

TABLE OF CONTENTS

Preface	2
Chapter One Overall Introduction.....	3
1.1 Summary	3
1.2 Features	3
Chapter Two Function Specification.....	5
2.1 Mainframe Front Panel Specification.....	5
2.2 Mainframe Rear Panel Specification	14
2.3 Bottom Panel Specification (No such function in this version)	15
Chapter Three Introduction to Extensible User Interface Card	17
3.1 V.35 User Interface Card	17
3.2 Ethernet User Interface Card	17
3.3 V.24 User Interface Card	18
Chapter Four Introduction to Centralized Frame.....	18
4.1 Frame Front Panel Discription	18
4.2 Discription of Frame Rear Panel	19
Chapter Five Technical Specifications	21
5.1 Operating Environment	21
5.2 Power Supply Section.....	21
5.3 Mechanical Specifications (W×H×D mm)	21
5.4 Optical Interface Specification	21
5.5 E1 Interface Specification	21
5.6 Ethernet Interface Specification	22
5.7 V.35 Interface Specification.....	22
5.8 V.24 Interface Specification.....	22
5.9 RS-232 Interface Specification.....	22
5.10 FXO (FXS) Interface Specification of Phone.....	22
Chapter Six Installation	23
6.1 Safety Requirement	23
6.2 Inspection Upon Unpacking	24
6.3 Power Supply	24
6.4 Test	24
6.5 Configuration and Connection.....	25
Chapter Seven Accessories	25
7.1 Method of making lines.....	25
7.2 Diagnosis and removal of malfunctions	28
7.3 Warranty Card.....	29

Preface

Version Description

Manual version: V2.0

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Brief Introduction

This User Manual describes the installation and operation of E1 Fiber Optical Modem. 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 One Overall Introduction

1.1 Summary

Designed basing on self-developed software, the Modular Voice and Data multiplexing Device is a new-generation highly-integrated voice&data multiplex access device with automatic dynamic bandwidth distribution. It can transfer various data operation such as Ethernet, V.35/V.24,etc and different voice signals in one standard fiber channel (or E1 channel). It is powerful in functions, flexible in structure, and modularized designed. It provides a module slot which supports various interface modules according to different network demands of different customers, and interface modules could be added or replaced to adjust customers' demand under different circumstances, in order to protect customers' investment. According to the different user cards inserted, a series of voice and data multiplexing devices with multi-operation interfaces could be derived.

It can be widely used in integrated accesses of voice, data and iamge of ISPs like China Telecom, China Mobile, China Netcom and China Unicom, and departments like electric power, water conservancy, finance, transportation, coal, public security, prison and army. When the transmission interface is optical, it also can be used as a multi-interface opti-modem, extending the operation distance of user interfaces with fiber, and it can be used as a voice optical termination.

1.2 Features

- High density single-board design increases the system's stability, and brings features like easy installing and debugging, maintainance-free and stable performance. According to the different device styles ordered by the customer, there are three kinds of upward interfaces as follows (please select when ordering): 1. FC/SC fiber interface; 2. 75 ohm E1 interface; 3.120 ohm E1 interface.
- The mainframe is 19-inch structure of 1U height, which can provide 4-way or 8-way common voice, 2-way Ethernet interface with VLAN supported, 2-way plug-and-play RS232 interface and a extensible slot.
- One extensible slot supporting various user interfaces with powerful functions. Supports N*64K V.35 or Ethernet user interface card and V.24 data card providing abundant user interfaces. All user interface cards support hot swap.
- Comprehensive control switches and intelligent alarming indications are installed on the panel to indicate whether the device is correctly configured

or not. The local indicators can display the status of all the indicators of remote device.

- Various testing functions for loopback and pseudo-random code. Can be used as an E1 Bit Error Detector to help establish connection and locate failures. Broadcast storm shielding function, using loopback won't cause Ethernet paralysis.

- Ethernet user interface 10M/100M full/half duplex auto-negotiation, cross direct auto-negotiation; connection failure self checking, the device automatically shuts the Ethernet interface and tells the switch to start standby lines when LOS or SYL appear on line. When these alarms disappear, the Ethernet interface will restart automatically and the switch can be told to start the main line.

- The Ethernet interface has automatic bandwidth controlling function, which can automatically compute and set the rate of the Ethernet interface according to the settings of extensible slot user interface (physically isolated) and other interfaces.

- Speed of each data channels can be set separately, while every data and voice channel is physically isolated from each other.

- Traditional PSTN common voice, every way of voice tied up with a 64K channel, no compression, good voice quality; can provide polarity reversal and caller ID detection to help customer counting charge accurately.

- Voice operation supports FXO and FXS peer-to-peer networking mode; can provide hot-line telephone, namely FXS device docking use.

