ASCENT Communication Technology

AEOC Series

AM300C

User Guide

Revision A

ACT Ethernet over Coax (EoC) Series

EoC Master (AM300C) & EoC Client (AC100C)

User Guide

ACT Document Number: AEOC EoC UG Revision A

This document is produced to assist professional and properly trained personnel with installation and maintenance issues for the product. The capabilities, system requirements and/or compatibility with third-party products described herein are subject to change without notice.

For more information, contact ACT: Sales@ascentcomtec.com

Revision History

Revision	Date	Reason for Change
A	08/01/2012	Initial Release

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Chapter 1 Overview

1. Overview

1.1. Introduction

AM300C is a series of outdoor networking EoC master device designed to deliver multimedia services to subscriber's home through cost effective last mile CATV coaxial network. AM300 features two main plug and play components in one compact IP67 aluminium housing, 2 Ethernet over Cable (EoC) Master unit and 2/4 ports CATV module.

AM300C provides the easy migration path from traditional HFC to PON/P2P type of Fiber to the Building (FTTB) application. It offers high quality CATV signal together with high speed broadband data access, which can be managed through the SNMP management system.

The AM300C EoC module is fully compliant with IEEE802.3, 802.3x, 802.3au, IEEE P1901 standards. It provides great flexibility to network service operator to connect MDUs with multiple low cost AMAP-EoC CPE AC100C unit. With outstanding performance, quality, and features packed in a compact sized device, the AM300C series is a great selection for Network Operators and Services Providers in Fibre to the Building and business networks.

Features and Benefits

- Advanced Outdoor EoC Node Platform designed for Fiber to the Building application
- Suitable for last mile CATV Coaxial HFC system
- Optional built-in 10/100/1000Mbps media converter which supports IEEE 802.3, 802.3ab, 802.3u, 802.3z standards as well as full duplex and half duplex mode
- SC/PC optical connector for 1000Base-SX or 1000Base-Lx
- 10/100/1000M auto-negotiable Ethernet RJ45 interface supports Auto MDI/MDIX.
- Deliver high speed internet, and CATV services
- EoC bandwidth from 7.5 to 65MHz
- Support NTSC, PAL, DVB-C, DVB-T video standards
- Optimize the service performance as well as utilization of limited IP resource for service providers
- Aluminium die-casting housing, water-proof and heat dissipation
- Network monitoring and management through SNMP

1.2. Specifications

AM300C **Outdoor EoC Master Platform (HFC+ EoC)**

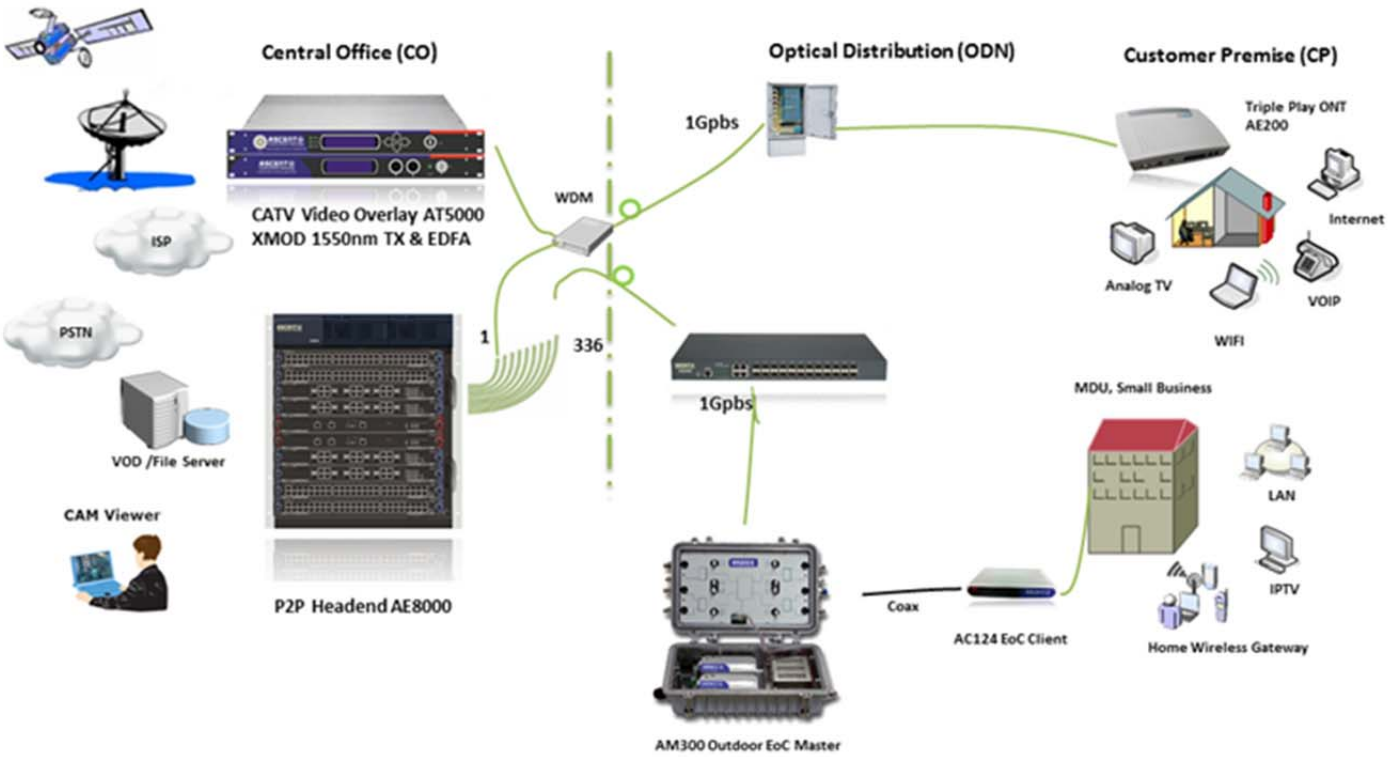
Gigabit Ethernet Ports	2 x 10/100/1000Mbps Ethernet port
CATV RF Output	2/4 RF Outputs, CATV Coaxial F Connector
CATV RF Local Input	2/4 CATV Coaxial F Connector
System Console	1 port
EoC Specification	P1901 HomePlug AV
RF Bandwidth	7.5~65MHz
Modulation Scheme	OFDM 2690, 16/64/128/256/512/1024/4096-QAM, QPSK, BPSK
Typical EoC Link Range	1km coaxial cable
Output Power	105±5dBuv
Receive sensitivity	-65dBm
MAC Speed (Max)	350Mbps Symmetrical @ 7.5MHz to 65MHz
VLAN	IEEE802.1Q (VLAN Tagging)
QoS	ToS and CoS Classification
SNMP	SNMP v1, v2, v3
Security	128-bit AES encryption
General Specifications	
Management	Support user management based at SNMP,WEB and CLI
Operating Temp, °C	-25 to 60
Storage Temp, °C	-40 to 70
Power Supply VAC	100 to 240 / 60V Network
Operating relative humidity, %	10 to 95
Power Consumption W	9
Dimensions (W x D x H) mm	289x206x128
Weight, kg	3.5

