } ] [ dpl { <0-1> | default } ]
[ dscp { <0-63> | { be | af11 | af12 | af13 | af21 | af22 | af23 | af31 | af32 | af33 | af41 | af42 |
af43 | cs1 | cs2 | cs3 | cs4 | cs5 | cs6 | cs7 | ef | va } | default } ] } ]
```

Parameters

<Id : 1-256>	QCE ID.
refresh	Refresh QCE tables in hardware.
update	Update an existing QCE.
action	Specify action.
dei	Specify DEI (Drop Eligible Indicator).
dmac-type	Specify DMAC type.
frametype	Specify frame type.
ingress	Ingress interfaces.
last	Place QCE at the end.
next	Place QCE before the next QCE ID.
pcp	Specify PCP (Priority Code Point).
smac	Specify SMAC. If 'qos qce dmac-dip' is set, this parameter specifies the DMAC.
tag	Specify tag options.
vid	Specify VLAN ID.
cos	Specify class of service.
dpl	Specify drop precedence level.
dscp	Specify DSCP.
cos	Specify class of service.
<Cos : 0-7>	Specific class of service.
default	Keep default class of service.
<Dpl : 0-1>	Specific drop precedence level.
default	Keep default drop precedence level.
<Dscp : 0-63>	Specific DSCP.
af11	Assured Forwarding PHB AF11(DSCP 10).
af12	Assured Forwarding PHB AF12(DSCP 12).
af13	Assured Forwarding PHB AF13(DSCP 14).
af21	Assured Forwarding PHB AF21(DSCP 18).
af22	Assured Forwarding PHB AF22(DSCP 20)
af23	Assured Forwarding PHB AF23(DSCP 22).
af31	Assured Forwarding PHB AF31(DSCP 26).
af32	Assured Forwarding PHB AF32(DSCP 28).
af33	Assured Forwarding PHB AF33(DSCP 30).
af41	Assured Forwarding PHB AF41(DSCP 34).
af42	Assured Forwarding PHB AF42(DSCP 36).
af43	Assured Forwarding PHB AF43(DSCP 38).
be	Default PHB(DSCP 0) for best effort traffic.
cs1	Class Selector PHB CS1 precedence 1(DSCP 8).
cs2	Class Selector PHB CS2 precedence 2(DSCP 16).

cs3	Class Selector PHB CS3 precedence 3(DSCP 24).
cs4	Class Selector PHB CS4 precedence 4(DSCP 32).
cs5	Class Selector PHB CS5 precedence 5(DSCP 40).
cs6	Class Selector PHB CS6 precedence 6(DSCP 48).
cs7	Class Selector PHB CS7 precedence 7(DSCP 56).
default	Keep default DSCP.
ef	Expedited Forwarding PHB(DSCP 46).
va	Voice Admit PHB(DSCP 44).
any	Any.
broadcast	Broadcast.
multicast	Multicast.
unicast	Unicast.
etype	Ethernet frames.
ipv4	IPv4 frames.
ipv6	IPv6 frames.
llc	LLC frames.
snap	SNAP frames.
<Etype : 0x600-0x7ff,0x801-0x86dc,0x86de-0xffff>	
	Specific EtherType.
interface	Interfaces.
<Next : 1-256>	The next QCE ID.
<Pcp : pcp>	Specific PCP (0-7) or range (0-1, 2-3, 4-5, 6-7, 0-3 or 4-7).
<Smac : mac_addr>	Specific SMAC (XX-XX-XX-XX-XX-XX).
tagged	Tagged frames only.
untagged	Untagges frames only.
<Vid : vlan_list>	Specific VLAN ID or range.

Example

```
GAM(config)# qos qce 100 vid any
GAM(config)#
```

storm

Storm policer.

Syntax

```
qos storm { unicast | multicast | broadcast } <1,2,4,8,16,32,64,128,256,512,1024> [ kfps ]
no qos storm { unicast | multicast | broadcast }
```

Parameters

broadcast	Police broadcast frames.
multicast	Police multicast frames.

unicast	Police unicast frames.
<Rate : 1,2,4,8,16,32,64,128,256,512,1024>	
	Policer rate (default fps).
kfps	Rate is kfps.

Example

```
GAM(config)# qos storm broadcast 256 kfps
GAM(config)#
```

wred

Weighted Random Early Discard.

Syntax

```
qos wred queue <0~5> min_fl <0-100> max <1-100> [ fill-level ]
no qos wred queue <0~5>
```

Parameters

queue	Specify queue.
<Queue : 0~5>	Specific queue or range.
min_fl	Specify minimum fill level.
<MinFl : 0-100>	Specific minimum fill level in percent.
max	Specify maximum drop probability or fill level.
<Max : 1-100>	Specific maximum drop probability or fill level in percent (default is drop probability).
fill-level	Specify fill level.

Example

```
GAM(config)# qos wred queue 3 min_fl 70 max 80 fill-level
GAM(config)#
```

show qos

Quality of Service.

Syntax

```
show qos [ { interface [ <port_type> <port_type_list> ] } | wred | { maps [ dscp-cos ]
[ dscp-ingress-translation ] [ dscp-classify ] [ cos-dscp ] [ dscp-egress-translation ] } | storm | { qce
[ <1-256> ] } ]
```

Parameters

interface	Interface.
<port_type >	10GigabitEthernetor G.hn.
<port_type_list>	Port list in 1/1-5 for GigabitEthernet, 1/1 for G.hn.
maps	Global QoS Maps/Tables.
qce	QoS Control Entry.

storm	Storm policer.
wred	Weighted Random Early Discard.
cos-dscp	Map for COS to DSCP.
dscp-classify	Map for DSCPclassify enable.
dscp-cos	Map for DSCPto COS .
dscp-egress-translation	Map for DSCP egress translation.
dscp-ingress-translation	Map for DSCP ingress translation.
<Qce : 1-256>	QCE ID.

Example

```
GAM# show qos qce 150
%QOS: qce 150 not found

qce status:
no qce conflicts found!
GAM#
```

12 System commands

show system

System.

Syntax

```
show system cpu status

show system fan status

show system led status

show system temperature status
```

Parameters

cpu	CPU.
led	LED.
status	Average load.

Example

```
GAM# show system cpu status
   Average load in 100 ms  : 36%
   Average load in   1 sec : 39%
   Average load in  10 sec : 36%
GAM#
GAM# show system fan status
-----------------------------------------------------
Fan          Current Rotation Speed     Status
             (RPM)
-----------------------------------------------------
Fan #1        7108                    ok
Fan #2        7198                    ok
Fan #3        7019                    ok
Fan #4        7287                    ok
GAM#
GAM# show system led status
System LED: red, solid, major or critical alarm.
GAM#
GAM# show system temperature status
-------------------------------------
Sensor Location   Current Temperature
-------------------------------------
CPU:            37.6(C), 99.7(F)
Intake  #1:      28.8(C), 83.8(F)
Intake  #2:      41.2(C), 106.1(F)
Exhaust #1:      39.4(C), 102.9(F)
Exhaust #2:      27.4(C), 81.4(F)