- V.35 user interface card speed adjustable, inner/outer/following timing modes supported to adjust various working conditions; and V.35 user interface card can work at DTE and DCE mode.

- When voice channel and RS232 are not in use, the time slot will be automatically assigned to Ethernet, and the automatic switching won't cause pack loss.

- When the speed and PCM mode of user interface of the device at one end is set, the remote end can automatically follow without setting.

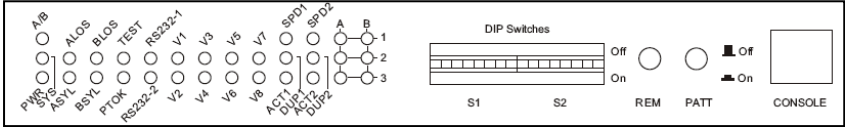
- Our modular voice and data multiplexing devices with E1 transmission port, modular voice and data multiplexing devices with fiber transmission port and E1 fiber MODEM can implement 3rd level networking to reduce customer's networking cost, and can provide whole course SNMP network administration.

- Device parameters can be configured through CONSOL interface.

- 6U, 19 inch standard communication chassis provided, 15 slots altogether, double power supply hot standby supported, and all operation cards support hot swap.
- E1 interface 1+1 standby device can be provided according to customer's special demand, thus to ensure running stability.

Chapter Two Function Specification

2.1 Mainframe Front Panel Specification



There are 31 indicators, 2 groups of 16 DIPs, 2 switches and one RJ45 port on the front panel.

2.1.1 Front Panel Indicators Specification

There are 31 indicators on the front panel, and their functions are:

Indicator	Function	Discription		Remark
PWR	Indication of power supply status	On	5V power supply is OK.	
		Off	5V power is off.	
A/B	Indication of Channel A E1 and Channel B E1 operation status	On	Channel B E1 is working.	Invalid when transmission is optical.
		Off	Channel A E1 is working (when the device provides only one E1 channel, E1 works at Channel A) .	
SYS	Indication of following status of operating parameters	On	Operating parameters follow the configuration of network management system.	
		Off	Operating parameters follow the configuration of DIP switches.	

		Flash	Operating parameters follow the configuration of DIP switches, while DIP controlling switch unlocked.	
ALOS	Alarm of loss of signal in Channel A main transmission channel E1 or alarm at remote end.	On	There is an alarm of loss of signal in local Channel A main transmission channel E1 or optical link.	
		Off	In normal operation.	
		Flash	There is an alarm of loss of signal in remote Channel A main transmission channel E1 or optical link.	
ASYL	Alarm of loss of frame alignment in Channel A main transmission channel E1 or alarm of main transmission channel all 1	On	There is an alarm of loss of frame alignment in local Channel A main transmission channel E1 or optical link.	
		Off	In normal operation.	
		Flash	There is an alarm of Channel A main transmission channel E1 all 1.	
BLOS	Alarm of loss of signal in Channel B main transmission channel E1 or alarm at remote end.	On	There is an alarm of loss of signal in local Channel B main transmission channel E1 or optical link.	Valid only when double channel transmission E1 interface 1+1 standby is provided, otherwise alarm off.
		Off	In normal operation.	
		Flash	There is an alarm of loss of signal in remote Channel B main transmission channel E1 or optical link.	

BSYL	Alarm of loss of frame alignment in Channel B main transmission channel E1 or · alarm of main transmission channel all 1	On	There is an alarm of loss of frame alignment in local Channel B main transmission channel E1 or optical link.		Valid only when double channel transmission E1 interface 1+1 standby is provided, otherwise alarm off.
		Off	In normal operation.		
		Flash	There is an alarm of Channel B main transmission channel E1 all 1.		
TEST	Indication of test status or · indication of configuration error	On	Local or remote device is in test mode.		When devices are in normal operation and keys REM or PATT is ON, local and remote TEST indicators will both be on
		Off	In normal operation.		
		Flash	There's error in local or remote device configuration: 1. timing mode 2. card data rate 3. local device transmission line physically looped back		
PTOK	Indication of pseudo-random code test	On	Pseudo-random code test passed.		
		Off	Bit error detected while in pseudo-random code test mode.		
RS232-1	Indications of RS232 data	Flash	There's data transferring in local 2-way RS232.		
RS232-2		Off	No data transferring.		
V1-V8	Indications of voice operation status	On	S port	Picked up and talking.	Only ordered ways will be on, others invalid.
			O port	Simulated S port picked up successfully.	
		Off	S port	Hung off.	
			O port	Hung off.	
		Flash	S port	Send ring to the phone.	

