Model name: E1-MUX
E1 / 4*10(100)BaseT+8*voice +1 RS232 interface converter

User's Reference Manual

Contents

1 Product Introduction

§1.1 Function

E1-MUX provides conversion between ITU-T G.703 standard E1 framed interface and 10/100Mbase-T Ethernet interface, can through E1 channel provide 1-8 voice, realize the long-distance extend of telephone line through E1 channel. It also provides one RS232 data channel. E1 signal can transmit through MUX, when networking the two local networks become two parts of one network. E1-MUX is a high-performance, multi-type long-range Ethernet bridge. Its small size, low cost and very appropriate to the cost-sensitive bridging applications, or as spaces become an extension of the LAN infrastructure, devices or above devices. Automatically connected to the LAN with its uninterrupted learning the MAC address and the address as another purpose of the frame relay LAN. TCP/IP agreement on transparency for different network interface between communications equipment to provide safe, seamless connectivity. E1-10/100BT interface converters widely used for LAN and Wan networking, control, and so on, and particularly applicable to the network users to the network users with a single E1 channel data and voice access at the same time. RS232 asynchronous transmission 300-115.200 kbps self-adapt .

§1.2 Features

- realizes long-distance monitoring of **local device** to the remote device based on self-copyright IC;
- provides 4 channels Ethernet connectors
- 10M/100M□4 Ethernet nterfaces,10M/100M,full half duplex self adapt, support VLAN.

- The Ethernet interface supports AUTO-MDIX(cross over and straight through self adapt)
- 4 Ethernet interfaces support channel separate function, can set VLAN based on TAG
- provides two clock types: E1 master clock, E1 line clock;
- provides 3 kinds of loop-return function, namely E1 self-looping at local end, Ethernet self-looping at local end, ordered to self-loop at remote end;
- realize the automatically rate set of local device to remote device
- has the function of pseudo-random code testing, convenient for opening of the circuit, and can be used as an error code instrument;
- Ethernet supports rate of N*64k (N=1-32), which can be regulated from 64K to 1098K;
- supports 75Ω unbalanced and 120Ω balanced impedance at the same time;
- Provide Ethernet auto reset function, run more stably.
- various Ethernet data indicate functions, which indicate data transmission status timely;
- Provides 1-8 voice channels, support calling indication;
- Voice connector FXO (FXS), FXO connect to PBX and FXS connect to phone;
- RS232 channel can transfer asynchronous serial data with self-adaptable baud rate of 300 to 115.200;

§1.3 interface

E1 interface

Interface standard: Conforms to G.703 standard

Interface rate: N×64Kbps, N:1□32

Code: HDB3

Interface impedance: 75Ω (unbalanced), 120Ω (balanced)

Connecter: BNC (75 Ω), RJ45 (120 Ω)

Vibration characteristic: Satisfies G.742 and G.823 standard

Clock type: internal-clock, line clock

10/100Base-T port

Rate□10M/100M□full/half duplex self adapt

Protocol: support IEEE 802.3□IEEE 802.1Q(VLAN)

MAC address table: 4096 MAC addresses

Ethernet Total Memory Sizes: 64MBits SDRAM

Physical interface□RJ45, support AUTO-MDIX(cross over and straight through self adapt)

Voice port

- FXS phone port

  Ring voltage□75V

  Ring frequency□25HZ

  Two line input impedance□600Ω(hanging off)

  Wastage□40 db

- FXO switch port

  Ring test voltage□35V

Ring test frequency：17HZ-60HZ

Two line input impedance：600Ω(hanging-off)

Wastage：40 db

RS232 port

Rate： 300～115.2Kbps auto-adaptable (Asynchronous)

Interface characteristic： satisfies ITU-T V.24 standard

Connector：RJ45

§1.4dimension

standalone: 483（L）×140（W）×50（H）mm

§1.5Working Condition

Input voltage: AC180V ~ 240V ;DC-48V;DC+24V

Power consumption: ≤5W

Operating temperature: 0°C ~ 50°C

Storing temperature: －40°C ~ +70°C

Relative humidity: 95 %

Without disturbance of erosive and solvent gas, raising dust or strong magnetic field

§1.6 Packing

Packing information:

