VER：1.0

MMR-EDB- XXX

牧马人®同轴电缆交换机

使 用 说 明 书

Operating Specification

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FCC Statement

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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目 录

地址：武汉市东湖高新技术开发区关山二路喜玛拉雅数码园 邮编：430074
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1 产品概述 Overviews

1.1 产品简介 Brief Description

牧马人®同轴电缆交换机是一种支持以太网数据利用同轴电缆快速接入的家用设备。该产

MMR® switches over coax is a kind of household appliance which supports quick access of ethernet data using coaxial cable.

品内置 CATV 二分配器、二层以太网交换机，通过双工器将 CATV 信号、以太网数据混合和

There are CATV two-divider and two-level Ethernet switches in itself, mixing and separating the CATV signal and Ethernet data by duplexer

分离，完成室内以太网数据信号利用同轴电缆传输的功能。该产品提供一个 10/100M 自适

to achieve transmission of indoor Ethernet data signal with coaxial cable.

It provides one standard 10/100M self-adaptive jack、

应的标准 RJ45 接口，一个 CATV/DATA 信号输入口、三个用户接入端口，供用户同轴电缆连

one CATV/DATA signal input、three user access ports for coaxial cable connection of users.

接。每个用户接入端口在输出 47-860MHz（或 87-860MHz）频带内 CATV 信号的同时，为用户

Each user access port outputs 47-860MHz（or 87-860MHz） CATV signal within frequency band

提供 10Base-T 的宽带接入。外观如图 1。

as well as providing 10Base-T broadband access. The appearance is shown as the

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picture.

-----设备前面板 front panel of the appliance

-----设备后面板 front panel of the appliance

图 1：牧马人®同轴电缆交换机外观图片

Picture One: the appearance picture of MMR® switches over coax cable

1.2 产品特性和规格说明 Features and Specifications

1.2.1 产品主要特性 Key Features

- 具有 TV 信号接入 2 端口分配输出功能，具有 TV 信号、DATA 基带信号分离、混合功能；
- With the function of TV signal input and distributing output through the second port and splitting and mixing of TV signal and DATA baseband signal
- 具有高可靠 DATA、TV 信号隔离功能，降低 TV 信号 C/N 劣化程度；

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- With the function of high reliable DATA、TV signal isolation, decreasing C/N degradation of TV signal
- DATA 接口部分遵循 IEEE802.3 以太网标准，以太网 RJ45 接口部分遵循 IEEE802.3U 快速以太网标准；
- DATA access follows IEEE802.3 ethernet standard while RJ45 keeps to IEEE802.3U quick Ethernet standard
- 提供一个具有 10/100M、全双工/半双工自适应以太网 RJ45 口，具有自动 MDI/MDI-X 线序交叉功能，有 LED 连接指示功能，该端口也可作为数据 Up-Link 口使用；
- Provide one 10/100M、full-duplex /half-duplex self-adaptive Ethernet RJ45 jack with automatic MDI/MDI-X line sequence cross function and LED connecting instruction, the port can also used as data Up-Link port
- 具有两种供电方式可选、两种应用模式可选，详见本文第 3 章；
- With two means of power supply and two application model available, please turn to the third chapter for more details
- 具备本地串口设置接口，LAN 口配置端口及控制管理设备的广播包丢弃设置、VLAN 划分、流量控制、QoS 等功能；
- With local serial setting interface, LAN port and discarding setting of broadcasting packet controls managing devices、VLAN dividing、flow control、QoS etc.
- 可设置基于端口的 Port_Based VLAN 和基于 IEEE 802.1Q 的 VLAN 划分；
- Can set the VLAN of port-based and the VLAN dividing of IEEE 802.1Q-based
- 具备环路检测功能。可自动关闭闲置端口的数据接入，避免空载致环。
- With the function of loop detection. Can close the data access of free ports automatically to avoid the loop caused by no-load.

1.2.2 产品规格 Specificaion

- 设备端口支持自动协商功能，支持 Auto-MDI/MDIX 自动翻转；
- The port support automatic negotiation and Auto-MDI/MDIX automatic turn
- 流控方式：全双工采用 IEEE 802.3x 标准，半双工采用 Backpressure 标准；
- Means of flow control: full-duplex adopts IEEE 802.3x standard while half-duplex applies to Backpressure standard
- 设备支持基于端口优先级、IEEE 802.1p、和 DiffServ/TOS 等 QoS 机制；
- The appliance support port-based priority、IEEE 802.1p and DiffServ/TOS mechanisms etc..
- 工作温度：－10℃到 55℃；Operating Temperature:
- 工作湿度：5%到 90%RH。Operating Humidity

2 设备快速应用指南 Rapid Practical Guide of the Appliance

牧马人®同轴电缆交换机是具有可管理功能的网络设备，为保证设备的正确使用，需要按

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MMR® switches over coax cable belongs to network equipment, and there's a need to follow the strict operating rules to configurate、install and manage to ensure its proper operation

照严格的操作规程予以配置、安装和管理。具体而言，牧马人®同轴电缆交换机的应用应

In terms of details, MMR® switches over coax cable should follow the work procedure of

遵循“参数设置→安装→连接→调试→设备配置→管理与使用”的工作流程。

“parameter setting → installation → connection → debugging → equipment appliance → management and using”

2.1 配置计算机的准备与连接 Ready of configurating computer and its connection

配置计算机应安装并运行 Windows 98/2000/XP，且安装有“牧马人®同轴电缆交换机控件”程序（安装方法见本文件）。The configurating computer needs to install and run Windows 98/2000/XP and be with activeX

1) 将配置计算机用专用串口配置电缆连接到牧马人®同轴电缆交换机的 LAN 口，给交换机加电; Connect the configurating cable of special serial port of configurating computer to LAN port of MMR® switches over coax cable and supply switches with power
2) 打开“控件”程序界面，选择串口，鼠标单击“连接设备”。

   Open “ActiveX” program interface, select serial port and click “connecting device”

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图 2：配置计算机与同轴电缆交换机的连接

串口适配器：adapter with serial port

2.2 设备安装 Equipment Installation

在完成设备参数设置后，牧马人®同轴电缆交换机可交由工程技术人员进行设备安装，主

After finishing equipment parameter settings, can be installed by engineers and technicians,

要包括设备的安装固定、有线电视网络、设备与用户家庭网络之间的线缆的连接。具体方

including installation and fixing of equipments、cable TV network、wire cable connection of equipments to users home network.

法与步骤详见本文件第 4 章。

Please review more details in Chapter Four.

2.3 设备功能配置 Functional Configuration of Equipments

牧马人®同轴电缆交换机的功能配置主要是根据网络业务及管理需求，对牧马人®同轴电缆

Functional configuration of MMR® switches over coax is predominantly based on network

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business and management,

交换机进行 VALN 划分、QoS 机制的配置、端口通讯模式及速率设置、端口控制（启用/

realizing the configuration and management of its VALN division、QoS mechanism configuration、mode of port communication and rate settings、port control(able/disable).

