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OAM Function Configuration Guide

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If you have comments on the ... specification, instead of the web page above, please send comments to:

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Release Notes

Date of Release	Manual Version	Software Version	Revisions

Preface

About This Manual

This manual introduces primary functions of the configuration management software for RC series products.

Who Should Read This Manual

This manual is a valuable reference for sales and marketing staff, after service staff and telecommunication network designers. For those who want to have an overview of the features, applications, structure and specifications of ... device, this is also a recommended document.

Relevant Manuals

《Raisecom NView System User Manual》

《Raisecom Nview System Installation and Deployment Manual》

《... User Manual》

《... Commands Notebook》

Organization

This manual is an introduction of the main functions of ... EMS. To have a quick grasp of the using of the EMS of ... , please read this manual carefully. The manual is composed of the following chapters

Chapter 1 Overview

This chapter briefly introduces the basic function of ...

Chapter 2 Configuration Management

This chapter mainly introduces the central site configuration management function of the

Chapter 3 Performance Management

This chapter focuses on performance management function of

Chapter 4 Device Maintenance Management

This chapter introduces the device maintenance management function of

Appendix A Alarm Type

The alarm types supported by

Compliance

The RC series products developed by Raisecom are strictly complied with the following standards as well as ITU-T, IEEE, IETF and related standards from other international telecommunication standard organizations:

YD/T900-1997 SDH Equipment Technical Requirements - Clock

YD/T973-1998 SDH 155Mb/s and 622Mb/s Technical conditions of optical transmitter module and receiver module

YD/T1017-1999 Network node interface for the Synchronous Digital Hierarchy (SDH)

YD/T1022-1999 Requirement of synchronous digital hierarchy (SDH) equipment function

YD/T1078-2000 SDH Transmission Network Technique Requirements-Interworking of Network Protection Architectures

YD/T1111.1-2001 Technical Requirements of SDH Optical Transmitter/Optical Receiver Modules——2.488320 Gb/s Optical Receiver Modules

YD/T1111.2- 2001 Technical Requirements of SHD Optical Transmitter/Optical Receiver Modules——2.488320 Gb/s Optical Transmitter Modules

YD/T1179- 2002 Technical Specification of Ethernet over SDH

G.703 Physical/electrical characteristics of hierarchical digital interfaces

G.704 Synchronous frame structures used at 1544, 6312, 2048, 8448 and 44 736 kbit/s hierarchical levels

G.707 Network node interface for the synchronous digital hierarchy (SDH)

G.774 Synchronous digital hierarchy (SDH) - Management information model for the network element view

G.781 Synchronization layer functions

G.783 Characteristics of synchronous digital hierarchy (SDH) equipment functional blocks

G.784 Synchronous digital hierarchy (SDH) management

G.803 Architecture of transport networks based on the synchronous digital hierarchy (SDH)

G.813 Timing characteristics of SDH equipment slave clocks (SEC)

G.823 The control of jitter and wander within digital networks which are based on the 2048 kbit/s hierarchy

G.825 The control of jitter and wander within digital networks which are based on the synchronous digital hierarchy (SDH)

G.826 End-to-end error performance parameters and objectives for international, constant bit-rate digital paths and connections

G.828 Error performance parameters and objectives for international, constant bit-rate synchronous digital paths

G.829 Error performance events for SDH multiplex and regenerator sections

G.831 Management capabilities of transport networks based on the synchronous digital hierarchy (SDH)

G.841 Types and characteristics of SDH network protection architectures

G.842 Interworking of SDH network protection architectures

G.957 Optical interfaces for equipments and systems relating to the synchronous digital hierarchy

G.691 Optical interfaces for single channel STM-64 and other SDH systems with optical amplifiers

G.664 Optical safety procedures and requirements for optical transport systems

I.731 ATM Types and general characteristics of ATM equipment

I.732 ATM Functional characteristics of ATM equipment

IEEE 802.1Q Virtual Local Area Networks (LANs)

IEEE 802.1p Traffic Class Expediting and Dynamic Multicast Filtering

IEEE 802.3 CSMA/CD Access Method and Physical Layer Instruction

Chapter 1 802.3ah OAM Function Configuration

1.1 802.3ah OAM Principle Introduction

IEEE802.3ah OAM (Operation Administration Maintenance) is used to provide more efficient Ethernet link operation, management and maintenance. As the efficient complementarity of the high managing tool, OAM enhances the Ethernet management and monitoring.