GAM#
```

clock

Configure time-of-day clock.

Syntax

```
Clock< timezone> <word16> <-23-23> [ <0-59> ]
no clock timezone

Clock <summer-time> <word16> recurring [ <1-5> <1-7> <1-12> <hhmm> <1-5> <1-7> <1-12> <hhmm> [ <1-1440> ] ]
no clock summer-time

Clock < summer-time> <word16> date [ <1-12> <1-31> <2000-2097> <hhmm> <1-12> <1-31> <2000-2097> <hhmm>
[ <1-1440> ] ]
no clock summer-time
```

Parameters

<word16>	Name of time zone.
<-23-23>	Hours offset from UTC.
<0-59>	Minutes offset from UTC.
<1-12>	Month to start.
<1-31>	Date to start.
<2000-2097>	Year to start.
hh:mm	Time to start (hh:mm).
<1-12>	Month to end.
<1-31>	Date to end.
<2000-2097>	Year to end.
hh:mm	Time to end (hh:mm).
<1-1440>	Offset to add in minutes.
<1-5>	Week number to start.
<1-7>	Weekday to start.
<1-12>	Month to start.

Example

```
GAM(config)# clock timezone test 10 30
GAM(config)# clock summer-time test date 7 20 2000 12:00 8 02 2012 12:00 1000
GAM(config)#
```

show clock

Configure time-of-day clock.

Syntax

```
show clock [detail]
```

Parameters

detail	Display detailed information.

Example

```
GAM# show clock
System Time: 1970-01-01T03:03:14+00:00

GAM#
```

show controller announcement

Show controller announcement configuration.

Syntax

```
show controller announcement
```

Example

```
GAM# show controller announcement
Period : 1 minutes
URL #1 : https://device:device@192.168.103.173:8443/device/announcement/request
URL #2 : http://device:device@192.168.98.100:8080/device/announcement/request
URL #3 :
URL #4 :
```

12.1 NTP

ntp

Configure Network Time Protocol.

Syntax

```
ntp enable
no ntp enable

ntp server <1-5> ip-address { <ipv4_ucast> | <hostname> }
no ntp server <1-5>

ntp server <1-5> ip-address { <ipv4_ucast> | <ipv6_ucast> | <hostname> }
no ntp server <1-5>
```

Parameters

enable	Enable the NTP protocol.
server	Configure NTP server.
<1-5>	Index number.
ip-address	IP address.
<ipv4_ucast>	IPv4 address.
<ipv6_ucast>	IPv6 address
<hostname>	domain name.

Example

```
GAM(config)# ntp server 3 ip-address 192.168.1.1
GAM(config)#
```

show ntp

Configure NTP.

Syntax

```
show ntp status
```

Parameters

status	status

Example

```
GAM# show ntp status
NTP Mode : disabled
IdxServer IP host address (a.b.c.d) or a host name string
------------------------------------------------------------
1
2
3
4
5
GAM#
```

12.2 PTP

ptp

Configure Network Time Protocol.

Syntax

```
ntp enable
no ntp enable

ntp server <1-5> ip-address { <ipv4_ucast> | <hostname> }
no ntp server <1-5>

ntp server <1-5> ip-address { <ipv4_ucast> | <ipv6_ucast> | <hostname> }
no ntp server <1-5>
```

Parameters

enable	Enable the NTP protocol.
server	Configure NTP server.
<1-5>	Index number.
ip-address	IP address.
<ipv4_ucast>	IPv4 address.
<ipv6_ucast>	IPv6 address
<hostname>	domain name.

Example

```
GAM(config)# ntp server 3 ip-address 192.168.1.1
GAM(config)#
```

show ntp

Configure NTP.

Syntax

```
show ntp status
```

Parameters

status	status

Example

```
GAM# show ntp status
NTP Mode : disabled
IdxServer IP host address (a.b.c.d) or a host name string
------------------------------------------------------------
1
2
3
4
5
```

12.3 Syslog

logging

Syslog is a way for network devices to send event messages to a logging server.

Syntax

```
logging host { <ipv4_ucast> | <hostname> }
no logging host

logging level { info | warning | error }

logging on
no logging on
```

Parameters

system-priority	System priority.
<1-65535>	Priority value, lower means higher priority.
host	Host
<ipv4_ucast>	IP address of the log server.
<hostname>	Donain name of the log server.
level	Level.
info	Information.
warning	Warning.
error	Error.
on	Enable syslog server.

Example

```
GAM(config)# logging on
GAM(config)#
```

clear logging

Clear logging (event logs)

Syntax

```
clear logging [ info | warning | error ]
```

Parameters

error	Error
info	Information
warning	Warning

Example

```
GAM# clear logging error
GAM#
```

show logging

Syslog.

Syntax

```
show logging <1-4294967295>
```

```
show logging [ info ] [ warning ] [ error ]
```

Parameters

<logging_id: 1-4294967295>	Logging ID.
error	Error.
info	Information.
warning	Warning.

Example

```
GAM# show logging info
Switch logging host mode is disabled
Switch logging host address is null
Switch logging level is information

Number of entries:
Info: 3
Warning: 158
```

```
Error: 0
All : 161

ID LevelTimeMessage
------------------------------------------------------------------
1Info 1970-01-01T00:00:00+00:00Switch just made a cold boot.
2Info 1970-01-01T00:00:03+00:00Link up on port 1
 161Info 1970-01-01T02:25:55+00:00Link down on port 1
GAM#
```

show platform

Syntax

show platform debug

show platform phy [interface (<port_type> [<v_port_type_list>])]

show platform phy id [interface (<port_type> [<v_port_type_list>])]

show platform phy instance

show platform phy mode [interface (<port_type> [<v_port_type_list>])]

Parameters

debug	Debug command setting.
phy	PHYs' information.
Id	ID.
Interface	Interface.
instance	PHY Instance Information
mode	Operating mode of PHY

Example

```
GAM# show platform phy instance
Next Restart : Cold
Previous Restart: Cold
Current API Version : 1
Previous API Version: 0
Phy Instance Restart Source:1G
Phy Instance Restart Port:0
Current Phy Start Instance:none
GAM#
```

show line

TTY line information.

Syntax

show line [alive]

Parameters

alive	Display information about alive lines

Example

```
GAM# show line alive
Line is con 0.
 * You are at this line now.
 Alive from Console.
 Default privileged level is 2.
 Command line editing is enabled
 Display EXEC banner is enabled.
 Display Day banner is enabled.
 Terminal width is 80.
length is 24.
history size is 32.
exec-timeout is 10 min 0 second.
```

```
 Current session privilege is 15.
 Elapsed time is 0 day 0 hour 26 min 52 sec.
 Idle time is 0 day 0 hour 0 min 0 sec.