禁用）等交换机功能进行配置管理。

2.4 设备管理与使用 Management and Use of Equipments

牧马人®同轴电缆交换机具有本地管理功能，在使用过程中可利用“牧马人®同轴电缆交

MMR® switches over coax has local managing function, while using it can make use of “MMR® switches over coax ActiveX” program to set、modify and monitor the equipments related ethernet switch functions.

换机控件”程序对设备的以太网交换相关的功能进行设置、修改和监测。

3 两种供电方式和应用模式 Two Methods of Power Supply and Application Mode

3.1 供电方式 Power Supply

牧马人®同轴电缆交换机在设计过程中充分考虑用户应用环境的差异，支持在使用过程中选择两种供电方式。The design of MMR® switches over coax thoroughly considers the differences of users application circumstances, and the switches support selecting two methods of power supply.

方式一（适用于电源适配器供电）Method 1(apply to power supply of adapter)

应用环境：同轴电缆交换机安放位置容易取110v 电的则使用随机附带的 DC 12V/1A 电源

Application Circumstances: MMR® switches over coax whose placing location easily takes 110V power uses DC 12V/1A adapter accompanying with the switches to insert Power port;

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适配器插入 Power 口；

方式二（适用于同轴电缆芯线供电）Method 2(apply to core wire power supply of switches over coax cable)

应用环境：如设备被安放在弱电箱和天花板等位置不易取 AC220V 的，则可选择供电方式二（同轴电缆芯线供电），其应用方框图为：Application Circumstance: If equipments placed at places such as electrical boxes with weak current and ceiling etc. where are hard to take AC220V power, they can use this method (core wire power supply of switches over coax cable), its application drawing as shown:

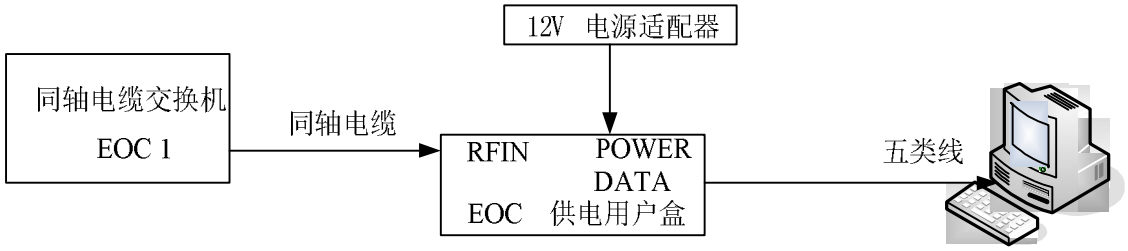

图 3 供电方式二（同轴电缆芯线供电）方框图

3.2 应用模式 Application Mode

牧马人®同轴电缆交换机支持两种应用模式，其一为 EOC IN 作为上联口，典型应用方式

MMR® switches over coax supports two application modes, one is EOC IN as uplink port, its typical application mode is shown as

如图（4）所示；其二为 RJ45 口作为上联口，可与局域网和广域网交换机等设备相连接，

drawing 4; The other is RJ45 jack as uplink port, which can connect to LAN or to WAN etc.

如用于局域网组网、共享 CM、宽带 ADSL 等。典型应用方式如图（5）所示：

such as the application of LAN networking、sharing CM、broadband ADSL etc., its typical application mode is shown as drawing 5:

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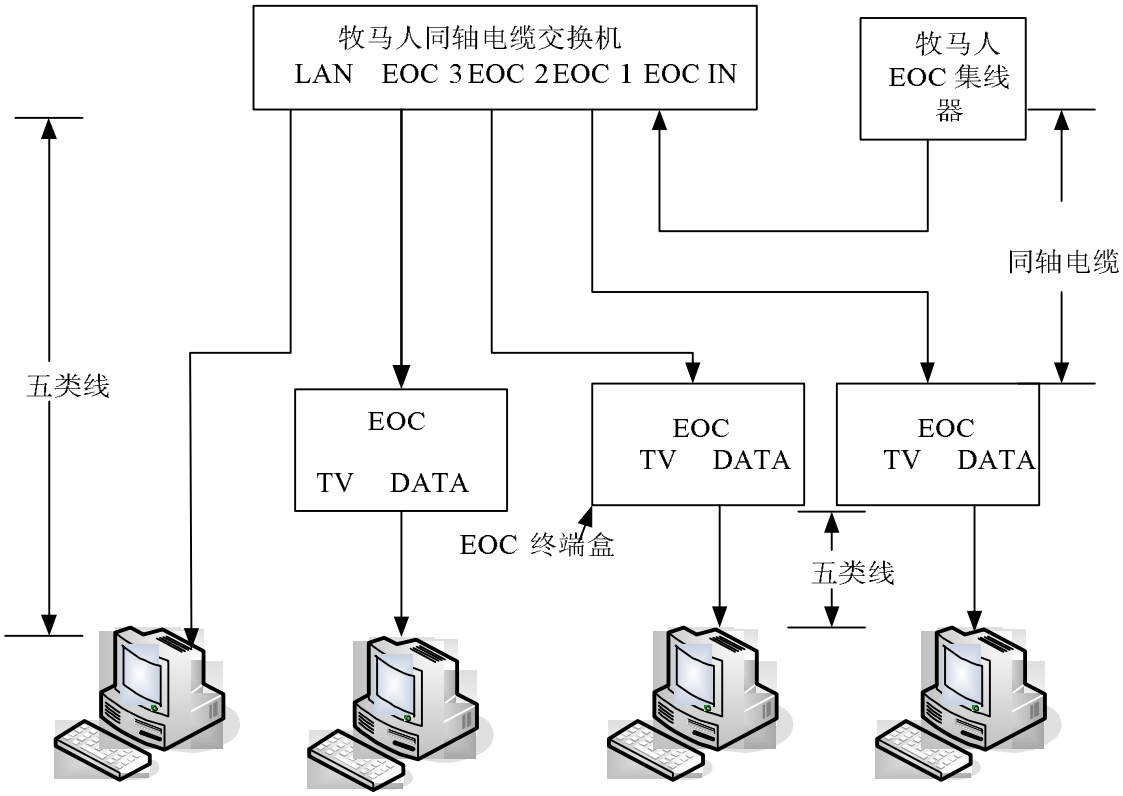