1.1.1 OAM mode

The process of Ethernet OAM connecting is also called Discovery, which is the process of one OAM entity discovers another one in the remote device for creating a stable conversation.

In the process, the connected Ethernet OAM (OAM Function port) entity sends the Ethernet configuration information and local node support Ethernet OAM ability information by switching the information OAM PDU to the opposite in two way. Once OAM receives the configuration data from the opposite, it will decide whether build the OAM connection up. If both ends are agreed to build up the OAM connections, Ethernet OAM protocol will start to run on the LAN Layer.

There are two modes for building up Ethernet OAM connection: active mode and passive mode. The connection can only be active by OAM entity and passive OAM entity has to wait for the connecting request from the opposite OAM entity.

After the Ethernet OAM is connected, OAM entities from both ends send information OAMPDU to keep the connection. If the Information OAMPDU is not received by the OAM entity from opposite in 5 seconds, it will be considered as connection time-out. Thus OAMs are needed to reconnect.

Information OAMPDU packet is sent by internal counter control with maximum rate of 10 packets/second.

1.1.2 OAM loop-back

OAM loop-back can only be achieved after Ethernet OAM connection is built up. In connected situation, active mode OAM will send OAM loop-back command and opposite will response for that command. As remote is in loop-back mode, all packets but OAMPDU packet will be sent back in the original route.

Periodical loop-back detection can detect network failure on time and find out the failure happened location by subsection loop-back detection. It can help users to remove failure.

1.1.3 OAM events

It is difficult to detect the Ethernet failure, especially when the physical network communication is in no-breakdown but low network. OAMPDU states a Flag Domain which allows Ethernet OAM entity sends the failure information to the opposite. That Flag also states the threshold events as shown below:

Link Fault: Signal lost in the opposite link.

Dying Gasp: Unpredict states happen, as power cut-down.

Critical Event: Uncertain critical events happen.

Ethernet OAM connecting process is continually sending the Information OAMPDU. Local OAM entity can send the local threshold event information to opposite OAM entity through Information OAMPDU. The Administrators can always notice the link status and solve the related problems on time.

Ethernet OAM monitors the link by Event Notification OAMPDU switches. Once the link fails, the local link will monitor the failure. And it will send monitors the Event Notification OAMPDU to opposite Ethernet OAM entity to inform the threshold events. Administrator can notice the network status by monitoring the link.

- Error frame event: error frame number in unit time is over stated threshold number.
- Error frame period event: states frame number N as a period; it means in the period of received N error frames, the error frame number is over stated threshold one.
- Error frame second event: indicated in M seconds, the error frame's time in seconds are over the stated threshold number.(error frame second states: an error frame happens in a specific second and this second is called error frame second.)

1.1.4 OAM mib

Devices can gain opposite device link configuration/ statistics value through OAM and then get link status/ data;

1.2 802.3ah OAM Mode Configuration

OAM supports two modes: active mode and passive mode. Active mode starts OAM opposite discover process, supports functions but non-response remote loop-back command and variable gained requests; passive mode does not start OAM opposite discover process, does not send remote loop- back command and variable gained request. Different devices use different mode supports and default configurations. If the device supports passive mode, then its default mode will be passive mode or it will be active mode. If the device only supports one mode, then it does not support mode configuration. OAM mode. OAM mode is all OAM port link share, and users can set mode configuration on the devices which support both two mode as shown below:

Steps	Command	Description
Step 1	config	Entry global configuration mode
Step 2	oam {active passive}	Set OAM as active/passive mode
Step 3	Exit	Return to privilege use mode
Step 4	show oam	Show OAM loop-back information

Set device OAM as active mode:

```
Raisecom#config
```

```
Raisecom(config)#oam active
```

```
Raisecom(config)#exit
```

```
Raisecom#show oam
```

1.3 802.3ah OAM Active Mode Function

1.3.1 OAM default configuration

Function	Default Value
OAM Enable\Disable	Enable
Opposite OAM event alarm	Disable