GAM#
```

show interface

Interface status and configuration.

Syntax

show interface <port_type> <port_type_list> [switchport [access | trunk | hybrid]]

show interface <port_type> <port_type_list> capabilities

show interface <port_type> <port_type_list> statistics [{ packets | bytes | errors | discards | filtered | { priority [<0~7>] } }] [{ up | down }]

show interface <port_type> <port_type_list> status

show interface <port_type> <port_type_list> veriphy

show interface vlan [<vlan_list>]

Parameters

<port_type >	10GigabitEthernet or G.hn.
<port_type_list>	Port list in 1/1-2 for 10GigabitEthernet, 1/1-24 for G.hn.
capabilities	Display capabilities.
statistics	Display statistics counters.
status	Display status.
switchport	Show interface switchport information.
veriphy	Run cable diagnostics and show result.
bytes	Show byte statistics.
discards	Show discard statistics.
down	Show ports which are down
errors	Show error statistics.
filtered	Show filtered statistics.

packets	Show packet statistics.
priority	Queue number.
up	Show ports which are up.
vlan	VLAN status.
<vlan_list>	VLAN list.

Example

```
GAM# show interface 10GigabitEthernet 1/1-2 statistics up

10GigabitEthernet 1/1 Statistics:
Rx Packets:                3318763090   Tx Packets:                 13629354
Rx Octets:              2592724329237   Tx Octets:                3942067778
Rx Unicast:                26544170   Tx Unicast:                 13097432
Rx Multicast:            3286182678   Tx Multicast:                 174543
Rx Broadcast:              6036242   Tx Broadcast:                 357379
Rx Pause:                        0   Tx Pause:                          0

Rx 64:                     3305140   Tx 64:                        640152
Rx 65-127:                13020868   Tx 65-127:                   4423307
Rx 128-255:                9926185   Tx 128-255:                   166263
Rx 256-511:                1844540   Tx 256-511:                   330612
Rx 512-1023:               1243893   Tx 512-1023:                  367216
Rx 1024-1526:           3289422464   Tx 1024-1526:                7701804
Rx 1527-    :                    0   Tx 1527-    :                      0

Rx Priority 0:          1892103423   Tx Priority 0:               1653066
Rx Priority 1:                   0   Tx Priority 1:                     0
Rx Priority 2:                   0   Tx Priority 2:                     0
Rx Priority 3:                   0   Tx Priority 3:                     0
Rx Priority 4:                   0   Tx Priority 4:                     0
Rx Priority 5:                   0   Tx Priority 5:                     0
Rx Priority 6:                   0   Tx Priority 6:                     0
Rx Priority 7:                  97   Tx Priority 7:                 57865

Rx Drops:                        0   Tx Drops:                          0
Rx CRC/Alignment:                0   Tx Late/Exc. Coll.:                0
Rx Undersize:                    0
Rx Oversize:                     0
Rx Fragments:                    0
Rx Jabbers:                      0
Rx Filtered:            1878404921
GAM#
```

ddmi

To activate DDMI monitoring SFP Digital Diagnostic Monitoring Interface.

Syntax

```
ddmi
```

Example

```
GAM(config)# ddmi
GAM(config)#
```

show ddmi

Show DDMI monitoring status.

Syntax

```
show ddmi
```

Example

```
GAM# show ddmi
Current mode: Enabled
GAM#
```

banner

Access management.

Syntax

```
banner< LINE >

banner< exec | login | motd >< LINE >
no banner exec
no banner login
no banner [ motd ]
```

Parameters

LINE	c banner-text c, where 'c' is a delimiting character.
exec	Set EXEC process creation banner.
login	Set login banner.
motd	Set Message of the Day banner.

Example

```
GAM(config)# banner exec test
GAM(config)#
```

do

Run exec mode commands in configuration mode.

Syntax

```
do< command >
```

Parameters

command	Command to execute.

Examples

```
GAM(config)# do show vlan
VLAN  Name                           Interfaces
----  -------------------------------  ----------
1     default                        Gi 1/1-25 10G 1/1-4
14    VLAN0014
15    VLAN0015
100   VLAN0100
1000  VLAN1000

GAM(config)#
```

```
GAM# do show clock
System Time: 1970-01-01T00:41:45+00:00

GAM#
```

hostname

Set host name.

Syntax

hostname < WORD >
no hostname

Parameters

WORD	This system's host name.

Example

```
GAM(config)# hostname abc
abc(config)#
```

json

JavaScript Object Notation RPC

Syntax

json notification host <hname>

json notification listen <notification> <host>

Parameters

notification	Notification request object.
host	Notification host.
listen	Json-rpc notification event subscription.
<hname>	Name of Notification host.

Example

```
GAM(config)# json notification listen port.status.update 333
GAM(config)# json notification host 333
GAM(config-json-noti-host)#
```

line

Configure a terminal line.

Syntax

line { <0-16> | console 0 | vty <0-15> }

Parameters

<0-16>	List of line numbers.
console	Console terminal line.
0	Console Line number.
vty	Virtual terminal.
<0-15>	List of vty numbers.

Example

```
GAM(config)# lacp system-priority 10000
GAM(config)#
```

Control SSH Terminal settings

Set terminal line parameters

Syntax

terminal editing

terminal exec-timeout <0-1440> [<0-3600>]

terminal help

terminal history size <0-32>

terminal length <0-512>

terminal width <0-512>

Parameters

editing	Enable command line editing.
exec-timeout	Set the EXEC timeout.
help	Description of the interactive help system.
history	Control the command history function.
length	Set number of lines on a screen.
width	Set width of the display terminal.
<0-1440>	Timeout in minutes.

<0-3600>	Timeout in seconds.
size	Set history buffer size.
<0-32>	Number of history commands, 0 means disable.
<0-512>	Number of lines on screen (0 for no pausing).
<0-512>	Number of characters on a screen line.

Example

```
GAM# terminal help
Help may be requested at any point in a command by entering
a question mark '?'.If nothing matches, the help list will
be empty and you must backup until entering a '?' shows the
available options.
Two styles of help are provided:
1. Full help is available when you are ready to enter a
command argument (e.g. 'show ?') and describes each possible
argument.
2. Partial help is provided when an abbreviated argument is entered
and you want to know what arguments match the input
(e.g. 'show pr?'.)