		h	O port	Received ring or simulated picking up failure.	Indicates received ring when O port line correctly connected, otherwise indicates simulated picking up failure.
SPD1	Indication of mainframe 1 st Ethernet operation speed	On	100M		
		Off	10M		
DUP1	Indication of mainframe 1 st Ethernet full/half duplex	On	Full duplex.		
		Off	Half duplex.		
ACT1	Indication of mainframe 1 st Ethernet connection and activity	On	Channel A Ethernet interface connected correctly.		
		Off	Disconnected.		
		Flash	Data pack transferring.		
SPD2	Indication of mainframe 2 nd Ethernet operation speed	On	100M		
		Off	10M		
DUP2	Indication of mainframe 2 nd Ethernet full/half duplex	On	Full duplex.		
		Off	Half duplex.		
ACT2	Indication of mainframe 2 nd Ethernet connection and activity	On	Channel B Ethernet interface connected correctly.		

			Off	Disconnected.	
			Flash	Data pack transferring.	
A and B	A1 and B1	Indication of Channels A and B Ethernet operation speed on Ethernet card	On	100M	1. Valid when Ethernet card is inserted into extensible slot; 2. Indicators A and B indicate Ethernet Interfaces A and B separately.
			Off	10M	
	A2 and B2	Indication of Channels A and B Ethernet full/half duplex on Ethernet card	On	Full duplex.	
			Off	Half duplex.	
	A3 and B3	Indication of Channels A and B Ethernet connection and activity on Ethernet card	On	Channels A and B Ethernet interfaces on Ethernet card connected correctly.	
			Off	Disconnected.	
			Flash	Data pack transferring.	

A and B	A1	Indication of V.35/V.24 port data receiving	Flash	V.35/V.24 port receiving data.	Valid when V.35/V.24 card is inserted into extensible slot.
			Off	No data.	
	A2	Reserved		Invalid now.	
	A3	Reserved		Invalid now.	
	B1	Indication of V.35/V.24 port data sending	Flash	V.35/V.24 port sending data.	
			Off	No data.	
	B2	Reserved		Invalid now.	
B3	Reserved		Invalid now.		

2.1.2 Front Panel Switches Specification

In order to prevent misoperation, when configuring with DIPs or switches(except configuring PATT key switch), S1[1] switch must be turned ON before configuring and then OFF afterwards, then the configuration will be valid.

There are 16bit DIP switches and 2 key switches, and their functions are:

Switch Name	Function	Discription		
REM	Remote loopback test switch	ON	Loopback is initiated at remote operation channels RS232, V.35, V.24(Ethernet not included) to E1/optical interface.	
		OFF	Remote loopback is off.	
PATT	1.Pseudo-random code transmitting switch for bit error test. 2.Remote indicator state obtain switch	ON	REM switch ON	Transmit pseudo-random test code.
			REM switch OFF	Order local indicator display remote device indicator state
		OFF	Such function is off.	

S1	[1]	DIP control switch lock	ON	DIP control switch open				
			OFF	DIP control switch locked				
	[2..3]	Clocking mode select(selecting principles in the specification following the table)	[2..3]=[ONON]	Host(inner) clocking, use the clock generated by the inner crystal oscillator				
			[2..3]=[ONOFF] or [2..3]=[OFFON]	Outer clocking, fetch clock from V.35 card or E1 card(Valid when V.35 operation card or E1 card is inserted into module slot)				
			[2..3]=[OFFOFF]	Following clocking, operation clock is fetched from received transmission interface E1 or optical signals.				
	[4]	PCM select	ON	PCM30				
			OFF	PCM31				
	[5]	Mainframe ethernet 1 st and 2 nd VLAN isolation configuration	ON	VLAN isolation enabled, mainframe ethernet 1 st and 2 nd interface status configuration must be 10M/100M auto-negotiation.				
			OFF	VLAN isolation disabled.				
	[6..8]	Mainframe ethernet 1 st and 2 nd VLAN status configuration		switch function	6	7	8	
				10M half duplex	ON	ON	ON	
				10M full duplex	ON	ON	OFF	
			100M half duplex	ON	OFF	ON		
			100M full duplex	ON	OFF	OFF		
	auto-negotiation	OFF	X	X				
S2: When Ethernet operati	[1..5]	Ethernet interface speed on card select	S2[1..5] is binary BCD code, S2[1] is low, and S2[5] is high, see Attached List 1 for details. Note: When S2[1..5] and S1 [4] of local device are both set OFF, this device can follow remote speed and PCM configuration automatically.					

on card inserted into extensible slot	[6..8]	Channel A and B ethernet interface status configuration	switch function		6	7	8
			10M half duplex	ON	ON	ON	
			10M full duplex	ON	ON	OFF	
			100M half duplex	ON	OFF	ON	
			100M full duplex	ON	OFF	OFF	
			auto-negotiation	OFF	X	X	
S2: When V.35 operation card inserted into extensible slot	[1..5]	V.35 interface speed select	S2[1..5] is binary BCD code, S2[1] is low, and S2[5] is high, see Attached List 1 for details. Note: When S2[1..5] and S1 [4] of local device are both set OFF, this device can follow remote speed and PCM configuration automatically.				
	[6]	Reserved	Invalid now.				
	[7]	V.35 receiving clock phase select	ON	V35 port receives data in rising edge sampling of the synchronous clock.			
			OFF	V35 port receives data in falling edge sampling of the synchronous clock.			
	[8]	V.35 sending clock phase select	ON	V35 port sends data in rising edge sampling of the synchronous clock.			
			OFF	V35 port sends data in falling edge sampling of the synchronous clock.			

