Contents

Preface

Version Description

Manual version: V1.0

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Brief Introduction

This User Manual describes the installation and operation of Multi-service ring network system core equipment. Before you use our device for the first time, please read all the included materials carefully, and install and operate this series of products in keeping with items listed in the manual, so as to avoid damaging the device resulting from malpractice. Thank you for choosing our products.

Environmental Protection

This product complies with the design requirements associated with environmental protection. The storage, use and disposal of the product should be conducted in accordance with related national laws and regulations.

We welcome you to put forward advice and suggestion to our work, which shall be viewed as the ultimate support to us.

Chapter 1 Introduction

1.1 Brief

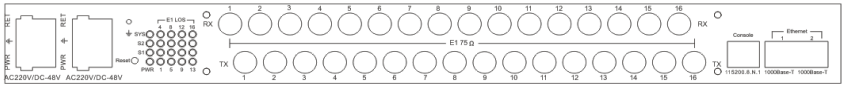
MRS4616 provides 16xE1 to 2xGE data converter. An Ethernet Switch IC chip is integrated inside. The panel of front contains LEDs and craft console ports. This device has 16 1xEthernet to 1x E1 protocol converters build in, and 16x FE to 2xGE Ethernet switch. It can used to connect 16x CPE side Ethernet to E1 converters. The encapsulation method is HDLC/PPP-BCP or GFP-F. This type can support multi-port E1 bundles by upgrade firmware.

1.2 Device Features

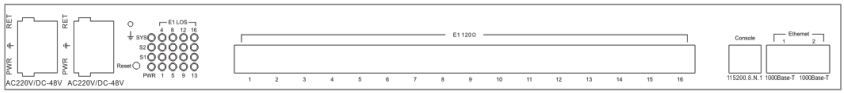
- ✧ Build in 10Gbps switch fabric.
- ✧ Support packet length up to 2K Bytes.
- ✧ Provides up to 1K MAC address entries.
- ✧ Supports port based VLAN.
- ✧ Support IEEE802.1Q VLAN.
- ✧ Support QinQ double tagging.
- ✧ Support broadcast storm control.
- ✧ Support IEEE 802.1P/Q QOS and IPv4 DSCP.
- ✧ Scheduling supports Strict Priority (SP) and Weighted Fair Queue (WFQ).
- ✧ Support HDLC/PPP-BCP(RFC3518) encapsulation.
- ✧ Support GFP-F encapsulation comply with ITU-T G.704 standard.
- ✧ GFP-F encapsulation support extension null header or extension linear header.
- ✧ Optional GFP-F FCS function.
- ✧ Support up to 31 logical channels which can be n*E1 or n*64K.
- ✧ Support E-Tree And E-LAN.
- ✧ Support Console/Telnet/SSH CLI management.
- ✧ Support SNMP(v1/v2c/v3) and WEB(both http and https) management.
- ✧ Build in redundant AC or DC power supply.

Chapter 2 Device Functions

2.1 Device Rear Panel



75Ωwith redundant DC&AC power supply



120Ωwith redundant DC&AC power supply

There are AC/DC power input in the rear panel, also the 16xE1 ports(BNC/RJ‐45) and 2xGE ports(RJ‐45). The GE ports can support 10/100/1000 Mbps Ethernet and Auto MDI/MDIX format adaptation.

2.1.1 Front Panel LED Indication

LED	Color	Functions	Status	Description
PWR	Green	Power Indication	on	Power on
			off	Power off
F1	Green	Reserve		
F2	Green	Reserve		
SYS	Yellow	System status	on	System abnormal
			flash	System operating
			off	System booting normally
LOS -1~ 16	Red	1-16 Channels Alarm	on	Channel loss signal
			off	Normal

2.1.2 Reset

Restore to factory default setting by pressing 10 second

2.1.3 Console

Console port which is connected to login into the device and use command-line to config and check deice information

2.2.4 Power Supply

Power supply voltage is AC220V. Allows voltage fluctuates about 20%. DC48V interface rear panel label affixed invalid.

2.2.5 E1 Interface

75Ω Physical Interface： Q9
75Ω/RX： 75Ω E1 Receiving
75Ω/TX： 75Ω E1 Transmitting
120Ω Physical Interface： RJ45
120ΩE1： 120Ω E1 in & out

2.3.6 Ethernet Interface

2 switch able RJ45 ports are located on the rear panel. Self-adaptive of 10/100/1000M, full / half duplex, direct and cross-adaptive network cable.

