H5000 Series
Integrated Service Access Equipment

User Manual

Beijing Huahuan Electronics Co., Ltd.

H5000 Series
Integrated Service Access Equipment

H5000	CO Equipment
H5001	SU Equipment
H5000DXC	64kbps DXC Equipment

Manual

Beijing Huahuan Electronics Co., Ltd.
2005.12

Disclaimer

The information contained in this document is subject to change without notice and does not represent a commitment on the part of Beijing Huahuan Electronics Co., Ltd. (Huahuan). The information in this document is believed to be accurate and reliable, however, Huahuan assumes no responsibility or liability for any errors or inaccuracies that may appear in the document.

Product Name: H5000 Series Integrated Service Access Equipment
Manual Version: 2.6
Last Update: 2005.12

BEIJING HUAHUAN ELECTRONICS Co., LTD.

Address: No.26, Shangdi 6th Street,
Haidian District, Beijing, 100085
P.R. China
Business telephone:（8610）62981998
After-sales service:（8610）62988820
Technique support:（8610）62960985
Fax: （8610）82899801
Web: http://www.huahuan.com，http://www.huahuan.com.cn
E-mail: support@huahuan.com

TABLE OF CONTENTS

The first unit:Whole Introduction

1. Introduction

H5000 Series Integrated Service Access Equipment have standard E1 interfaces, many voice interfaces, data and MPEG2 or MPEG4 image interface. According to the need of the users, the equipment have the following three kinds configure. Please see the table 1-1.

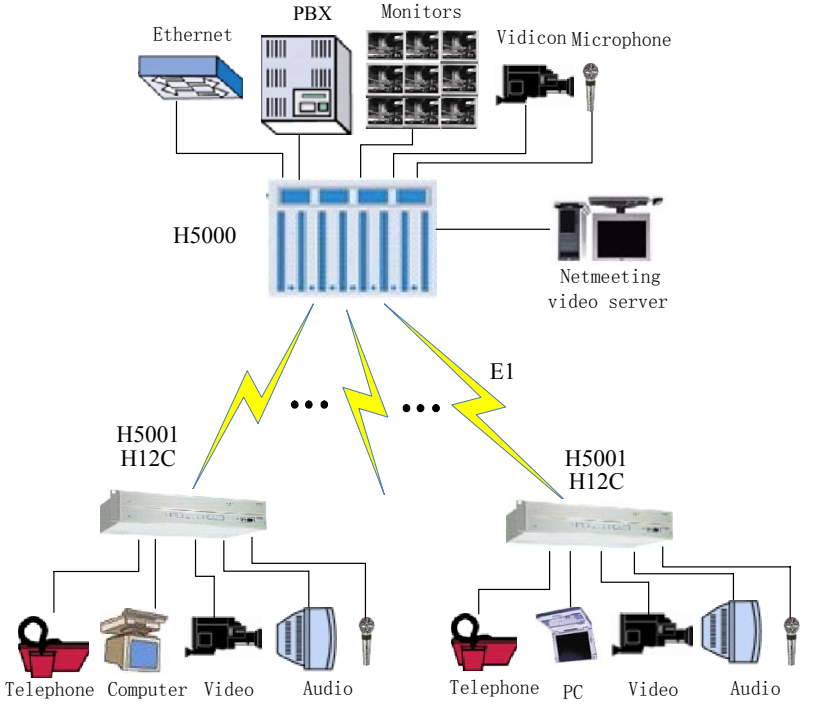
Table 1-1 H5000 Series Equipment configuring table

H5000	Office-end Equipment
H5001	Far-end Equipment
H5000DXC	64kbps DXC Equipment

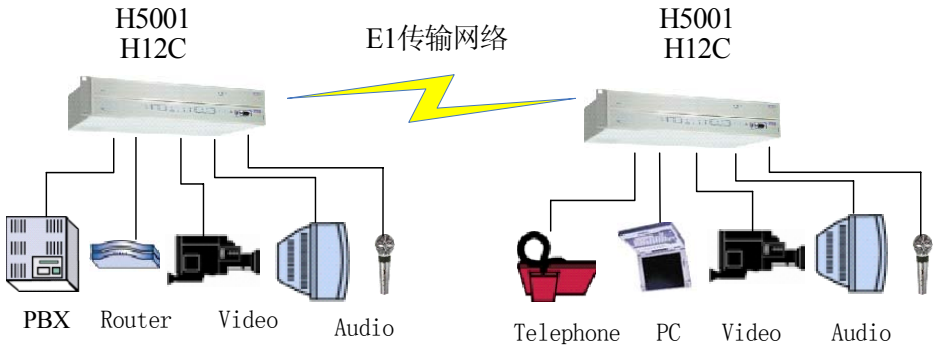
The H5000 series equipments can provide network management system, the management station executes TABS commands, connects the managed equipment with a RS485 or RS232 interface, easy to achieve the the higher network management.

2. Typical Application

The diagram2-1 is a typical application of the H5000 series equipment.

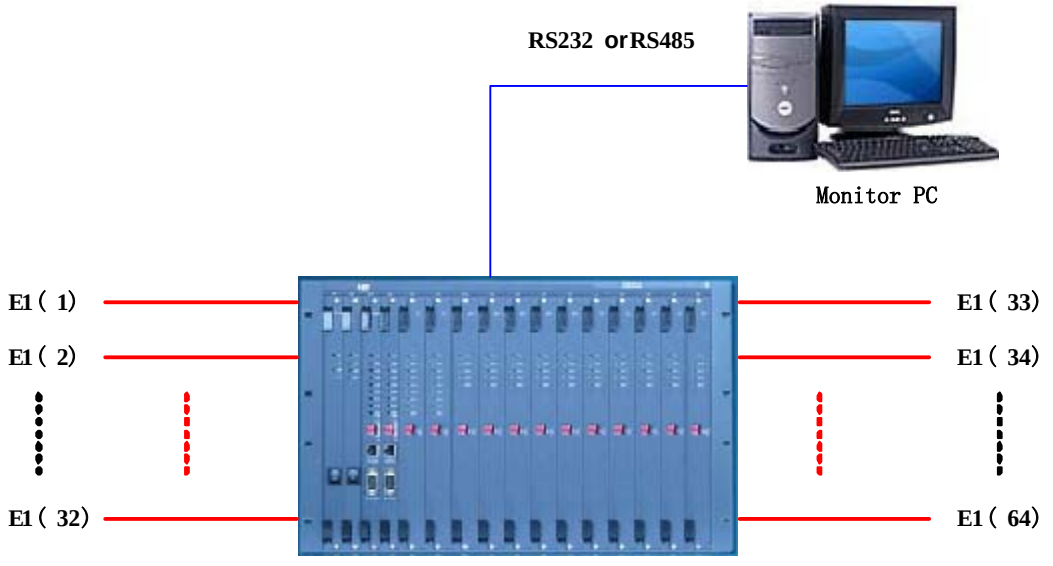


The figure 2-1 Point-to-multipoint application between H5000 and H5001

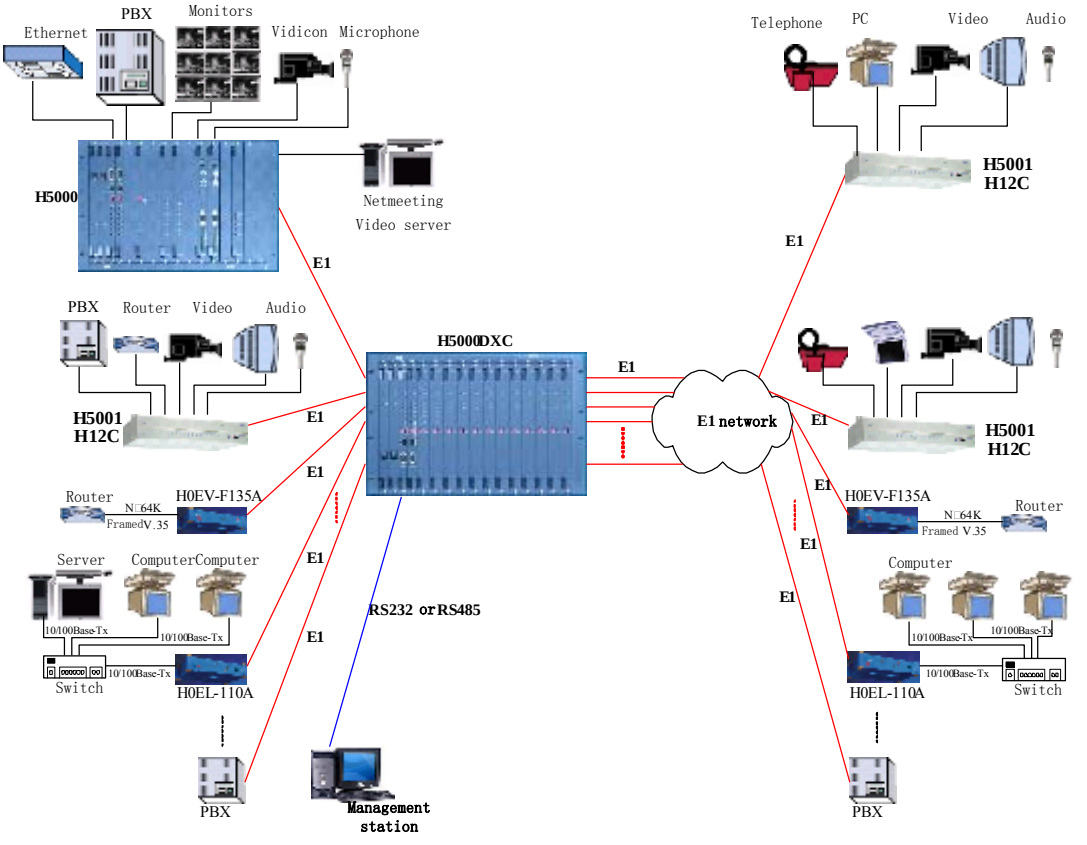


The figure 2-2 Point-to-point application between two H5001

H5000DXC can carry out cross connection between the timeslots of 64 E1 transmission channels, seeing the figure 2-3. H5000DXC can connect DDN or PCM in the figure 2-4.



The figure 2-3 H5000DXC can carry out cross connection of the timeslots of 64 E1 transmission channels



The figure 2-4 H5000DXC application example

3. 🕮 Network Management

H5000 series equipments can be managed by the H7GMSW management software, running on a PC platform. The H7GMSW is a based network management software package. It supports both SNMP and TABS protocols. At the physical layer, SNMP uses Ethernet, while TABS uses RS485 to connect to the monitored equipment. H5000 series equipments support TABS protocol. Please see H7GMSW operation manual for the software operation.