GAM#
```

show terminal

Display terminal configuration parameters.

Syntax

show terminal

Example

```
GAM# show terminal
Line is con 0.
 * You are at this line now.
 Alive from Console.
 Default privileged level is 2.
 Command line editing is enabled
 Display EXEC banner is enabled.
 Display Day banner is enabled.
 Terminal width is 80.
length is 24.
history size is 32.
exec-timeout is 10 min 0 second.

 Current session privilege is 15.
 Elapsed time is 0 day 0 hour 29 min 24 sec.
 Idle time is 0 day 0 hour 0 min 0 sec.

GAM#
```

more

Display a file.

Syntax

more<Path>

Parameters

<Path>	File in FLASH or on TFTP server.

Example

```
GAM# more tftp://server[3]//Desktop/users
GAM#
```

13 Diagnostics

13.1 link-oam

link oam

Link OAM configuration.

Syntax

```
link-oam remote-loopback supported

link-oam remote-loopback { start | stop } interface <port_type> <port_type_list>
```

Parameters

supported	Enable or Disable(when the no keyword is entered) remote loopback on the interface.
start	Start remote loopback test on interface.
stop	Stop remote loopback test on interface.
interface	Start/Stop remote loopback test on a specific interface or interfaces.
<port_type>	Port type: Fast, Giga or 10GigabitEthernet.
<port_type_list>	List of Port IDs. For example: 1/1,3-5;2/2-4,.6

Example

```
GAM# link-oam remote-loopback start interface 10GigabitEthernet 1/1
% Requested configuration is not supported with the current OAM mode for 10GigabitEthernet 1/1
GAM#
```

clear link-oam

Clear Link OAM statistics.

Syntax

```
Clear< link-oam>< statistics>

Clear< link-oam>< statistics>< interface ><port_type> <port_type_list>
```

Parameters

statistics	Clear all LACP statistics.
interface	clear Link OAM statistic on a specific interface or all interfaces.
<port_type>	10GigabitEthernet or G.hn.
PORT_LIST	Port list in 1/1-2 for 10GigabitEthernet, 1/1-24 for G.hn.

This parameter is not in the syntax

Example

```
GAM# clear link-oam statistics interface 10GigabitEthernet 1/1-2
GAM#
```

show link-oam

Link OAM configuration.

Syntax

show link-oam { [status] [link-monitor] [statistics] } [interface <port_type> <port_type_list>]

Parameters

internal	Internal LACP configuration.
status	Display local and remote node status parameters.
link-monitor	Display link-monitor status parameters.
statistics	Display statistics parameters.
interface	Interface status and configuration.
<port_type>	Port type: Fast, Giga or 10GigabitEthernet.
<port_type_list>	List of Port IDs. For example: 1/1,3-5;2/2-4,6.

Example

```
GAM#show link-oam status

10GigabitEthernet 1/1
----------------------------------------
PDU permission: Receive only
Discovery state:Fault state
Remote MAC Address:-
```

```
Local clientRemote Client
------------ --------------

port status:non operational -------
Mode:passive-------
Unidirectional operation support: disabled -------
Remote loopback support:disabled -------
Link monitoring support:enabled-------
MIB retrival support: disabled -------
MTU Size:1500-------
Multiplexer state: Forwarding -------
Parser state: Forwarding -------
OUI:00-01-c1 -------
PDU revision :0 -------

-- more --, next page: Space, continue: g, quit: ^C
```

13.2 Port mirroring

monitor

Set monitor configuration.

Syntax

```
monitor destination interface <port_type> <port_type_id>
no monitor destination
```

```
monitor source { interface <port_type> <port_type_list> | cpu [ <range_list> ] } { both | rx | tx }
no monitor source { interface <port_type> <port_type_list> | cpu}
```

Parameters

destination	The destination port. That is the port that traffic should be mirrored to.
interface	Interface to mirror traffic to.
source	None.
interface	None.
<port_type>	None.
<port_type_list>	None.
cpu	None.
<range_list>	None.
both	None.
rx	None.
tx	None.
ort_type>	Port type: 10GigabitEthernet or G.hn
<port_type_list>	List of port IDs. For example: 1/1,3-5; 2/2-4,6.

Example

```
GAM(config)# monitor source cpu both
GAM(config)#
```

show monitor

Monitoring different system events.

Syntax

show monitor [session { <session_number> | all | remote }]

Parameters

session	MIRROR session.
<1>	MIRROR session number.

all	Show all MIRROR sessions.
remote	Show only Remote MIRROR sessions.

Example

```
GAM# show monitor session all

Session 1
---------
Mode: Disabled
Type: Mirror
Source VLAN(s):
GAM#
```

13.3 Test connectivity

ping

Send ICMP echo messages.

Syntax

ping ip <word1-255> [repeat <1-60>] [size <2-1452>] [interval <0-30>]

ping ipv6 <ipv6_addr> [repeat <1-60>] [size <2-1452>] [interval <0-30>] [interface vlan <vlan_id>]

Parameters

ip	IP (ICMP) echo,
<word1-255>	ICMP destination address,
repeat	Repeat count,
<1-60>	1-60. Default: 5.
size	Datagram size
<2-1452>	2-1452. Default: 56 (excluding MAC, IP and ICMP headers).
interval	Repeat interval.
<0-30>	0-30. Default: 0.
ipv6	IPv6 (ICMPv6) echo.
<ipv6_addr>	ICMPv6 destination address.
repeat	Repeat count.
interface	Interface to configure.
vlan	VLAN Interface.
<vlan_id>	VLAN identifier(s): VID.

Example

```
GAM# ping ip 192.168.103.12
PING server 192.168.103.12, 56 bytes of data.
64 bytes from 192.168.103.12: icmp_seq=0, time=0ms
64 bytes from 192.168.103.12: icmp_seq=1, time=0ms
64 bytes from 192.168.103.12: icmp_seq=2, time=0ms
64 bytes from 192.168.103.12: icmp_seq=3, time=0ms
64 bytes from 192.168.103.12: icmp_seq=4, time=0ms
Sent 5 packets, received 5 OK, 0 bad
GAM#
```

13.4 Debug commands

platform debug

Platform configuration.

Syntax

platform debug { allow | deny }

Parameters

debug	Debug command setting.
allow	Allow debug commands.
deny	Deny debug command.

Example

```
GAM# platform debug allow
GAM# platform debug deny
GAM#
```

send

Send a message to other tty lines.

Syntax

send { * | <0~16> | console 0 | vty <0~15> } <line128>

Parameters

- ***** All tty lines

<0~16>	Send a message to multiple lines.
console	Primary terminal line.
vty	Virtual terminal.
0	Send a message to a specific line.
<0~15>	Send a message to multiple lines.
LINE	Message to be sent to lines, of 128 characters.

Example