E1-MUX	1
BNC connector	2
Use's Reference Manual	1

2.installation

§2.1 The front panel

§2.1.1 Indicate lights

The up row is LOCAL,indicate the local status

The down row is REMOTE,indicate the remote status

NAME	COLOR	STATUS	DESCRIPTION
DATA	yellow	on	Ethernet data transmit and receive normally
		wink (quickly)	Only receive data in ethernet
		wink (slowly)	Ethernet port only has data transmit,no data receive
		off	No data transmit and receive in Ethernet
LINK	green	on	Ethernet connected
		off	Ethernet unconnected
LOS	red	on	E1 line signal loss
		off	E1 line signal normal
LOF	red	on	E1 on unframing or on framing signal
		off	on unframing or on framing signal
TEST	yellow	on	When it is on test(any of ANA,DIG,REM,PATT is pressed
		off	Work normally
PTOK	green	on	When PATT pressed, PRN tested normally
		off	When PATT pressed, PRN tested wrong
		wink	When PATT pressed, PRN test has error code
PWR	green	on	Power supply connected
		off	Power supply not connected
	orange	on	Be controlled by console or SNMP managed;
RS232	green	on	Has normal RS232 data received and sent
		wink (quickly)	Has RS232 receive, no transmit
		wink (slowly)	Has RS232 no receive, transmit
		off	Has RS232 no receive, no transmit
PH1-8	yellow	on	1-8 channel voice is under calling

		off	1-8 channel voice is not under calling

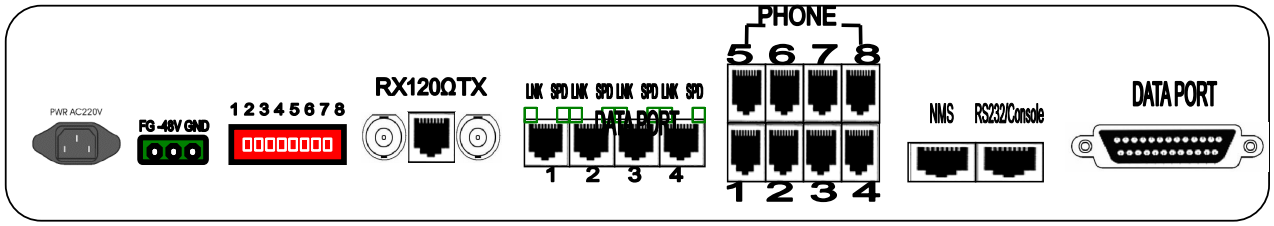
When all the indicators continue flick and off, it has several following reason for wrong set:

1:test botton set dead loop;

2:the set for the rate of local and remote follows each other

3:rate is set by local but both rate for local and reomote are not the same

§2.2 The back panel



§2.2.1 Power supply

AC220V: reserved with no function

DC-48V□no distinguish of positive and negative polarity for power supply due to auto-test circuit in the device.

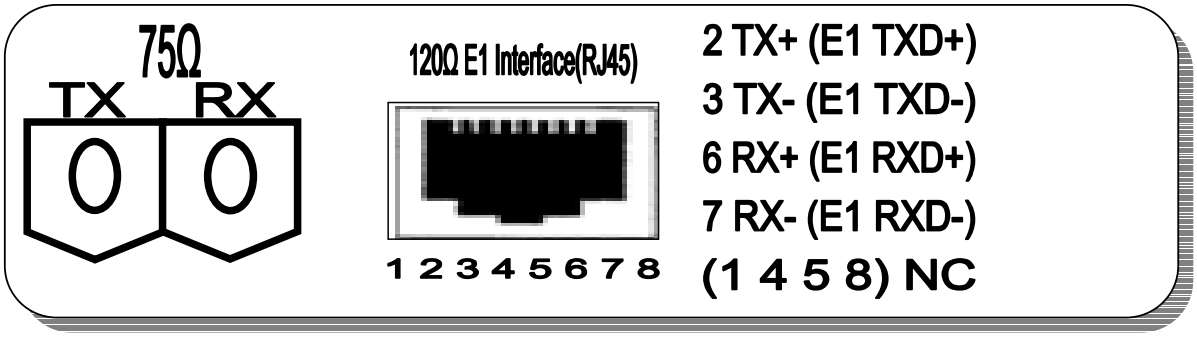
-48V and GND connector can be installed randomly.