Indoor AC100 EoC Client CPE Unit

AC124C-HP-65-1 AMAP EoC Client CPE Device

Fast Ethernet Ports	4x 10/100bps LAN port
CATV RF Output	1 x CATV Coaxial F Connector
CATV RF Input	1 x CATV Coaxial F Connector
EoC Specification	HomePlug AV
Modulation	OFDM 1024/256/64/16/8-QAM, QPSK, BPSK
RF Bandwidth	7.5~65MHz
Typical EoC Link Range	1km
Receive sensitivity	-65dBm
Output Power	15dBm
Data Performance	
MAC Speed (Max)	350Mbps
Physical Layer Speed	500Mbps
IEEE	IEEE 802.3, IEEE 802.3x
	IEEE 802.u Auto MDI(X), 802.1x
Protocol	TDMA, CSMA/CA
VLAN/QoS	IEEE 802.1P, IEEE 802.1Q
Encryption	128-bit AES
General Specifications	
Operating Temp	-5 to 55°*C*
Storage Temp	-40 to 70°*C*
Power Supply	12V, 100~240 VAC Adaptor
Operating relative humidity,	10 to 90%
Power Consumption	<7 *W*
Dimensions (W x D x H)	155x 108 x 27 *mm*
Weight, kg	0.32 kg

1.3. Application Diagram



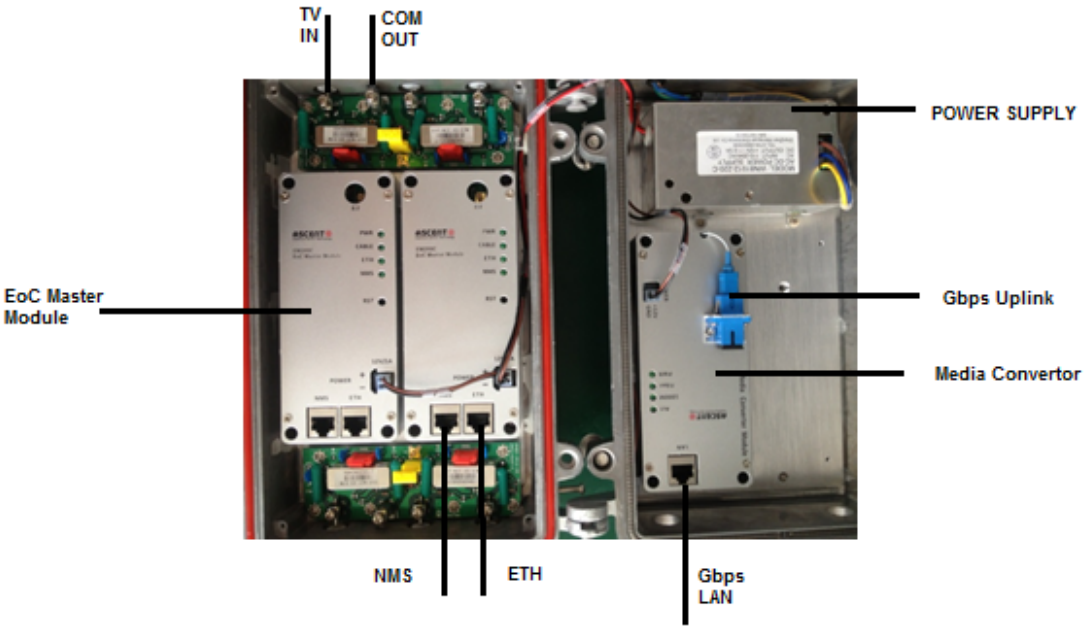
1.4. Ordering Information

AM342-HP-M1-65-2	AMAP Outdoor EoC Master Unit AM300C Series, 2 RF Input Ports, 2 RF Output Ports, 1 EoC Master, Home Plug, 7.5 to 65MHz, 100 to 240VAC
AM344-HP-M1-65-2	AMAP Outdoor EoC Master Unit AM300C Series, 4 RF Input Ports, 4 RF Output Ports, 1 EoC Master, Home Plug, 7.5 to 65MHz, 100 to 240VAC
AM342-HP-M2-65-2	AMAP Outdoor EoC Master Unit AM300C Series, 2 RF Input Ports, 2 RF Output Ports, 2 EoC Master, Home Plug, 7.5 to 65MHz, 100 to 240VAC
AM344-HP-M2-65-2	AMAP Outdoor EoC Master Unit AM300C Series, 4 RF Input Ports, 4 RF Output Ports, 2 EoC Master, Home Plug, 7.5 to 65MHz, 100 to 240VAC
AM344C-HP-M2-65-1	AM300 Series Outdoor EoC Master Node, 4 RF Input Ports, 4 RF Output Ports, 2 EoC Master, Home Plug, 7.5 to 65MHz, 60VAC
AM342C-HP-M2-65-1	AM300 Series Outdoor EoC Master Node, 2 RF Input Ports, 2 RF Output Ports, 2 EoC Master, Home Plug, 7.5 to 65MHz, 60VAC
AC124-HP-65-1	AMAP EoC Client CPE Unit AC100 Series, 1 RF Input Port, 1 RF Output Port, 4 FE Data Ports, Home Plug, 7.5 to 65MHz, 100 to 240VAC Adapter included
AC122C-HP-65-1	AMAP EoC Client CPE Unit AC100 Series, 1 RF Input Port, 1 RF Output Port, 2 FE Data Ports, Home Plug, 7.5 to 65MHz, 100 to 240VAC Adapter included

***Contact Ascent Local Representative for additional EoC Product Information**

1.5. Product Description

AM300C EoC Master Housing



AM300C EoC Master Top panel

ITEM	Descriptions	Function	
Power	Power indicator light	OFF	Power is OFF
		ON	Power is ON.
ETH	Uplink Ethernet indicator light	OFF	Ethernet Port is not connected
		ON	Ethernet Port Connection Normal
		Blinking	Ethernet Port Communication Normal
NMS	Network Management Light	ON	NMS Works Normal
		RED	System Alarm
CABLE	Cable Network light	OFF	No EoC Client connected
		ON	EoC Client Connected
		Blinking	Data Communication with EoC Client
RESET	RESET EoC Master		To reset the EoC Master Unit. Press reset button for 3 seconds, the unit will restart, press reset button for more than 5 seconds, the EoC Master unit will restore to factory default settings.