图 4 典型应用连接图

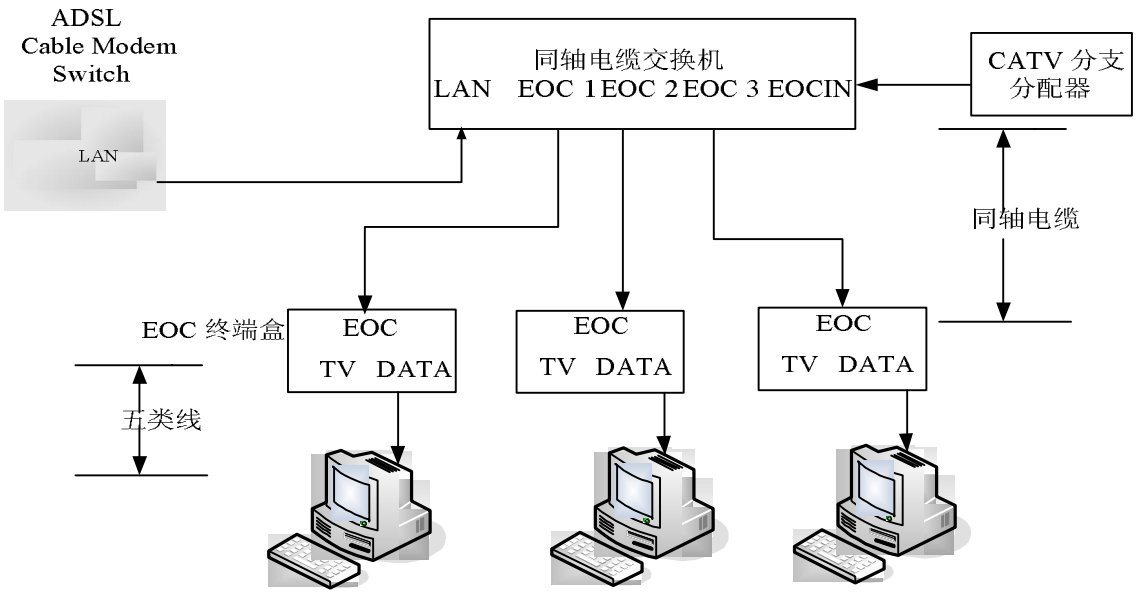

图 5 RJ45 口（LAN）作为上联口连接方框图

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4 设备安装连接 Installation and Connection of Equipments

设备安装包括牧马人®同轴电缆交换机的固定安装及各种网络线缆的连接。Installation and connection of equipments include installation and fixing of MMR® switches over coax and connections of kinds of network wired cables.

4.1 设备的安装 Installation of Equipments

牧马人同轴电缆交换机为室内安装方式，只需平放在桌面上即可，也可以安装在用户家弱电箱中。MMR® switches over coax is used for indoor installation, laying the desk or being installed electrical boxes with weak current in users home.

4.2 设备连接 Connection of Equipments

4.2.1 设备的连接 Connection of Equipments

对于CATV信号而言，牧马人®同轴电缆交换机的功能等同于四分配器；对于以太网信号而言，

In terms of CATV signal, MMR® switches over coax functions as four-divider; As far as ethernet signal,

牧马人®同轴电缆交换机的功能相当于可管理的二层以太网交换机。其典型应用连接如图 4 所

MMR® switches over coax functions as manageable two-level ethernet switches. Its typical application connection is shown as drawing four.

示。 图中的 EoC 终端盒主要功能是完成以太网信号与电视信号的分离。

The main function of EOC in the drawing is completing separate ethernet signal from TV signal.

（1） 同轴电缆交换机的 EOC IN 口连接上一级 EoC 设备的输出端口；

EOC IN port of switches over coax connects to EOC output of former link

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（2） 用户端口（如图 5）连接用户同轴电缆；

User port connects to user coaxial cable;

（3） 在用户室内适当位置，安装 EoC 用户终端盒，将用户交互终端（电脑、交互式机顶盒等）的 NIC 通过五类线与 EoC 用户终端盒上的 RJ45 口相连；At user indoor proper location, installing EoC user terminal box, connecting NIC of user interactive terminal to RJ45 jack of user terminal box using CAT5;

（4） 必须保证入户同轴电缆的完整性，入户同轴电缆与 EoC 用户终端盒中间不能连接有普通分支分配器等设备；Ensuring the completeness of coaxial cables which enter room, there shouldn't be any equipment such as ordinary splitter etc. between cables and EoC user terminal box;

（5） 插入电源适配器接头；Insert the joint of adapter;

（6） 若设备红色 LED 灯亮，则表示设备供电正常；当某一用户端用户交互终端加电并正常连接时，相对应的绿色指示灯亮，每个指示灯对应一个用户端口（含 RJ45 口）的连接状态；The equipment functions well when its red light is on; When one user interactive terminal is power-up, the corresponding green light is on, each indicator light indicates the connecting status of one user port(including RJ45);

（7） 用户交互终端的 NIC（网卡）支持 10/100Mbps 并设置在自协商工作模式；NIC(netcard)of user interactive terminal supports 10/100Mbps and sets Auto-Negotiation operating mode;

（8） 当用户端网络设备只支持 10BASE-T 工作模式时，需通过设备控制软件将同轴电缆交换机的相应 EoC 端口设置为自协商（Auto-Negotiation）模式。If user network equipments only support operating mode of 10BASE-T, there is a need to set EoC port of switches over coax as （Auto-Negotiation）using equipment control software.

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4.2.2 设备连接与维护注意事项 Precautions of Equipments Connection and Maintenance

在设备连接、使用及/或维护过程中必须注意以下几种情况：Please notice the following cases in the process of equipments connection、using and/or maintenance:

i. 在设备加电运行过程中，当某一用户端口（EoC 端口）相对应的绿色指示灯熄灭
ii. 时，可随意断开连接此用户端口的同轴电缆，以进行安装、开通、维护工作。In the process of equipments operation after power-uping ,when the corresponding green indicating light of one user port is off then the coaxial cable connects to the user port could be disconnected freely for installation、operation、maintenance.
iii. 在某一用户端网络设备正处于使用状态（半双工）下（相对应的绿色指示灯亮），在断开连接此用户终端的同轴电缆时，需先拔下用户端五类线五秒后，再断开连接此用户终端的同轴电缆；或者断开同轴电缆后，立即使用 75Ω匹配器连接该端口 5 秒，当相对应的绿色指示灯熄灭时，再断开 75Ω匹配器。When the networking equipment of one user port is in operation(half-duplex)(the corresponding green indicating light is on),the CAT 5 should be pulled out for five seconds before disconnecting coaxial cable of the user port; Or after disconnecting coaxial cable, the matcher with 75Ω is employed to connected to the port for five seconds immediately and disconnected when the corresponding green indicating light is off.
iv. 对于启用 EoC 功能（同时使用有线电视服务和数据接入业务）的用户端口，应保证 EoC 集线器与 EoC 用户终端盒之间的传输链路中没有普通 CATV 分支分配器件，且同轴电缆连接可靠，不能有断开、短路等非正常连接。Regarding enabling EoC(taking up CATV service as well as data access business) function of the user port, there shouldn't be any ordinary CATV splitter in transmission link between EoC concentrator and EoC user terminal box or

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abnormal connections such as disconnection、short circuiting etc..