§2.2.2 E1 interface

It support unbalance 75Ω (BNC),RX is input and TX is output , balance120Ω(RJ45)

- Not necessary to set 75Ω/120Ω,it's self-adapt.
- The physical connector is BNC connector Jack,RX is inout,TX is output(75Ω)
- The physical connector is RJ45(120Ω)

The pin definition as follows:

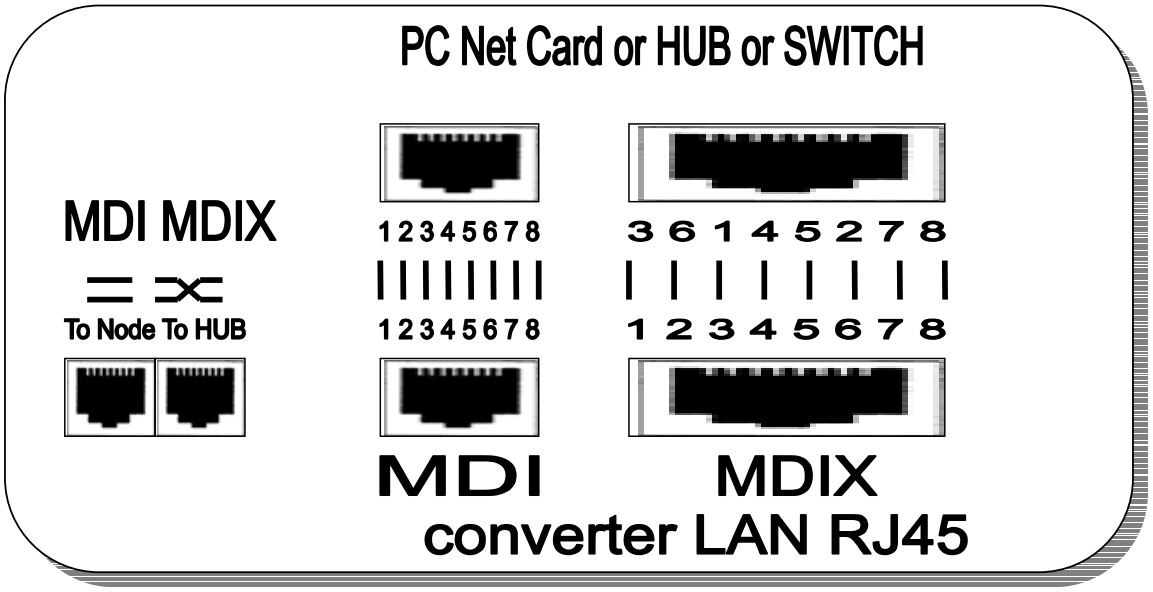


§2.2.3 Ethernet Port(LAN port)

The front panel:

- **1 2 3 4** —— 4 10/100Base-T ports,RJ45
- LNK lights: The Ethernet connect lights of related ports,If on,indicates Ethernet connected,if wink, indicates have data transmitd or received in Ethernet.
- SPD lights:Ethernet 10/100M indicate lights of related port,If on,the rate is 100M.

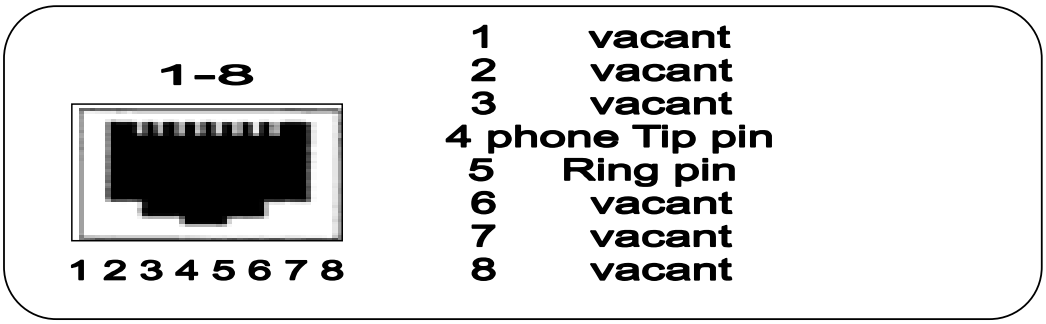
There are 4 10/100M RJ45 connectors on the back panel,support AUTO-MDIX(cross over and straight through self adapt).The pin definition of RJ45,please see the figure above,cross over and straight line as follows,