Chapter 3 WEB Introduction

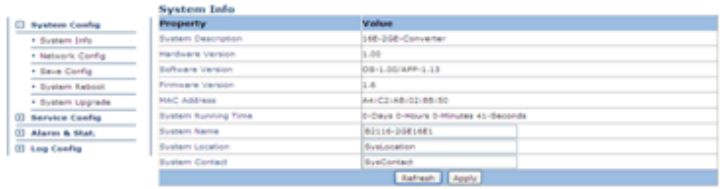
We use Internet Explorer as the example.Run the browser program, input the IP address of MRS4616 in the address bar with the prefix "http:// " or "https:// ". The default address is 192.168.0.168.

The following picture shows the login dialog box, input the right user name and password. The default user and password are both "root".

The password of the default user "root" can be modified through CLI(Command Line Interface),and new user can be added through CLI too. Please refer to CLI manual.

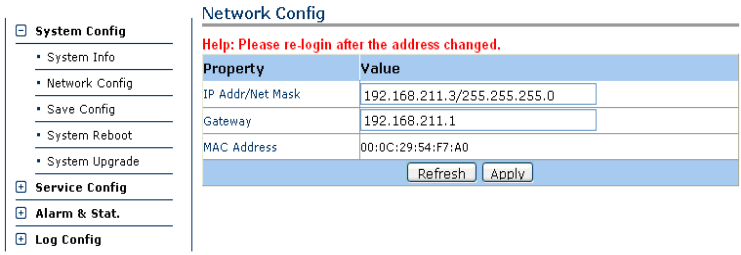
3.1 System Config

System Info



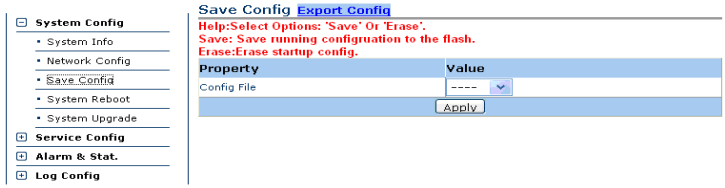
- ✧ System Description : The device description, can't be changed, fixed as "MRS4616"
- ✧ Hardware Version : The device hardware version.
- ✧ Software Version : The device software version.
- ✧ Firmware Version : The device firmware(FPGA) version.
- ✧ MAC Address : The device Mac address.
- ✧ System Running Time : The time since the device last boots.
- ✧ System Name : The system name. Each device can be assigned different system name.
- ✧ System Location : The system location. Each device can be assigned different system location.
- ✧ System Contact : The system contact. Each device can be assigned different system contact.

Network Config



- ✧ IP Addr/Net Mask : The device IP Address & netmask.(default IP is 192.168.0.168)
- ✧ Gateway : The device gateway
- ✧ MAC Address : The device mac address.

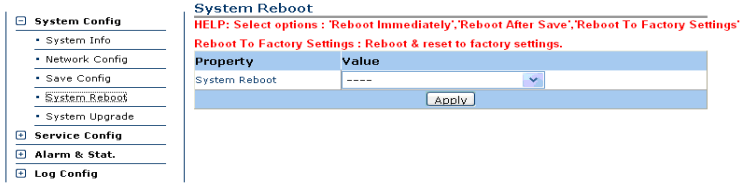
Save Config



✧ Config File：If 'Save' option selected, the running configuration will be written to the flash.

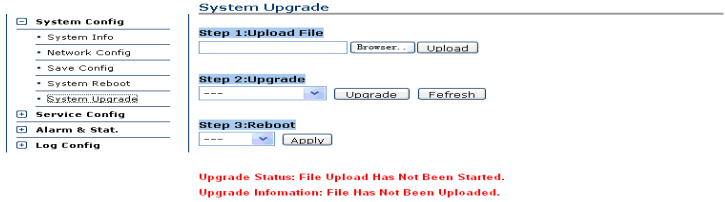
If 'Erase' option selected the saved config will be erased from the flash.

System Reboot



System Reboot：Reboot the system Immediately without save, or after save , or to factory settings(by erasing the saved configuration).