5 配置指南 Configuration Guide

牧马人®同轴电缆交换机支持本地管理。对牧马人®同轴电缆交换机设备的管理，可通过运行牧马人®同轴电缆交换机控制程序实现。本说明书将以牧马人®同轴电缆交换机控制程序 V1.0 为例，对牧马人®同轴电缆交换机配置方法予以说明。MMR® switches over coax supports local management. The equipment management of MMR® switches over coax can be attained by running control program of MMR® switches over coax. This specification takes control program of MMR® switches over coax for example to illustrate its configuration approach.

5.1 控制软件的安装 Installation of Control Software

在牧马人公司提供的光盘中，打开目录“牧马人®同轴电缆交换机”，双击或运行“SETUP.EXE”，控制软件自动进行安装。软件的安装位置可采用默认位置或根据您的需要选择安装目录。In the optical disk provided by MMR corporation, open the catalog named “MMR® switches over coax”, double-click or run”SETUP.EXE”, and the control software will be automatic installed. The software installation location can be adopted the default one or someplace according to your own requirements.

5.2 运行控制软件 Running Control Software

在计算机上选择“开始”→“程序”→“牧马人®同轴电缆交换机控件”，运行“牧马人®同轴电缆交换机控件”程序，得到如下窗口：Do the procedure by computer as following: ”start” →“ program”→“ control software of MMR® switches over coax ” and run the program, then the following window will be presented:

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图 6：牧马人®同轴电缆交换机控制程序界面

5.3 建立与设备的连接 Establishing the Connection to Equipments

在对牧马人®同轴电缆交换机进行控制管理操作之前，需要建立管理软件与被管理设备的连接。未建立连接之前，控制软件界面中所有按钮为禁用状态。The connection between management software and managed equipments should be established before controlling and managing MMR® switches over coax. All buttons in controlling software interface display disabled before the establishment.

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图 7：选择串口号并单击“连接设备 ”

5.4 设备整机功能设置 Function Settings of Complete Appliance

在与被管理设备建立连接后，即可在控制软件中的“整机设置”域内，对设备进行广播包丢弃规则、EOC IN 口的通讯模式、QoS、VLAN 等功能进行设置。After the connection to managed equipments, functions of broadcast packet discarding rule、the communication mode of EOC IN port、QoS、VLAN etc. can be set.

5.4.1 端口通讯模式的设置 Settings of Ports Communication Mode

牧马人®同轴电缆交换机的 EOC IN 口可工作在自协商（AUTO）、10M 全双工和 10M 半双工等工作模式，而设备的 EoC 端口也可工作在自协商（AUTO）、10M 全双工和 10M 半双工等通讯模式。EOC IN ports of MMR® switches over coax can be operated in modes of AUTO-negotiation、10M full-duplex、10M half-duplex etc. while the equipment’s EoC ports can be worked in communication modes of AUTO-negotiation、10M full-duplex、10M half-duplex etc..

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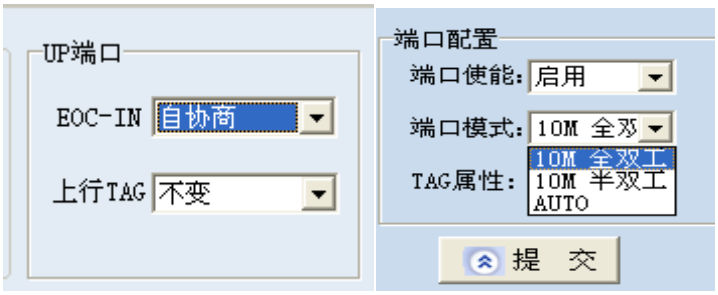

图 8：端口通讯模式设置界面

您可通过点击并在“EOC IN 口”下拉菜单中选择设备上联口的通讯模式；通过点击并在“端口设置”下拉菜单中选择设备相应 EoC 口的通讯模式（见图 8）。You can click and select the communication mode of the equipment uplink ports in the down menu named “ EOC IN port "; Click and select the communication mode of the corresponding EoC ports in “Ports Settings” down menu. “EOC IN”端口的“上行 TAG”可设置为加标、去标和不变三种模式。”Up TAG” of ”EOC IN” ports can be set as three modes of marked、un-marked and unchanging.

当“上行 Tag”设置为“加标”时，从 EOC IN 口发出的标记包不改变原来的包结构，直接进行转发；无标记包则按照 802.1Q 规则加上 TAG 属性（包括 PVID 值和优先级值）后，重新改变 CRC 校验字节，从 EOC IN 口发出，加入的 PVID 值为数据包入口所在 PORT—BASED VLAN 索引的 VID 值。When “ascending Tag” is set as “marked”, the marked packets sent from EOC IN port will be forwarded directly without changing the packet’s original structure; The un-marked packets will be sent from EOC IN port by changing CRC check bytes again in accordance with 802.1Q standard and TAG attribute (involving PVID values and priority values), the added PVID value is the BASED VLAN indexical VID value of the access port of data packets.

当“上行 Tag”设置为“去标”时，从 EOC IN 口发出的无标记包不改变包的原结构,直接转发；带有标记的数据包则去掉 802.1Q TAG 属性（包括 PVID 值和优先级值）后，重新改变 CRC 校验字节，EOC IN 口发出。When “ascending Tag” is set as “marked”, the un- marked packets sent from EOC IN port will be forwarded directly without changing the packet’s original structure; The marked packets will be sent from EOC IN port by removing 802.1 Q TAG attribute (involving PVID values and priority values) and change CRC check bytes again.

当“上行 Tag”设置为“不变”时，从 EOC IN 口发出的所有数据包均不改变数据包的结构,直接进行转发。When “ascending Tag” is set as “unchanging”, all data packets sent from EOC IN

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port can be directly forwarded without changing its structure.

对于用户端口，“端口 Tag 属性”的意义也与 EOC IN 口相同。As far as user port, the meaning of “TAG attribute of port” is the same with that of EOC IN.

当“启用流量控制”复选框中出现“ √”时，意味着所有端口的流量控制均为使能（Enabled）。此时，对于全双工的端口，其流量控制机制为基于 IEEE 802.3x 协议的 Flow Control，对于工作于半双工模式的端口，则采用 Backpressure 的流量控制机制。When the checkbox of “enable flow control” reveals “ √ ”, it means the flow control of all ports are enabled. At this moment, regarding full-duplex ports, their flow control mechanism is Flow Control based on IEEE 802.3x protocol while for ports work in half-duplex employ flow control mechanism of Backpressure.