4. 🕮 Technical Specifications

4.1 E1 Interface

Bit Rate: 2048kbps±50ppm

Line Code: HDB3, comply to ITU-T recommendation G.703
Impedance: 75Ω (unbalanced) or 120Ω (balanced)
Frame Structure: Comply to ITU-T recommendation G.704, G.706
Companding: A law, comply to ITU-T recommendation G.711
Signal level: ±2.37V±10% @75Ω, ±3V±10% @120Ω
Waveform within mask shown in Figure 4.1-1

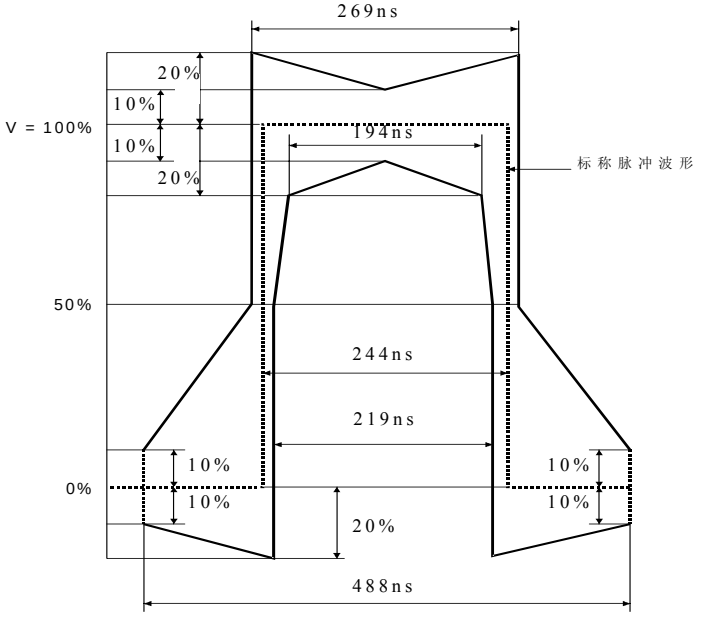


Figure 4.1-1 E1 output waveform mask

4.2 Loop Interface (traditional telephone)

4.2.1 FXO (CH/L card, connects to exchange)

Off-hook impedance: < 500Ω
On-hook impedance: > 10KΩ

4.2.2FXS (CH/R card, connects to telephone)

Loop impedance: ≤ 2000Ω (including telephone)
Idle loop voltage: ≤ 50V
Loop current: 25mA
Off-hook threshold: 8mA
Polority reverse delay: < 50msec
Dial: Pulse width distortion < 5msec
DTMF total frequency distortion comply totelephone interface specifications
Off-hook delay: < 100msec

4.3 Ring Power

4.3.1 Ring generator at FXS

Frequency:	25Hz ± 3Hz
Amplitude:	75V ± 5V_{rms}
Delay:	< 50 ms
Total output power:	≤3 W (per shelf)

4.3.2 Ring voltage detection at FXO

Threshold Voltage:	38V_{rms}

4.4 Voice Interface

Impedance: 600 Ω or 3-component equivalent compond impedance, as shown in Figure 4.4-1:

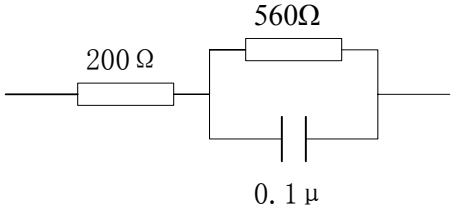


Figure 4.4-1 3-component compond impedance

Frequency range:	300-3400 Hz
Companding law:	ITU-T G.711 A-law
2-wire interface signal level:	
	transmit: 0dBr ± 0.5dBr
	receive: -3.5dBr ± 0.5dBr
Return Loss:	300-600Hz >12dB
	600-3400Hz >15dB
Frequency response:	300-3400Hz, comply to ITU-T G.713
Background noise:	≤ -65dBm0p
Gain:	-45dBm0 ~ +3dBm0 (within ±0.5dB)
Total S/N:	Comply to ITU-T G.713 mask, as shown in Figure4.4-2

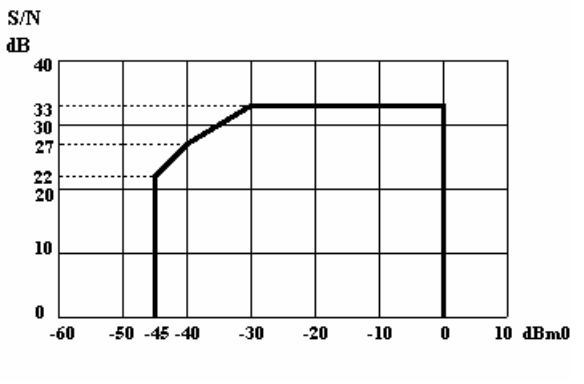


Figure 4.4-2 2-wire interface total signal to noise ratio mask

4.5 Other Interfaces

4.5.1 4-wire Voice Interface

4.5.1.1 Standard 4-wire voice (CH4W card)

Impedance: 600 Ω
Frequency range: 300-3400 Hz
Companding law: ITU-T G.711 A-law
2-wire interface signal level:
transmit: 0dBr ± 0.5dBr
receive: -3.5dBr ± 0.5dBr
Return Loss: 300-600Hz >12dB
600-3400Hz >15dB
Frequency response: 300-3400Hz, comply to ITU-T G.713
Background noise: ≤ -65dBm0p
Gain: -45dBm0 ~ +3dBm0 (within ±0.5dB)
Total S/N: Comply to ITU-T G.713 mask, as shown in Figure4.4-2

4-wire interface signal level:
transmit: 0dBr ± 0.5dBr or +4dBr ± 0.5dBr (jumper selectable)
receive: 0dBr ± 0.5dBr or +4dBr ± 0.5dBr (jumper selectable)

4.5.1.2 4-wire voice with attenuator (CH4W-A card)

4-wire interface signal level:
transmit: -14dBr ± 0.5dBr (when attenuator set to 0dB)
receive: +4dBr ± 0.5dBr (when attenuator set to 0dB)

Attenuator adjustable range: 0dB ~ 31.5dB at 0.5dB steps

Other specifications identical to 4-wire interface.

4.5.2 Magneto Interface

4.5.2.1 Standard Magneto (CHRD card)

Voice specification identical to standard 2-wire voice interface.

Ringing detection: minimum $20V_{rms}$, detection time: <0.5s.

Signalling: digital (PCM time slot 16 code a)

4.5.2.2 Carrier Signaling Magneto Interface (CHRD_2K)

1、Voice

2-wire interface signal level:

transmit: 3.5dBr ± 0.5dBr

receive: 0dBr ± 0.5dBr

Other specifications idential to standard 2-wire voice interface .

2、Signaling

a, Ring voltage detection: minimum $20V_{rms}$

b, Signaling: inband carrier ---2100Hz single frequency

c, 2100Hz signaling generator

Amplitude: -6dBm ±1dBm

Frequency: 2100Hz ± 5Hz

d, Signaling detection:

Amplitude: ≥ -17dBm

Frequency range: 2100Hz ± 50Hz

4.5.3 Synchronous Data Interface

4.5.3.1 G.703 64kbps interface (daughter card CHD)

Line code: comply to ITU-T G.703
Data rate: 64kb/s codirectional data

4.5.3.2 Low speed V.35 interface (daughter card CHD_V35)

Interface signal level: ITU-T V.35 / V.11
Data rate: 64kb/s codirectional data

4.5.3.3 N*64K V.35 interface (channel card DATA2)

Interface signal level: ITU-T V.35 / V.11

Data rate: N*64kbps(N=1 ~ 30, codirectional)

4.5.4 Asynchronous data interface (CHAD card)

Interface signal level: RS-232/V.24 or RS-422/V.11
Data rate: ≤ 14.4kb/s

4.5.5 Ethernet Interface

4.5.5.1 100 Base-Tx data card

- comply to IEEE 802.3
- 10M/100M Auto Negotiation
- Half/Full Duplex Auto Negotiation
- HP auto-MDIX
- 802.1Q MAC (up to 1536 byte MAC packet supported)
- 128K Byte Packet Buffer Size。

4.5.5.2 ETHxE1 data card

comply to IEEE 802.3, change 4 E1 singals to Ethernet , one is G.704 framed, 3 E1 signals are unframed .

- comply to IEEE 802.3
- 10M/100M Auto Negotiation
- Half/Full Duplex Auto Negotiation
- HP auto-MDIX
- 802.1Q MAC (up to 1536 byte MAC packet supported)
- 192K Byte Packet Buffer Size。

4.5.6 Hot Line Interface (CHP card)

Loop impedance:	≤ 2000Ω (including telephone)
Idle loop voltage:	≤ 50V
Loop current:	25mA
Off-hook threshold:	8mA

Voice interface specifications identical to those given in section 4.4.

4.5.7 The video and audio interface(VIDEO card)

4.5.7.1 Video characteristic

- video data rate:128 kbps ～ 15 Mbps.

- The video data output mode: fixed data rate / variable data rate
- type of PAL/ NTSC system
- Video resolution:

  PAL system:

  720×576,704×576, 640 ×576,480×576,352×576,352×288,176 ×144,etc.

  NTSC system:

  720×480,704×480,640×480,480×480,352×480,352×240,176×144,etc.
- Bright degree, the contrast degree, the saturation degree, the color degree can adjust
- Output format of the video flows: TS/ PS/ VES/ AES flows etc.
- Code grade:

  ISO/IEC-14496-2 MPEG-4 SP@L1, L2 and L3

  ISO/IEC-13818-2 MPEG-2 MP@ML

  ISO/IEC-11172-2 MPEG-1

Frame data rate:NTSC system:30/ second PAL system:25/ second

4.5.7.2 Audio characteristic

- The audio sample rate 8 K,32 K,44.1 K,48 K Hz
- Audio data rate 8 Kbps,32 Kbps,64 Kbps,192 Kbps,224 Kbps,384 Kbps etc.
- Code:MPEG1 Audio Layer I/ II, G.729, G.711, MP3 etc.
- The audio mode : C/ Rereo, Joint, Dual, Mono

4.5.7.3 Port characteristic

- Video input: Compound video (BNC/75 Ω)
- Video output:Compound video (BNC/75 Ω)
- Audio input: 3.5 mm left and right channel stereo port
- Audio output: 3.5 mm left and right channel stereo port
- Set the port:DB-9, Baud 9600 and 8 –N-1
- The data interface:RS422/485, Baud 1200~115200 bps.
- The network connects: 10/100M ethernet RJ45

4.6 The Ability of H5000DXC Cross Connection

transparent cross connection between 64 kbps timeslots of 64 E1 signals with CAS.

4.7 Control Interface

RS-485 or RS232, TABS protocol, 9-pin D type connector, 2.4kbps(H5000DXC default baud is 19.2 kbps, 8 data bits, 1 stop bit, odd parity.

4.8 Power Supply

Supply voltage:	-48V DC or ~220V AC(only for far-end equipment)
Voltage range:	-40 ~ -65V DC
Power comsumption:	H5000 <100W
	H5001 <20W

4.9 Operating Environment

Temperature:	0-45°C
Humidity:	90% (non-condensing)

4.10 Dimensions

W×H×D：

H5000 and H5000DXC：440 mm(W) × 310 mm(H) × 265 mm(D)

H5001： 440 mm(W) × 44 mm(H) × 231 mm(D)

The second unit: H5000 Integrated Service Access Central Office Equipment

1. 🕮Introduction

H5000 Integrated Service Access Equipments have standard E1 interfaces, many voice interfaces, data and MPEG2 or MPEG4 image interface. The equipments can install six kinds of cards (the power supply card －PWR ,MDX card－MDX, E1 card－E1, channel interface card－CHU, data card－DATA, VIDEO card－VIDEO), the power supply card and MDX card must be installed the fixed slot, other cards can be installed the other slots.

The PWR card converts –48V DC supply power to +5V, -5V voltage, and generates ringing current to subscriber loop, outputs the $75V_{AC}$(25Hz) ring voltage. The other type of voltage, such as +3.3V, is converted on each functional card. There are two slots for two PWR cards. One PWR card can supply the power for the complete unit, the other PWR card provides the 1+1 redundancy for more reliability.

The MDX card provide each timeslot cross-connect function of 64 E1 channels, and provide the clock and various cycle time signals for various function card, complete the signalling cross-connect function, manage power supply, the ring, E1 alarm information, output the equipment system alarm and Shelf Alarm, manage the whole system, accept the

control of the management station and install the information, carry on the control and install to the system according to this information. The MDX card has 8 E1 interfaces.

The E1 card output alarms for 8 or 4 E1 signals, such as the AIS, LOS, FLOS, MFLOS, set E1 signal loopback ,and give out the alarm information , loopback information of E1 signal by LED.]

The CHU card can hold 5 daughter CHU cards, and provide 10 channel voiceinterfaces. There are many types of daughter CHU card, such as telephone interface card (CH/L, CH/R), Magneto Cards (CHRD, CHRD_2K), Hot Line Interface card (CHP), 4-wire voice card (CH4W, CH4W_A),64K Synchronous Data Cards (CHD, CHD_V35B),Asynchronous Data Card (CHAD_232, CHAD_422), etc.