AC100 EoC Client Top panel

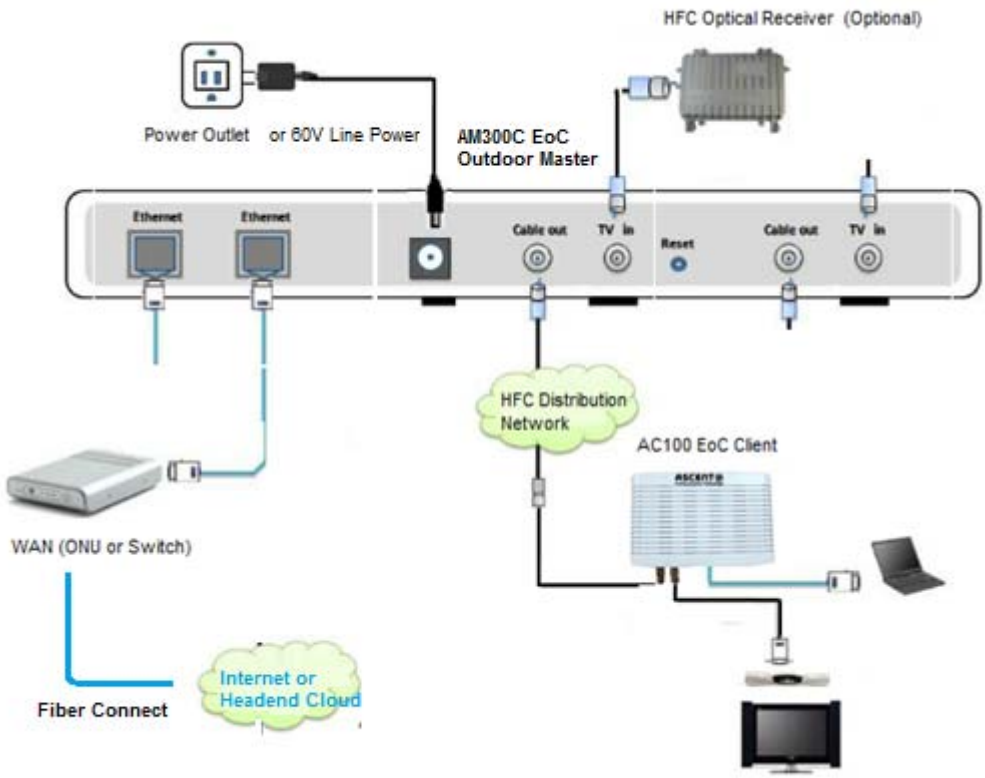
Side panel

Connection	Description	Function
CABLE	Network Input Port	Network Receiver Port to receive the EoC + TV signal from the EoC Master
TV	TV Signal Port	Connector to the TV Set or STB
LAN1	Local Network Port 1	Connect to Local Area Network or PC
LAN2	Local Network Port 2	Connect to Local Area Network or PC
LAN3(option)	Local Network Port 3	Connect to Local Area Network or PC
LAN4(option)	Local Network Port 4	Connect to Local Area Network or PC
POWER	Power Input	12V Power Input from the Adaptor
On/Off	Power On / Off	Turn On and Off the EoC Client

Side panel

LED	Descriptions	Function	
Power	Power indicator light	OFF	Power is OFF
		ON	Power is ON.
LAN1	Local Ethernet 1 indicator light	OFF	Ethernet Port is not connected
		ON	Ethernet Port Connection Normal
		Blinking	Ethernet Port Communication Normal
LAN2	Local Ethernet 2 indicator light	OFF	Ethernet Port is not connected
		ON	Ethernet Port Connection Normal
		Blinking	Ethernet Port Communication Normal
LAN3 (option)	Local Ethernet 3 indicator light	OFF	Ethernet Port is not connected
		ON	Ethernet Port Connection Normal
		Blinking	Ethernet Port Communication Normal
LAN4 (option)	Local Ethernet 4 indicator light	OFF	Ethernet Port is not connected
		ON	Ethernet Port Connection Normal
		Blinking	Ethernet Port Communication Normal
LINK	Cable Network Connection Status light	OFF	No EoC Master connected
		Green Blinking	EoC Master Connected Normal, Data Connection Normal
		Orange	EoC Master Connected with Low Quality Data Connection

1.6. Quick Installation



1. Connect the TV signal (RF cable) to the EoC Master unit.

2. Connect the EoC Master Unit to the Cable TV Distribution network through the "COM 1, 2, 3, 4 Port".

3. The output frequency range is from 7.5MHz to 65MHz. Output (Narrowcast signal) level is at around 105dBuV.

Note: Make sure that the total RF link loss is less than 50dB for proper reception at the EoC Client side. SNR should be above 20dB. Please also refer to the section 2.3.6.

Note: When measuring the RF output power of EoC master, it is recommended to use a Spectrum Analyser for accurate reading.

Note: While connecting, please keep the RF connectors tightly fastened.

4. Connect the uplink EoC Master Unit to the WAN network through Fiber Link. On WAN side, it could be a Data Switch or Router. For some applications, the EoC master can also be connected to the WAN through the ONU at the same location.

5. The unit uses the line 60V power or optionally use the power adapter to the wall outlet.

6. After the power is ON, LED indicators should light up as for normal operation. Check whether the POWER status LED is on continuously. And the Cable LED is one for active RF output to the distribution network.

7. Connect RF input to the AC100 Network Port

8. Connect the TV port to either the set top box or TV set

9. Connect the LAN port 1 – 4 to the Home network, router or Personal Computer

10. Plug the power adapter to the wall outlet and also the 12V power input port of EoC Client.

11. After the EoC Master is ON, LED indicators should light up as for normal operation. Check whether the Ethernet and Cable status LED is on continuously. If yes, the connection is normal; otherwise there is either issue with the physical connection or the RF levels at either end. This may be caused by either too much or too little attenuation over the RF cable. Please refer to the Layout Description section of this installation manual for nominal LED activity.

12. Check all signal levels and services on all the communication ports.

Note: EoC Client Unit Installation Adjustment

1. Installing the AC100 on a horizontal surface (Bench top)

Put the EoC Client on a clean, flat, sturdy bench top. Suggest keep the clearance for all sides of the unit to more than 10cm for heat dissipation.

2. Installing the AC100 on a vertical surface (Hanging on a wall)

You can install the EoC Client on a vertical surface by using the moulded mounting holes on the bottom of the unit chassis (refer to Figure below) and two flat-head wood screws.