5.4.2 广播包丢弃规则设置 Settings of Discarding Rules of Broadcasting Packets

当基于 IEEE 802.3x 协议（端口为全双工）或 Backpressure（端口为半双工）的流量控制（Flow Control）机制启用时，本功能设置了流量控制过程中广播包的丢弃规则（见图 9）。When flow control mechanism based on 802.3x protocol (full-duplex of ports) or Backpressure (half-duplex of ports) enables, the function will set the discarding rule of broadcasting packets in the process of flow control. (Picture 9 as shown)

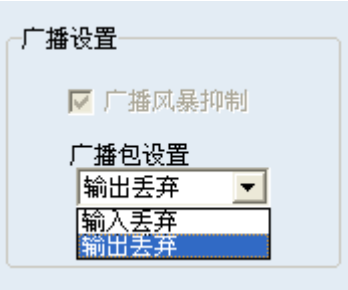

图 9：广播包丢弃规则设置

为启用广播包丢弃规则设置，点击“广播风暴抑制”复选框，使框中出现“ √”，默认为“启用”模式；然后选择“输入丢弃”单选按钮或“输出丢弃”单选按钮。其含义是：To enable the

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setting of discarding rule of broadcasting packets, please click checkbox of “broadcasting storm restrain” to get “ √ ”, which defaults to be the “enabled” mode; Then select the radio button of “input the discarding “or “output the discarding”. It indicates:

当本机设备的流量控制（Flow Control）功能启用以后，交换机自动根据包括包缓存区及发送队列在内的系统资源使用情况，决定何时开始运行流量控制机制。当某转发端口出现拥塞或系统资源紧张时，系统启动流量控制机制，此时，广播包将根据本项设置的规则被丢弃。如果“输入丢弃”被选择，则广播包直接被丢弃而不向任何端口转发；如果“输出丢弃”被选择，则广播包只向未出现拥塞的端口转发。When the flow control function of this equipment is enabled, switches decide when to begin to operate the flow control mechanism automatically according to the system resource use including packets cache region and the sending queue. When one forwarded port is in jam or the system resource is short, the system will enable flow control mechanism, then the broadcasting packets will be discarded by this set rule. If “input the discarding” is selected, the broadcasting packet will be directly discarded without forwarding to any port; If “output the discarding” is selected, the broadcasting packets will be forwarded to ports don’t appear congestion.

5.4.3 设备 VLAN 功能的使能 Enable VLAN functions of the equipments

在“ VLAN 设置”域（见图 10）中，点击“启用 VLAN 划分”复选框，使框中出现“ √”，则设备支持基于 IEEE 802.1Q 的 VLAN 划分的功能被启用。In “VLAN setting” domain (Picture 10 as shown), click the checkbox of “enable VLAN to divide” to get “ √”，then the VLAN dividing function based on IEEE 802.1Q supported by this equipment is enabled.

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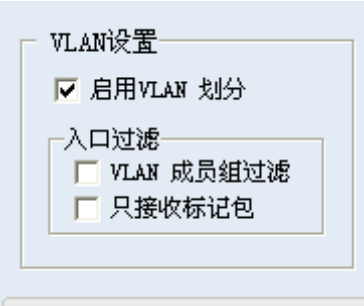

图 10：VLAN 设置域

当“启用 VLAN 划分”被选择时，您可以在“ VLAN 划分区”中根据您的需要划分 VLAN，此时，交换机将带有 VLAN ID 标记（Tag）的数据包按照所划分的 VLAN 进行转发，对于只带有 IEEE 802.1p 优先级标记或非标记的数据包，则按照基于端口的 VLAN 进行转发。When “enable VALN to divide” is selected, you can divide VLAN in “VLAN dividing area” according to your requirements, then switches will forward data packets with VLAN ID TAG in accordance with the divided VLAN, while data packets with IEEE 802.1p priority tag or untag are forwarded according to VLAN based on ports.

您还可以启用“ VLAN 成员组过滤”功能。当“ VLAN 成员组过滤”功能启用后，来自非 VLAN 成员端口的数据包将被丢弃。You can also activate the function of “members of VLAN group filter”. Data packets from ports of VLAN members will be discarded as soon as the function is launched.

5.4.4 QoS 功能的启用与配置 Launch and Configurate QoS Function

牧马人®同轴电缆交换机支持 TOS/DiffServ 及基于 IEEE 802.1p 协议的优先级等 QoS 机制。

MMR® switches over coax supports mechanisms of TOS/DiffServ and priority based on IEEE 802.1p protocol etc..

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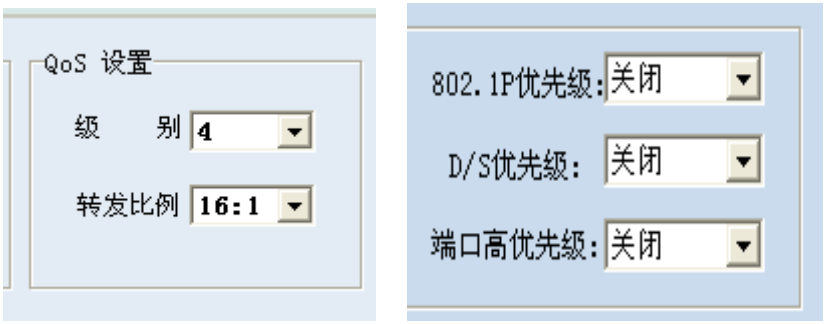

图 11：QoS 功能设置

当“ IEEE 802.1P 优先级”被选择时，设备将根据带有 VLAN 标记的数据包标签中的 3 位（Bit）Priority 信息提取出来并与设备设定的阈值进行比较，当 3 位 Priority 信息的值≥设备设定的阈值时，则该数据包被认为具有高优先级，将被列入高优先级队列进行转发。设备的优先级阈值可利用“级别”下拉键进行选择。When “IEEE 802.1P Priority” is selected, equipments will fetch three-Bit Priority information of data packets marks with VLAN tag and compare with threshold values set by the equipment, if three-Bit Priority information values are greater than or equal to threshold values set by equipments, then the data packets are supposed to possess the highest priority and ranged among high priority queue to forward. Besides, the priority threshold values of equipments can be selected by “rank” down button.

当“ TOS/DS 优先级”被选择时，设备从数据包的 IP 包头中提取 DS 域中的 DSCP 优先级信息。当数据包的 DS 域=101110_2，001010_2，010010_2，011010_2，100010_2，110000_2 和 111000_2 时，数据包被列入高优先级队列进行转发；当数据包的 DS 域为其它值时，数据包将列入低优先级队列进行转发。When “TOS/DS priority” is selected, equipments will extract DSCP priority information of DS domain from IP head of data packets. When DS domain of data packets is equal to 101110_2, 001010_2, 010010_2, 011010_2, 100010_2, 110000_2 and 111000_2, data packets will be classified as high priority queue to forward; When DS domain of data packets is other value, data packets will be placed as low priority queue to forward.