H5000 can install two kinds of data cards: The 100 Base_T data card and V.35 data card. V.35 data card provide 2 data interfaces, and data rate is N×64 Kb/ s (N=1-30), DCE working mode (The mode of DTE can be selected). The 100 Base_T data card can transmit 10/100 Base-Tx Ethernet packets by E1 channel, and provide voice, low-speed data at the same time. The 100 Base_T data card can install three kinds of daughter Eth cards, and provide 6 Ethernet ports.

The VIDEO card provide decoder and 4 E1 interfaces, and transmit MPEG-2 or MPEG-4 image. For MPEG-2 image, the transmit bandwidth is 1-4 E1 signal, one of them can be used part of timeslots, and ensure 3M bandwidth to transmit the image signal, the remaining bandwidth can be used to transmit voice and data businesses. For MPEG-4 image, the transmit bandwidth is narrow, MPEG-4 image is transmitted together with the voice or data in one E1 channel.

2. 🕮 Typical Application

The first unit has described the typical application of H5000 series equipment, please see the first unit: Whole Introduction.

3. 🕮 Architecture

3.1 Device Architecture

H5000 can install six kinds of cards (the power supply card －PWR ,MDX card－MDX, E1 card－E1, channel interface card－CHU, data card －DATA, VIDEO card －VIDEO), the power supply card and MDX card must be installed the fixed slot, other cards can be installed the other slots. Please see the table3.1-1.

Table 3.1-1 Types of card

Number	Card type	Marking	Slot	Connector
1	Power Supply Card	PWR	1, 2	None
2	MDX card	MDX	3, 4	MDXADP-75 MDXADP-120
3	E1 card (4)	E1	5~16	E1ADP
4	E1 card (8)	E1	5, 6	E1ADP-75 E1ADP-120
5	Channel Interface Card	CHU	5~16	CHUADP
6	Data Card	DATA	5~16	ETH.ADP ETH-ADP.6RJ45
7	Image Card	VIDEO	5~16	IMAGE-ADP75

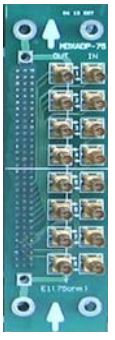
The H5000 uses 19 inches standard metal shelf, 7U in height, 16 slots, among them having 12 in general use slots.

PWR	PWR	MDX	MDX	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
I	II	I	II	01	02	03	04	05	06	07	08	09	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Figure 3.1-1 Shelf configuration

3. 2 Card Description and Operation

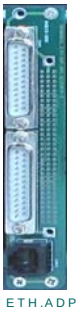
Please see the Introduction for card description. Each kind of front-panel see follow figure.



MDXADP-75

CHUADP

ETH-ADP.6RJ45



ETH.ADP

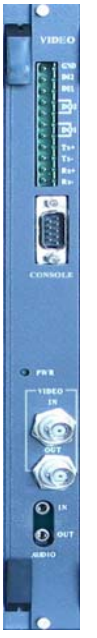
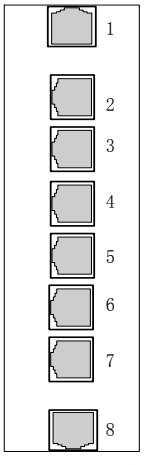
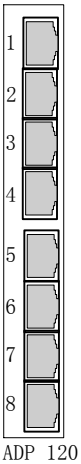


IMAGE-ADP75



MDX ADP-120Ω



E1ADP 120Ω

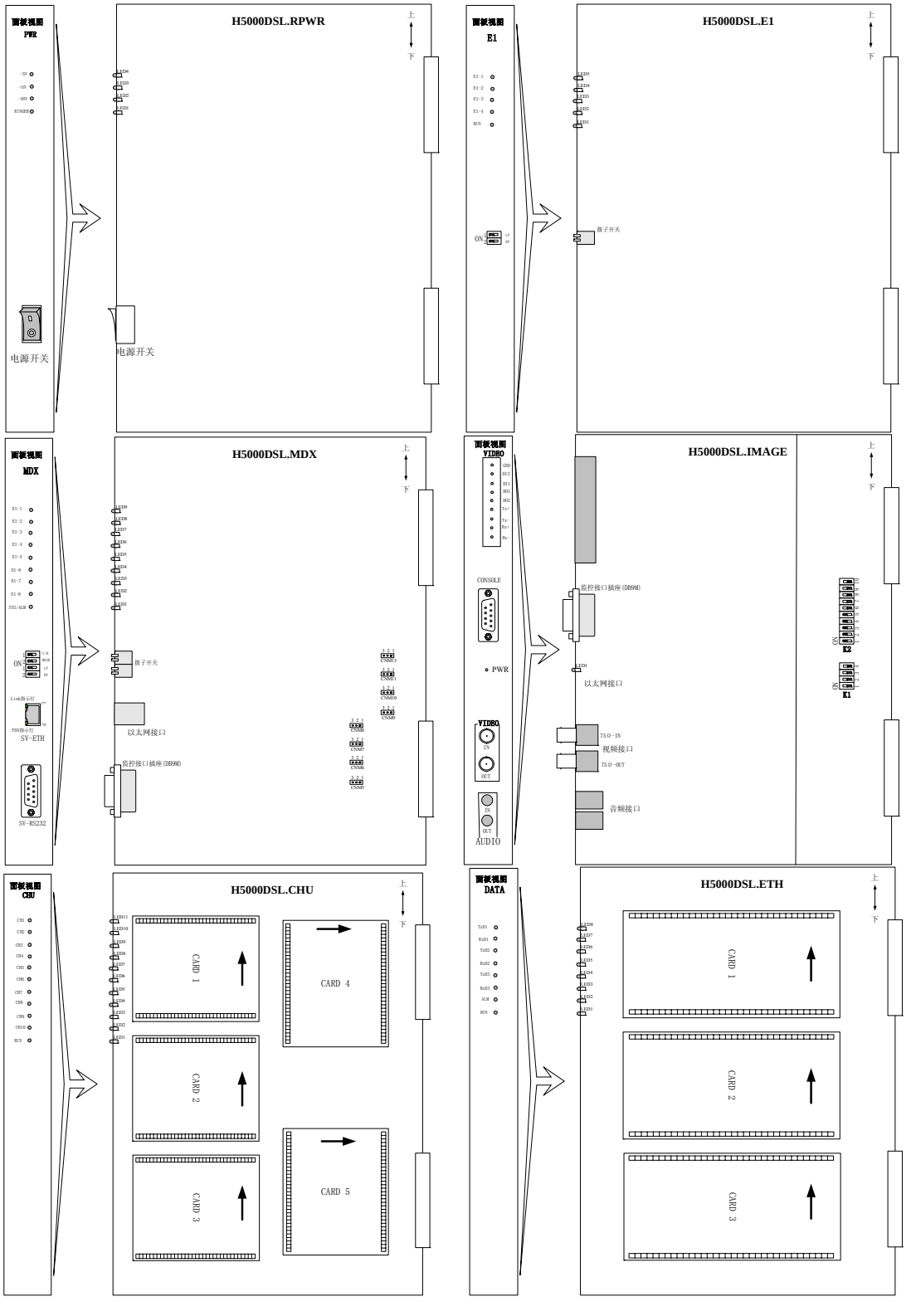


Figure3.2-1 Panel sketch of each card

Table 3.2-1 LED table of each card

LED name	Colour	Meaning		Note
PWR card LED				
RING	green	Ring indication, bright: work normal		
-48V	green	-48V indication, bright: work normal		
+5V	green	+5V indication, bright: work normal		
-5V	green	-5V indication, bright: work normal		
MDX card LED				
SYS_ALARM	three colours	red:Serious alarm, yellow:General alarm, green:Normal work		
E1_1 ALARM	three colours	E1-1	red: E1serious alarm（F LOS or MF LOS） yellow: E1 AIS green: E1 work normal put out: E1 LOS	
E1_2 ALARM	three colours	E1-2		
E1_3 ALARM	three colours	E1-3		
E1_4 ALARM	three colours	E1-4		
E1_5 ALARM	three colours	E1-5		
E1_6 ALARM	three colours	E1-6		
E1_7 ALARM	three colours	E1-7		
E1_8 ALARM	three colours	E1-8		
E1 card LED				
E1_1 ALARM	three colours	E1-1	red: E1serious alarm（F LOS or MF LOS） yellow: E1 AIS or Loopback（LLP or RLP） green: E1 work normal put out: E1 LOS	
E1_2 ALARM	three colours	E1-2		
E1_3 ALARM	three colours	E1-3		
E1_4 ALARM	three colours	E1-4		

RUN	green	bright: E1 card work normal	
CHU card LED			
CH1 ~CH10	green	Please see table 3.2-2	
Run	green	bright: CHU card work normal	
DATA card LED			
TXD1	green	Data card1 For 100Base-Tx card: Wink: the first Ethernet port link indication For V.35 data card: bright: data transmitted	
RXD1	green	Data card1 For 100Base-Tx card: Wink: the second Ethernet port link indication For V.35 data card: bright: data transmitted	
TXD2	green	Data card2，the same define as TXD1	
RXD2	green	Data card2，the same define as RXD1	
TXD3	green	Data card3，the same define as TXD1	
RXD3	green	Data card3，the same define as RXD1	
ALARM	red	bright:data card clock alarm put out: data card work normal	
RUN	green	bright:data card work normal	
VIDEO card LED			
PWR	green	Power indicator，bright: Power work normal	

Table3.2-2 CHU LED

Daughter card type	LED ON	LED OFF
CH/L	Remote telephone off-hook	Remote telephone on-hook
CH/R	Subscriber telephone off-hook	Subscriber telephone on-hook
CH2W	Can't	Normal
CH4W	Can't	Normal
CHD, CHD_V35B	Data loss	Normal
CHAD	Receive signal from remote	No signal from remote
CHRD	Ringing or being called	No ring signal present
CHRD_2K	Ringing or being called	No ring signal present
CHP	Telephone off-hook	Telephone on-hook

***About the Dip Switches*:**

MDX card:

Dip Switch C/R, ON: CO, OFF: SU.

Dip Switch MASK, ON: mask all current alarms, OFF: unmask.
Dip Switch LP, ON: set 8 E1 local loopback, OFF: cancel the local loopback.
Dip Switch RP, ON: set 8 E1 remote loopback, OFF: cancel the remote loopback.

E1 card:
Dip Switch LP, ON:set local loopback, OFF: cancel the local loopback.
Dip Switch RP, ON: set remote loopback, OFF: cancel the remote loopback.

***About the jumps*:**

MDX card:

CNM5、7、8、9、11, CNM13 jump on 2 and 3 feet, E1 impedance is 120Ω (left side), jump on 1 and 2 feet, E1 impedance is 75Ω.

CNM22 jump on 2 and 3 feet, write FPGA program.

E1card:
CNM1、2、3、4 jump on 2 and 3 feet, E1 impedance is 120Ω , jump on 1 and 2 feet, E1 impedance is 75Ω.

About the E1 sockets:

The E1 socket is CC4 coaxial socket when E1 impedance is 75Ω, the E1 socket is RJ45 socket when E1 impedance is 120Ω. RJ45 plug is showen below.

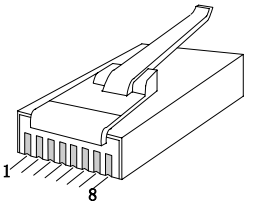


Figure3.2-2 RJ-45 plug

Please see the table3.1-1 for the definition of RJ-45 (120Ω).

Table3.2-2 The definition of RJ-45 plug（120Ω）

Pin	1	2	3	4	5	6	7	8
Name	E1-IN		GND	E1-OUT		GND		

4. 🕮 Alarms and Maintenance

In previous sections, individual functional cards are described in detail. Many cards have alarm lights on the front panel. These alarm LEDs give out alarm indication that can help the maintenance during the operation. Apart from LED indication, the equipment also can output sound alarm on the ALARM connector (Shelf Alarm Output).