System Upgrade



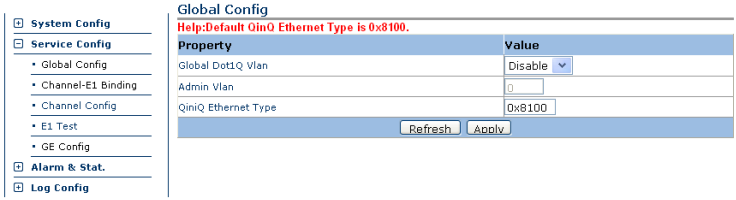
Device OS Software , Device Application Software and FPGA Firmware can be upgraded by three steps:

✧ Step 1: Click the 'Browser' button to select the 'upgrading file',and then Click upload.

- ✧ Step 2: Choose ‘Upgrade OS’ , ‘Upgrade APP’ or ‘Upgrade FPGA’ according to the File witch has been uploaded, and Click Upgrade
- ✧ Step 3: Wait until the system upgraded successfully, then reboot.

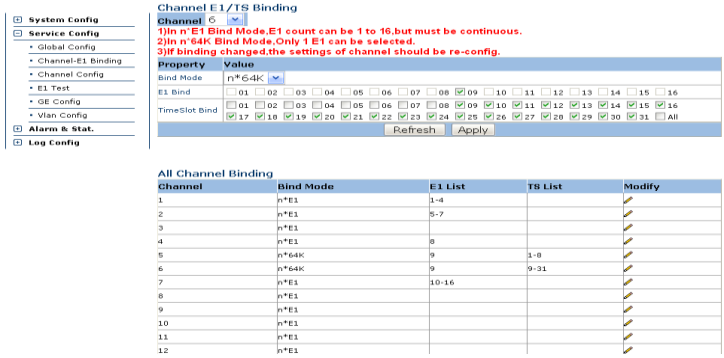
3.2 Service Config

Global Config



- ✧ Global Dot1Q Vlan: The global dot1q vlan function.If it is disabled,the device passes through all the packet without adding or removing dot1q tag.If it is enabled,the device works with the flowing parameters(channel pvid,channel QinQ function,channel Dot1q Vlan, Channel Vlan List ,GE Port Pvid, GE Port Vlan List)
- ✧ Admin Vlan : The Admin vlan.
- ✧ QinQ Ethernet Type : QinQ Ethernet Type in Hex,default is 0x8100.
- ✧ Channel Isolation: Channel Isolation Enable means 'E-Tree' mode,Disable means 'E-LAN' mode.
- ✧ E1 Clock Source : E1 Clock Source , Internal or one of 16 E1.default is Internal.

Channel-E1 Binding



There are 31 logical channels and 16 E1s in the system.The Bind Mode of channel can be n*E1 or n*64K.

1) In n*E1 Bind Mode,E1 count of channel can be 1 to 16,but must be continuous.

2) In n*64K Bind Mode,Only 1 E1 can be selected.

The picture above shows that there are 6 channels working in the system:

Channel 1 works as n*E1,E1 List is 1-4;

Channel 2 works as n*E1,E1 List is 5-7;

Channel 4 works as n*E1,E1 List is 8;

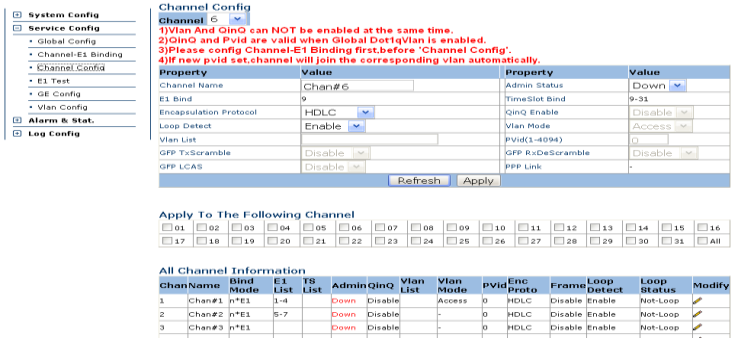
Channel 5 works as n*64K,E1 List is 9,Timeslot is 1-8;

Channel 6 works as n*64K,E1 List is 9,Time-out is 9-31;

Channel 7 works as n*E1,E1 List is 10-16;