§2.2.4 Voice connector

On back panel there are 8 RJ45 port supporting 1-8 phone connection. If FXO module is set in device, the port is FXO which is connected to switch. If FXS module is set in device, the port is FXS which is connected to phone.

Pins of FXO/FXS are listed as below:



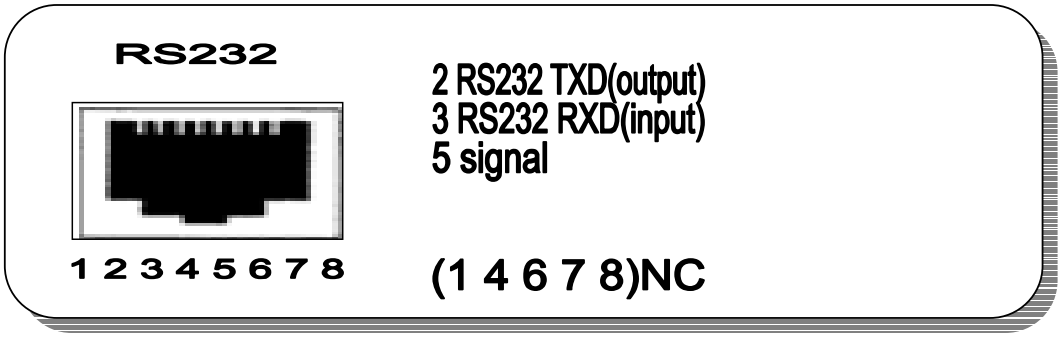
Note: NMS port is reserved with no function, **DATE port** support V.35 date,but here as Ethernet channel has occupied ,then this port is reserved with no function.

§2.2.5 RS232/Console port

There is RS232/Console RJ45 port on the rear panel and offer one channel RS232 but **console** function couldn't work as only one of the two function could be

choosed. **This port only for RS232 date channel**

Pin as follows,

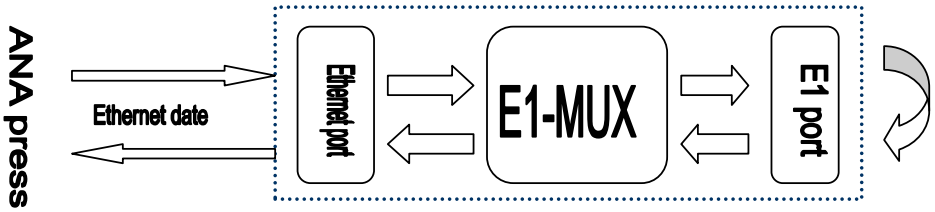


§2.2.5 Loop-back test buttons

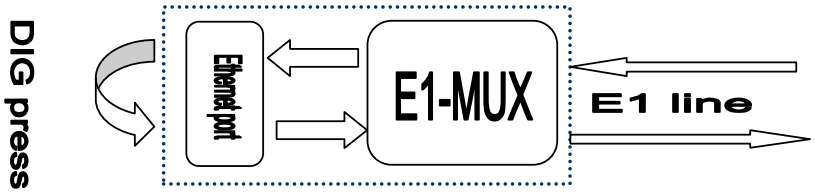
2.1.1 Loop back test button

4 switch buttons on the front panel, from left to right as follows:

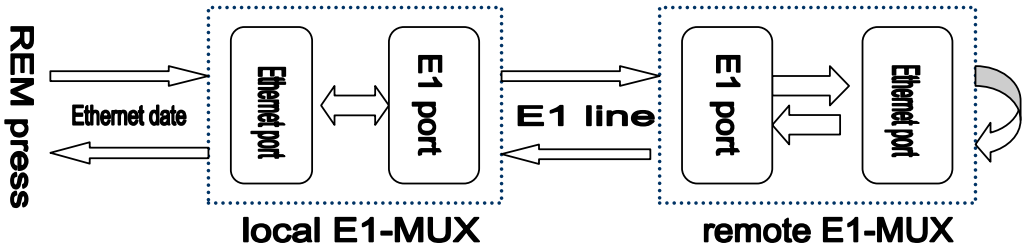
- ANA□local loop of E1, used to test if local device and connect wire is normal