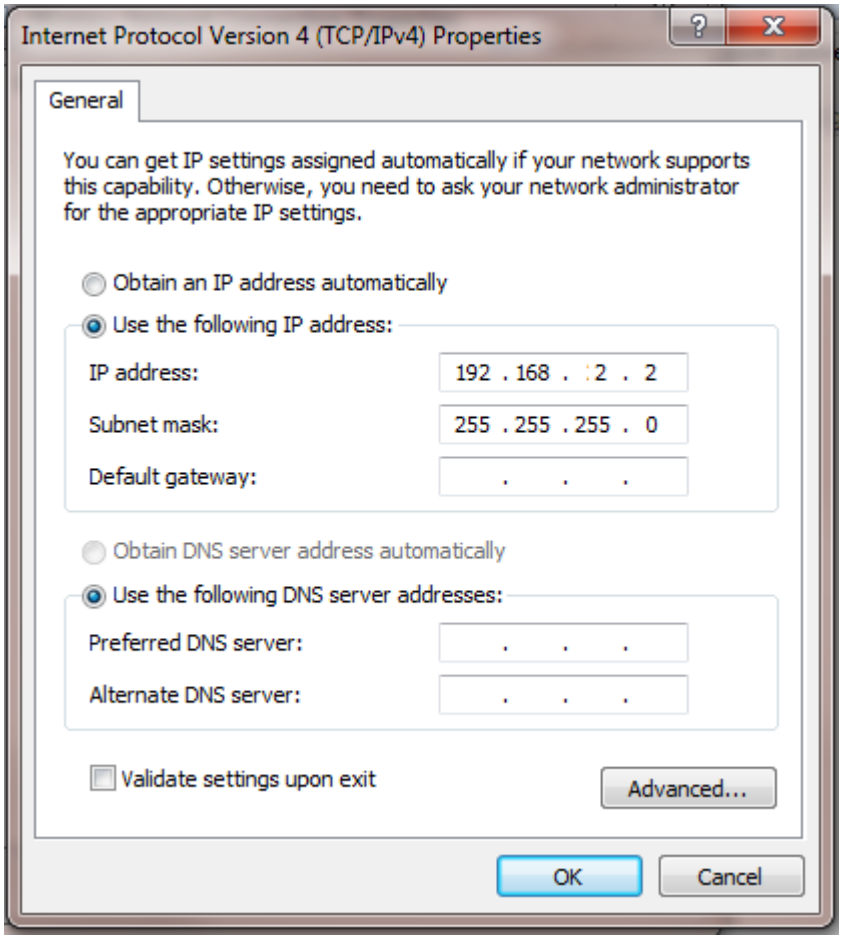
Chapter 2 Configuration

2. Configuration

2.1. EoC Master Web Interface Login

The EoC Master and Client devices are configured using the web GUI interface. The EoC Master has a default IP Address of 192.168.2.2 and subnet mask of 255.255.255.0. The following steps will enable the administrator to login:

1、 Config the management computer in the same LAN network with IP address in the same subnet.



2、 Connected both EoC Master and Client as descried in section “1.6 Quick Installation” ;
3、 Ping EoC Master 192.168.2.2. If successful, go to next step.
4、 Open the IE web browser, type the device IP address 192.168.2.2 in address bar;
5、 Entry of the username and password will be prompted. Enter the default login User Name and Password:

The default login User Name of the administrator is "admin", and the default login Password is "admin".

2.2. EoC Master Information and Configuration

This section shows you how to use the EoC Web Management GUI Software.

2.2.1. EoC Master Device Information

This Device Information page shows EoC Master information. You can modify the unit specific information such as Device name, description etc.

Figure 2.2.1.1: Device information

2.2.2. Change EoC Master Uplink Config

In the “Uplink Network Configuration” setting, user can change the default IP address of the EoC Master. This page shows the IP Setting function.

The page also shows MAC address information such as below.

Figure 2.2.2.1: Uplink Network information

Under “Uplink Network Configuration” setting, user can setup the Broadcast Filter.

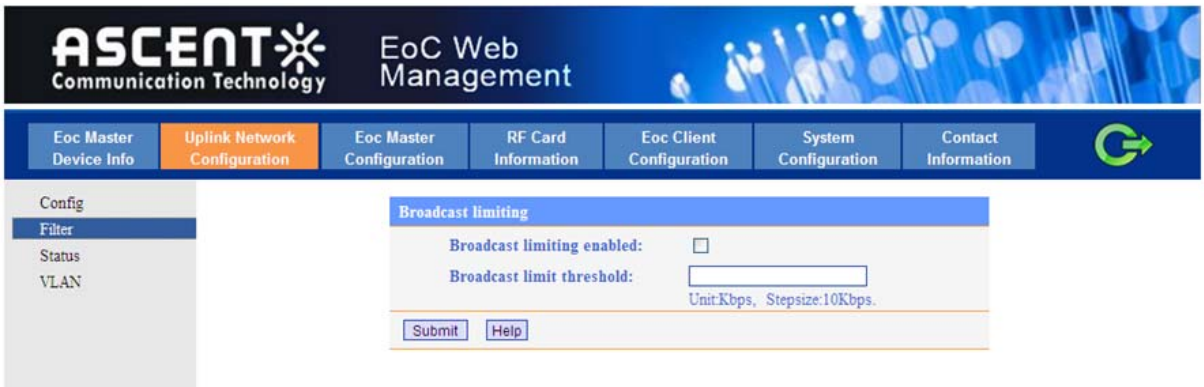


Figure 2.2.2.2: Broadcast Filter information

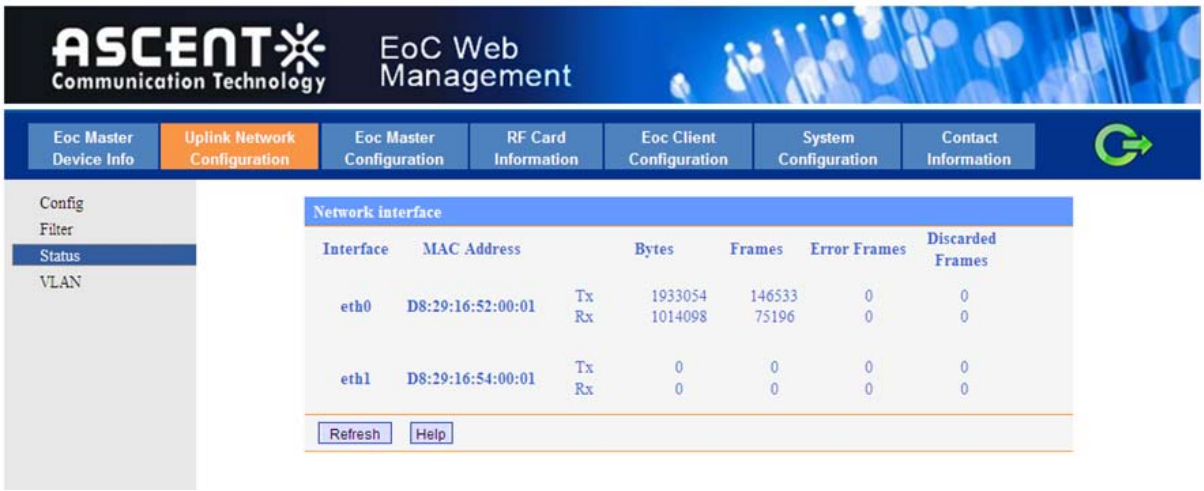


Figure 2.2.2.3: Uplink Network Status information

This page shows VLAN information you have configured. Once the VLAN ID is set, only the computers connected to the corresponding VLAN port on the network switch can access the management information of the EoC master.