```
GAM# send * yes,i do
Enter TEXT message.End with the character 'y'.

y

----------------------------------------
*** Message from line 0:
yes,i do


----------------------------------------
GAM#
```

14 Software and Configuration Management

14.1 Software version

show version

System hardware and software status.

Syntax

```
show version
```

Example

```
GAM# show version

MAC Address     : 00-0e-d8-13-03-38
Previous Restart : Cold

System Contact   : Roger
System Name      : GAM-24-JF2-MIMO
System Location  : left rack
System Time      : 2020-04-06T14:46:46-05:00
System Uptime    : 18d 06:33:06


Bootloader
----------
Image           : RedBoot (bootloader)
Version         : version 1_4-18990
Date            : 13:09:38, Jul 25 2019

Active Image
------------
Image           : linux (primary)
Version         : _v1.1.0
Date            : 2020-03-19T06:41:53-04:00
Upload filename  : ce_jr2_mimo.mfi

Backup Image
------------
Image           : linux.bk (backup)
Version         : _v1.1.0
Date            : 2020-03-17T10:02:51-04:00
Upload filename  : ce_jr2_mimo.mfi

------------------
SID : 1
------------------
Chipset ID      : VSC7468
Board Type      : Jaguar2-cu8sfp16
Port Count      : 27
Product         : Positron GAM-xx-M Switch
Software Version : GAM-xx-M_v1.1.0
Build Date      : 2020-03-19T06:41:53-04:00
Code Revision    : 20028
GAM#
```

14.2 Firmware upgrade and revert

firmware

Firmware upgrade/swap.

Syntax

```
firmware swap

firmware upgrade <word>
```

Parameters

swap	Swap between Active and Alternate firmware image.
upgrade	Firmware upgrade.
<FTPServer_path_file : word>	
	FTP Server IP address, path and file name for the server containing the new image.

Example

14.3 Manage configuration

show running-config

Show current system configuration.

Syntax

```
show running-config [ all-defaults ]

show running-config feature <cword> [ all-defaults ]

show running-config interface <port_type> <port_type_list> [ all-defaults ]

show running-config interface vlan <vlan_list> [ all-defaults ]

show running-config line { console | vty } <range_list> [ all-defaults ]

show running-config vlan <vlan_list> [ all-defaults ]
```

Parameters

all-defaults	Include most/all default values
feature	Show configuration for specific feature
interface	Show specific interface(s)
line	Show line settings
vlan	VLAN
CWORD	Valid words are: 'access' 'access-list' 'aggregation' 'arp-inspection' 'auth' 'clock' 'dhcp' 'dhcp-snooping' 'dns' 'dot1x' 'eps 'erps' 'evc' 'green-ethernet' 'http' 'icli' 'ip-igmp-snooping' 'ip-igmp-snooping-port 'ip-igmp-snooping-vlan' 'ipmc-profile' 'ipmc-profile-range' 'ipv4' 'ipv6' 'ipv6-mld-snooping' 'ipv6-mld-snooping-port'

	'ipv6-mld-snooping-vlan' 'lacp' 'link-oam' 'lldp' 'logging' 'loop-protect' 'mac' 'mep' 'monitor' 'mstp' 'mvr' 'mvr-port' 'ntp' 'port' 'port-security' 'ptp' 'pvlan' 'qos' 'rmon' 'snmp' 'source-guard' 'ssh' 'upnp' 'user' 'vlan' 'voice-vlan' 'web-privilege-group-level'
<port_type >	10GigabitEthernetor G.hn.
<port_type_list>	Port list in 1/1-5 for GigabitEthernet, 1/1 for G.hn.
<vlan_list>	List of VLAN numbers.
console	Console.
vty	VTY.
<range_list>	List of console/VTYs.

Example

```
GAM# show running-config all-defaults
Building configuration
hostname
no logging on
no logging host
logging level info
username admin privilege 15 password none
username security privilege 15 password encrypted c2VjdXJpdHk=
username superuser privilege 13 password encrypted c3VwZXJ1c2Vy
username administrator privilege 10 password encrypted YWRtaW5pc3RyYXRvcg==
username operator privilege 6 password encrypted b3BlcmF0b3I=
loop-protect transmit-time GAM#
-- more --, next page: Space, continue: g, quit: ^C
```

show startup-config

Show persistent system configuration.

Syntax

show start

Parameters

Example

```
GAM# show start
-- more --, next page: Space, continue: g, quit: ^C
GAM#
```

copy

Copy from source to destination.

Syntax

copy { startup-config | running-config | < flash:filename > } { startup-config | running-config | < flash:filename > } [Syntax

Parameters

flash:filename | tftp://server/path-and-filename File in FLASH or on TFTP server

running-config	Currently running configuration
startup-config	Startup configuration
Output modifiers	

Syntax

begin	Begin with the line that matches.
exclude	Exclude lines that match.
include	Include lines that match.
LINE	String to match output lines.

Example

```
GAM# copy startup-configrunning-config syntax-check | include
GAM#
```

delete

Delete one file from the flash file system.

Syntax

```
Delete< word>
```

Parameters

<Path : word>	Name of file to delete.

Example

```
GAM# delete text
GAM#
```

dir

List all files in the flash file system.

Syntax

```
Dir [ | < begin / exclude / include > LINE]
```

Parameters

begin	Begin with the line that matches.
exclude	Exclude lines that match.
include	Include lines that match.
LINE	String to match output lines.

Example

```
GAM# dir
Directory of flash:
 r- 1970-01-01 00:00:00 316 default-config
 rw 1970-01-01 04:28:291435 startup-config
2 files, 1751 bytes total
GAM#
```

15 G.hn services

15.1 Ports

ghn port

Configures G.hn services on a GAM port.

Syntax

```
ghn port ghn port <hnport> [ mode { mimo | siso } ] [ name <ghn_name> ] [ shutdown ]
no ghn port <hnport> [ shutdown ]
```

Parameters

hnport	GAM port number.
mimo	Sets MIMO mode. Use when the port is connected to two twisted pairs. (G1001-M, G1001-MP only.)
siso	Sets SISO mode. Use when the port is connected to a single twisted pair. (G1001-M, G1001-MP only.)
ghn_name	Friendly name to identify the port.
shutdown	Disable the port administratively.

Examples

Configuring port 1 as MIMO:

```
GAM(config)# ghn port 1 mode mimo
```

Disabling port 2:

```
GAM(config)# ghn port 2 shutdown
```

Enabling port 2:

```
GAM(config)# no ghn port 2 shutdown
```

clear ghn port

Clear G.hn port statistics.

Syntax

```
clear ghn port <hnPort> statistics
```

Parameters

hnPort	GAM port number.
statistics	Clear statistics.

Example

```
GAM# clear ghn port 1 statistics
```

show ghn port

Show g.hn port information.

Syntax

```
show ghn port <hnPort> { configuration | statistics | { status [ detail ] } }
```

Parameters

hnPort	GAM port number.
configuration	Show port configuration.
statistics	Show port statistics.
status	Show port status.
detail	Show detailed status information.

Examples

```
GAM# show ghn port 14 configuration
Enable: Yes
Name:
MAC: 00:0e:d8:13:03:5d
Mode: MIMO
```

```
GAM# show ghn port 14 statistics
Port: 14

Info
----
tx_bytes         : 0
rx_bytes         : 0
tx_packets       : 0
rx_packets       : 0
out_queue_full    : 0
tx_errors        : 0
rx_errors        : 0

Errors
------
tx_collisions    : 0
tx_max_collisions : 0
rx_errors        : 0
rx_collisions    : 0
rx_length_errors  : 0
rx_storage_errors : 0
rx_fifo_errors    : 0
rx_crc_errors    : 0
```

```
GAM# show ghn port 14 status

Active Links: 1
Discovered Endpoint MAC:
    00:0e:d8:13:08:1a
```

15.2 Bandwidth Profiles

ghn bw-profile

Configure a G.hn profile to define rate limiting for upstream and downstream subscriber traffic.

Syntax

ghn bw-profile <bw> [name <ghn_name>] [description <ghn_description>] [rate-downstream <ghn_ds>] [rate-upstream <ghn_us>] [service-limit-level <service_limit>]

no ghn bw-profile <bw>

Parameters

bw	Bandwidth profile number: Range: 1 to 15.
ghn_name	Bandwidth profile name. Length: 1 to 31 characters.
ghn_description	Bandwidth profile description. Length: 1 to 127 characters.
ghn_ds	Downstream rate in Mbps. 0 to disable.
ghn_us	Upstream rate in Mbps. 0 to disable.
service_limit	Profile service limit rate. By default, all traffic rate limited. Based on QoS, by changing the service level, it is possible to rate limit just lower priority traffic and not higher priority traffic. Range: 1 to 4. (G1001-C only.)

Rate	Description	802.1p rate service class
1	High throughput + High latency	0, 2
2	High throughput + Mid latency	1, 3
3	Mid throughput + Mid latency	4, 5
4	Low throughput + Low latency	6, 7

Examples

Defining bandwidth profile 1, named Class 1, that permits 15000 Kbps downstream and 6500 Kbps upstream:

```
GAM# ghn bw-profile 1 "Class 1" rate-downstream 15000 rate-upstream 6500
```

On a G1001-C, defining bandwidth profile 2, named Class 2, that permits 17000 Kbps downstream and 11000 Kbps upstream with a service limit rate of 4:

```
GAM# ghn bw-profile 2 "Class 2" rate-downstream 17000 rate-upstream 11000
service-limit-level 4
```

Deleting bandwidth profile 1:

```
GAM# no ghn bw-profile 1
```

show ghn bw-profile

Show ghn bw profile information.

Syntax

show ghn bw-profile <bw> [configuration]

Parameters

bw	Bandwidth profile number: Range: 1 to 15.
configuration	Show configuration information.

Example

```
GAM# show ghn bw-profile 1
Name: Default BW Profile
Description:
DS: 10 Mbps
US: 10 Mbp
```

15.3 Endpoints

ghn endpoint

Creates and manages a G.hn endpoint.

Syntax

ghn endpoint <ep> [name <ghn_name>] [mac-address <ghn_mac>] [description <ghn_description>] [port { <hnport> | unassigned | auto }] [allow-management-access]

no ghn endpoint <ep> [port]

no ghn endpoint <ep> allow-management-access

Parameters

ep	Endpoint number. Range: 1 to 384.
ghn_name	Endpoint name. Length: 1 to 31 characters.
ghn_mac	Endpoint MAC address.
ghn_description	Endpoint description. Length: 1 to 127 characters.
hnport	GAM port number to which the endpoint is connected.
unassigned	Endpoint is not assigned to a GAM port. It is disabled.
auto	Assign the endpoint to the GAM port on which it is first discovered.
allow-management-access	Allow G.hn management access through the endpoint.

Example

Creating endpoint 1 on GAM port 1:

```
GAM# ghn endpoint 1 name EP1 mac-address 11:2F:1F:A1:CC:DF  description "Apt1" port 1
```

Creating endpoint 2 to be auto assigned on the port on which it is discovered:

```
GAM# ghn endpoint 2  mac-address 22:2F:1F:A2:CC:DF  description "Apt2" port auto
```

ghn firmaware upgrade endpoint

Upgrades the endpoint firmware. Endpoint firmware is built-into the GAM firmware.

Syntax

```
ghn firmware upgrade endpoint { { mac-address <ghn_mac> } | <ep> }
```

Parameters

ghn_mac	Endpoint MAC address.
ep	Endpoint number.

Example

```
GAM# ghn firmware upgrade endpoint 13
```

clear ghn endpoint

Clear g.hn endpoint statistics.

Syntax

```
clear ghn endpoint { { mac-address <ghn_mac> } | { <ep> } } statistics
```

Parameters

ghn_mac	G.hn Endpoint MAC address.
ep	Endpoint number. Range: 1 to 384.

Example

```
GAM# clear ghn endpoint 1 statistics
```

show all ghn endpoints (discover)

Shows all endpoints discovered by the GAM.

Syntax

```
show ghn discover all
```

Example

```
GAM# show ghn discover all

Port  MACAddress        Configured  IsUP
-----------------------------------------
 1    00:0E:D8:13:00:E2  yes         yes
 2    00:0E:D8:13:00:E3  yes         yes
 3    00:0E:D8:13:00:DA  yes         yes
 4    00:0E:D8:13:00:D9  yes         yes
 5    00:0E:D8:13:00:DE  yes         yes
 6    00:0E:D8:13:00:D8  yes         yes
 7    00:0E:D8:13:00:DD  yes         yes
 8    00:0E:D8:13:00:E1  yes         yes
 9    00:0E:D8:13:00:DB  yes         yes
10    00:0E:D8:13:00:DC  yes         yes
11    00:0E:D8:13:00:DF  yes         yes
12    00:0E:D8:13:00:E0  yes         yes
GAM#
```

show ghn endpoint

Show current configuration, statistics and state of physical endpoint bridge.

Syntax