当“端口优先级”被选择“启用”时，此端口就成为高优先级端口，从此端口接收的数据包作为高优先级包转发；When “Port Priority” is selected to launch, the port then becomes high

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priority one while data packets taken from it are forwarded as high priority ones; 从此端口接收的无标记包从加标端口发送时，也会在 Tag 标签中加上 When “ priority of ports” “ 7” 的优先级标记。When untagged packets received from the port sent from tagged ports, the tag will be added When “ priority of ports” “ 7 ” .

牧马人®同轴电缆交换机提供两个优先级队列。高优先级数据包与低优先级数据包的发送比例可以是 4:1、8:1、16:1、或 Always high priority first（高优先级先发），即：发送 4/8/16 个高优先级数据包后发送一个低优先级数据包，或只要有高优先级数据包就优先发送。您可通过控制软件“整机设置”中的“转发比例”来选择上述发送权重比率。MMR® switches over coax provides two priority queue. The sending proportion of high priority data packets and low priority data packets can be defined as 4:1、8:1、16:1、or always high priority first, that is: sending one low priority data packet after the high one, or if there exists one high priority data packet, it always be sent firstly. Please decide the sending proportion with “forwarding proportion” of “complete mechanism setting” of control software.

5.4.5 其他功能的启用与配置 Launch and Configurate Other Functions

牧马人®同轴电缆交换机支持背压控制和环路检测时间设置功能。MMR® switches over coax supports functions of back pressure control and time setting of the loop testing.

当“启用背压控制”复选框中出现“ √”时，表示工作于半双工模式的端口，采用 Backpressure 的流量控制机制；您可通过点击并在“环检时间”下拉菜单中选择环路检测时间，分别可 5 秒、10 秒和 15 秒。When checkbox of “launch back pressure control” occurs “ √ ”, it means ports with half-duplex mode employ backpressure flow control mechanism; You can click “testing time of the loop” and select the testing time of the loop in the down menu, which is 5 seconds、10 seconds and

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15seconds respectively.

5.4.6 MAC 地址老化时间 Ageing Time of MAC Address

您还可以选择 MAC 地址老化时间（见图 12）。当您选择标准老化时间，那么，当在交换机的 MAC 地址表内的某一 MAC 地址在 300 秒内未被刷新，则该 MAC 地址成为无效 MAC 地址，被移出地址表；当您选择快速老化，则当 MAC 地址在 800μs 内未被刷新，该 MAC 地址成为无效 MAC 地址。You can select the ageing time of MAC address (picture 12 as shown). When the standard is selected, then if one MAC address in the list has not been refreshed in 300 seconds, it will turn to be ineffective and removed out of the list; When rapid ageing is selected, then if MAC address has not been refreshed in 800μs, it will become ineffective.

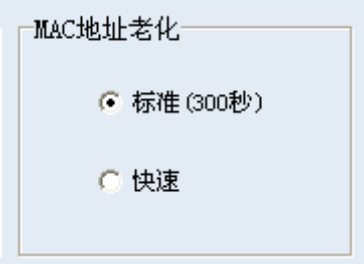

图 12：MAC 地址老化时间设置

当您已确认以选择了您所希望的功能设置，点击“提交”按钮，新的设置将发挥作用。如果您要恢复设备出厂状态，则点击“恢复出厂默认值”按钮，则设备的所有设置参数等，**全部还原为出厂时的值**。When you have confirmed the functional settings you desired, please click “submit”, then the new setting works. If state as delivered is wanted, please click “return to factory-default setting”, then all setting parameters of the equipment will be wholly returned to be factory-default values.

.EoC 端口状态显示与控制 Show and Control of EoC Ports State

端口设置如图 13 所示。点击“端口设置”，则设备所有 EoC 端口的连接、传输速率、使用等状态将显示出来。您还可以通过点击“刷新”按钮获取端口最新的状态信息。Ports’ settings

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are shown as Picture 13. Please click “ports’ setting”, then the connection of all ports, transmission rate, and user state appear.

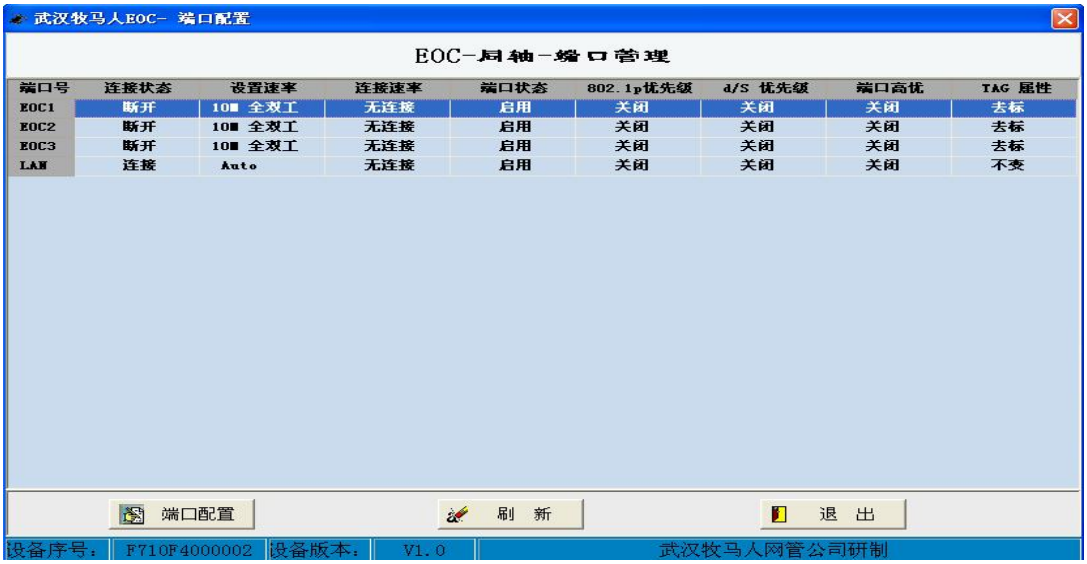

图 13：EoC 端口状态显示

图 14：端口配置

从“端口设置”中，您还可以对端口进行设置，方法如下：You can finish the setting of ports in “Ports Setting”, the approach is as follow:

点击“ EOC 配置端口”按钮，弹出“ EOC-同轴-端口配置”窗口（见图 14）。在“端口配

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置”窗口中，可选择“全部端口”单选按钮，对设备所有 EoC 端口进行配置及控制，也可以单击“单个端口”单选按钮、再利用下拉键选择某个特定端口，以对该端口单独进行设置或控制。同时可对端口的优先级进行设置，具体含义见 5.4.4 章节。The window of ’’EOC coaxial ports configuration” occurs after clicking “EOC configuration ports”. In the window of “ports configuration”, you can select “all ports” radio button and configurate and control EoC ports of the equipment or click “single port” radio button, select one designated port with drop-down button to realize setting or control. You can set the priority of ports as well, please find the specific meaning in 5.4.4 Chapter.