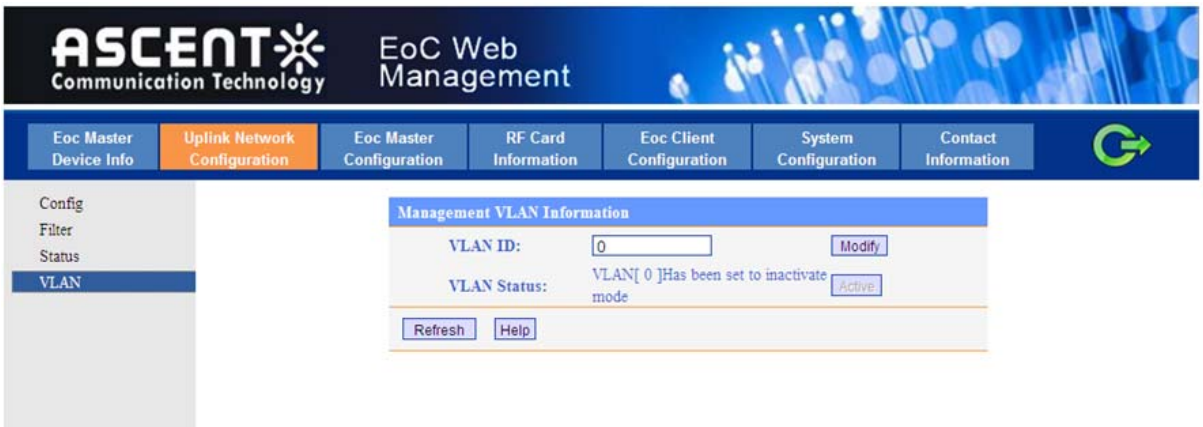


Figure 2.2.2.4: VLAN Setting

2.2.3. Change EoC Master ID

In the “EoC Master Configuration” setting, user can change the default SNID of the EoC Master. This page shows the SNID Setting function.

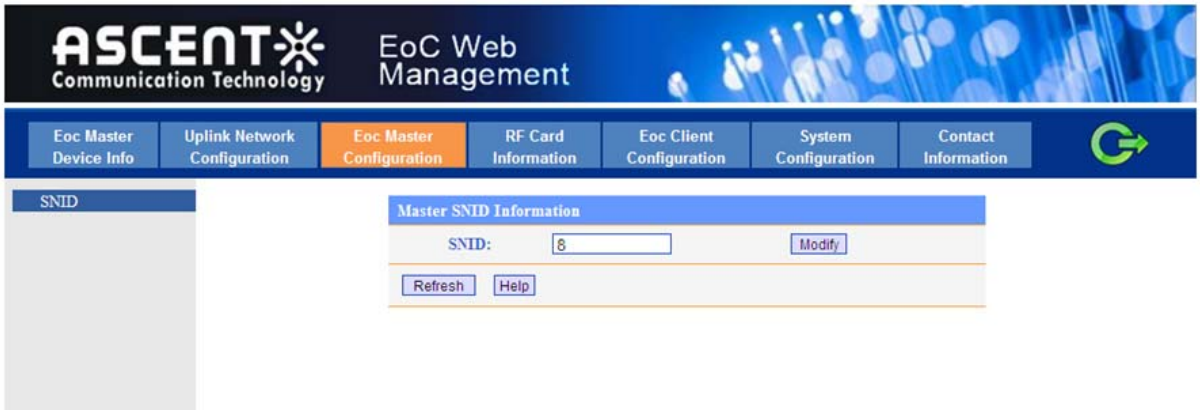


Figure 2.2.3.1: SNID Setting Information

2.2.4. EoC Master RF Information

Under “RF Card Information” page, it shows EoC master RF related parameters and information such as output power.

Figure 2.2.4: RF Card information

2.3. EoC Client Management

2.3.1. EoC Client Access Control:

Authorization Mode:

Auto (default setting): All the connected EoC Client can access the EoC Master

Manual: Only the added(registered) EoC Client can access the EoC Master

Add Client: This function is to add the EoC Client to the registered EoC Client list.

NOTE: The authorization process could take around 1 minute to finish.

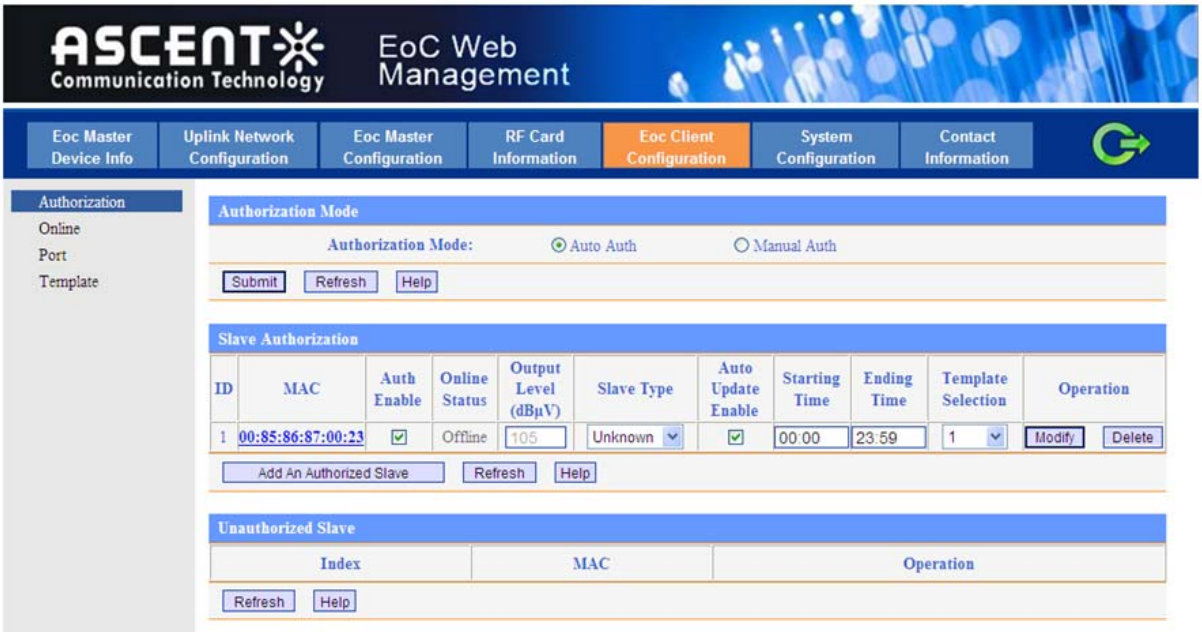


Figure 2.3.1.1: EoC Client Access Control

Figure 2.3.1.2: Add Authorized EoC Client

After EoC Client MAC address is added, then click “submit”. The EoC client will be added to the authorized client list. In the “authorization client” list, click slave MAC address in the window, the following window will show up:

Figure 2.3.1.3: Add Authorized EoC Client MAC Address

NOTE: when you make any configuration changes, please do **save** the configuration before reboot, otherwise the information/configuration will not be saved after EoC Master is rebooted.

2.3.2. Online EoC Client Status

This page shows EoC Client Online Status. The template is to allow network administration to reboot EoC Client in the network.

2.3.3. EoC Client Port Management

This page shows EoC Client Port Management function. You could make below configuration: port service rule, port VLAN, and enable port.