Daily Maintenance:

For reliable operation and extended life, users should take the following notices:

1. Do not modify any setting of the system, do not adjust any adjustable components.
2. Limit the frequency of changing cards, avoid plugging or unplugging the cards with system power on.
3. Never mis-plug cards into wrong slots.
4. When changing daughter cards, make sure alignment is correct.
5. Strictly connect the earth plate to local earth potential using short, thick wire to limit the danger of lightening damage.
6. Keep discharge devices on over voltage protection frame in good condition, avoid bypassing the protection frame and directly connect outside loop to the system.
7. When using control station, make sure the PC is securely earthed.
8. -48V DC or ~220V AC supply power must be stable and reliable.

5. 🕮 Installation

5.1 Shelf and Mounting Illustration

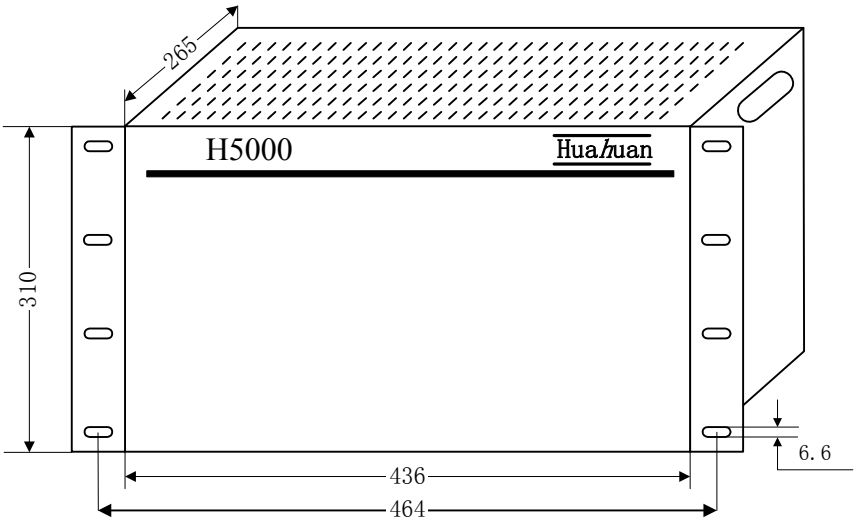


Figure 5.1-1 shelf illustration

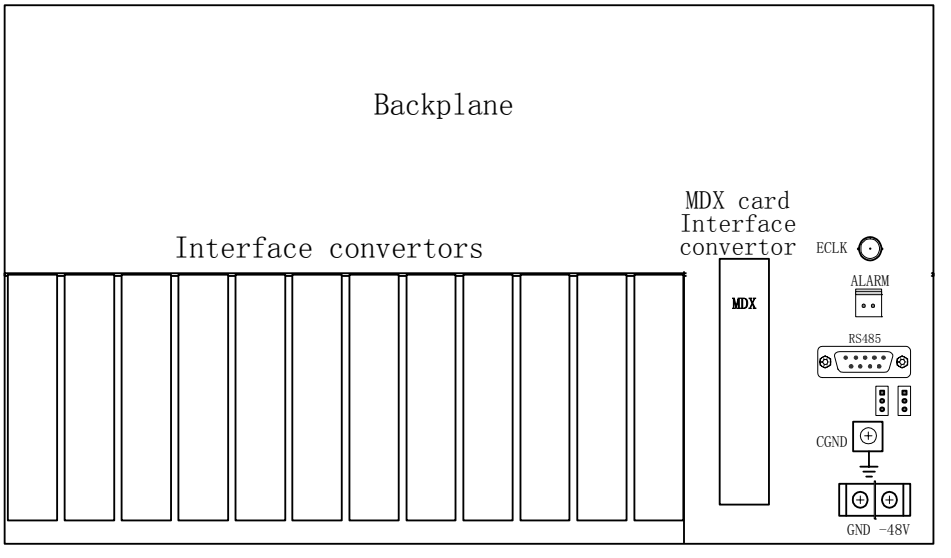


Figure 5.1-2 Illustration of backplane connectors

***About the backplane jumps*:**

CNM19- CNM20 jump on 2 and 3 feet, RS485 port is selected, jump on 1 and 2 feet, RS485 port is floated.

The standard equipment can be installed in 19 inches of shelf.

5.2 Connection

Power in connector

The supply power of -48V voltage is connected to the H5000 system throuth the power connector on the backplane. The right screw is the -48V input, and the left screw is ground. Make sure the voltage and polarity are correct, and tightly fasten the screw for reliable connection.

Shelf Alarm Output connector

On the backplane, there is a connector labeled ALARM, which is the shelf alarm output connector. The left pin is the prompt alarm output, and the right pin is the deferred alarm output. Defects triggering the respective alarm outputs are set by management software, and can be masked out by Set Alarm Mask command.

When the alarm is appeared, the pin will be connected to ground. Otherwise, the pin will be floated. Connection between the H5000 and the shelf alarm unit is made by inserting each end of an alarm cable into the alarm ports, see Figure 5.2-1.

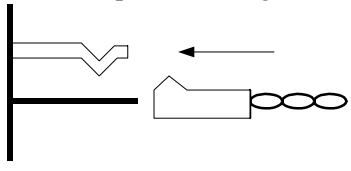


Figure 5.2-1 The Alarm Connector

Management Port

The DB9 connectors on the MDX card and VIEDO card are RS232 management port, the DB9 connector on the shelf backplane is the RS485management port.

The pin definition of the RS485/RS232 port is given in Table 5.2-1.

Table 5.2-1 Pin definition of DB9 management prot

PIN No.	2	3	4	5	Note
RS232	Rx	Tx		GND	
RS485	TxP	TxN	RxP	RxN	Hypotactic port mode

Note: Tx and Rx are relative to the H5000. Unspecified pins should be left open.

The RS485 is used to manage the whole equipment, but the RS232 is only used to manage itself.

The third unit: H5001 Integrated Service Access Subscriber side equipment

1. 🕮 Introduction

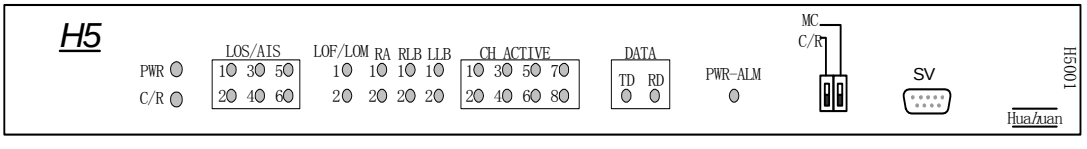
H5001 is a subscriber side equipment as the miniaturization equipment of H5000. H5001 can connect to H5000, also can connect to H5001 in a point-to-point link.

H5001 has eight voice interfaces or low rate datas, two N×64 kbps V.35 data interfaces, and two 100Bases-Tx Ethernet ports. It has many interfaces: such as FXO, FXS,64Kbps codirectional data interface(G.703), asynchronous data interface(RS232, RS485), hot line interface, magneto Interface, 2/4-wire voice interface, N×64 kbps V.35 data interface, E&M signalling interface.

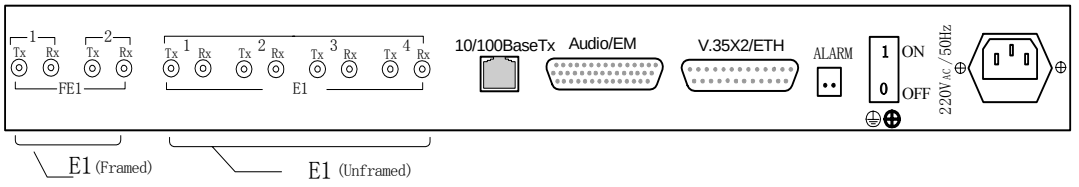
H5001 can assign the business to 2 directions, and can install a image processing equipment-H12C, a netmeeting system. H12C provide image decoder and 4 E1 interfaces, and transmit MPEG-2 or MPEG-4 image. For MPEG-2, the transmit bandwidth is 1-4 E1 signal, one of them can be used part of timeslots, and ensure 3M bandwidth to transmit the image signal, the remaining bandwidth can be used to transmit voice and data businesses. For MPEG-4, the transmit bandwidth is narrow, the image is transmitted together with the voice or data in one E1 channel. The more details is described in the manual of H12C image processing netmeeting terminal.

2. 🕮 System Configuration

H5001 system configuration is shown in figure 2-1.



(A) H5001Front panel



(B) H5001 Rear panel

Figure 2-1 H5001 equipment sketch map

Figure2-2 shows the motherboard of H5001. There are six function cards can be installed on the motherboard. The position CARD1、CARD2、CARD3、CARD4 can be installed the daughter channel interface cards, and the position DATA CARD can be installed Ethernet card(100Base-Tx Ethernet card or **ETHxE1 data card**)or V.35 data card.

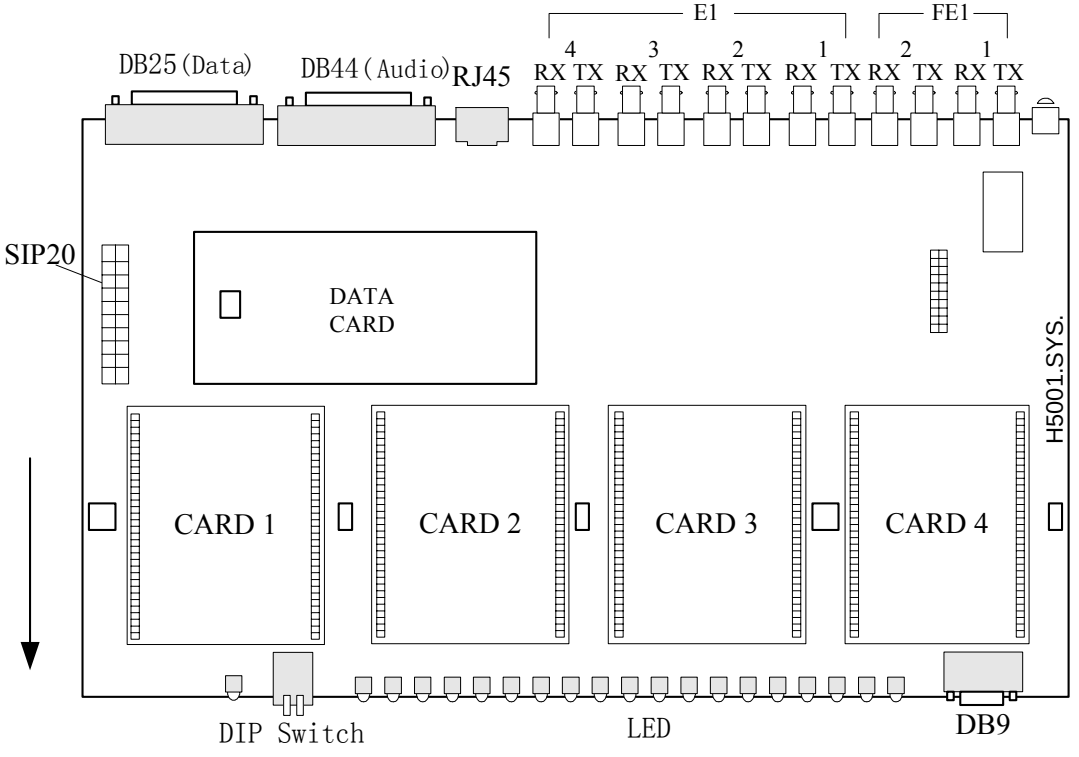


图 2-2 H5001 Mother Board

3. 🕮 System Description and Operation

3.1 LED and DIP Switch

3.1.1 Led

The LED's on the front panel indicates the operation status and alarms of the H5001. They are listed in Table 3.1.1-1, Table 3.1.1-2, Table 3.1.1-3.