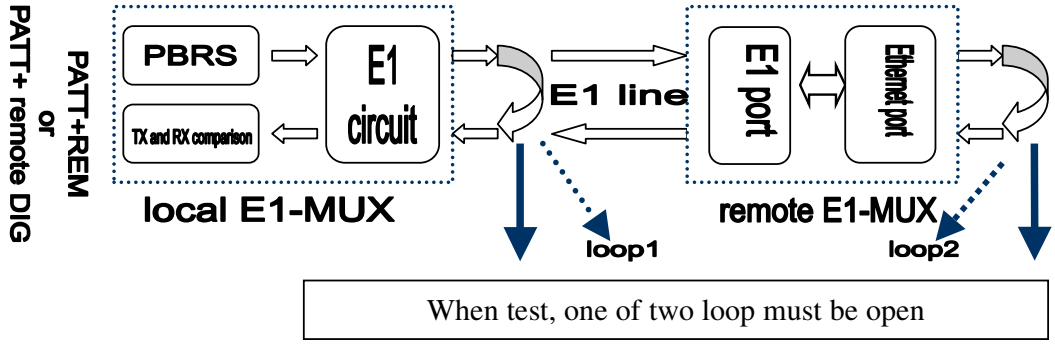
- DIG□Ethernet local loop back, used to test remote device and E1 line.



- **REM**□remote device Ethernet port self loop-back,ie command remote device Ethernet port loop-back to local.as this command is transmitted to remote by E1 line, when under unframed(the whole time-slots transmit Ethernet date), REM is not valid.



■ PATT□ pseudo random code test: generate pseudo random code to Ethernet input port, and test if the output signal of Ethernet accord with the standard. PTOK ON if accord, OFF if not accord.



detect if local device work normal when loop 1 open, detect if E1 transmission line and both device work normal when loop 2 open and loop 1 close.

Note:

1) press any button of front panel will stop normal data transfer, and shift to test mode.
2) The connection should be a loop when in PATT mode, or no return for the send pseudo random code.

□ **combination of button**

A: press local **ANA**+local **PATT**□

PBRS test local device,if PTOK on, device work normal, if off or flick, it

has failure□as loop 1□

B: press remote DIG+local PATT□

PBRS test local device, remote device and E1 line. if PTOK on, device work normal, if off or flick, it has failure□as loop 2□

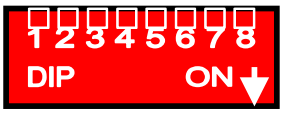
C: press local REM+local PATT□

PBRS test local device, remote device and E1 line. if PTOK on, device work normal, if off or flick, it has failure□as loop 2□

B has the same function as C

§2.3 set

There are 8 DIP switchs on the front panel used for clock set and Ethernet as well as E1 rate set.



DIP1:E1 clock set
DIP2:4 channel Ethernet Vlan set
DIP3:reserved
DIP4:make remote follow local
DIP5-DIP8:the opened channel of Voice

§2.3.1 clock set

There are 8 DIP switches,the DIP1 is clock setting.

DIP 1	Description
OFF(upward)	E1 internal clock
ON(downward)	E1 line clock

- Internal clock: use clock generated by internal crystal.
- Line clock: working clock from receivede1 signal.