Postscript: Principles in clock selection:

- 1、 In any condition, there must be and only one clock origin on line to insure normal operation of our devices. Please affirm the line clock when starting and make sure only one device on line offers clock(namely set clocking to host or outer), and set all the other devices following(line) clocking.
- 2、 If V.35 interface needs to be connected to DCE devices(such as DDN, ATM, HDSL, V.35 interface of baseband MODEM), cross cable is needed. If V.35 interface of the counter DCE is set to inner clocking, this device should be set to outer clocking, namely fetching clock from V.35 interface.

Attached List 1: Speed configuration when Ethernet card/V35 user interface card inserted into extensible slot

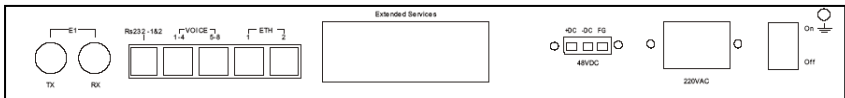
S2 switch speed (Kbit/s)	1	2	3	4	5
1984	O N	ON	ON	ON	ON
1920	O FF	ON	ON	ON	ON
1856	O N	OFF	ON	ON	ON
1792	O FF	OFF	ON	ON	ON
1728	O N	ON	OFF	ON	ON
1664	O FF	ON	OFF	ON	ON
1600	O N	OFF	OFF	ON	ON
1536	O FF	OFF	OFF	ON	ON
1472	O N	ON	ON	OFF	ON
1408	O FF	ON	ON	OFF	ON
1344	O N	OFF	ON	OFF	ON
1280	O FF	OFF	ON	OFF	ON
1216	O N	ON	OFF	OFF	ON
1152	O FF	ON	OFF	OFF	ON
1088	O N	OFF	OFF	OFF	ON
1024	O FF	OFF	OFF	OFF	ON
960	O N	ON	ON	ON	OFF
896	O FF	ON	ON	ON	OFF

832	O N	OFF	ON	ON	OFF
768	O FF	OFF	ON	ON	OFF
704	O N	ON	OFF	ON	OFF
640	O FF	ON	OFF	ON	OFF
576	O N	OFF	OFF	ON	OFF
512	O FF	OFF	OFF	ON	OFF
448	O N	ON	ON	OFF	OFF
384	O FF	ON	ON	OFF	OFF
320	O N	OFF	ON	OFF	OFF
256	O FF	OFF	ON	OFF	OFF
192	O N	ON	OFF	OFF	OFF
128	O FF	ON	OFF	OFF	OFF
64	O N	OFF	OFF	OFF	OFF
0	O FF	OFF	OFF	OFF	OFF

2.1.3 CONSOLE interface (invalid in this version)

Operation parameters of local and remote devices can be configured through CONSOLE interface, and operation status of local and remote devices can be fetched at the same time.

2.2 Mainframe Rear Panel Specification



2.2.1 E1 Interface (Exists when no optical interface provided)

75Ω/RX: 75Ω unbalanced E1 signal input

75Ω/TX: 75Ω unbalanced E1 signal output

Postscript: 1. When E1 is 120Ω balanced signal input and output, please note when ordering:

2. When 2-way E1 interface 1+1 standby is provided, the upper will be Channel A, and the lower Channel B.

2.2.2 Optical interface (Exists when no E1 interface provided)

RX: Optical signal input

TX: Optical signal output

2.2.3 2-way RS232 Data Interface

There are five connected RJ45 ports on the rear panel, and the one next to E1 port is 2-way RS232

2.2.4 VOICE Interface

Customer needs to connect in turn according to the number of ways ordered. For example, if 4 ways are ordered, the RJ45 next to RS232 must be connected to.

There are 2 RJ45 ports for voice interface on the rear panel, and one RJ45 can transfer 4 ways of telephone. The port next to RS232 corresponds ways 1-4, and the port next to Ethernet interface corresponds ways 5-8.