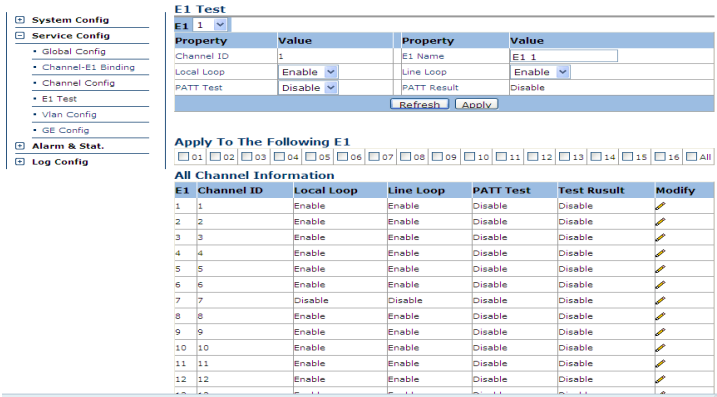
Channel 3 and 8-31 are not working.

Channel Config



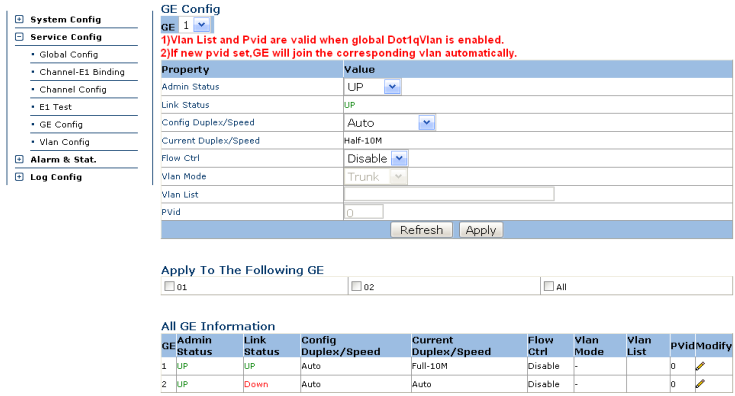
- ✧ Channel Name : The channel name, Easier to remember than channel ID.
- ✧ E1 Bind : The E1 List bind to this channel.
- ✧ Timeslot : The Timeslot List bind to this channel.
- ✧ QinQ Enable : QinQ function.
- ✧ Vlan Mode : Access or Trunk.
  1. Access : Remove dotq vlan tag when transmitting packet.
  2. Trunk: Add or Keep the dot1q vlan tag when transmitting packet.
- ✧ Vlan List : The vlan list of this port.use comma(,) or hyphen(–) to separate.such as "1,5,10-16".
- ✧ PVID : The Channel Port VID.
- ✧ Encapsulation Protocol: If the channel includes multi E1s,the mode is fixed as GFP.If the channel Bind Mode is n*64K the mode is fixed as HDLC, If the channel Bind Mode is n*E1 and only 1 E1,HDLC , PPP-BCP or GFP can be set.
- ✧ GFP TxScramble : Disable, Header,Payload or Both,Valid only when the Encapsulation Protocol is GFP
- ✧ GFP RxDeScramble : Disable, Header,Payload or Both,Valid only when the Encapsulation Protocol is GFP
- ✧ GFP LCAS: Disable or Enable,Valid only when the Encapsulation Protocol is GFP
- ✧ Loop Detect: Detect Channel Loop Function.If it is enabled,the channel will be shutdown when loop is detected..
- ✧ Apply To The Following Channel: batch configurate.Multi-Channels can be selected to be modified at the same time

E1 Test



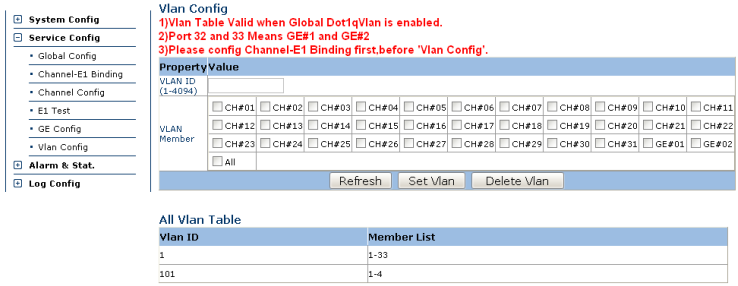
- ✧ E1 Name : The E1 name, Easier to remember than channel ID.
- ✧ Local Loop : Local loopback test.
- ✧ Line Loop : Line loopback test
- ✧ PATT Test : PATT Test/BERT Test
- ✧ PATT Reruls : PATT Test Result
- ✧ Apply To The Following E1: batch configurate.Mutil E1s can be selected to be modified at the same time