NOTE: the speed limitation will be only valid after set and apply for service rule.

Figure 2.3.3: Port Management

2.3.4. EoC Client Template Management

This page shows EoC Client Template Management function. The template is to set different parameters for the EoC Client, such as VLAN, Filter, Port Speed Limit, etc.

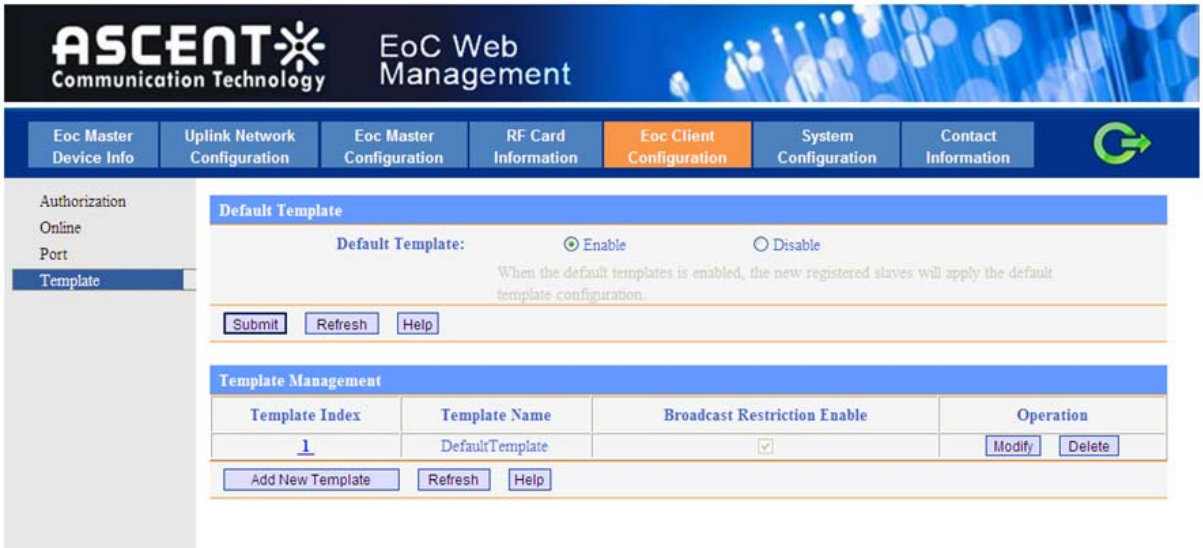


Figure 2.3.4: Template Management

The Administrator can add new template for the EoC Client. The EoC Client can have different services levels which can be achieved by applying different EoC Client template.

2.4. EoC System Configuration

This page shows the steps to manage the EoC system configuration.