2.2.5 Ethernet Interface (LAN Interface)

There are five connected RJ45 ports on the rear panel, and the two next to the operation extending slot are Ethernet interfaces. These two Ethernets are switch-mode, which can transfer on E1 cable at the same time. The Ethernet interface supports cross cable automatical adjusting, excusing the bother of remaking cable.

2.2.6 Operation Extending Slot

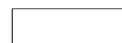
1-way V.35/V.24 user interface card and 2-way Ethernet ETH user interface card can be provided according to customer's demand. (Can be physically isolated from Ethernet interface on mainframe)

2.2.7 Power Supply

The power supply has two options: AC and DC, which should be specified upon ordering. The device supports both voltages 220V and 48V. The device supports two power versions: 220V and -48V, with up to 20% fluctuation. Note that the DC power supply has positive and negative poles. The negative/positive pole of -48V power source should be plugged into the negative/positive pole of the power input on the device. **The power is off when the switch is on "OFF" position. Otherwise the power is on.**

2.3 Bottom Panel Specification (No such function in this version)

When the transmission interface is E1, E1 interface impedance



configuration is at the bottom of the device. Turn the device over, and you can see a rectangle hole on the bottom panel as is shown in the bottom view. There's a 8-bit DIP switch below the hole.

Bottom panel E1 interface impedance configurationswitches specification:

Switch Name	Function	Discription		Remark
[1..2]	Channel A E1 impedance select	[1..2]=[ONON]	75Ω unbalanced	
		[1..2]=[OFFOFF]	120Ω balanced	
3	Channel A E1 calculated ground	ON	Ground of 75Ω E1 transmission cable connects to local ground.	Ground of 75Ω E1 transmission cable disconnects from local ground.
		OFF	Ground of 75Ω E1 transmission cable disconnects from local ground.	
4	Channel A E1 sending ground	ON	Ground of 75Ω E1 transmission cable connects to local ground.	
		OFF	Ground of 75Ω E1 transmission cable disconnects from local ground.	
[5..6]	Channel B E1 impedance select	[5..6]=[ONON]	75Ω unbalanced	
		[5..6]=[OFFOFF]	120Ω balanced	
7	Channel B E1 calculated ground	ON	Ground of 75Ω E1 transmission cable connects to local ground.	Ground of 75Ω E1 transmission cable disconnects from local ground.

		OFF	Ground of 75Ω E1 transmission cable disconnects from local ground.
8	Channel B E1 sending ground	ON	Ground of 75Ω E1 transmission cable connects to local ground.
		OFF	Ground of 75Ω E1 transmission cable disconnects from local ground.

Chapter Three Introduction to Extensible User Interface Card

3.1 V.35 User Interface Card

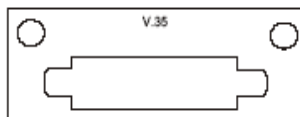
This card is mainly for data collection. Can provide synchronous data transmission at speed $n \times 64k (n=1 \sim 31)$. The speed can change according to DIPs on the device or configuration of network management system.

1-way V.35 interface provided

Interface level: accord with CCITT V.35 standard

Physical interface: DB25 hollow socket

Interface speed : $N \times 64Kbit/s$



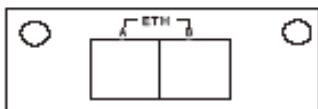
3.2 Ethernet User Interface Card

Mainly converts Ethernet data into the synchronous data format of E1 channel. Occupies $N \times 64K$ channels, including fulfilling functions bandwidth selecting, data buffer and data format converting.

10M/100M auto-negotiation, 10M half duplex, 10M full duplex, 100M half duplex and 100M full duplex for your choice.

The physical interface is 2 RJ45s.

Ethernet maximum bandwidth 1984Kbit/s.



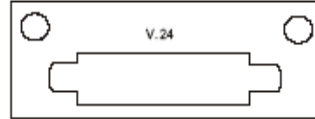
3.3 V.24 User Interface Card

This card mainly does the data collection. The cable length of V.24 interface is related to transmission speed. The length increases as speed decreases, the higher speed, the shorter distance.

The physical interface is DB25

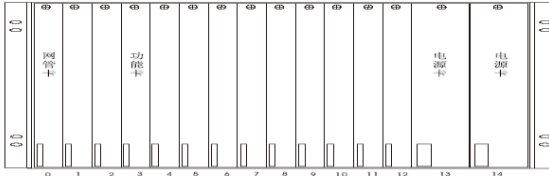
1-way V.24 transmission channel provided

Transmission speed 128K or 64K



Chapter Four Introduction to Centralized Frame

4.1 Frame Front Panel Discription



4.1.1 Network Management Proxy Card

If customer needs network management, the network management card can be inserted in any position among 1-12, but position "0" is strongly recommended for management convenience. If customer doesn't need network management, position "0" can hold operation card. If customer needs multi-frame cascade (with regard to the reaction time of network management, no more than 2 frames cascade is recommended, more frames cascade will prolong the reaction time of network management), it is recommended that the network management card inserted into position "0" of the first frame, and this position of all the other frames can hold operation cards.