Table 3.1.1-1 LED on the motherboard

Name	Colour	Meaning
PWR	green	Power supply indication, bright: work normal
C/R	green	bright:local clock, put off: hypotactic clock
LOS/AIS 1、2	red	1: FE1-1signal alarm indication, 2:FE1-2 signal alarm indication, bright: LOS，wink:AIS
LOS/AIS 3、4、5、6	red	E1-3～E1-6 signal alarm indication, Corresponding **ETHxE1** data card, bright: LOS，wink:AIS
LOF/LOM	red	1:FE1-1 received signal alarm indication, 2:FE1-2 received signal alarm indication, bright: LOF (Loss of frame), wink: LOM(Loss of multi-frame)
RA	yellow	1:FE1-1 Remote alarm
		2:FE1-2 Remote alarm
RLB	yellow	1:FE1-1 Remote loopback
		2:FE1-2 Remote loopback
LLB	yellow	1:FE1-1 Local loopback
		2:FE1-2 Local loopback
CH ACTIVE 1～8	green	Please see table3.1.1-2
DATA/ TD	green	V.35 data card is installed on the position DATA CARD: V.35 data indication, 100Base-T data card is installed on the position DATA CARD: Ethernet link indication, Please see table3.1.1-3
DATA/ RD	green	
PWR-ALM	red	bright: Power supply work failure

The position CARD1~4 on the motherboard can be installed various function cards, and LED1~8 correspond to 4 function cards. The LED's on various function cards are listed in Table 3.1.1-2.

Table3.1.1-2 Meaning of LED1~ LED 8

Daughter card type	LED ON	LED OFF
CH/L,4CHL	Remote telephone off-hook	Remote telephone on-hook
CH-R, 4CH-R	Subscriber telephone off-hook	Subscriber telephone on-hook
CH4W	Can't	Normal
CHD, CHD_V35B	Data loss	Normal
CHAD	Receive signal from remote	No signal from remote
CHRD	Ringing or being called	No ring signal present
CHRD_2K,4 CHRD_2K	Ringing or being called	No ring signal present
CHP	Telephone off-hook	Telephone on-hook
Note:LED1/2 and CARD1 is corresponding, LED3/4 and CARD2 is corresponding, LED5/6 and CARD3 is corresponding, LED7/7 and CARD4 is corresponding.		

Hint: H5001 supports 4 voice channel card(4CHL, 4CH- R, 4CHRD-2K) and 2 voice channel card. When 2 voice channel card is installed on the position of CARD, one LED indicates the status of one voice channel, when 4 voice channel card is installed on the position of CARD, one LED indicates the status of two voice channel. When 2 voice channel card and 4 voice channel card is mixed on the same equipment, 4 voice channel card must be installed on the frontal position of CARD, and 2 voice channel card must be installed on the after position of CARD. Therefore must be careful to distinguish the LED indicated the corresponding voice channel.

Table3.1.1-3 LED（TD，RD）Meaning

Data card name	TD	RD
V.35 data card	When data is transmitted from one of the two data interfaces, TD is bright.	When data is received from one of the two data interfaces, RD is bright.
100Base-T data card	Bright: Ethernet Collision	Bright: Ethernet link Wink: Ethernet packet flow

3.1.2 DIP switches

The definition of the DIP switches on the panel is listed in Table3.1.2-1.

Table3.1.2-1 The definition of the DIP switches on the panel

C/R	ON	Local clock mode(CO, the C/R LED is bright)
	OFF	recovered clock mode(SU)
MC	ON	The managed data is transmitted through E1 link.
	OFF	The managed data isn't transmitted through E1 link.

3.2 CONNECTION INTERFACES

3.2.1 V.35 data interface

The DB25 connector on the rear panel (marking: V.35X2) is used to connect the V.35 data, please see the appendix 2 for the details.

3.2.2 Ethernet port

The RJ45 connector on the rear panel (marking: 10/100Base-Tx) is used to connect the Ethernet packet, please see the appendix 2 for the details.

3.2.3 Audio and E&M interface

The DB44 connector on the rear panel (marking: Audio/EM) is used to connect the Audio and E&M signalling, please see the appendix 2 for the details.

3.2.4 Management port

The DB9 connector on the rear panel (marking: RS232/RS485) is used to communication with the management station through RS232 or RS-485.

The pin definition of the DB9 port is given in Table 3.2.4-1.

Table 3.2.4-1 Pin definition of DB9

DB9 Pin	Name	Note
1		Open
2	RS232_RX	RS232 Received data
3	RS232_TX	RS232 Transmitted data
4	Sel	To RS232，this pin is open. To RS485，this pin is connected to pin5.
5	GND	
6	RS485_RXN	RS485 Received negative data
7	RS485_RXP	RS485 Received positive data
8	RS485_TXN	RS485 Transmitted negative

		data
9	RS485_TXP	RS485 Transmitted positive data
Shell	GND	CGND

Note: Tx and Rx are relative to H5001.

3.2.5 E1 interface

H5001 provides six E1 interfaces on the rear panel, 75 Ω, two for Framed（FE1）, the others for unframed（E1）.These interfaces are CC4 coaxial connectors, Rx and Tx denote input and output ports respectively.

3.2.6 Alarm connector

Shelf Alarm Output connector

On the rear panel, there is a connector labeled ALM, which is the shelf alarm output connector. Defects triggering the respective alarm outputs are set by management software, and can be masked out by Set Alarm Mask command.

When the alarm is appeared, the pin will be connected to ground. Otherwise, the pin will be floated. The left pin is the prompt alarm output, and the right pin is the deferred alarm output. Connection between the H5001 and the shelf alarm unit is made by inserting each end of an alarm cable into the alarm ports, see Figure 3.2.6-1.

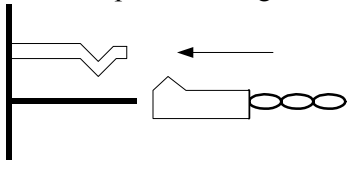


Figure 3.2.6-1 The Alarm Connector

3.2.7 GND connector

In order to protect this equipment and user 's safety, must connect the GND connector to the ground.

3.2.8 Power connector

The H5001 can be powered either with -48VDC or 220VAC supply. The flip switch selects the power input. When flipped up, -48VDC is selected, and 220VAC is selected with switch flipped down. The middle position switches the power off.

When H5001 is powered by -48VDC, make sure the voltage and polarity are correct, and tightly fasten the screw for reliable connection. When H5001 is powered by 220VAC supply, use power outlet with srcure earth connection to avoid danger of electric shock.

4. 🕮 Alarms and Maintenance

4.1 Introduction

H5001 has the management and alarm function. In addition to supervise and control system can give alarm information, the equipment also provides various alarming indication and the sound alarming.

4.2 Alarm Items and Possible Causes

The following table lists alarms of H5001 may give out, and their possible causes.

Alarm	sign	Possible causes
E1 signal loss	LOS LED on the motherboard is bright, and buzzer is ringing.	The transmission equipment shut down E1 cable not connected or broken
E1 frame loss	FLS LED on the motherboard is bright, and buzzer is ringing.	High bit error rate in transmission system E1 cable connection unreliable Local or Remote system malfunction Local or Remote CRC4 is differed.
E1 multi-frame loss	MLS LED on the motherboard is bright, and buzzer is ringing.	High bit error rate in transmission system E1 cable connection unreliable Local or Remote system malfunction Remote system is CCS mode.
Remote alarm	RA LED on the motherboard is bright.	The remote system finds at least one of the following alarms: E1 signal loss, E1 AIS, E1 frame loss, E1 multi-frame loss. Such alarms may indicate the malfunction of this system, or may be caused by transmission errors.

4.3 Daily Maintenance

For reliable operation and extended life, users should take the following notices:

1.Do not modify any setting of the system, do not adjust any adjustable components.

2.Limit the frequency of changing cards, avoid plugging or unplugging the cards with system power on.

3.Never mis-plug cards into wrong slots.

4.When changing daughter cards, make sure alignment is correct.

5.Strictly connect the earth plate to local earth potential using short, thick wire to limit the danger of lightening damage.

6.Keep discharge devices on over voltage protection frame in good condition, avoid bypassing the protection frame and directly connect outside loop to the system.

7.When using control station, make sure the PC is securely earthed.

8.-48V DC or ~220V AC supply power must be stable and reliable.

5. 🕮 Installation

5.1 Shelf and Mounting Illustration

Figure 5.1-1 illustrates the H5001 shelf.

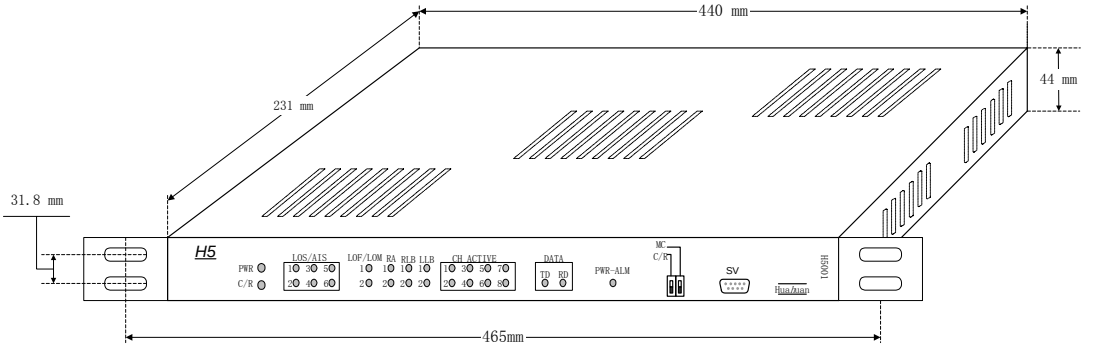


图5.1-1 H5001 shelf illustration

5.2 Connection

About the power supply connection, the E1 cable connection, the network management connection, the audio cable connection, and the data cable connection, please see the appendix 2- the general introduction of the connection cable.

6. 🕮 Regulation in the usage

While using the E1 link to deliver the management data, certainly do not set the 2M loopback by the management command (the management will be broken at this time, and the loopback will can't be cancelled) .

The fourth unit: H5000 DXC digital cross connection equipment

H5000DXC can carry out transparent cross connection of 64kbps timeslots of 64 E1 links with CCS.The equipment can install three cards (the power supply card- PWR , MDX card- MDX, and E1 card(4 or 8)- E1);Among them, the power supply card and E1 card are the same as H5000 equipment. The shelf, backplane, management and installation are similar to H5000 equipment, please see the second unit for details.

Attention:

- H5000DXC isn't support the voice channel card (CHU), the data card (DATA), the VIDEO card, and not support H5000 MDX card(MDX).
- When set H5000DXC E1 cross connection, click with the " setting" and the " searching " buttons " twice, to guarantee the result without any error.
- When H5000DXC connect E1/ V.35 converter ,H0EV- F135A, the H5000DXC E1 framer singalling must be CCS mode.
- The RS485 is used to manage the whole equipment, but the RS232 is only used to manage itself.
- For H5000DXC RS-232 or RS485, the default Baud rate is 19200.

Appendix 1 General card introduction

1. 🕮Channel Iinterface Cards

Channel interface cards contain telephone interface daughter card, 4-wire voice daughter card, synchronous data daughter cards, hot line daughter card, magneto daughter cards, etc. Each daughter card usually contains 2 interface ports, occupying 2 timeslots in the E1 signal, some contain 4 interface ports. All the daughter cards are pluged onto the appropriate socketsCARD1~CARD4 on the motherboard.

The sections 1.1-1.8 introduce the main function of these CHU cards respectively.

1.1 FXO telephone interface daughter card（CH/L、4 CHL）

CH/L, 4 CH/L interfaces act as the exchange user lines. Its functions include A/D and D/A conversion, ring current detection, signaling coding and decoding, etc. Each CH/L daughter card contains 2 exchange user line interfaces, each 4CH/L daughter card contains 4 exchange user line interfaces.

1.2 FXS telephone interface daughter card（CH/R、4 CH/R）

CH/R, 4 CH/R daughter card provides interface to subscriber loop. Its functions include A/D and D/A conversion, 2-wire/4-wire conversion, battery to subscriber loop, ringing current to subscriber loop, over-voltage and over-current protection, etc. Each CH/R daughter card contains 2 subscriber line interfaces, each 4CH/R daughter card contains 4 subscriber line interfaces.