1.3.2 OAM enable/disable configuration function

- OAM Enable\Disable

OAM is Ethernet point to point link protocol. Enable/Disable is used for all the link ports. In default situation, all ports OAM are Enable, user can Enable/ Disable OAM by the following steps:

Steps	Command	Description
Step 1	Config	Entry global configuration mode
Step 2	interface port <i>port_number</i>	Entry Ethernet physical interface mode <i>port_number</i> is physical interface number
Step 3	oam {disable enable}	Enable or Disable OAM
Step 4	Exit	Return Global Configuration mode
Step 5	Exit	Return privileged EXEC mode
Step 6	show oam	Show OAM Configuration state

Disable port 2 OAM:

```
Raisecom#config
```

```
Raisecom(config)#interface port 2
```

```
Raisecom(config-port)#oam disable
```

```
Raisecom(config-port)#exit
```

```
Raisecom(config)#exit
```

- Show OAM local link status

Privilege mode command: show oam can display OAM link local configuration and status include mode configuration, management status, working status, maximum packet length, configuration version and function support , etc. Through this command, users can understand OAM link configuration, running status, etc.

Raisecom#**show oam**

Port: 1

Mode: Passive

Administrate state: Enable

Operation state: Disabled

Max OAMPDU size: 1518

Config revision: 0

Supported functions: Loopback, Event, Variable

Port: 2

Mode: Passive

Administrate state: Disable

Operation state: Disable

Max OAMPDU size: 1518

Config revision: 0

Supported functions: Loopback, Event, Variable

- Show OAM opposite link status

Privilege mode command: show oam peer can display the opposite device information on OAM link, include: opposite MAC address, manufactory OUI, manufactory information, mode configuration, maximum packet length, configuration version and function support information. If OAM link is not connected, then there no information will be displayed.

Raisecom#show oam peer

Port: 1

Peer MAC address: 000E.5E00.91DF

Peer vendor OUI: 000E5E

Peer vendor info: 1

Peer mode: Active

Peer max OAMPDU size: 1518

Peer config revision: 0

Peer supported functions: Loopback, Event

1.3.3 Run OAM loop-back function

OAM provide link layer remote loop-back system, which can be used for located link error position, performance and quality test. Under link loop-back status, devices will loop-back all link received packets to the opposite devices except OAM packet. Local device uses OAM remote command to enable or disable remote loop-back. Opposite device will use loop-back configuration command to control whether response loop-back command.

In central office end , users can build up remote loop-back through remote loop-back command.

Step s	Command	Description
Step 1	config	Entry global configuration mode
Step 2	interface port <i>port_number</i>	Entry Ethernet physical interface mode, <i>port_number</i> is physical interface number
Step 3	oam remote-loopback	Build up remote loop-back
Step 4	exit	Return to global configuration mode
Step 5	exit	Return to privileged EXEC mode
Step 6	show oam loopback	Show OAM loop-back situation

Build remote loop-back on port link 2:

```
Raisecom#config
```

```
Raisecom(config)#interface port 2
```

```
Raisecom(config-port)#oam remote-loopback
```

```
Raisecom(config-port)#exit
```

```
Raisecom(config)#exit
```

```
Raisecom#show oam loopback
```

Users can remove remote loop-back as below:

Steps	Command	Description
Step 1	Config	Entry global configuration mode
Step 2	interface port <i>port_number</i>	Entry Ethernet physical interface mode <i>port_number</i> is physical interface number
Step 3	no oam remote-loopback	Remove remote loop-back
Step 4	Exit	Return global configuration mode
Step 5	Exit	Return privileged EXEC mode
Step 6	show oam loopback	Show OAM loop-back state

Remote loop-back on remove end link 2:

Raisecom#**config**

Raisecom(config)#**interface port 2**

Raisecom(config-port)#**no oam remote-loopback**

Raisecom(config-port)#**exit**

Raisecom(config)#**exit**

Raisecom#**show oam loopback**

△ Attention:

- Remote loop-back only can be achieved after Ethernet OAM is connected.

1.3.4 Opposite OAM event alarm function

By default, when opposite link monitor event is received, device will not inform network managing center through SNMP TRAP. Users can use Enable/Disable opposite monitor events is informed to the network managing center.