4.1.2 Operation Card

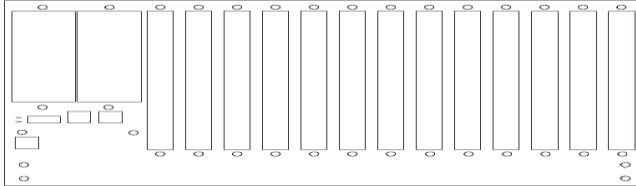
At most 13 operation cards can be inserted into one frame. Mixed use of operation cards of various series of our devices is supported, and the operation is the same as desktop devices.

4.1.3 Power Supply Card

Customer can insert the needed power supply card according to actual configuration. The power supply card has temperature display, and voltages

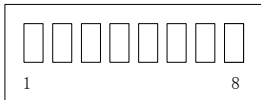
220V, -48V and powers 75W, 100W and 150W are available. Power supply hot standby supported.

4.2 Discription of Frame Rear Panel



4.2.1 Address Switch

There are 8-bit DIP switches on rear panel, “1” representing ON, and “0” OFF. Defined as follows:



Bits 1-4: Frame address setting DIPs, S1 for low and S4 for high.

Our SNMP network management address is defined as a set of 8-bit binary code, and address of the inserted card is made up with two parts, the lower 4 bits as slot address, and the higher 4 as frame address. The higher address is arranged before the lower when 8-bit address is composed.

Slot Address: We define that the 1st from the left in the front elevation of frame front panel, namely Slot 0, is assigned address “0000”, the 2nd from the left, namely Slot 1, is assigned address “0001”, and thus increases to the right, and the right end namely Slot 14 is assigned address “1110”.

Frame Address: Frame rear panel DIPS S1-S4 are frame addresses, S1 for the 5th bit of network management address, and S4 for the 8th bit of network management address

For example, if a frame has the frame address “1100”, the inserted device in the 3rd slot from the left of the frame, namely Slot 2, has the address “0010”, then this inserted device will have the network management address “1100-0010”.

Bits 5-6: Reserved.

Bits 7-8: The bits S7-S8 are for frame device SNMP network management matched resistance selection, Bit 7 for receiving match and Bit 8 for sending match.

While SNMP network managing, endmost devices on the bus should be

suiting with matched resistances, or DIPs S7-S8 of endmost devices should be turned On.

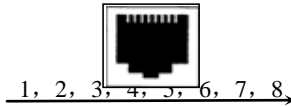
Attention:

◆In the jurisdictional limits of a same network management card, the address of the managed device must be unique. Once there's address conflict, the network management system will be paralysed, and the conflict addresses should be revised and the system has to be restarted.

◆When cascading, it must be made sure that only the endmost frame(or desktop) has matched resistance in one network management bus when any frame(or desktop device) is connected to SNMP network management, that is DIPs 7-8 turned to ON while all the other DIPs turned to OFF.

4.2.2 Cascade Interface

There are 2 RJ45s on the right of the rear panel(back side) used as cascade interface, specifically defined as follows:



For PC network management interface, please make specific chovr cable, and when multi-frame cascading, just connect the RJ45s on the two rear panels with direct cable.

Pin Number	Signal Definition	Direction
2、4	GND	Signal ground
5	RS485TP	Output
6	RS485TN	Output
8	RS485RN	Input
7	RS485RP	Input

Attention: When need cascading, set the number of frames in the network management card, and set frame addresses (which can't be the same) on the frame rear panels according to actual needs. For example, when 2 frames cascading, set the number of frames in the network management card to 2, and set the frame numbers on the rear panels to 0000 and 0001 separately. After setting, the network management card and network management software must be restarted.

Chapter Five Technical Specifications

5.1 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	0°C ~ +50°C
Storage Temperature	-40°C ~ +70°C
Relative Humidity	10 % ~ 95 %
Atmospheric Pressure	70 ~ 106 kpa

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

5.2 Power Supply Section

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 or -36VDC ~ -72VDC
Power consumption	< 15 W (Power consumption varies with different interfaces)

5.3 Mechanical Specifications (W×H×D mm)

Stand-alone type(1U height, 19"): Appearance dimension 430(483)×44.5×203

Machine frame type(6U height, 19"): Appearance dimension 483×267×245

5.4 Optical Interface Specification

Optical Wavelength: 850, 1310, 1550nm Optional

Average Transmit Power : $\geq -8\text{dBm}$ (single-mode, 1310)
 $\geq -18\text{dBm}$ (multi-mode, 850)
 $\geq -25\text{dBm}$ (multiple mode, 1310)