1.3 4-wire voice daughter card（CH4W、CH4W_A）

4-wire voice cards include voice signal A/D and D/A conversion, and signal level adjustment functions. Each 4-wire voice daughter card contains 2 voice interfaces.

4-wire voice daughter card does not have CO and SU versions, it is typically used for 4-wire tandem connections.

Operation Note:

1、Standard 4-wire voice daughter card (CH4W)

The CH4W daughter card contains two 4-wire voice interfaces. Both the received (coming out of the system) and transmit (going into the system) signal levels can be set to one of two levels: 0dBr or +4dBr. Signal level selection is accomplished by

setting jumpers on the card. Jumpers CNM1~CNM2 set receive signal level for interface-1, jumper CNM3 sets transmit signal level for interface-1, jumpers CNM4~CNM5 set receive signal level for interface-2, jumper CNM6 sets transmit signal level for interface-2, as is listed below:

Interface number	Jumpers	Jumper position	Meaning
1	CNM1, CNM2	Left	Receive level: 0dBr
		Right	Receive level: +4dBr
	CNM3	Left	Transmit level: 0dBr
		Right	Transmit level: +4dBr
2	CNM4, CNM5	Left	Receive level: 0dBr
		Right	Receive level: +4dBr
	CNM6	Left	Transmit level: 0dBr
		Right	Transmit level: +4dBr

The default factory setting is 0dBr/0dBr, i.e. all jumpers on left side.

2、 4-wire voice with built-in attenuator daughter card (CH4W_A)

The CH4W daughter card contains two 4-wire voice interfaces, with built-in attenuators for fine adjustment of the signal levels. The maximum received (coming out of the system) signal level is -14dBr when attenuator is set to 0 dB attenuation, and the maximum transmit (going into the system) signal level is +4dBr when attenuator is set to 0 dB attenuation. The amount of attenuation each attenuator can insert is between 0dB to 31.5dB, adjustable at 0.5 dB steps.

There are 4 separate attenuators for signal level adjustment for receive and transmit of 2 interfaces. The attenuation value is set by four 12-bit DIP switches, denoted K1, K2, K3, and K4.

K1: setting receive signal level for interface-1

K2: setting transmit signal level for interface-1

K3: setting receive signal level for interface-2

K4: setting transmit signal level for interface-2

Total attenuation of each attenuator is the sum of a 6-section sub-attenuators, each section selectively inserts 0.5dB, 1dB, 2dB, 4dB, 8dB, and 16dB respectively. Table1.3-1 lists the DIP switches coding for each section.

Table1.3-1 Attenuator setting table

Section	Insert attenuation	Dip position
all	Yes	2,4,6,8,10,12 OFF 1,3,5,7,9,11 ON
	No	2,4,6,8,10,12 ON 1,3,5,7,9,11 OFF

0.5dB	Yes	1 ON; 2 OFF
	No	1 OFF; 2 ON
1dB	Yes	3 ON; 4 OFF
	No	3 OFF; 4 ON
2dB	Yes	5 ON; 6 OFF
	No	5 OFF; 6 ON
4dB	Yes	7 ON; 8 OFF
	No	7 OFF; 8 ON
8dB	Yes	9 ON; 10 OFF
	No	9 OFF; 10 ON
16dB	Yes	11 ON; 12 OFF
	No	11 OFF; 12 ON

Note: the default factory setting is 0dB total attenuation.

Suppose a 14.5dB attenuation is to be inserted, which can be decomposed into 8dB+4dB+2dB+0.5dB, and corresponding dip setting is shown in Figure 1.3-2.

Figure 1.3-2 Dip setting for 14.5dB attenuation

1	2	3	4	5	6	7	8	9	10	11	12
ON	OFF	OFF	ON	ON	OFF	ON	OFF	ON	OFF	OFF	ON

The CH4W_A daughter card can also be used as 2-wire interface card, where attenuation adjustment is required. There are 8 jumpers on the card, CN2, CN3, CN4, CN5, CN6, CN7, CN9, CN10, to set the card interface mode. Figure 1.3-1 and Figure 1.3-2 illustrate the jumper positions for setting the card into 4-wire or 2-wire mode.

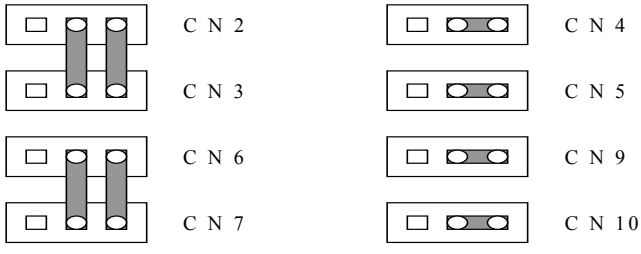


Figure 1.3-1 4-wire mode setting

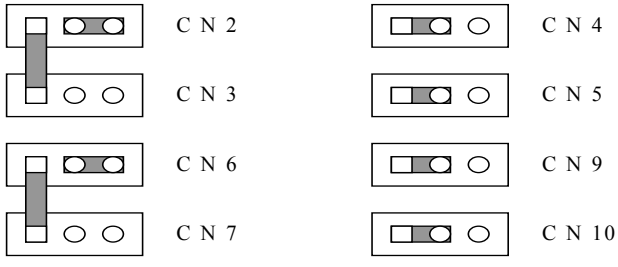


Figure 1.3-2 2-wire mode setting

1.4 Synchronous Data Daughter Cards（CHD、CHD_V35B）

Synchronous data daughter cards are used to interface with low speed synchronous data. They perform interface coding and data adaptation into one or two 64kbps channels within a E1 signal. Two types of synchronous data daughter cards are available, the CHD card which contains two 64kbps G.703 codirectional synchronous data interfaces, and the CHD_V35B card which contain one 64kbps or 128kbps synchronous data with interface selectable between V.35 and V.11/RS422.

Operation:

No setting is required for CHD daughter card.

For CHD_V35B daughter card, selections can be made for bit rate and interface type. There is a 2-bit dip switch on the daughter card to set its operation mode, as shown in Figure 1.4-1. The left dip selects interface type between V.35 and V.11, and the right dip selects bit rate between 128kbps and 64kbps.

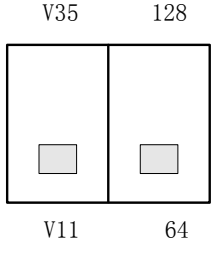


图 1.4-1 CHD_V35B DIP switches

Each socket on the channel mother card CHU corresponds to 2 channels in E1 signal. When CHD_V35B is set to 64kbps, it only occupies the first channel, only when 128kbps is selected, it will occupy both channels.

Note: when 128kbps is selected, the CHD_V35B daughter card should not be plugged at socket-4 position on the CHU, if the CHU is at slot 12 or 22. V35B data card can work as DCE, cann't work as DTE.

1.5 Synchronous Data Daughter Cards（CHD_V35N）

CHD_V35N daughter card contains one V.35 data interface, should be plugged at socket-4 position on the CHU, the occupying timeslots in the E1 signal can be setted. V35N data card can work as DCE, cann't work as DTE.

Operation

① **Install position and LED**

V35N card should be plugged at socket-4 position on the CHU, the led indicator is LED7/8, LED7 is bright, the V.35 data is transmitted; LED8 is bright, the V.35 data is received.

② DIP SWITCHES

For CHD_V35N daughter card, the timeslots can be selected by DIP switch K1. There is a 10-bit DIP switches on the daughter card to set its operation mode, as shown in Figure 1.5-1.

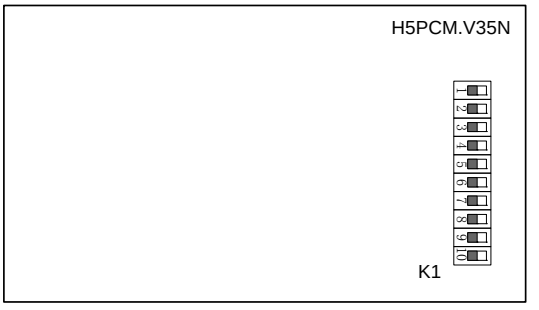


Figure1.5-1 V35N DIP switches

DIP1~5: setting the start occupying timeslots, 1 for the lowest, 5 are the tallests.
DIP6~10: setting the end occupying timeslots,6 for the lowest, 10 are the tallests.
Table1.5-1 indicates the Bit value in decimal when each DIP is ON.

Table1.5-1 K1 setting

DIP switch	1	2	3	4	5	6	7	8	9	10
Bit value in decimal	1	2	4	8	16	1	2	4	8	16

For example:

Suppose the occupying timeslot is 7~30, the K1 setting is shown in Table1.5-2.

Table1.5-2 K1 setting for occupying timeslot is 7~30

DIP switch	1	2	3	4	5	6	7	8	9	10
Status	ON	ON	ON	OFF	OFF	OFF	ON	ON	ON	ON

Attention:The timeslots that the V.35 data take up don't lap over with other channel or data occupied timeslot, otherwise the data and channel will have error.

③ Data connection

Choose the appropriative connection cable (BH4.851.092) connect the audio signal and

V.35 data at the same time for V.35N data card,

1.6 Asynchronous Data Daughter Card（CHAD）

The CHAD card adapts asynchronous serial data into a single 64kbps PCM channel. The maximum baud rate is 14.4kb/s. Each card contains 2 channels.

Two interface versions are available, one for RS-232/V.24 interface, and the other for RS-422/V.11 interface. The card is in plug-n-play type, no setting is required.

1.7 Magneto Daughter Cards （ CHRD 、 CHRD_2K 、 4CHRD_2K）

Magneto interface card interfaces with magneto telephone sets. It converts analog signal to and from 64kbps PCM digital signal, detects hand-cranked AC signalling, and sends rining power to magneto telephone when the remote is making the call. Each card contains two channels or four channels.

Three types of magneto daughter cards are available, one is the standard magneto interface card, CHRD, and the others are the carrier signalling magneto interface card, CHRD_2K and 4 CHRD_2K.

1. Standard magneto interface daughter card CHRD

It is used to connect ordinary magneto telephone, or magneto switchboard. Signalling is transmitted through channel associated signalling bits in time slot 16 of the E1 signal.

2. Carrier signalling magneto interface daughter card CHRD_2K, 4 CHRD_2K

It is also used to connect ordinary magneto telephone, or magneto switchboard. It differs from CHRD in that the signalling is transmitted in-band using a 2100Hz single frequency tone. The card has the function of 2100 Hz ring signalling examination.

1.8 Hot Line Interface Daughter Card（CHP）

Hot line telephone interface is similar to ordinary telephones, except that it does not need to dial. When one side pickes up the phone, the other side rings. So hot line interface needs to provide ring power on both sides. Thus, RPWR card is required in a shelf if CHP card is installed.

2. DATA CARD

2.1 V.35 Data Card

Introdution:

H5PCM.V.35 data card provides two V.35 data DCE interfaces, the bit rata for each channel, and corresponding timeslots occupied in the E1 signal, can be individually configured.

DIP switches setting:

Various parameters can be setted by using DIP switches on the card. Figure 2.1-1 depicts the positions of each switch.

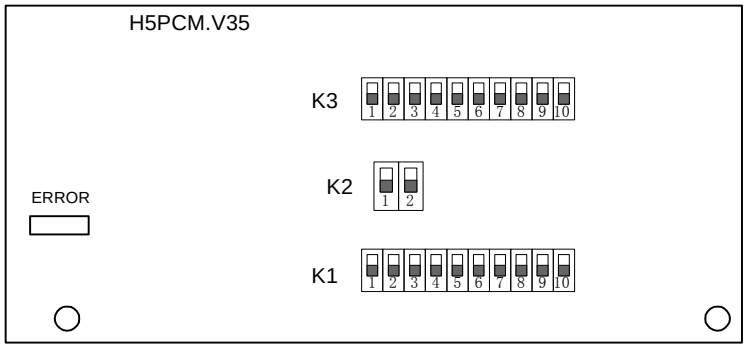


Figure2.1-1 DIP switches positions on V.35 data card

Function of the switches are given in Table 2.1-1 below.