GE Config



- ✧ Admin Status :Admin status to open or close the GigaEthernet Port.
- ✧ Link Status :The Giga Ethernet Port Link Status.
- ✧ Config Duplex/Speed : Config Duplex/Speed
- ✧ Current Duplex/Speed : Current Duplex/Speed
- ✧ Vlan Mode : Access or Trunk.
  1. Access : Remove dotq vlan tag when transmitting packet.
  2. Trunk: Add or Keep the dot1q vlan tag when transmitting packet.
- ✧ Vlan List : The vlan list of this port.use comma(,) or hyphen(–) to separate.such as "1,5,10-16".
- ✧ PVID : The Giga Ethernet Port PVID.
- ✧ Apply To The Following GE: batch configurate.Mutil-GEs can be selected to be modified at the same time

Vlan Config



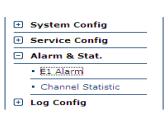
- ✧ There are 4K vlan table entries in the system.Before you config vlan table,please config global dot1q vlan enable and config channel binding first.
- ✧ You can also config Channel Vlan List (in Channel Config page)or GE Vlan List(in GE Config page) to set the vlan table.It has the same effect.
- ✧ Vlan Config and Channel/GE Vlan List are two methods to

set vlan table,but have the same function.

- ✧ The picture above shows that there are 2 Vlan(s) working in the system:
- ✧ Vlan 1 Member List is 1-33;Vlan 101 Member List is 1-4;
- ✧ In other words, the Vlan List of Channel 1,2,3,4 is 1,101;the Vlan List of Channel 5-31,GE#1,GE#2 is 1.

3.3 Alarm & Statistic

E1 Alarm

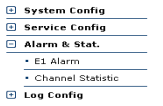


E1 Alarm Refresh

E1	LOS	LOF	AIS	LOMF	RAI	Loop
1	OK	OK	OK	OK	OK	OK
2	OK	OK	OK	OK	OK	OK
3	OK	OK	OK	OK	OK	OK
4	Alarm	Alarm	Alarm	Alarm	Alarm	OK
5	OK	OK	OK	OK	OK	OK
6	OK	OK	OK	OK	OK	OK
7	OK	OK	OK	OK	OK	OK
8	OK	OK	OK	OK	OK	OK
9	OK	OK	OK	OK	OK	OK
10	OK	OK	OK	OK	OK	OK
11	OK	OK	OK	OK	OK	OK
12	Alarm	Alarm	Alarm	Alarm	Alarm	OK
13	OK	OK	OK	OK	OK	OK
14	OK	OK	OK	OK	OK	OK
15	OK	OK	OK	OK	OK	OK
16	OK	OK	OK	OK	OK	OK

- ✧ LOS：E1 LOS Alarm
- ✧ LOF：E1 LOF Alarm
- ✧ LOMF：E1 LOMF Alarm
- ✧ RAI：E1 RAI Alarm
- ✧ Loop：E1 Loop Alarm

Channel Statistic



Channel Statistics Refresh Clear

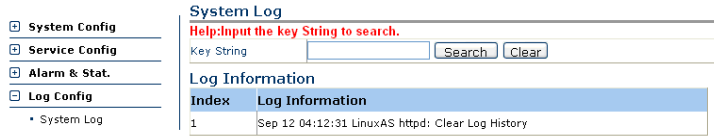
Channel	RxPkt	TxPkt	ErrPkt	CRC
1	41120	41120	41120	0
2	257	257	257	0
3	514	514	514	0
4	771	771	771	0
5	1028	1028	1028	0
6	1285	1285	1285	0
7	1542	1542	1542	0
8	1799	1799	1799	0
9	2056	2056	2056	0
10	2313	2313	2313	0
11	2570	2570	2570	0
12	2827	2827	2827	0
13	3084	3084	3084	0
14	3341	3341	3341	0
15	3598	3598	3598	0
16	3855	3855	3855	0

- ✧ RxPkt：Receive Packet count

- ✧ TxPkt：Transmit Packet count
- ✧ ErrPkt：Error Packet count
- ✧ CRC：CRC count
- ✧ Clear：Reset the counter to 0.

3.4 Log Config

System Log



The page shows all the log history of the device,such as alarm log or operation log.Input the key string can search the log you want.

Chapter 4 Technical Specification

4.1 Operating Environment

The device has a wide range of operating temperature and is able to work normally and stably in highly adverse environment.