The E1 clock model selection as following:

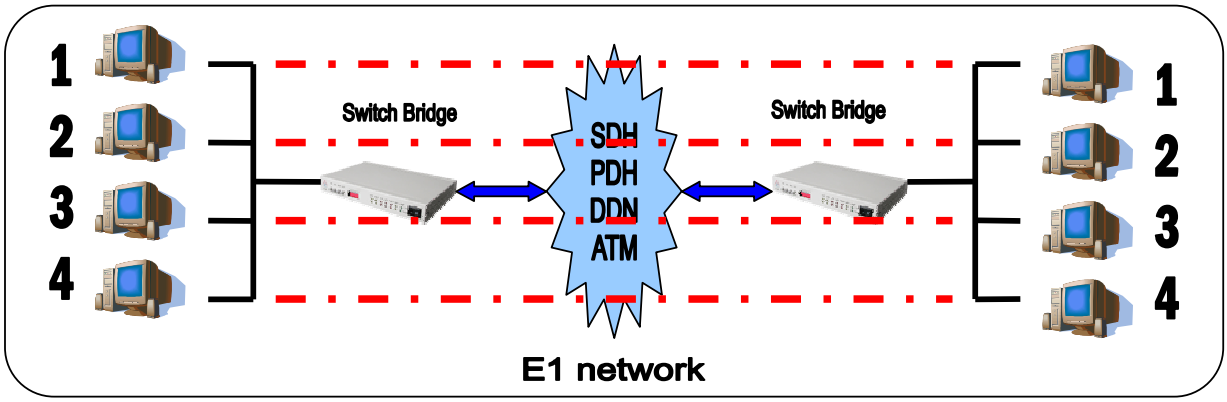
- When the local and remote devices work in pairs, both of them could be internal

clock,or one is internal clock, the other is line clock.

- Try to make only one device has the clock.
- Try to avoid all devices use line clock. If can make sure there already have the line to provide clock, then all other devices can set as line clock, if can't make sure, please set the device as internal clock.

§2.3.2 VLAN setting

When the 2nd switch of DIP is ON,the 1-4 Ethernet ports of network bridge isolated each other, this is separated based on TAG and VLAN, that is,4 Ethernet ports of E1 channels separated ,for example,the 1st port of local device only can transmit to 1st port of remote device.



§2.3.3 make remote follow local

the DIP 4 is to make remote device follow local device, the details as followings:

DIP 4	description
OFF(up)	Remote device set as panel Dip switch (original)
ON(down)	Remote device follow local device

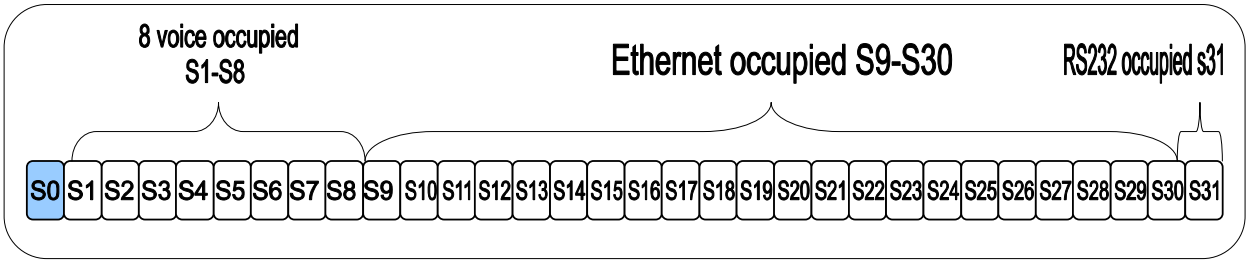
note□the remote device follow these function: the opened channel/RS232 channel open/VLAN set