您可以通过选择“端口使能”复选框、再使用下拉键选择启用/禁用全部或某个端口；通过选择“端口速率”复选框、再使用下拉键选择所有或某个 EoC 端口的通讯速率是 10Mbps 还是工作于 Auto-Negotiation 模式。You can enable/disable all ports or one with drop-down button after selecting the check box of “Ports Enable”; You can decide whether the communication rate of all ports or one is 0Mbps or Auto-Negotiation mode with drop-down button after selecting the check box of “rate of ports”.

5.5 VLAN 划分 VLAN Division

每台牧马人®同轴电缆交换机支持九个 VLAN。您可以在“ VLAN 划分区”将设备的 EoC 端口划分 VLAN。Each MMR® switches over coax supports nine VLAN. You can divide VLAN of EoC ports of the equipment in “VLAN division area”.

点击“ VLAN 设置”得到如图 15 的窗口。窗口中列出了九个的 VLAN 的编号、VLAN ID（VID）、以及每个 VLAN 的成员（端口）。Click “VLAN setting” and get the window shown as Picture 15. Nine VLAN numbers, VLAN ID, and each VLAN member(port) have been listed.

注意事项：Attention:

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1、VLAN1的VLAN成员不能被修改，包含所有成员。端口" EOC IN"只能索引到VLAN1，不能配置到其它 VLAN，用户只可更改其 P/VID 值 All VLAN members of VLAN1 can't be modified. "EOC IN" of ports can only index to VLAN1, can't configurate with other VLAN, users can only modify its P/VID values.

2、拨码开关的使用 The use of the code switch

在同轴交换机底部有一个两位的拨码开关，用于端口 EOC3 的 Port_Based VLAN 端口索引设置。At the bottom of MMR® switches over coax, there exists one two-status code switch, which is used for index and setting of Port_Based VLAN port of EOC3 port.

A、拨码开关位 2 拨到"软控"时，拨码开关位 1 无效。拨码开关位 2 拨到"键控"时，拨码开关位 1 拨向"互动"，则表示端口 EOC3 与端口 EOC1、 EOC2 处于同一 VLAN 中；拨码开关位 1 拨向"宽带"，则表示端口 EOC3 与端口 LAN 处于同一 VLAN 中。When the second status of code switch is put in "control by software", the first status of code switch is invalid. When the second status of code switch is put in "control by keyboard", the first status of code switch is placed in "interact", which implies that EOC3 port and EOC1、EOC2 ports are in the same VLAN; When the first status of code switch is placed in "broadband", EOC3 port and LAN port are in the same VLAN.

B、当拨码开关位 2 拨到"键控"时，采用配置软件首先对设备执行一次"恢复出厂设置"操作，再将拨码开关位 1 拨到相应位置，然后将设备上电重启，才可对设备进行其它配置。When the second status of code switch is put in "control by keyboard", it is necessary to carry out the operation of "factory reset" with configuration software firstly, then to place the first status of code switch the corresponding position, and to power up and restart the equipment, the other configuration could be achieved ultimately.

C、拨码开关位 2 拨到"键控"时，除 P/VID 值外，禁止采用配置软件对 Port_Based VLAN 其它项目进行修改；拨码开关位 2 拨到"软控"时，采用配置软件可对设备进行任何配置。When the second status of code switch is put in "control by keyboard", the manner of adopting

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configuration software to modify other programmes of Port_Based VLAN is forbidden. But if the second status of code switch is put in "control by software", the same operation is allowed.

D、每执行一次拔码操作，必须上电重启设备，方可有效。采用配置软件可显示该设备详细配置参数。It turns to be effective after powering up and restarting the equipment each code switch operation. More detailed configuration parameters appear if the configuration software is employed.

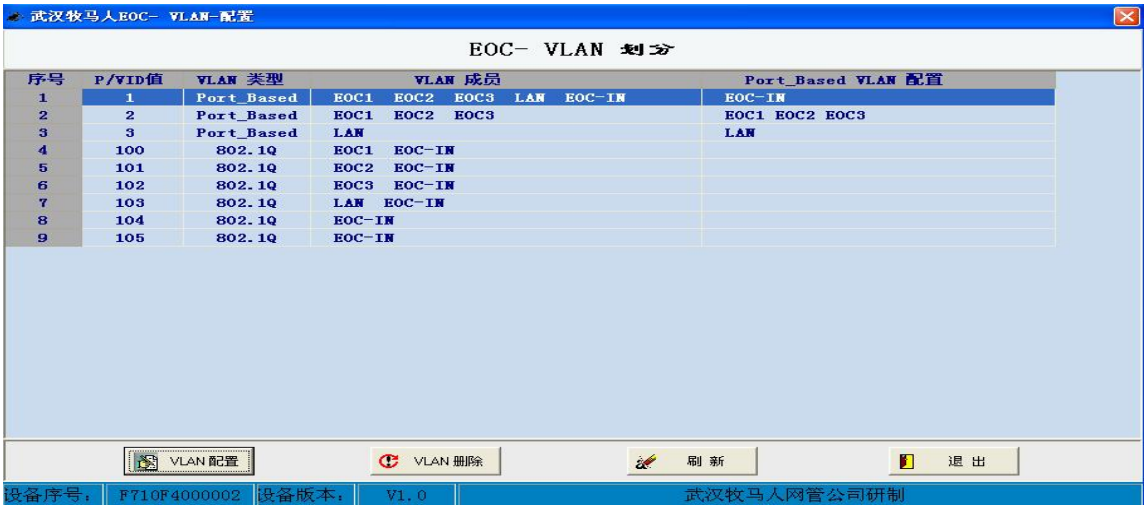

图 15：VLAN 划分显示

5.5.1 基于端口的 VLAN 划分 Port_Based VLAN Division

当需要重新划分基于端口的 VLAN 时，点击“ VLAN 配置按钮”弹出“ EOC-VLAN 划分类型”窗口（见图 16）。If port_based VLAN division is needed, click "VLAN configuration" to get the window of "EO –VLAN division type"(Picture 16 as shown).选择“ Port_Based VLAN”，弹出“ Port_Based VLAN 管理”窗口（见图 17）()。You can get the window of "Port_Based VLAN management" if select“ Port_Based VLAN ”.点击“创建”，出现变灰的 VLAN 号，通过“ PVID 值”旁边的空白框输入 PVID 值，然后在相应端口前的复选框中打“ √”以将该端口添加至 VLAN 中，点击“提交”按钮。Click "new" to get the grey VLAN number, insert PVID value into the blank window side away, then select “ √ ” in the checkbox of the corresponding port to add the port into

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VLAN, then click the button of “submit”.出现提示是否继续划分 VLAN 或者进行配置 Port-Based VLAN 的设置，点击“是”继续刚才划分 VLAN 步骤，否则出现“配置 Port-Based VLAN”窗口（见图 18）。There appears the notice whether continue to divide VLAN or set Port-Based VLAN, click “YES” to continue the former procedure, or else appears the window of “configurate Port-Based VLAN”(Picture 18 as Shown)通过下拉框选择 VLAN 序号，点击“提交”按钮以使该 VLAN 生效。Select VLAN number in dropdown box, click “submit” to get VLAN work. VLAN 划分完毕后，点击“刷新 VLAN”按钮，此时，在“VLAN 划分区”中显示的是新的 VLAN 划分情况。After VLAN division, click “refresh VLAN”, at the moment, a new VLAN division details appear in “VLAN division area”.