Steps	Command	Description
Step	config	Entry global configuration mode

1		
Step	interface port <i>port_number</i>	Entry Ethernet physical interface
2		mode
		<i>port_number</i> is physical interface number
Step	oam peer event trap	Enable or Disable opposite
3	{disable enable}	OAM monitor event is informed network managing center
Step	exit	Return to global configuration
4		mode
Step	exit	Return to privileged EXEC
5		mode
Step	show oam trap	show OAM TRAP information
6		

Enable port 2 opposite link monitoring event informed to network managing center:

```
Raisecom#config
```

```
Raisecom(config)#interface port 2
```

```
Raisecom(config-port)# oam peer event trap enable
```

```
Raisecom(config-port)#exit
```

```
Raisecom(config)#exit
```

```
Raisecom#show oam trap
```

1.3.5 View opposite IEEE 802.3 Clause 30 mib

OAM variable gain is a link monitoring measure. It allows local device to get opposite device current variable value thus get current link status. IEEE802.3 Clause30 particularly states the variables which support OAM gain and their representing way. Variable can be divided into its biggest unit -- object which include package and attribute. Package also is combined by several attribute. Attribute is variable's smallest unit. OAM variable gain uses Clause 30 to state object/package/attribute's branch described requesting objects. And branches plus the variable value are used to represent object response variable request. Now, all devices have supported both OAM information and port statistics as object variable gain. EPON OLT device also supports MPCP and OMPEmulation object information gain.

When device OAM work as active mode, users can gain opposite devices OAM information or port statistics variable values as the steps below:

Step s	Command	Description
Step 1	show oam peer { link-statistics oam-info } { port-list client line } <i>port_number</i>	Gain opposite device OAM information or port statistics variable value <i>port_number</i> is physical interface number

Gain port 2 opposite device OAM information value is shown as below:

```
Raisecom(debug)#show oam peer oam-info port-list 2
```

Attention:

- OAM variable gain is only achieved if and only if Ethernet OAM connection is built up.

1.3.6 OAM statistics clear function

OAM calculates the number of all different types of OAM packets which are sent/received on each OAM port link. The types of packets are: information, link event information, loop-back control, variable gain request, variable gain response, organise using, uncertain type and repeated event information. Users can clear port link OAM statistics information as follow steps:

Step s	Command	Description
Step 1	config	Entry global configuration mode
Step 2	interface port <i>port_number</i>	Entry Ethernet physical interface mode <i>port_number</i> is physical interface number
Step 3	clear oam statistics	Clear OAM port link statistics information
Step 4	exit	Entry global configuration mode
Step 5	exit	Return to privileged EXEC mode

Step	show oam statistics	show OAM link statistics information
6		

Clear port 2 OAM link statistics information as below:

```
Raisecom#config
```

```
Raisecom(config)#interface port 2
```

```
Raisecom(config-port)#oam clear statistics
```

```
Raisecom(config-port)#exit
```

```
Raisecom(config)#exit
```

```
Raisecom#show oam statistics
```

1.3.7 Monitoring and maintenance

Command	Description
show oam	show OAM link's local configuration and status
show oam peer	show OAM link's opposite device information
show oam loopback	Show remote loop-back information
show oam peer event	show opposite device informed event
show oam trap	show OAM related SNMP TRAP information and its configuration situation.
show oam statistics	show all OAM port link statistics information

1.3.8 Configuration example

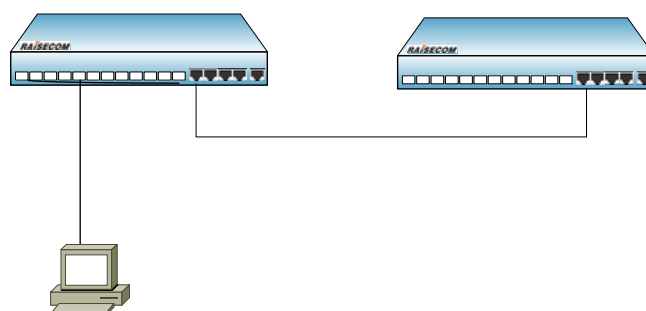


Figure 1-1

As figure 1-1, to set remote loop-back as following configuration:

```
Raisecom#config
```

```
Raisecom (config)#interface port 1
```

```

Raisecom(config-port)#oam enable
Raisecom(config-port)#exit
Raisecom#show oam port-list 1

Port: 1

Mode: Active

Administrate state: Enable

Operation state: Operational

Max OAMPDU size: 1518

Config revision: 0

Supported functions: Loopback, Event