```
show ghn endpoint <ID> { configuration | statistics | status [detail] }
```

Parameters

<ID>	Endpoint number.
configuration	Show configuration information.
statistics	Show statistics information.
status	Show status information.
detail	Show detailed information.

Example

```
GAM# show ghn endpoint 13 configuration
MAC: 00:0e:d8:13:08:18
Name: ep13
Description:
Management Access: No
GAM port Id: 13
```

```
GAM# show ghn endpoint 13 status detail
Discovered Endpoint on G.hn port 13
Endpoint MAC: 00:0e:d8:13:08:18

Model                              : G1000-M
Serial no                           : 01013599
FW Version                          : G1000M_positron_19589
Downstream Current Allocated Bandwidth :  435 Mbps
Upstream Current Allocated Bandwidth   :  433 Mbps
Downstream Max Allocatable Bandwidth   : 1128 Mbps
Upstream Max Allocatable Bandwidth     :  429 Mbps
Downstream Current Usage             :    0 Mbps
Upstream Current Usage               :    0 Mbps
Downstream Number of Allocated Bands   : 1
Upstream Number of Allocated Bands     : 1
Estimated Wire Length                : 162 m
Uptime                             : 12 days, 2h 18m 33s
```

show ghn firmaware upgrade endpoint

Show firmware upgrade information.

Syntax

```
show ghn firmware upgrade endpoint { { mac-address <ghn_mac> } | <ep> } [ detail ]
```

Parameters

<ghn_mac>	Endpoint MAC address.
<ep>	Endpoint Instance (ID).
detail	Show detailed information.

Example

```
GAM# show ghn firmware upgrade endpoint 13 detail
```

reboot ghn endpoint

Reboot an endpoint.

Syntax

```
reboot ghn endpoint { { mac-address <ghn_mac> } | <ep> }
```

Parameters

ghn_mac	Endpoint MAC address.
ep	Endpoint number.

Example

```
GAM# reboot ghn endpoint 1
% Rebooting G.hn Endpoint 1 with MAC: 00:0f:df:11:05:54
```

15.4 Subscribers

ghn subscriber

Creates and manages G.hn subscriber profiles. To use the G.hn service, a subscriber profile must be created for each user. The profile associates a subscriber with a G.hn endpoint and the primary VLAN on which the subscriber's traffic is carried between the endpoint and the GAM.

The subscriber profile can also optionally define VLAN remapping, and various bandwidth settings to manage subscriber traffic.

Syntax

```
ghn subscriber <subscriber> [ name <ghn_name> ] [ description <ghn_description> ] [ endpoint
<ghn_endpoint> ] [ vid <ghn_vid> ] [ tagged | untagged ] [ { remapped-vid { none | <ghn_mapped_vid> } } ]
[ bw-profile { unthrottled | <ghn_bw_profile> } ] [ allowed-vlan { none | <vlan_lists> } ] [ port2-vid
{ none | <ghn_port2_vid> } ]
```

```
no ghn subscriber <subscriber> [endpoint]
```

Parameters

subscriber	A number to uniquely identify a subscriber number. Range: 1 to 384.
ghn_name	Friendly name to identify the subscriber. Range: 1 to 31 characters.
ghn_description	Subscriber description.
ghn_endpoint	Number of the G.hn endpoint to which the subscriber is assigned.
ghn_vid	The primary VLAN for subscriber traffic. Subscriber traffic uses this VLAN between the endpoint and the GAM. If the primary VLAN is not specified, subscriber traffic is assigned to VLAN 4094. Range: 3 to 4094. Default: 4094.
tagged	Egress traffic on the endpoint (to the subscriber) is tagged with the primary (or remapped VLAN). Untagged ingress traffic (from the subscriber) is dropped.
untagged	Ingress and egress traffic on the endpoint is untagged.
remapped-vid	Remap traffic on the primary VLAN is to this VLAN. Range: 3 to 4094.
unthrottled	Assign an unthrottled bandwidth profile to the subscriber, meaning no bandwidth limit.
ghn_bw_profile	Number of the bandwidth profile to assign to the subscriber.

allowed-vlan none	No additional VLANs are accepted by the endpoint.
vlan_lists	Specify up to 14 additional VLANs that are accepted by the endpoint and forwarded unchanged. Specify a range of VLANs in the format: `a-b`. For example: `1-10`. Use commas to separate items. For example: `1,2,5-10`.
ghn_port2_vid none	No VLAN traffic is allowed on endpoint port 2. Ingress and egress traffic is untagged (G1001-M or G1001-C only).
<ghn_port2_vid>	Set the G.hn VLAN ID for traffic on endpoint port 2 (G1001-M or G1001-C only). Ingress and egress traffic is tagged. Subscriber traffic uses this VLAN between the endpoint and the GAM.

Examples

Assigning subscriber 1 to endpoint 1 and VLAN 1. These are the minimum settings required to define a subscriber:

```
GAM# ghn subscriber 1 endpoint 1 VLAN 1
```

Assigning a name and description to subscriber 1.

```
GAM# ghn subscriber 1 name “James” description “Accounting Dept”
```

Assigning bandwidth profile 5 to subscriber 1:

```
GAM# ghn subscriber 1 endpoint 1 VLAN 1 bw-profile 5
```

Allowing VLANs 15 to 20 to be sent by subscriber 1:

```
GAM# ghn subscriber 1 endpoint 1 VLAN 1 allowed-vlan 15-20
```

Removing subscriber 1 from the endpoint to which the subscriber is associated:

```
GAM# no ghn subscriber 1 endpoint
```

Removing subscriber 1:

```
GAM# ghn subscriber 1
```

show ghn subscriber

Show g.hn subscriber information.

Syntax

ghn subscriber <ID> [configuration]

Parameters

ID	Subscriber ID.
configuration	Show subscriber configuration.

Example

```
GAM# show ghn subscriber 1
Name: s4
Description:
Vlan: 4093 Untagged
Endpoint Id: 1
BW profile Id: None
Allowed Vlan:
```

15.5 Vectorboost server (MIMO only)

ghn vectorboost

Manages current configuration of the VectorBoost feature. VectorBoost is an innovative approach to dealing with crosstalk in broadband access networks based on G.hn operating over twisted-pair. VectorBoost uses the statistical properties of network traffic to achieve virtually the same user experience as if crosstalk did not exist.

VectorBoost needs to look at all G.hn links in a binder group to compute the optimum level of boosting for each pair. In cases, where other G.hn links are in the same binder group as the GAM, VsctorBoost can still function, but with reduced performance.

Syntax