图 16 选择 Port_Based VLAN

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图 17：Port_Based VLAN 划分

图 18 配置 Port-Based VLAN

5.5.2 基于 IEEE 802.1Q 的 VLAN 划分 VLAN Division Based on IEEE 802.1Q

当需要重新划分基于 IEEE 802.1Q 的 VLAN 时，点击“创建/配置 VLAN 按钮”弹出“ VLAN 划分类型”窗口（见图 19）。If you need to divide IEEE 802.1Q –based VLAN, please click “New/ Configurate VLAN” to get the window of “VLAN division type”.(Picture 19 as Shown)选择“ 802.1Q VLAN”，弹出“ 802.1Q 划分”窗口（见图 20），Select “ 802.1Q VLAN ” to get the window of “ 802.1Q VLAN Division ” (Picture 20 as Shown)通过“ VLAN”下拉框选择 VLAN 序号，select VLAN number by “VLAN” dropdown box 通过“ VID”旁边的空白框输入 VLAN ID 值，input VLAN ID values by “VID” blank window by side，然后在相应端口前的复选框中打“ √”以将该端口添加至 VLAN 中，then select“ √ ”in the checkbox of the corresponding port to add the port into VLAN 或将相应端口前的复选框中的“ √”清除以将该端口从 VLAN 中移除，or clear up “ √ ” in the checkbox of the corresponding port to remove it from VLAN,点击“提交”按钮以使该 VLAN 生效。Click “submit” to get VLAN work, VLAN 划分完毕后，点击“刷新 VLAN”按钮，此时，在“ VLAN 划分区”中显示的是新的 VLAN 划分情况。after the VLAN division, click “refresh

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VLAN", at the moment, new VLAN division details appear in "VLAN division area" .

图 19　选择 802.1Q　VLAN

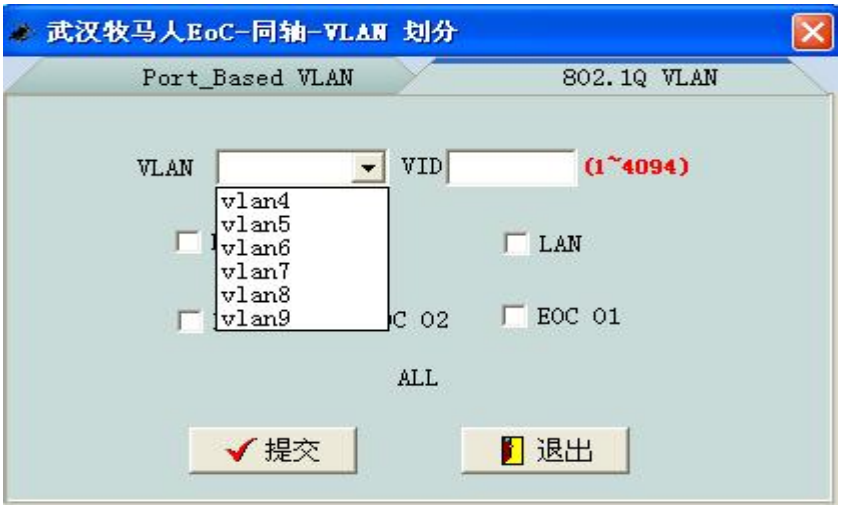

图 20：802.1Q　VLAN 划分

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6 同轴电缆交换机技术参数 Technical Parameter of MMR® switches over coax

测试结果 Test Results / 项目 Performance Parameter	
CATV 信号 CATV signal	**技术指标 Technical Data**
输入端口数 the number of input ports	1 个 one
接口类型 Interface Type	F 头 F jack
输入电平范围 the range of input electrical level	68--85dBuV（45---860M）
输入端口反射损耗 Return Loss of Input Ports	≥14 dBuV
输出端口数 the number of output ports	3 个
接口类型 Interface Type	F 头
输出端口插损 Insertion Loss of Output Ports	≥-7.5dBuV
输出端口反射损耗 Return Loss of Output Ports	≥14dBuV
输出端口隔离度 Isolation of Output Ports	≥22 dBuV
输出端口噪声 The noise of output port	≤21dBuV（250M、375M、500M）
数据通信 Data Communication	
UPLINK 口类型/速率 UPLINK Port Type/Rate	1 个 F 头/ 10BASE-T one F jack/10BASE-T
用户交换端口数量 the number of user exchanging port/类型 type	3 个 F 头，1 个标准以太网 RJ45 口 three F jacks, one standard Ethernet RJ45 Port
用户端口速率 User Port Rate	10Mbps Full /10Mbps Half /10Mbps Auto
端口限速 Port Rate Limit	无 Without

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环路检测功能 Detect Capacity of Loop	支持任一交换端口空闲和通信过程中终端设备的拔插 Support any exchanging port free and the pull and plug of the terminal equipment in communication
终端适应能力 Terminal Adaptive Capacity	终端可设置为自适应/ 10M 半双工/全双工 Terminal setting can be auto-adaptive/10M half-duplex/ full-duplex
传输距离 Transmission Range	不大于 60 米 No more than 60 meters
配置功能 Configuration Function	
配置端口/类型 Configuration Port/Type	本地 RS232 串口 Local RS232 Serial Port
配置方式 Configuration Method	专用配置软件 Special Configuration Software
端口状态查询 Inquire into Port Status	支持 Support
空载致环抑制 No-load Results in Loop Restraint	支持 Support
单端口环路抑制 Loop Restraint of Single Port	支持 Support
广播风暴抑制 Broadcasting Storm Restraint	支持 Support
MAC 地址老化及快速老化 Ageing and Rapid Ageing of	支持 Support
VLAN 的划分与管理 Division and Management of	支持 Port-Based VLAN 和 802.1Q VLAN Support Port-Based VLAN and 802.1Q VLAN
端口配置 Ports' Configuration	支持 Support
整机性能	
工作环境 Working Temperature	-25～+55℃
输入电压 Input Voltage	DC 5 - 12V
整机功耗 Overall Power Consumption	≤3W

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