Table 2.1-1 Function of Switches K1, K2 and K3

Switch	Dip setting	Explanation
K3[1～10]		Switches K3 is used to set the timeslots for interface-1.
K2[1]	ON	Data interface 1set to DTE mode（not the equipment standard mode)
	OFF	Data interface 1set to DCE mode
K2[2]	reserved	
K1		Switches K1 is used to set the timeslots for interface-2.

Note: 1. The DTE mode of V.35 data card isn't standard mode that the equipment provided, if needed, please select to purchase.

2. Only one of the two interfaces can be setted in DTE mode in the actual

application.

3. When the data interface is setted in DTE mode, the equipment must be CO unit.

Switch K1 and K3 are used to set the timeslots for two V.35 data interfaces.

Each switch:

DIP1~5: setting the start occupying timeslots, 1 for the lowest, 5 are the tallests.

DIP6~10: setting the end occupying timeslots,6 for the lowest, 10 are the tallests.

Table2.1-2 indicates the Bit value in decimal when each DIP is ON.

Table2.1-2 Switch K1 and K3 setting

DIP switch	1	2	3	4	5	6	7	8	9	10
Bit value in decimal	1	2	4	8	16	1	2	4	8	16

For example:

Suppose the second interfaces occupying timeslot is 7~30, the K3 setting is shown in Table2.1-3.

Table2.1-3 K3 setting for occupying timeslot is 7~30

DIP switch	1	2	3	4	5	6	7	8	9	10
Status	ON	ON	ON	OFF	OFF	OFF	ON	ON	ON	ON

Note:1. Make sure no channels are overlapped among two data channels.

2. Make sure no channels are overlapped with other interfaces for voice and lowspeed data that are set by physical positions.

3. For unused interface, make sure all the corresponding dips are OFF.

LED's:

The ERROR LED on V.35 data card indicates the timeslots setting error. When the timeslots are overlapped, ERROR LED is bright, reminding that the customer needs to reinstall.

TD, RD LED on the front panel can indicate the data.is transmitted and received.

2.2 ETHxE1 Ethernet Data Interface Card

- **Introdution**

The ETHxE1 Ethernet data interface card is used to transmit Ethernet packets through a

N*64kbps channel within 1~4 E1 links. One of the four E1 links confirms to the standard G.704, and the others are unframed. The ETHxE1 Ethernet data card is only used in H5001 currently.

Ethernet Interface confirms to the standard IEEE 802.3. The Ethernet port on the rear panel of H5001 marking V35x2/ETH connect MPEG2/ MPEG4 image business by DB25/RJ45 pocket. The Ethernet port on the rear panel marking 10/100BASE-TX connect the ordinary Ethernet packet.

2.3 100M Ethernet Data Interface Card

- **Introdution**

The 100BASE-T card is used to transmit Ethernet packets through a N*64kbps channel within a E1. This enables the H5001 be used to provide voice, low-speed data, and Ethernet at the same time, using E1 connection.

DIP switch K1 on the card is used to set working mode and testing mode.

K1（2）ON means single port mode, K1（2）OFF means double ports mode. The DB25/RJ45 port has the higher priority, the RJ45 port has the lower priority.

K1(1) ON means testing mode(for the factory testing), K1(1) OFF means working mode.

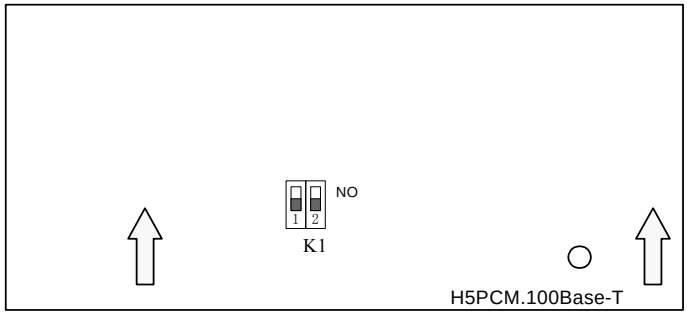


Figure2.3-1 DIP switches on 100Base-T data card

2.4 RS232/RS422 Asynchronous Data Card

Introdution

RS232/RS422 Asynchronous Data Card can be installed on the DATA CARD position on the motherboard, provides 4 asynchronous data interfaces, which are **RS232** interfaces or **RS422** interfaces, customer can according to need to set. Each asynchronous data occupies one timeslot, the start occupying timeslot is setted by DIP switch K1 on the card.

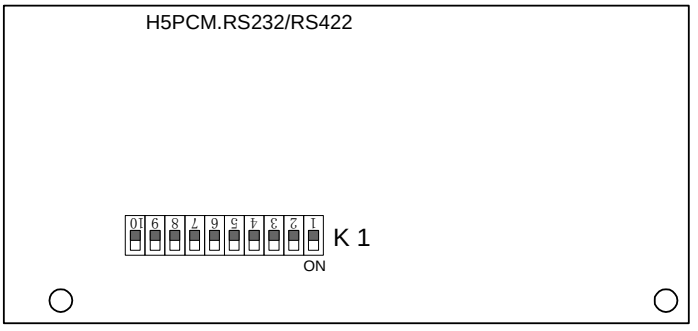


Figure2.4-1 DIP switch K1 on RS232/RS422 card

Timeslot setting

E1 timeslot allocation is set using dip switch K1 on the card. Dip 1 to dip 5 of K1 set the starting timeslot, and dip 6 to dip 10 set the ending timeslot. The numbers are coded in binary, with dip 1 and dip 6 the lowest bits, and dip 5 and dip 10 the highest bits respectively. Dip position ON represents 1, and OFF represents 0. Table 2.4-1 indicates the dip arrangement.

Table2.4-1 DIP switches setting

DIP switches	1	2	3	4	5
Bit value in decimal	1	2	4	8	16

For example:

Suppose the occupying timeslot is 9~12, the K1 setting is shown in Table2.4-2.

Table2.4-2 Example K1 setting for channels 9~12 allocation

DIP switches	1	2	3	4	5
Status	ON	OFF	OFF	ON	OFF

Interface selection:

RS232/RS422 data card provides 4 RS232 data interfaces or 2 RS232 data interfaces and 2 RS422 data interfaces, Dip 9 to dip 10 of K1 set the interface selection, the interface selection for interface-2 or interface-4 is shown in Table2.4-3.

Table2.4-3 Interface selection on RS232/RS422 data card

DIP switches	DIP setting	Explanation
9	ON	Select RS422 for interface-2

	OFF	Select RS232 for interface-2
10	ON	Select RS422 for interface-4
	OFF	Select RS232 for interface-4

Note: RS232 data interface is the default interface.

channel selection:

RS232/RS422 RS232/RS422 data card can provide 4 data interfaces, Dip 6 to dip 8 of K1 set the channel selection, is shown in Table2.4-4.

Table2.4-4 Channel selection on RS232/RS422 data card

DIP switches	Explanation
6	OFF: forbidden to use for interface-2, ON: select to use for interface-2.
7	OFF: forbidden to use for interface-3, ON: select to use for interface-3.
8	OFF: forbidden to use for interface-4, ON: select to use for interface-4.

DIP switches setting sum-up:

DIP 1~10 of switch K1 is divided into three functions, seeing the table 2.4-5.

Table 2.4-5 DIP switches setting on RS232/RS422 data card

DIP	1	2	3	4	5	6	7	8	9	10
Function	Setting the start occupying timeslot					setting channel selection of interface-2,3,4			setting Interface mode of interface-2,4	
setting	table 2.4-1					table 2.4-4			table 2.4-3	

The default status of switch K1 is shown in Table2.4-6.

Table2.4-6 The default status of switch K1on RS232/RS422 data card

DIP	1	2	3	4	5	6	7	8	9	10
Setting	**ON**	**OFF**	**OFF**	**ON**	**OFF**	**ON**	**ON**	**ON**	**OFF**	**OFF**
Meaning	The occupying timeslot is from 9 to12					select to use for interface-2、3、4			select RS232 for interface-2、4	

3. E&M Signalling

The CHU card of H5000 convert E&M signalling information into timeslot16 in E1. Each CHU card contains 10 E lines and 10 M lines which are corresponding to 10 voice channels.

The E&M signalling of H5001 is convertted on the mothetboard, which contains 4 E lines and 4 M lines. The 4 pairs of E&M are corresponding to 4 voice channels, which can be configured with management software, but must be 4 contious voice channels.

Note:It should be clear that in this equipment, E line is the input line where signal goes into the system, and M line is the output line where signal comes out of the system.

Appendix 2 General connection cable introduction

1. 🕮 Power Connection

The H5000&1 series can be powered either with -48VDC or 220VAC supply. The flip switch selects the power input. When flipped up, -48VDC is selected, and 220VAC is selected with switch flipped down. The middle position switches the power off.

When H5000&1 series is powered by -48VDC, make sure the voltage and polarity are correct, and tightly fasten the screw for reliable connection. When H5000&1 series is powered by 220VAC supply, use power outlet with srcure earth connection to avoid danger of electric shock.

2. 🕮 E1 Cable Connection

On the rear panel, there are E1 connectors. Default connectors are coaxical for 75Ω unbalanced E1 interface. The sockets marked Tx2M and Tx are output ports, the sockets marked Rx2M and Rx are input ports.

3. 🕮 Management Cable Connection

DB9 socket (Marking:RS232/RS485)is serial communication connector which is used to communicate between management station with the equipment.

4. 🕮Voice Interface Cable Connection

On the rear panel, there is DB44 connector(Marking: Audio/EM)which is used to connect voice interface cable and EM signalling cable.For H5001, the voice interface cable is **BH4.851.085**、**BH4.851.085-A** or **BH4.851.088**、**BH4.851.088-A**，the cable shape is showen in Figure4-1.The definition of these voice interface cables is described in Table4-1, Table 4-2, Table 4-3 and Table 4-4. Notice the four Tables are 8 voice interfaces cable Tables, If H5001 installs 16 voice interfaces, the cable definition is described in Table

4-9(BH4.851.085-16) or Table 4-10(BH4.851.085- A-16).

For H5000, the voice interface cable is **BH4.851.098**、**BH4.851.099** 、**BH4.851.100.** The cable shape is showen in Figure4-1.The definition of these voice interface cables is described in Table4-6, Table4-7, Table4-8.

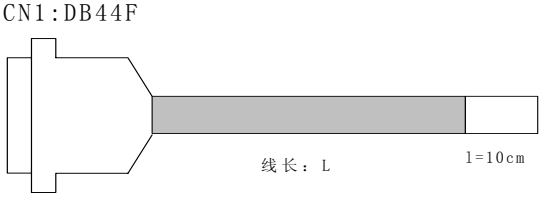


Figure4-1 Voice interface cable shape

In Table4-1、Table4-2、Table4-9、Table4-10, Ei(i=1~4) means 4 E lines, Mi(i=1~4) means 4 M lines. Tia、Ria、Tib、Rib(i=1~8 or 1~16) pins are transmitted signal pins (Ti pin: going into the system) and received signal pins (Ri pin: coming out of the system). For various daughter cards, the meaning of Tia、Ria、Tib、Rib pins is different, the details is shown in Table4-5.

Somtimes the telephone lines is 2-wire, and the E&M signalling also does not adopt, using BH4.851.088 or BH4.851.088- A cable will be fit for subscribers.

