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Two-Layer Protocol Transparent Transmission Configuration

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Comments and questions about how the … system software works are welcomed. Please review the FAQ in the related manual, and if your question is not covered, send email by using the following web page:

http://www.raisecom.com/en/xcontactus/contactus.htm.

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

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We hope to hear from you!

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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 Two-Layer Protocol Transparent Transmission Configuration

1.1 Two-layer protocol transparent transmission principle

QinQ offers a relatively simple two-layer VPN tunnel, by packaging outer layer VLAN Tag of user's private network message, so that the message is able to go through the operator's backbone network with two-layer Tag. Based on this, with two-layer protocol transparent transmission function, the two-layer protocol of the user's network can go through the operator's network, so that the same user network of the different places can run two-layer protocol in uniform.

Usually two-layer protocol transparent transmission is carried out by the operator's network edge switch. Transparent transmission function starts on the port that connect the operator's network edge switch and user network. The port exchange mode is access mode or dot1 q-tunnel mode, while the user switch port that is connected with it is trunk mode or hybrid mode. User network's two-layer protocol message, coming from the transparent transmission port, enters operator's network after being packaged by operator edge switch (message input interface). Then decapsulation will be done by the edge switch and the message will be transmitted to user network.

Transparent transmission function includes message packaging and decapsulation, the basic principle is shown below:

● Message encapsulation: in the message input side, the equipment will change the destination MAC address of two-layer protocol message from user network into special broadcast MAC address (default value 010E.05E00.0003). In operator network, the modified message will be transmitted in the user's VLAN as data message.

● Message decapsulation: in the message output side, the equipment will recognize the message that the destination MAC address is special broadcast MAC address (default value is 010E.5E00.0003), and revert the destination MAC address to the source destination MAC address of two-layer protocol message, then send the message to the given user network.

Two-layer protocol transparent transmission function can run with QinQ function or work respectively. But in actual, after the protocol message MAC address being modified, it still need to be covered with outer Tag to go through the operator network.

1.2 Two-layer protocol transparent transmission configuration

Two-layer transparent transmission configuration includes: transparent transmission protocol enable/diabale, transparent transmission message destination MAC address, COS value, the specified VLAN, the specified output port, message lost limit and port off limit. Configuring specified VLAN can make the transparent transmission message be transmitted by the specified VLAN, not the input VLAN; configuring the specified output port, can make the transparent transmission message being transmitted by only the given output port.

1.2.1 Two-layer protocol transparent transmission default configuration

Function	Default value
Enable/disable protocol	Disable

transparent transmission	
Message destination MAC address	010E.5E00.0003
Message COS	5
Specified VLAN	No specified VLAN
Specified output port	No specified output port
Message package lost limit	No limit
Message port disabled limit	No limit

1.2.2 Two-layer protocol transparent transmission configuration

By the following step, transparent transmission message destination MAC address, message COS value, the specified output port and VLAN can be configured, and enable/disable two-layer protocol transparent transmission function is available.

Step	Command	Description
1	**config**	Enter global configuration mode
2	**relay destination-address** *HHHH.HHHH.HHHH*	Configure transparent transmission message destination MAC address, transparent transmission message destination MAC address must be broadcast address, and can not take 0x0180C2 or 010E.5E00.0003 as front
3 (optical)	**relay cos** *<0-7>*	Set transparent transmission COS value, range is 0-7
4	**interface port** *portid*	Enter Ethernet physical port mode
5	**relay port** *portid*	Set transparent transmission specified output port, range is 1-MAX port number.
6	**relay vlan** *<1-4094>*	Set transparent transmission message specified VLAN, range is 1-4094.
7	**relay** {stp | dot1x | lacp | gmrp | gvrp | all}	Enable/disable port two-layer transparent transmission function, all stands for all two-layer protocols that support transparent transmission.
8	**exit**	Return to global configuration mode

9	**exit**	Return to privileged EXECmode
10	**show relay**	Show transparent transmission function configuration and state
11	**write**	Save current system configuration

no relay destination-address reverts transparent transmission message destination MAC address to default value, that is 010E.5E00.0003. **no relay cos** clears transparent transmission message specified VLAN, that is the not specified VLAN. **no relay**{stp|dot1x|lacp|gmrp|gvrp|all} closes two-layer protocol transparent transmission function.

⚠ Notice:

➢ Transparent transmission message input equipment and output equipment need to configure the same transparent transmission message destination MAC address, that is to say, to cooperate with other manufacturers, it is needed to keep the equipment transparent transmission message destination MAC address to stay the same. Transparent transmission message destination MAC address must be broadcast address, and can not begin with 0x0180c2 or 0x010E5E, but can be set to 010E.5E00.0003.

➢ Transparent transmission message COS value range is 0-7. Usually, transparent transmission protocol message PRI should be higher than ordinary data message.

➢ Transparent transmission specified output port can be any port of the equipment (except source port). User needs to make sure port VLAN attribution correct by configuration, or the message transparent transmission will fail.

➢ Transparent transmission specified VLAN value range is 1-4094. If this VLAN has not been created, transparent transmission message real-time transmission fails. So, when configuring specified VLAN, it is necessary to create and enable the VLAN on the equipment.