```

```

Raisecom#config
Raisecom (config)#interface port 1
Raisecom(config-port)#oam remote-loopback
Raisecom(config-port)#exit
Raisecom(config)#exit
Raisecom#show oam loopback

Port: 1

Loopback status: Remote

Loopback react: Ignore

```

1.4 802.3ah OAM Passive Function

1.4.1 OAM default configuration

Function	Default Value
Oam Enable\Disable	Enable
Oam mode	Passive
Response\Ignore opposite oam loop-back Configuration	Response
Local oam event alarm	Disable
Oam failure indication	Enable
Error frame periodical event window and threshold.	window 10 (s) Threshold 1 (unit)

Error frame event window and threshold	Window 10 (s) Threshold 1(unit)
Error frame second statistics event window and threshold	Window 600 (s) Threshold 1 (unit)

1.4.2 OAM enable/disable configuration

- OAM Enable\Disable

OAM is Ethernet point to point link protocol, Enable/Disable is for different link port. In default situation, all ports OAM are Enable. Users can enable/disable OAM by following steps:

Steps	Command	Description
Step 1	Config	Entry global configuration mode
Step 2	interface { line client} port_number	Entry Ethernet physical interface mode <i>port_number</i> is physical interface number
Step 3	oam {disable enable}	Enable or Disable OAM
Step 4	Exit	Return to global configuration mode
Step 5	Exit	Return to privileged EXEC mode
Step 6	show oam	show OAM configuration situation

Disable port 2 OAM as follow:

```
Raisecom#config
```

```
Raisecom(config)#interface port 2
```

```
Raisecom(config-port)#oam disable
```

```
Raisecom(config-port)#exit
```

```
Raisecom(config)#exit
```

- Show OAM local link status

Privileged EXEC mode command: show oam can show OAM link local configuration and status, displayed information is include mode configuration, managing status, running status, maximum packet length, configuration version and function support information. By this command, users can

understand OAM link configuration, running status such information.

Raisecom#show oam

Port: 1

Mode: Passive

Administrate state: Enable

Operation state: Disabled

Max OAMPDU size: 1518

Config revision: 0

Supported functions: Loopback, Event, Variable

Port: 2

Mode: Passive

Administrate state: Disable

Operation state: Disable

Max OAMPDU size: 1518

Config revision: 0

Supported functions: Loopback, Event, Variable

- Show OAM opposite link status

Privileged EXEC mode command: show oam peer can show OAM link's opposite device information, include opposite MAC address, manufactory OUI, manufactory information, mode configuration, maximum packet length, configuration version and function support information. If OAM link is not built up, then it will not show any information.

Raisecom#show oam peer

Port: 1

Peer MAC address: 000E.5E00.91DF

Peer vendor OUI: 000E5E

Peer vendor info: 1

Peer mode: Active

Peer max OAMPDU size: 1518

Peer config revision: 0

Peer supported functions: Loopback, Event

1.4.3 Response/ignore opposite OAM loop-back configuration function

OAM provide link layer remote loop-back system, can be used for locating link error position,

function and quality testing. In link loop-back status, all packets received from the link but OAM packet loop-back to opposite device. Local device use OAM remote loop-back command enable or disable remote loop-back, opposite device uses loop-back configuration command control to response loop-back command.

In default situation , device loop-back responses as Enable , users set loop-back response configuration as below:

Step s	Command	Description
Step 1	config	Entry global configuration mode
Step 2	interface { line client } port_number	Entry Ethernet physical interface mode <i>port_number</i> is physical interface number
Step 3	oam loopback { ignore process }	Enable or Disable OAM loop-back response
Step 4	exit	Return to global configuration mode
Step 5	exit	Return to privileged EXEC mode
Step 6	show oam loopback	show OAM loop-back situation

Disable response port link 2 OAM remote loop-back:

```
Raisecom#config
Raisecom(config)#interface port 2
Raisecom(config-port)#oam loopback ignore
Raisecom(config-port)#exit
Raisecom(config)#exit
Raisecom#show oam loopback
```

1.4.4 OAM link monitor configuration function

OAM link monitor is used to detect and report different link errors. When link errors are detected, device informs opposite error cause time, window and threshold configuration by OAM event information packets. Opposite reports events to network managing center by SNMP TRAP. Local device reports events directly to network managing center by SNMP TRAP. OAM link monitoring

supports events below:

Error frame events: indicates periodical error frames over threshold. When indicated time periodical error frames over threshold, device will have that event.