Receiver Sensitivity: $\leq -36\text{dBm}$

Connector Type: FC/SC optional; single-mode/multi-mode optional; single optical fiber/double optical fiber optional

5.5 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 \pm 50ppm

User port $N \times 64$ Kbps ($N=1 \sim 31$), i.e. 64Kbps to 1984Kbps adjustable

Line Code Pattern: HDB3

Interface Impedance: 75 Ω /120 Ω

Interface Connector: Q9(75 Ω), RJ45(120 Ω)

5.6 Ethernet Interface Specification

Rate of Ethernet interface: 10M/100M self adjustable, 10M half duplex , 10M full duplex , 100M half duplex , 100M full duplex optional

Ethernet interface is compatible with IEEE 802.3 protocol and supports IEEE 802.1Q

Transmission Rate: $N \times 64$ Kbps ($N=1 \sim 31$), i.e. 64Kbps to 1984Kbps adjustable

5.7 V.35 Interface Specification

Electric Characteristics: compatible with ITU-T V.35, recommended

Terminal Interface: compatible with ISO2593 regulations

Transmission Rate: $N \times 64$ Kbps($N=1 \sim 31$) , i.e. 64Kbps to 1984Kbps adjustable

5.8 V.24 Interface Specification

Operating Mode of Interface: DCE, fit with DTE or DEC equipment

Electric Characteristics of Interface: compatible with ITU-T V24 standard

Clock Mode: master /slave /external modes optional

Interface Code Rate: 64K, 128K

Interface Type: DB25 hole type socket

5.9 RS-232 Interface Specification

Electric Characteristics: compatible with CCITT V.28 protocol

Transmission velocity: asynchronous 9600bps

5.10 FXO (FXS) Interface Specification of Phone

Voice Line characteristics: compatible with *General technical specifications for phone switching device by post and telecommunication ministry*

Voice Code: PCM code, 64Kbps each line

Relay(FXO): connected to exchanger

Two-line AC Input Impedance: $200+680//0.1 \ \Omega$ (three elements)

Ringing Voltage: 35~150V

Ringing Frequency: 17~60HZ

Return loss: 20db

User Interface (FXS): connected to users' telephone

Two-line AC Input Impedance: $200+680//0.1 \ \Omega$ (three elements)

Loop Impedance of User's Line: less than $1K \ \Omega$ (including phone)

Peak-Peak Value of Ringing Voltage: 110~150V

Ringing Frequency: 22~28HZ

Feed Voltage: 28V

Return Loss: 20db

Chapter Six Installation

6.1 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 dismantled.

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.
11. Do not point the optical header toward eyes, lest that laser injures the retina.

6.2 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.

6.3 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. **Before insert or extract power supply line, please disconnect power supply first which can be re-connected after the operation. This product shall be used in the operating conditions specified in this specification.**

6.4 Test

Please first carry out the following test before usage:

1. Check whether all switches on the front panel are in OFF positions. When the transmission interface of the device is an E1 interface or an optical interface, PWR lamp and ALOS lamp of the device shall be ON and the other lamps shall be OFF when correct power supply is applied; when the transmission interfaces of the device are two E1 interfaces with standby 1+1, PWR lamp and A/B, ALOS, BLOS lamps of the device shall be ON and the other lamps shall be OFF when correct power supply is applied;

2. When two equipments positioned back to back are connected by E1 Connecting Cable or optical fiber with the clock and other operating modes configured in position, ALOS and BLOS lamps of two equipments shall be OFF;
3. Press REM and PATT of equipments in this terminal after proper connection of equipments, Test lamp on the remote terminal device will be ON, while the TEST and PTOK lamps on the equipments of this terminal will all be ON.

6.5 Configuration and Connection

If the indicator lamps of equipments can operate normally as the above 6.4 describes, release all the switches on the front panel; switch off the power supply; set up the clock and E1 impedance as per the requirement of the whole network environment and insert E1 or optical fiber input output lines, network lines, serial port line, phone line and V.35 line etc. Then turn on the power supply and the device will enter into normal state of operation.

If the equipments can't operate normally as the above 6.4 describes, please look up diagnosis and removal of malfunctions. If fails in removing malfunctions, please contact our company or distributors and agents of our company at once.