Working Temperature	-10℃ ～ +55℃
Storage Temperature	－40℃ ～ +85℃
Relative Humidity	10 %～95 %
Atmospheric Pressure	70～106 kpa

The environment should be free from corrosive and solvent gases, dust, and magnetic interference.

4.2 Power Supply

Using high-quality power adaptor, the device has a wide fluctuation tolerance and strong anti-interference and isolation quality to ensure a stable operation.

Input voltage AC 220V /DC－48V

Voltage fluctuation 165VAC～265VAC/－36VDC～－72VDC

Power consumption ＜12 W

4.3 Mechanical Specifications

Dimension： 430mm*203mm*44.5mm

Weight: 2.63kg

4.4 E1 Interface Specification

Electric Characteristics of Interface: compatible with ITU-T G.703 standard

Transfer Characteristics of Interface: compatible with ITU-TG.823 standard

Jitter Characteristics of Interface: compatible with ITU-T G.823 standard

Rate: transmission port 2048Mbps±50ppm

Line Code Pattern: HDB3

Interface Impedance: 120Ω

Interface Connector: RJ45(120Ω)

4.5 Ethernet Interface Specification

Ethernet Interface Speed rate: 10/100/1000M self-adaptive. Support MDI/MDIX cables auto-recognition. Compatible with IEEE 802.3 protocol, supports IEEE 802.1Q, support ELCP agreement.

Chapter 5 Installation

5.1 Safety Requirement

Please read the following safety items before installation to avoid physical injury and damage to this product or any other products connected. To avoid potential hazard, the product can be used only within specified scope. **Maintenance can be conducted only by technical personnel authorized by our company.**

1. Avoid fire or physical injury.
2. All power supply should be shut off during installation, which can be turned on only when all terminals have been connected correctly and checked to be free from mistakes.
3. Connect and disconnect in a properly. When device is powered up, do not connect or disconnect data cable without due cause.
4. Grounding. The product should be linked to the ground through earthed conductor. To avoid electric shock, the earthed conductor must be in connection with the ground. Make sure that the product is correctly earthed before connecting with the input or output terminals.
5. Correct connection. Users are expected to use accompanied accessories. In the event that special connections are needed, please pay attention to the corner allocation requirements.
6. Don't operate when there is no cover plate over the device. Do not operate the product if the cover plate or panel has been dismounted.
7. No contact with bare circuit is allowed. Do not touch bare connectors or components when power is on.
8. No operation is allowed if there is suspicion of failure. Call authorized maintenance personnel for examination and reparation should the product be suspected of damage.
9. Good ventilation. Do not operate under humid or explosive environment.
10. Maintain the surface of the product clean and dry.

5.2 Inspection upon Unpacking

After unpacking the product, inspect the type, quantity and condition of device and accessories inside according to the list of contents specified in this manual. Contact the Company or

its distributors and agencies immediately should abnormal circumstances arise.

5.3 Power Supply

Check the power supply of the device. The power input should be configured in accordance with related requirements. Pay particular attention to the voltage and polarity if the power supply is DC.

Please disconnect the power supply before you plug in/out power cable. And operate the device under the environment which is suggested by the user manual.

5.4 Test

Test the following steps before operating: Connect correctly to the power supply and the PWR and LOS LED light on, SYS and WRK LED light flashing and other LED indicators are all off.

5.5 Set Up and Connection

1、Each node in the E1 port device connected to each other, depending on the network topology demands, transport interface devices are connected to the corresponding transmit port. After connecting the Ethernet cable correctly, SPD and ACT LED lights on, LOS LED turns off.

2、It is required the two or three layer switches to turn off the STP function before networking.

3、1 U distance should be kept between to devices.

Chapter 6 Accessories

6.1 Method of Making Cables

6.1.1 How to make E1 connecting cable

75Ω Line Making Method:

Connection between core and follows:

Core and between skin and skin;

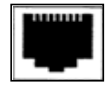
No connection between skin and core

Core

Skin

120Ω Line Making Method:

the pins are arranged as



1, 2, 3, 4, 5, 6, 7, 8

1（+）、2（-）pins are output ports

4（+）、5（-）pins are input ports

6.1.2 Making of Ethernet Interface Connecting Cable

Ethernet interface Connecting Cable adopts twisted pair line with its specific making methods divided into two international standards, which are EIA/TIA568A and EIA/TIA568B. Position the tail of crystal head downward (i.e. the flat side upward), determine the lines with figures as 1 2 3 4 5 6 7 8 from left to right, and the distributions of each line are as follows:

(EIA/TIA568A standard)			(EIA/TIA568B standard)		
Pin No.	Connection signal	Sequence of twisted pair line	Pin No.	Connection signal	Sequence of twisted pair lines
1	TX+(transmission)	White and green 1	1	TX+(transmission)	White and orange
2	TX-(transmission)	Green	2	TX-(transmission)	orange
3	RX+(receive)	White and orange	3	RX+(receive)	White and green
4	Not to be used	Blue	4	Not to be used	Blue
5	Not to be used	White and blue	5	Not to be used	White and blue

6	RX-(receive)	Orange	6	RX-(receive)	Green
7	Not to be used	White and brown	7	Not to be used	White and brown
8	Not to be used	Brown	8	Not to be used	Brown

RJ-45 twisted pair line is specified as follows:

1)1, 2 used to send; 3, 6 used to receive; 4, 5，7, 8 are bi-directional lines.

2)1, 2 must be pair twisted; 3, 6 pair twisted; 4, 5 pair twisted; 7, 8 pair twisted.

Making of straight-through line: both heads are connected as per T568B line sequence standard. Making method of crossover line: one head is connected as per T568A line sequence while the other head is connected as per T568B line sequence. The follows are specific connection conditions:

1) The device is connected with PC and router: straight-through line shall be adopted with the same connecting method on both ends of network line.

2) The device is concatenated with switch (or HUB): crossover line shall be adopted with different connecting method on both ends of network line.

6.1.3 Making of Console Interface Connecting Cable

Pin3 is output pin(TXD）

Pin6 is input pin (RXD)

4,5 pins are GND pins(GND)

6.2 Diagnosis and Troubleshooting

Phenomena	Potential Cause	Measures
Power indicator PWR fails	1. Control switch is not in place 2. Incorrect connection of power polarity 3. External power supply is not plugged in	1. Press the switch in place 2. Change the polarity of power supply 3. Plug the external power

	4. Conductor dropped into machine frame that leads the power supply to be short circuited with the ground. 5. Malfunctions of power supply module	supply 4. Remove the conductor 5. Contact the supplier
LOS alert after the E1 connection	1. RX and TX of E1 are reversed. 2. The making of connection cable is not correct. 3. Transmission distance exceeds the standard specification. 4 The clock setting mode in the circuit line is incorrect.	1. Exchange RX and TX terminals. 2. Make the lines correctly. 3. 75Ω：300M 4. Set the clock mode of the other devices.
System not working, but no LOS alarming	1. E1 cable is not connected to the device properly.	1. Check the connection of each E1 cables.

6.3 Warranty Card

Our company is committed to provide users with the following terms:

1. Warranty service
   1) Within the charge free warranty term (within 12 months since the purchase of the product), damaged parts can be exchanged free of charge and maintenance charges will be free in the conditions that the device is considered to be malfunctioned in normal service by our company.
   2) Within the charged warranty term (more than 12 months and within 36 months since the purchase of the product), damaged parts will be charged for corresponding cost with free maintenance service in the conditions that the device is considered to be malfunctioned in normal service by our company.

2. Users can not enjoy warranty service with the following cases and corresponding cost of damaged parts replacing and maintenance service will be charged
   （1） Exceed 36 months since the purchase of the product
   （2） Can't provide certificate of purchasing date, and serial No. of product shows that ex-works term has exceeded 36 months;
   （3） Include but not limit to the abnormal service conditions such as violent knocking, extrusion, drop, liquid immersion that cause damages;
   （4） Fragile label on the device is damaged;
   （5） User disassembles this product himself
   （6） Force majeure that leads to product damage, such as earthquake, flooding and lightening stroke;
3. The newly installed parts after maintenance will be repaired free of charge within 12 months since the installation date.
4. When malfunction occurs, users can choose to send it to our company to receive maintenance service

or to post it to maintenance points of our company all over the country to be repaired.

5. Our company does not undertake any responsibilities for losses caused by abnormal operation; for losses really caused by product itself, including but not limited to all direct or indirect losses due to data loss, our company will only undertake responsibilities within the selling price of products.

Repair and Maintenance Record

Product Name: MRS4616		**Device No.:**
Maintenance date		**No. of Service Bill**
1		
2		
3		
4		
5		