Error frame periodical event: lately N frames' error are over threshold, N is indicated value; once lately N frames' error over threshold is detected, device will release that event.

Error frame second statistics event: lately M seconds, the error frames' second number over threshold. M is the indicated value. When error frame second number is over indicated threshold in M seconds, device releases that event.

OAM named the previous monitoring period, frame calculate number and second statistics number as monitoring window.

Users can set the link monitoring configuration as steps below:

Step s	Command	Description
Step 1	config	Entry global configuration mode
Step 2	interface { line client } port_number	进入 Ethernet physical interface mode <i>port_number</i> is physical interface number
Step 3	oam errored-frame window <1-60> threshold <0-65535>	Config error frame monitoring window and threshold <1-60> is monitoring window, unit is second, <0-65535> is threshold.
Step 4	oam errored-frame-period window <100-60000> threshold <0-65535>	Config error frame periodical event monitoring window and threshold <100-60000> is monitoring window, unit is second, <0-65535> is threshold.
Step 5	oam errored-frame-seconds window <10-900> threshold <0-900>	Config error frame statistics monitoring window and threshold <10-900> is monitoring window,

		unit is second, <0-900> is threshold.
Step	exit	Return to global configuration mode
6		
Step	exit	Return to privileged EXEC mode
7		
Step	show oam notify	show OAM events configuration situation
8		

Configuration port 2 error frame event monitoring window is 2 seconds, threshold is 8 error frame: error frame period event monitoring window is 100 ms, threshold is 128 error frames; error frame second statistics event monitoring window is 100 seconds, threshold is 8 seconds.

```
Raisecom#config
```

```
Raisecom(config)#interface port 2
```

```
Raisecom(config-port)# oam errored-frame window 2 threshold 8
```

```
Raisecom(config-port)# oam errored-frame-period window 100 threshold 128
```

```
Raisecom(config-port)# oam errored-frame-second window 100 threshold 8
```

```
Raisecom(config-port)#exit
```

```
Raisecom(config)#exit
```

```
Raisecom#show oam notify
```

Using physical layer interface configuration command **no oam errored-frame** can resume error frame event monitoring window and threshold as Default Value

Using physical layer interface configuration command **no oam errored-frame-period** can resume error frame event monitoring window and threshold as Default Value

Using physical layer interface configuration command **no oam errored-frame-second** can resume error frameevent monitoring window and threshold as Default Value.

1.4.5 OAM fault indication function

OAM fault indication function is used to inform opposite device local device with abnormal event as link-fault, power break, abnormal temperature, etc. Those will cause the faults as link disable, device restart, ect. Now stated faults are link-fault, dying-gasp and critical-event caused by abnormal temperature. In default, device fault indicated as Enable status, thus when fault happened, device informs opposite by OAM. Users can Enable or Disable faults (except link-fault fault indicated must inform opposite) by following steps:

Steps	Command	Description
Step 1	config	Entry global configuration mode
Step 2	interface { line client } port_number	Entry Ethernet physical interface mode <i>port_number</i> is physical interface number
Step 3	oam notify { dying-gasp critical-event } { disable enable }	Enable or Disable OAM error indicated opposite
Step 4	exit	Return to global configuration mode
Step 5	exit	Return to privileged EXEC mode
Step 6	show oam notify	show OAM event configuration situation

Disable port 3 critical-event fault indication:

Raisecom#config

Raisecom(config)#interface port 3

Raisecom(config-port)# oam notify critical-event disable

Raisecom(config-port)#exit

Raisecom(config)#exit

Raisecom#show oam notify

1.4.6 Local OAM event alarm function

In Default, when link monitoring event is detected, device will not inform network managing center by SNMP TRAP. Users can use Enable or Disable to inform network managing center the monitor events by following steps:

Steps	Command	Description
Step 1	config	Entry global configuration mode
Step	interface { line client }	Entry Ethernet physical interface

2	<i>port_number</i>	mode
		<i>port_number</i> is physical interface number
Step 3	oam event trap { disable enable }	Enable or Disable OAM monitoring event to inform network managing center
Step 4	exit	Return to global configuration mode
Step 5	exit	Return to privileged EXEC mode
Step 6	show oam trap	show OAM TRAP information

Enable port 2 link monitoring event inform to network managing center:

Raisecom#config

Raisecom(config)#interface port 2

Raisecom(config-port)# oam event trap enable

Raisecom(config-port)#exit

Raisecom(config)#exit

Raisecom#show oam trap

1.4.7 IEEE 802.3 Clause 30 mib support

OAM variable gain is a link monitoring measure. It allows local device to gain opposite device lately variable value. Thus it can gain lately link status. IEEE802.3 Clause30 detailly states support OAM gain variable and its representation. Object is the biggest division of variable. Each object has package and attribute. Package is include many attribute. Thus attributes are the smallest variable unit. OAM variable gain states object/package/attribute branches description as request objects, and branches plus variable value are used to represent as object response variable request. Now, all devices can support OAM information and port statistics variable gain. EPON OLT device also supports MPCP and OMPEmulation object information gain.

When device OAM is in active mode, users can gain opposite device OAM information or port statistics variable value by following steps:

Step	Command	Description
Step 1	show oam peer { link-statistics oam-info } { client line } <i>port_number</i>	Gain opposite device OAM information or port statistics variable value

port_number is physical
interface number

Gain port 2 opposite device OAM information value:

Raisecom(debug)#show oam peer oam-info port-list 2

1.4.8 OAM statistics clear function

OAM statistics sending/receiveing all OAM packets number on each OAM port link. Packets types:information, link events information, loop-back control, variable gain request, variable gain response, organise using, uncertain type and repeat event inforamtion. Users can clear port link OAM statistics information as following steps:

Steps	Command	Description
Step 1	config	Entry global configuration mode
Step 2	interface { line client } <i>port_number</i>	Entry Ethernet physical interface mode <i>port_number</i> is physical interface number
Step 3	clear oam statistics	Clear OAM port link statistics information
Step 4	exit	Return to global Configuration mode
Step 5	exit	Return to privileged EXEC mode
Step 6	show oam statistics	show OAM link statistics information

Clear port 2 OAM link statistics information

Raisecom#config

Raisecom(config)#interface port 2

Raisecom(config-port)#oam clear statistics

Raisecom(config-port)#exit

Raisecom(config)#exit

Raisecom#show oam statistics

OAM record recent happening local and opposite link monitoring and fault (key) events. Users can clear port link OAM local and opposite events record as following steps:

Steps	Command	Description
Step 1	config	Entry global configuration mode
Step 2	interface { line client } port_number	Entry Ethernet physical interface mode <i>port_number</i> is physical interface number
Step 3	clear oam event	Clear OAM port link event record
Step 4	exit	Return to global configuration mode
Step 5	exit	Return to privileged EXEC mode
Step 6	show oam event	show OAM link local event record
Step 7	Show oam peer event	show OAM link opposite event record

Clear port 2 OAM link events record:

Raisecom#config

Raisecom(config)#interface port 2

Raisecom(config-port)# clear oam event

Raisecom(config-port)#exit

Raisecom(config)#exit

Raisecom#show oam event

Raisecom#show oam peer event

1.4.9 Monitoring and maintenance

Command	Description
show oam	show OAM link local configuration and status
show oam peer	show OAM link 上 opposite device 的信息
show oam loopback	show remote loop-back information

show oam event	show local device happening events
show oam peer event	show opposite device informing events
show oam notify	show all OAM link local events informing configuration
show oam statistics	show all OAM port link statistics information

1.4.10 Configuration example

According to Figure 1-1, if response remote loop-back, device A can be configed as below:

```
Raisecom#config
Raisecom(config)#oam passive
Raisecom (config)#interface client 1
Raisecom(config-port)#oam enable
Raisecom (config-port)# oam loopback process
Raisecom(config-port)#exit
Raisecom(config)#exit
Raisecom#show oam loopback
Port: client1
Loopback status: No
Loopback react: Process
```



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