Chapter Seven Accessories

7.1 Method of making lines

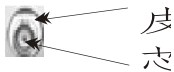
7.1.1 How to make E1 connecting cable

75 Ω Line Making Method:

Connection between core and core and between skin and skin; No connection between skin and core

120 Ω Line Making Method:

Pin sequencing method of 120 Ω is as shown below:



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

→
1 (+), 2 (-) pins are output port
4 (+), 5 (-) pins are input ports

7.1.2 How to make V.35 connecting cable

Our device is used as DCE device in default. V.35 data interface

adopts DB25 interface. V.35 interface pins on DTE side are defined as follows (straight-through cable):

Pin code	Pin name
1	Protective grounding
7	Signal grounding
2	V35 send data A(from DTE)
14	V35 send data B(from DTE)
3	V35 receive data A(from DCE)
16	V35 receive data B(from DCE)
4	Request to send
5	Reset sending
6	DCE ready
20	DTC ready
8	Data carrier detected
24	Send clock A (from DTE)
11	Send clock B (from DTE)
15	Send clock A (from DCE)
12	Send clock B (from DCE)
17	Receive clock A (from DCE)
9	Receive clock B(from DCE)

When this card is out of factory, there is a V.35 header among the accessories of the product which can switch DB25M to DB34F and thus connect directly with DTE equipment. **When the device needs to be connected with DCE equipment, crossover cable can be adopted to carry out tail connection.** Please clarify it to our company when placing orders.

7.1.3 Making of Ethernet Interface Connecting Cable

(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

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:

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

7.1.4 Making of RS232 Interface Connecting Cable

Pin definitions and connecting method of RJ45 socket with RS232 data interface are as the following table:

RJ45	Definition	First DB9 (parent)	Second DB9 (parent)
1	RXD1: RS232 data input in A	3	

	channel		
2	CTS&CSR&DCD	1, 6, 8	
3	TXD1: RS232 data output in A channel	2	
4	GND	5	
5	RXD2: RS232 data input in B channel		3
6	CTS&CSR&DCD		1, 6, 8
7	TXD2: RS232 data output in B channel		2
8	GND		5

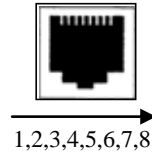
7.1.4 Making of CONSOLE interface Connecting Cable

Pin No.	Definition
1	RS232 input
2	GND
3	RS232 output
4	GND
5	RS485 positive output
6	RS485 negative output
7	RS485 negative input
8	RS485 positive input

7.1.5 Making of Voice Interface Connecting Cable

Those close to E1 are 1~4 channel phones accordingly; those close to RS232 are 5~8 channel phones accordingly. Telephone interface varies according to requirements, thus only the following corresponding relations need to be satisfied in service.

Pin No.	Definition
[1..2]	First channel voice
[3..4]	Second channel voice
[5..6]	Third channel voice
[7..8]	Forth channel voice



7.2 Diagnosis and removal of malfunctions

Phenomena	Potential Cause	Measures
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<p>Power indicator of device PWR lamp fails to be ON.</p>	<ol style="list-style-type: none"> 1. Control switch is not in place 2. Incorrect connection of power polarity 3. External power supply is not plugged in 4. Conductor dropped into machine frame that leads the power supply to be short circuited with the ground. 5. Malfunctions of power supply module 	<ol style="list-style-type: none"> 1. Press the switch in place 2. Change the polarity of power supply 3. Plug the external power supply 4. Remove the conductor 5. Contact the supplier
<p>After E1 (optical fiber) is connected, ALOS and ASYL would alarm</p>	<ol style="list-style-type: none"> 1. Reverse connection of sending and receiving elements of E1 (optical fiber) 2. Wrong making of Connecting Cable of E1 (optical fiber) 3. Transmission distance exceeds standard specification 4. Malfunctions of E1 (optical) module 5. There are wrong configurations of clock mode of device in the links. 	<ol style="list-style-type: none"> 1. Exchange the sending and receiving elements 2. Make lines correctly 3. 75 Ω : 300M 120 Ω :500M; according to the power of optical module 4. Contact the supplier 5. Adjust the other device clock mode on the line.
<p>Ethernet interface can ping through, but there are packet-loss problems</p>	<ol style="list-style-type: none"> 1. Network line is not made in twisted line form 2. There are too much concatenated HUBER in the network 3. Working modes are not corresponded with each other 4. There are wrong configurations of clock mode of device in the links. 	<ol style="list-style-type: none"> 1. Make the lines Correctly 2. Change the structure of network and decrease the multi-level concatenated HUBER 3. Set the correct working mode 4. Adjust the other device clock mode on the line.
<p>Wrong connection of telephone interface</p>	<ol style="list-style-type: none"> 1. Equipments are constructed in the wrong way during network building 2. No correspondence for telephone interface ordered 	<ol style="list-style-type: none"> 1. Connect 0 interface device with voice switch; connect S interface with user's equipment 2. Select telephone interface ordered.
<p>Very loud noise in the phone</p>	<p>There is interference</p>	<p>Ground the device</p>

7.3 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: Modular Voice and Data Multiplexing device	Device No.:
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	Maintenance date	No. of Service Bill
1		
2		
3		
4		
5		