2.4.1. System Admin Account Setting

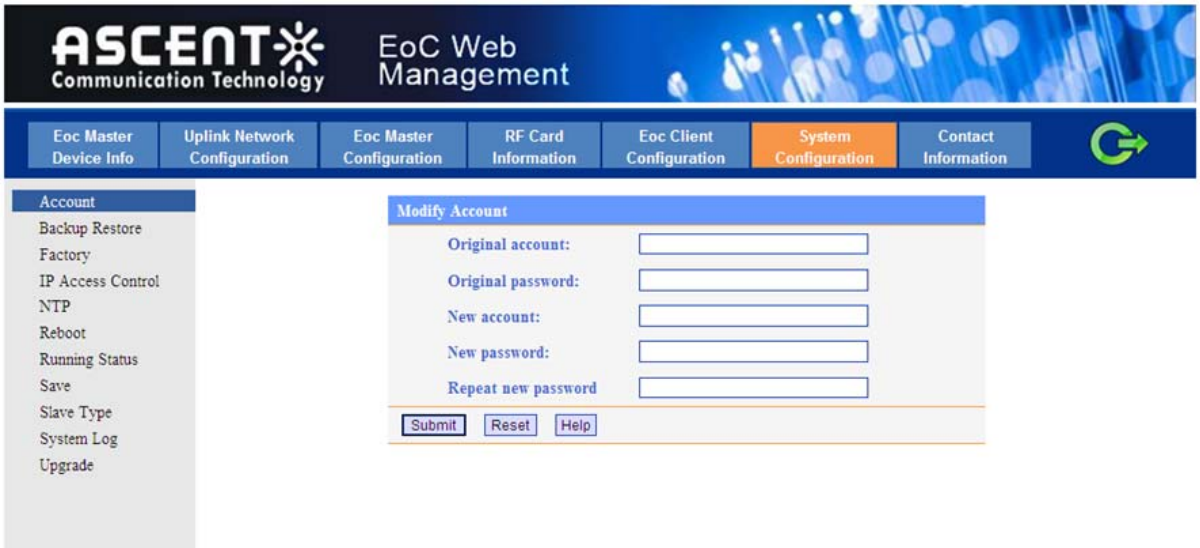


Figure 2.4.1: EoC System information

2.4.2. EoC System Backup Restore

Figure 2.4.2: Backup Restore

2.4.3. EoC System Restore Factory Default Setting

Figure 2.4.3: Restore Factory Default Setting

2.4.4. EoC System IP Access Control

Figure 2.4.4: IP Access Control

2.4.5. EoC System Time Setting

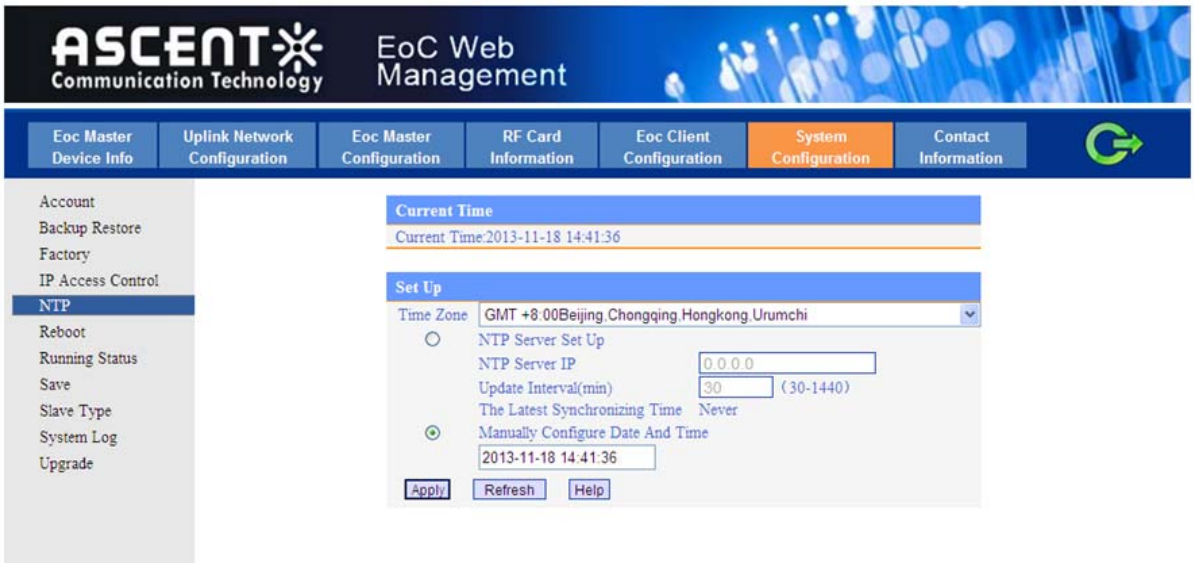


Figure 2.4.5: NTP Time Setting

2.4.6. EoC System Reboot

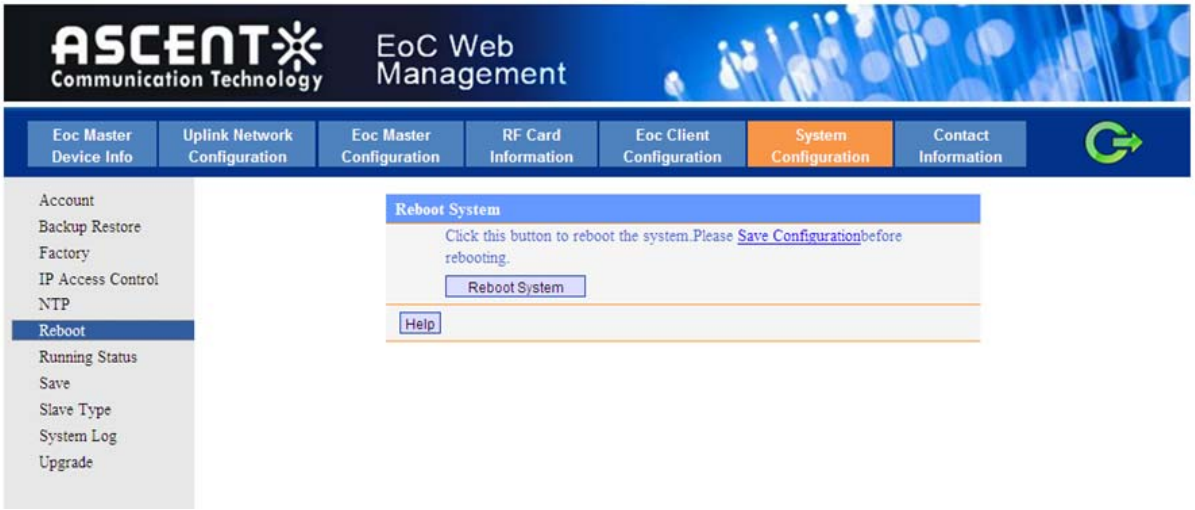


Figure 2.4.6: Reboot

2.4.7. EoC System Operation Status

Figure 2.4.7: Operation Status

2.4.8. EoC System Backup

Figure 2.4.8: System Backup

2.4.9. EoC Client Group Config

Figure 2.4.9: EoC Client Type

2.4.10. EoC System Log File

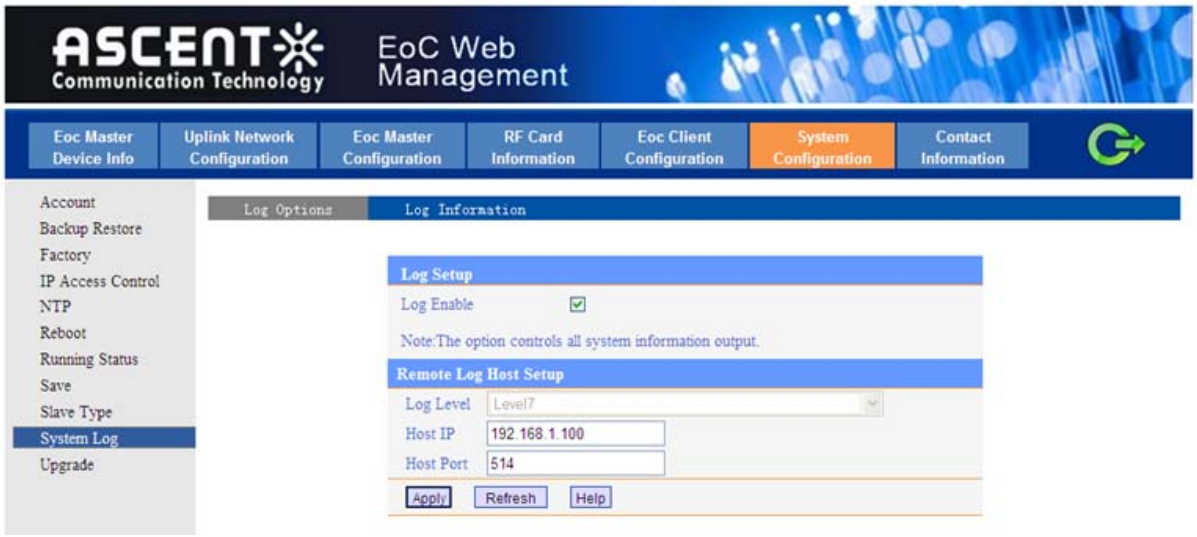


Figure 2.4.10: System Log

2.4.11. EoC System Upgrade

Figure 2.4.11: EoC System Upgrade

3. Command Line Interface (CLI)

3.1. Configuration preparation

3.1.1. CLI Network connecting

AM300C support both in-band management (network connect to 10/100 BASE-TX interface) and out-band management (network connect to MGMT interface), manage EOC equipment through telnet connecting to CLI configuration interface.

Default out band manage IP: 192.168.2.2

192.168.1.2 Default in band manage IP: 192.168.1.2

3.1.2. User Login

When connect EOC through debug interface or telnet, you could use below default account to login in.

User name	Pass word
admin	admin

It will pop up below screen when you connect EOC successfully.

```
+-----------------------------------------+
|  Hello, This is                         |
|  EoC System Management Program.    |
|  Version: V1.6.12                       |
+-----------------------------------------+

EoC CLI starting....

username: admin
Password: admin
vtysh>
```

After enter user name and pass word, you will see below command.

vtysh>

You could then input configuration command to configure the eoc equipment or view the EOC configuration information.

3.2. Command description

3.2.1. Command format

EOC CLI commands formed as "command name + command parameter", command name must be unique, command parameter could be various, from 0 to unlimited number, the extra parameter will be invalid. Command name and command parameters are separated by one or more space.

Command name could be combination of multiple words; you could display all the command names by run command "list".

Commands are case sensitive, the entire command name must be lowercase, command parameter could be uppercase, lowercase, or mixed case letters, same letter sequence but different case combination are regarded as different parameters, such as "hello" and "Hello"

Command line support online editing, you could use "left" and "right" key to move the cursor, then through "insert" key to change to insert mode or overwrite mode. If insert mode, the new character will be added to the space of cursor indicate; If overwrite mode, the new character will replace the character of cursor indicates. "Delete" key could delete the character where cursor indicates, "Backspace" key could delete the character before cursor indicates.