➢ To start two-layer protocol transparent transmission, it is needed to disable the corresponding protocols. To enable STP transparent transmission, closing STP protocol is needed.

➢ On the same equipment, when both the protocol message input port and output port transparent transmission function is enabled, the destination MAC address of protocol message will not be modified.

1.2.3 Two-layer protocol transparent transmission speed limit configuration

To configure transparent transmission message lost threshold and port off threshold, follow the steps below:

Step	Command	Description
1	**config**	Enter global configuration mode
2	**interface port** *portid*	Enter Ethernet physical port mode
3	**relay drop-threshold** {stp | dot1x | lacp | gmrp | gvrp} *<1-4096>*	Set transparent transmission message lost threshold, value range is 1-4096 PDUs/sec.

4	**relay shutdown-threshold {**stp | dot1x | lacp | gmrp | gvrp**}** *<1-4096>*	Set transparent transmission message close threshold, value range is 1-4096 PDUs/sec.
5	**exit**	Return to global configuration mode
6	**exit**	Return to privileged EXEC mode
7	**show relay**	Show transparent transmission configuration and state
8	**write**	Save the current configuration of the system

no relay drop-threshold{stp\|dot1x\|lacp\|gmrp\|gvrp**}**: revert transparent transmission protocol packet lost default configuration. **no relay shutdown-threshold{**stp\|dot1x\|lacp\|gmrp\|gvrp**}**: revert transparent transmission protocol port close threshold to default configuration, use **no relay shutdown** to enable the port.

⚠ Notice:

➢ Transparent transmission message packet lost threshold and port close threshold value range is 1-40%, usually, packet lost threshold should be less than port close threshold.

➢ After port transparent transmission function is enabled, if message receiving rate exceeds port close threshold, or if the port receives the message of specified destination MAC address, the port will be closed. When the port is closed because of transparent transmission function, use **no relay shutdown** to enable the port.

1.2.4 Two-layer protocol transparent transmission message statistics clear

Follow the step below to clear transparent transmission message statistics

Step	Command	Description
1	**config**	Enter global configuration mode
2	**clear relay statistics [port-list** *port-list*]	Clear transparent transmission message stat. information
3	**exit**	Return to privileged EXEC mode
4	**show relay statistics**	Show transparent transmission stat. information.

1.2.5 Monitoring and maintaining

Command	Description
show relay [port-list ***port-list***]	Show transparent transmission configuration

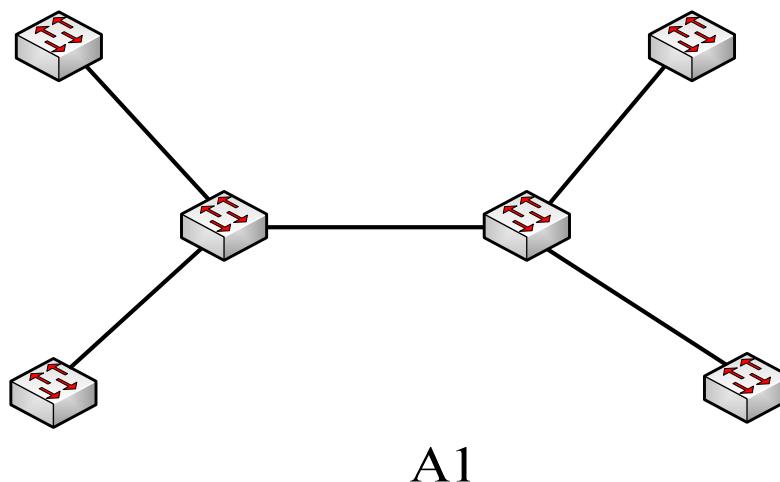|	and state
show relay statistics [port-list *port-list*]	Show transparent transmission message stat. information

1.2.6 Typical configuration example

A1

Fig 1 transparent transmission basic function configuration

S1,S2 configuration is the same. S1 configuration is shown below:

1) Create VLAN

Raisecom(config)#create vlan 100 active

Raisecom(config)#create vlan 200 active

P1: tunnel
vlan 100

2) Set port 1 exchange mode to dot1q-tunnel mode, ACCESS VLAN to 100, enable STP protocol transparent transmission and set STP message transparent transmission threshold to 1500. S1

Raisecom(config)# interface port 1

P3: do

Raisecom(config-port)#switchport mode dot1q-tunnel

Raisecom(config-port)#switchport access vlan 100

Raisecom (config-port)#relay stp

P2: tunnel
vlan 200

Raisecom(config-port)#relay drop-threshold stp 1500 B1

Raisecom (config-port)#exit

3) Set port 2 exchange mode to dot 1q-tunnel mode, ACCESS VLAN to 200, enable STP protocol transparent transmission and set STP message transparent transmission threshold to 1000.

Raisecom(config)# interface port 2

Raisecom(config-port)#switchport mode dot1q-tunnel

Raisecom(config-port)#switchport access vlan 200

Raisecom (config-port)#relay stp

Raisecom(config-port)#relay drop-threshold stp 1000

Raisecom (config-port)#exit

4) Set port 3 exchange mode to trunk double-tagging mode.

Raisecom(config)# interface port 3

Raisecom(config-port)# switchport mode trunk double-tagging

Raisecom (config-port)#exit