2.3.4 control the number of voice channels set

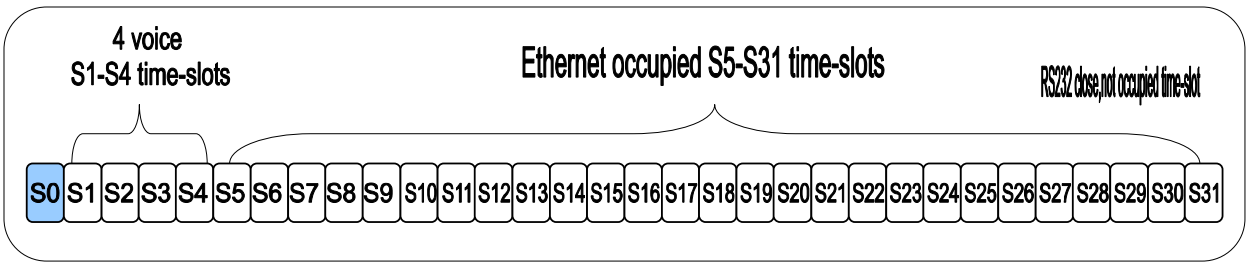
1 is OFF□0 is ON

Model	DIP 5	DIP 6	DIP 7	DIP 8	Telephone Opened Nos	Ethernet occupied time-slots	Ethernet rate □Kbit/s□	RS232 channel
15	1	1	1	1	8	22	1408	**open**
14	1	1	1	0	6	24	1536	**open**
13	1	1	0	1	4	26	1664	**open**
12	1	1	0	0	3	27	1728	**open**
11	1	0	1	1	2	28	1792	**open**
10	1	0	1	0	1	29	1856	**open**
9	1	0	0	1	0	30	1920	**open**
8	1	0	0	0	8	23	1472	close
7	0	1	1	1	7	24	1536	close
6	0	1	1	0	6	25	1600	close
5	0	1	0	1	5	26	1664	close
4	0	1	0	0	4	27	1728	close
3	0	0	1	1	3	28	1792	close
2	0	0	1	0	2	29	1856	close
1	0	0	0	1	1	30	1920	close
0	0	0	0	0	0	31	1984	close

mode15□DIP5-8 when OFF□8 voice opened□RS232 open, E1 time-slots occupied as followings□



mode4□DIP5-8 when ON,OFF,ON,ON, 4 voice open,RS232 close,E1 time-slots occupied as following:



3. installation procedure

- Unpack, inspect the content carefully. verify that all items are included with your carton. contact us or local agent if there is any content missing or damaged.
- Check power supply configuration. care about the value of voltage if use DC input.
- Take these test before use:
  - Check if all the loop back test switch button on the back panel is loosen, PWR and LOS should be ON, and all other led should be OFF.
  - If device work as framing status, LOS and LOF should both ON, Press PATT, TEST should ON, PTOK should OFF. And Press ANA button, PTOK ON, and LOS OFF.

- If used with two ends, press PATT, and loose ANA, press DIG or REM at remote, PTOK should ON.

- If indicator LED work normal, unpress all switch on the back panel, power off, set clock, plug E1 wires, power on, the device should work normally.
- If the device not work normally, refer to chapter 4: trouble shooting. Contact us or our local agent quickly if the problem can't be solved.

4. Malfunction Diagnoses and Elimination

when work normal, LINK, PWR, DATA ON, all other LED OFF.

status	cause	solution
All LED normal, but couldn't PING	Both LAN not in one IP	Make local and remote device point to point PING by one IP
	The device is on TEST status	Loop-back button on the front panel pressed, please make it not press
	E1 line transmit has problem	Press the PATT and REM buttons, (or make the opposite device loop back the LAN data), if the PTOK light off, it means the E1 transmission channel has problem.
	E1 transmit has cycle line□like SDH E1 cycle line has no remove□	Press PATT on one device, if PTOK ON, it means has cycle line; if off, press the other device PATT and check the PTOK.
status	**cause**	**solution**
Date could PING, but has package loss	The LAN wire wrong	Make right LAN wire□ 1□2 pin use one pair twisted line□ 3□6 pin use one pair twisted line□
	The E1 clock of local and remote both are line clock	Make both are main clock or one is the main, the other is line
	Computer virus	Kill virus by softwore

	phenomenon	solution
1	PWR OFF	Check if power supply connect ok
2	LOS ON	Loop back TX□output□and RX□input□,if LED OFF, check the E1 wire
3	LINK OFF	Please check Ethernet connector pins
4	LOS OFF□ LOF ON	E1 channel have problem, check it by PATT and REM
		Check if Remote device work in framing status, or work in slave status(follow master)

note□how to check the device work normal?
(1) if press ANA on one device, and press PATT,PTOK ON, if unpress ANA, PTOK OFF, then the device work normal.
(2) if press PATT,PTOK OFF, press DIG on remote device, PTOK ON, then both devices and E1 works normal.
caution□
1□TEST ON□some button ON , maybe stop normal data communication□
2□ pseudo random code□PATT□test□must having loop, or the send pseudo random code would not return.