Command line supports automate command completion. When input part of command, press "TAB" key, it will match and complete the commands automatically. If there is only one command could match the input characters, the whole command characters will be completed to command line; if there are multiple commands may match the input character, all the matched commands will be listed on the screen, then indicate a new command line, include the part characters you already input.

In any mode, input command "exit", you could then exit to current mode.

3.3. System directory

When you login successfully, input"vtysh>list", you will see below:

```
vtysh> list
  enable
  exit
  list
```

3.3.1. Enable mode

Command	vtysh>**enable**
Funcion description	when enter into enable management mode, pssword is needed.

【example】

e.g: get into "enable" management mode

```
vtysh>enable
username:admin
password:admin
vtysh#
```

The default password for enable management mode is admin.

input"list" to display below commands

vtysh # list
configure terminal
disable
exit
list
master <1-2>
ping WORD
reboot
factory
slave (all|WORD|<1-64>)
start-shell
telnet WORD
telnet WORD PORT
write configure

3.3.2. EOC master management

Get into management mode

Command	vtysh # **configure terminal**
Function description	Get into management mode

Reboot master

Command	vtysh(config)# **reboot**
Function description	Reboot master

Get into master module management

Command	vtysh(config)# **master *<1~2>***
Function description	get into master chipset management, default value is 1. Current equipment support 1 module.

Show current on line slave list

Command	vtysh(config-master 1)# **show online**
Function description	Display as below table, show all the on line slave connect to this master, line attenuation, physical bandwidth and authorization status.

e.g: show current on line slave list.

```
vtysh(config-master 1)# show online
ID MAC-Address    ATT(dB)  TX/RX(Mbps)    TX/RX(SNR)     Authorized
 2 00:a1:02:02:20:40   0.00     59/0            7.71/0.00         0
Total [1] slaves online.
```

Show authorized slave list.

Command	vtysh(config-master 1)# **show legal-slaves**
Function description	List all the authorized slaves connect to this master.

e.g: show authorized slave list

```
vtysh(config-master 1)# show legal-slaves
ID    MAC-Address   Auth-Enable  Online  RF-Output    Auto-Upgrade
1     00:a1:02:02:20:5b  Enable     ------   129          Enable
2     00:a1:02:02:20:40  Enable     ------   129          Enable
3     00:a1:02:02:20:5f  Enable     ------   129          Enable
4     00:a1:02:02:20:47  Enable     ------   129          Enable
5     00:a1:02:00:00:10  Enable     ------   129          Enable
6     00:a1:02:02:20:62  Enable     ------   129          Enable
7     00:a1:02:02:20:5e  Enable     ------   129          Enable
8     00:a1:02:02:20:46  Enable     ------   129          Enable
Total [17] slaves.
```

Show current rules configuration

Command	vtysh(config-master 1)# **show service-rule**
Function description	show current rules parameter

e.g: show current rules configuration

```
vtysh(config-master 1)# show service-rule
ID  Name  MValue  QoS  DownPIR  DownCIR   UpPIR    UpCIR   Latency
1   123   0       1    2097152   1048576   2097152   1048576   0
Total [1] service rules.
```

Add slave to master white list

Command	vtysh(config-master 1)# **bind slave-id <1-64> mac *mac-address* <0-1> <80-120> <0-1> <XX:XX> <XX:XX>**
Function description	add slave to master white list, set slave ID, enable or disable authorization(0 is disable, 1 is enable), output level, enable or disable upgrading (0 is disable, 1 is enable), authorization start time and ending time.

e.g: add a slave with mac address 00:a1:02:02:20:40 to master white list, slave ID is 20, enable authorization and enable upgrading. the start time of authorization is 00:00 and ending time is 23:59

```
vtysh(config-master 1)# bind slave-id 20 mac 00:a1:02:02:20:40 1 120 1
00:00 23:59
Add mac address (00:A1:02:02:20:40) successful.
```

Delete slave from master white list.

Command	vtysh(config-master 1)# **no bind mac *mac-address***

Function description	delete a slave from aster master white list.

e.g: delete a slave with mac address 00:a1:02:02:20:40 from master white list.

```
vtysh(config-master 1)# no bind mac 00:a1:02:02:20:40
No bind mac address (00:A1:02:02:20:40) successful
```

Set master management VLAN

Command	vtysh(config-master 1)# **set vlan *active|inactive|<2-4094>***
Function description	set manage vlan as active mode, configurate vlan ID.

e.g: set management VLAN mode is active, manage VLAN ID is 10, display current VLAN configuration.

```
vtysh(config-master 1)# set vlan active
Set vlan successful.
vtysh(config-master 1)# set vlan 10
Set vlan successful.
vtysh(config-master 1)# show vlan
VLAN_ENABLE = no
MASTER_VID = 10
```

Get into slave module management

Command	vtysh(config)# **slave *slaveid <1~64>***
Function description	get into slave management, "slaveid is" the slave ID, check in 4.1.1.1.2.1.

Show slave port status

Command	vtysh[*slave-id*]# **show port list**
Function description	show current slave port status.

e.g: check the port status of slave with mac 00:a1:02:02:20:40.

```
vtysh[00:A1:02:02:20:40]# show port list
MAC-Address        PORT  RULE  VLAN_EN  VLAN_ID  PORT_EN
00:A1:02:02:20:40   1     0     0        0        1
00:A1:02:02:20:40   2     0     0        0        1
Total [2] ports.
```

Manage slave port

Command	vtysh[*slave-id*]#**set port*<1-4> <1-65535> (enable|disable) <2-4094> (enable|disable)***
Function description	manage slave port, add rules to appointed port, open/close port enable, set port VLAN ID, set port tag mode.

e.g: manage the port 1 of slave with mac 00:a1:02:02:20:40, add a rule ID 1 for port 1, enable port, set the VLAN ID as 10, and set the port as tag mode.

```
vtysh[00:A1:02:02:20:40]# set port 1 1 enable 10 enable
Set port [1] successful.
```

4. Trouble shooting

Note: During the initial lab testing, if the same computer is used to setup the EoC Master and then used to test the EoC Client through the Client LAN port, it will take about 10 mins for the EoC Client to sync the MAC address with the EoC master.

Solution: Power cycle the EoC Client can refresh the MAC and expedite the process.

Ascent Communication Technology Ltd

AUSTRALIA
961 Mountain Highway, Boronia, Victoria 3155, Australia
Phone: +61-488 293 682
Email: sales@ascentcomtec.com

CHINA/HONG KONG
13/F., Shum Tower, 268 Des Voeux Road Central, Hong Kong
Phone China: +86-139 0173 4382
Phone Hong Kong: +852-3170 4081
Email: sales@ascentcomtec.com

EUROPE
Pfarrer-Bensheimer-Strasse 7a, 55129 Mainz, Germany
Phone: +49 (0) 6136 926 3246
Email: sales@ascentcomtec.com

USA
2710 Thomes Ave, Cheyenne, WY 82001
USA
Phone: +1-203 816 5188
Email: sales@ascentcomtec.com