```
ghn vectorboost engine cdta [ enable | disable ] [ down-up-weight <down_up_weight> ] [ min-down-up-rate <min_down_up_rate> ] [ max-down-up-rate <max_down_up_rate> ] [ default-down-up-rate <default_down_up_rate> ] [ perc-metric-change <perc_metric_change> ]

ghn vectorboost engine vdsl-coexistence {yes | no}

no ghn vectorboost engine cdta { default-down-up-rate | down-up-weight | max-down-up-rate | min-down-up-rate | perc-metric-change}
```

Parameters

vdsl- coexistence	Set to **yes** when all the pairs in the binder group are assigned to the GAM. This provides the best performance. Set to **no** when pairs in the binder group are shared with other G.hn equipment. Vectorboost will still function, but with reduced performance.
enable	Enables the G.hn VectorBoost engine CDTA to dynamically adjust bandwidth allocation between upstream and downstream traffic according to traffic flow.
disable	Disables dynamic rate adjustment. The rate is fixed at the setting for **default-down-up-rate**.
down-up-weight	Specify a value for the downstream rate. The upstream rate is set to 100 - the downstream rate. For example, if you specify a value of 70, it results in a bandwidth allocation of 70% downstream and 30% upstream when full bandwidth is used in both directions. Default: 50.
min-down-up-rate	Set the minimum ratio between downstream and upstream traffic that will be selected by CDTA. Specify a value for the downstream rate. The upstream rate is set to 10 - downstream rate. For example, if you specify a value of 7, it results in a bandwidth allocation of 70% downstream and 30% upstream when full bandwidth is used in both directions. Range: 3 to 8. Default: 3.
max-down-up-rate	Set the maximum ratio between downstream and upstream traffic that will be selected by CDTA. Specify a value for the downstream rate. The upstream rate is set to 10 - downstream rate. For example, if you specify a value of 7, it results in a bandwidth allocation of 70% downstream and 30% upstream when full bandwidth is used in both directions. Range: 3 to 8. Default: 8.
default-down-up-rate	Set the initial ratio between downstream and upstream traffic when CDTA is enabled. When CDTA is disabled, the effective rate is set to this rate and does not change. Specify a value for the downstream rate. The upstream rate is set to 10 - downstream rate. For example, if you specify a value of 7, it results in a bandwidth allocation of 70% downstream and 30% upstream when full bandwidth is used in both directions. Range: 3 to 8. Default: 5.

perc-metric-change	Set the G.hn VectorBoost engine CDTA metric change percentage. CDTA adjusts bandwidth allocation when the traffic ratio on the link differs from the currently allocated bandwidth ratio by the specified percentage. Range: 0. to 100. Default: 50.

Example

```
GAM(config)# ghn vectorboost engine cdta enable  down-up-weight 70  min-down-up-rate
4 max-down-up-rate 7 default-down-up-rate 6 perc-metric-change 60
```

show ghn vectorboost

Shows the current configuration and state of the G,hn VectorBoost engine.

Syntax

```
show ghn vectorboost  {engine configuration | state [detail] }
```

Parameters

engine configuration	Show G.hn VectorBoost engine configuration.
state	Show G.hn VectorBoost engine state.
detail	Show detailed information.

Examples

```
GAM# show ghn vectorboost engine configuration
VectorBoost Engine Global configuration
---------------------------------------
VDSL Coexistence     : No

VectorBoost Engine CDTA configuration
-------------------------------------
CDTA Enabled         : Yes
Down:up Weight       : 50:50
Minimum Down:Up Rate  : 30:70
Maximum Down:Up Rate  : 80:20
Default Down:Up Rate  : 50:50
Percent Metric Change : 5%
```

```
GAM# show ghn vectorboost state
READY
```

15.6 Frequency control (notches and SNR)

ghn notch

Creates and manages a notch. A notch is a power mask that removes the signal from a range of frequencies to facilitate co-habitation of G.hn with other services. The GAM supports up to 10 notches.

Note: Notches apply to all GAM ports.

A notch guarantees that the transmitted Power Spectral Density (PSD) is at least as deep as the depth setting for the frequency range specified by the start and stop frequency range.

Syntax

```
ghn notch <notchId> startfreq <start_freq> stopfreq <stop_freq> depth { <depth> | remove }
```

```
no ghn notch <notchId>
```

Parameters

notchId	G.hn power mask notch instance. Range: 1 to 10.
start_freq	G.hn notch start frequency. Range: 3.5 - 100 MHz (MIMO), 3.5 - 100 MHz (SISO), 1.955 - 200 MHz (COAX).
stop_freq	G.hn notch stop frequency. Range: 3.5 - 100 MHz (MIMO), 3.5 - 100 MHz (SISO), 1.955 - 200 MHz (COAX).
depth	Set amount of attenuation applied to the G.hn signal over the notch range. Range: 0.5 to 40 dB (in 0.5 dB increments)

Examples

Creating notch 1 with a start frequency of 4.5 MHz, a stop frequency of 20 MHz, and depth of 20 dB:

```
GAM# ghn notch 1 startfreq 4.5 stopfreq 20 depth 20
```

Removing notch 1.

```
GAM# no ghn notch 1
```

show ghn notch

Shows the current configuration of notches.

Syntax

```
show ghn notch configuration
```

```
show ghn notch port <hnport> status [ force-refresh ]
```

Parameters

hnport	G.hn notch number. Rang: 1 to 10.
configuration	Show configuration information.
status	Show status information.

Examples

```
GAM# show ghn notch configuration

G.hn powermask notches
id    startfreq   stopfreq     depth
-------------------------------------
 1         0         0         0
 2         0         0         0
 3         0         0         0
 4         0         0         0
 5         0         0         0
 6         0         0         0
 7         0         0         0
 8         0         0         0
 9         0         0         0
10         0         0         0
```

```
GAM# show ghn notch port 1 status
Power mask user notches enabled=YES

power mask regulation notches
id  startfreq   stopfreq     depth
-----------------------------------
 1         0      3516    remove

Power mask vendor notches
id  startfreq   stopfreq     depth
-----------------------------------
-- none --

Power mask user notches
id  startfreq   stopfreq     depth
-----------------------------------
1       5000      6000    remove
```

show ghn maxsnr

Show maximum SNR detected on the G.hn link.

Syntax

```
show ghn maxsnr endpoint-mac <MAC> { upstream | downstream }
```

Parameters

MAC	Endpoint MAC address.
upstream	Show the maximum SNR in the upstream direction (endpoint --> port).
downstream	Show the maximum SNR in the downstream direction (port --> endpoint).

Example

```
GAM# show ghn maxsnr endpoint-mac upstream 00:EF:D3:13:38:2E
Max SNR for line #1: 43.5dBm
Max SNR for line #2: 43.8dBm
```