Table 4-1 The definition of 8 voice interfaces cable（BH4.851.085）

CN1	Cable Colour	Name	CN1	Cable Colour	Name	CN1	Cable Colour	Name
1	Yellow	T1a	16	Pink &Red	T1b	31	White &Yellow	T8a
2	Yellow &Black	R1a	17	Pink Red &Black	R1b	32	White &Green	R8a
3	Red	T2a	18	Purple	T2b	33	Pale Green &Red	T8b
4	Red &Black	R2a	19	Purple & White	R2b	34	Green &Blue	R8b
5	Brown	T3a	20			35	Pale Blue &Blue	T3b
6	Brown &White	R3a	21			36	Pale Blue &Red	R3b
7	Pale Blue	T4a	22	Grey	M4	37	Pink Red &Red	T4b
8	Pale Black	R4a	23	Grey &Black	E4	38	Pink Red &Blue	R4b

9	Pale Blue &Green	T5a	24	Orange	M3	39	Grey& Red	T5b
10	Pale Blue &Yellow	R5a	25	Orange & Black	E3	40	Grey &Blue	R5b
11	Green	T6a	26	Pink Red &White	M2	41	Green &White	T6b
12	Green &Black	R6a	27	Pink Red &Yellow	E2	42	Pale Green & Blue	R6b
13	Blue	T7a	28	Grey &Green	M1	43	Yellow &Red	T7b
14	Blue &White	R7a	29	Grey &Yellow	E1	44	Yellow & Blue	R7b
15	White	GND	30	White &Black	GND			

Table 4-2 The definition of 8 voice interfaces cable（BH4.851.085-A）

CN1	Cable Colour	Name	CN1	Cable Colour	Name	CN1	Cable Colour	Name
1	Blue • （Red）	T1a	16	Blue • • • （Red）	T1b	31	Green • •（Red）	T8a
2	Blue • （Black）	R1a	17	Blue • • • （Black）	R1b	32	Green • • （Black）	R8a
3	Pink • （Red）	T2a	18	Pink • • • （Red）	T2b	33	Green • • • • （Red）	T8b
4	Pink • （Black）	R2a	19	Pink • • • （Black）	R2b	34	Green • • • • （Black）	R8b
5	Green • （Red）	T3a	20			35	Green • • • （Red）	T3b
6	Green • （Black）	R3a	21			36	Green • • • （Black）	R3b
7	Brown • （Red）	T4a	22	Brown •••••• (Red）	M4	37	Brown • • • （Red）	T4b
8	Brown •（Black）	R4a	23	Brown • • • • • • （Black）	E4	38	Brown • • • （Black）	R4b
9	Grey • （Red）	T5a	24	Green •••••• (Red）	M3	39	Grey •••（Red）	T5b
10	Grey • （Black）	R5a	25	Green • • • • • • （Black）	E3	40	Grey • • • （Black）	R5b
11	Blue • • （Red）	T6a	26	Pink •••••• (Red）	M2	41	Blue • • • • （Red）	T6b
12	Blue • •（Black）	R6a	27	Pink •••••• (Black）	E2	42	Blue • • • • （Black）	R6b
13	Pink • • （Red）	T7a	28	Blue •••••• (Red）	M1	43	Pink • • • • （Red）	T7b
14	Pink • •（Black）	R7a	29	Blue •••••• (Black）	E1	44	Pink • • • • （Black）	R7b
15	Grey • • （Red）	GND	30	Grey • • (Black）	GND			

Note: Brown: Brown or Orange.

Table 4-3 The definition of 8 voice interfaces cable（BH4.851.088）

CN1	Cable Colour	Name	CN1	Cable Colour	Name	CN1	Cable Colour	Name
1	Blue &White	T1a	16			31	Pink Red &Black	T8a
2	Blue	R1a	17			32	Pink Red	R8a
3	Red &Black	T2a	18			33		
4	Red	R2a	19			34		
5	Green &Black	T3a	20			35		
6	Green	R3a	21			36		
7	Brown &White	T4a	22			37		
8	Brown	R4a	23			38		
9	Purple& White	T5a	24			39		
10	Purple	R5a	25			40		
11	Yellow & Black	T6a	26			41		
12	Yellow	R6a	27			42		
13	White & Black	T7a	28			43		
14	White	R7a	29			44		
15			30					

Table 4-4 The definition of 8 voice interfaces cable（BH4.851.088-A）

CN 1	Cable Colour	Name	CN1	Cable Colour	Name	CN1	Cable Colour	Name
1	Blue	T1a	16			31	White	T8a
2	Blue •	R1a	17			32	White •	R8a
3	Pink	T2a	18			33		
4	Pink •	R2a	19			34		
5	Green	T3a	20			35		
6	Green •	R3a	21			36		
7	Brown	T4a	22			37		
8	Brown	R4a	23			38		
9	Grey	T5a	24			39		
10	Grey •	R5a	25			40		
11	Red	T6a	26			41		
12	Red •	R6a	27			42		
13	Yellow	T7a	28			43		
14	Yellow •	R7a	29			44		
15			30					

Table4-5 Signal Allocation for Wire-Wrap Pins alongside CHU cards

Daughter card	Tia、Ria	Tib、Rib
CH/L	Exchange Subscriber lines	Un-used
CH/R	Subscriber Loop	Un-used
CH2W	2-Wire Voice Lines	Un-used
CH4W	Received Voice Lines (voice out)	Transmitted Voice Lines (voice in)
CHD	64kbps G.703 Codirectional Tx Data (data out)	64kbps G.703 Codirectional Rx Data (data in)
CHD_V35B	Tia : TDA（Tx data out） Ria : TDB（Tx data out） T(i+1)a : TCLKA R(i+1)a : TCLKB （TCLK：Tx clock；I is odd）	Tib : RDA（Rx data in） Rib : RDB（Rx data in） T(i+1)b : GND R(i+1)b : GND
CHAD （RS-232）	Tia : TxD（data out） Ria : GND	Tib : RxD（data in） Rib : VCC(+5V)
CHAD （RS-422）	TxD（data out） Tia :TxN Ria :TxP	RxD（data in） Tib :RxN Rib :RxP
CHRD、CHRD_2K	Magneto Telephone lines	Un-used
CHP	Hot Line Telephone lines	Un-used

Table 4-6 The definition of 2-wire voice interfaces cable（BH4.851.098）

CN1	Cable Colour	Name	CN1	Cable Colour	Name	CN1	Cable Colour	Name
1	Blue • （Red）	T1a	16			31		
2	Blue • （Black）	R1a	17			32	Green • •（Red）	T8a
3	Pink • （Red）	T2a	18			33	Green • •（Black）	R8a
4	Pink • （Black）	R2a	19			34		
5	Green • （Red）	T3a	20			35		
6	Green •（Black）	R3a	21			36	Brown • •（Red）	T9a
7	Brown • （Red）	T4a	22			37	Brown • •（Black）	R9a
8	Brown • （Black）	R4a	23			38		
9	Grey • （Red）	T5a	24			39		
10	Grey • （Black）	R5a	25			40	Grey • •（Red）	T10a
11	Blue • •（Red）	T6a	26			41	Grey • •（Black）	R10a

12	Blue • •（Black）	R6a	27			42		
13	Pink • •（Red）	T7a	28			43		
14	Pink • •（Black）	R7a	29			44		
15			30					

Note： Tia pins are transmit signal pins (going into the system), and Ria pins are receive signal pins (coming out of the system)（i=1~10）.This cable is used in 2-wire voice interface of **H5000**.

Table 4-7 The definition of voice interfaces cable（BH4.851.099）

CN 1	Cable Colour	Name	CN 1	Cable Colour	Name	CN 1	Cable Colour	Name
1	Blue •（Red）	T1a	16			31		
2	Blue •（Black）	R1a	17	Blue • • •（Red）	T1b	32	Green • •（Red）	T8a
3	Pink •（Red）	T2a	18	Blue • • •（Black）	R1b	33	Green • •（Black）	R8a
4	Pink •（Black）	R2a	19	Pink • • •（Red）	T2b	34	Green • • • •（Red）	T8b
5	Green •（Red）	T3a	20	Pink • • •（Black）	R2b	35	Green • • • •（Black）	R8b
6	Green •（Black）	R3a	21	Green • • •（Red）	T3b	36	Brown • •（Red）	T9a
7	Brown •（Red）	T4a	22	Green • • •（Black）	R3b	37	Brown • •（Black）	R9a
8	Brown •（Black）	R4a	23	Brown • • •（Red）	T4b	38	Brown • • • •（Red）	T9b
9	Grey •（Red）	T5a	24	Brown • • •（Black）	R4b	39	Brown • • • •（Black）	R9b
10	Grey •（Black）	R5a	25	Grey • • •（Red）	T5b	40	Grey • •（Red）	T10a
11	Blue • •（Red）	T6a	26	Grey • • •（Black）	R5b	41	Grey • •（Black）	R10a
12	Blue • •（Black）	R6a	27	Blue • • • •（Red）	T6b	42	Grey • • • •（Red）	T10b
13	Pink • •（Red）	T7a	28	Blue • • • •（Black）	R6b	43	Grey • • • •（Black）	R10b
14	Pink • •（Black）	R7a	29	Pink • • • •（Red）	T7b	44	Pink • • • •（Black）	R7b
15			30					

Note： Tia ,Tib pins are transmit signal pins (going into the system), and Ria,Rib pins are receive signal pins (coming out of the system)（i=1~10）.This cable is used in 2-wire or 4-wire voice interface of **H5000**.

Table 4-8 EM Singalling Cable（BH4.851.100）

CN1	Cable Colour	Name	CN1	Cable Colour	Name
1			16	Pink •（Black）	M[2]
2	Blue •（Red）	E[1]	17	Green •（Black）	M[3]
3	Pink •（Red）	E[2]	18	Brown •（Black）	M[4]
4	Green •（Red）	E[3]	19	Grey •（Black）	M[5]

5	Brown • （Red）	E[4]	20	Blue • •（Black）	M[6]
6	Grey • （Red）	E[5]	21	Pink • • （Black）	M[7]
7	Blue • • （Red）	E[6]	22	Green • • （Black）	M[8]
8	Pink • • （Red）	E[7]	23	Brown • • （Black）	M[9]
9	Green • • （Red）	E[8]	24	Grey • • （Black）	M[10]
10	Brown • • （Red）	E[9]	25		
11	Grey • • （Red）	E[10]			
12					
13					
14					
15	Blue • （Black）	M[1]			

Note：This cable is used in E&M singalling interface of **H5000**.

Table 4-9 The definition of 16 voice interfaces cable（**BH4.851.085-16**）

CN1	Cable Colour	Name	CN1	Cable Colour	Name	CN1	Cable Colour	Name
1	Yellow	T1a	16	Pink &Red	T3 a	31	White &Yellow	T14a
2	Yellow &Black	R1a	17	Pink Red &Black	R3 a	32	White &Green	R14a
3	Red	T2a	18	Purple	T4 a	33	Pale Green &Red	T16a
4	Red &Black	R2a	19	Purple & White	R4 a	34	Green &Blue	R16a
5	Brown	T5a	20			35	Pale Blue &Blue	T7a
6	Brown &White	R5a	21			36	Pale Blue &Red	R7a
7	Pale Blue	T6a	22	Grey	M4	37	Pink Red &Red	T8a
8	Pale &Black	R6a	23	Grey &Black	E4	38	Pink Red &Blue	R8a
9	Pale Blue &Green	T9a	24	Orange	M3	39	Grey& Red	T11a
10	Pale Blue &Yellow	R9a	25	Orange & Black	E3	40	Grey &Blue	R11a
11	Green	T10a	26	Pink Red &White	M2	41	Green &White	T12a

12	Green &Black	R10a
13	Blue	T13a
14	Blue &White	R13a
15	White	GND

27	Pink Red &Yellow	E2
28	Grey &Green	M1
29	Grey &Yellow	E1
30	White &Black	GND

42	Pale Green & Blue	R12a
43	Yellow &Red	T15a
44	Yellow & Blue	R15a

Note：This cable is used in 16 voice interfaces of 2-wire telephone of **H5001**.

Table 4-10 The definition of 16 voice interfaces cable（**BH4.851.085-A-16**）

CN1	Cable Colour	Name
1	Blue • （Red）	T1a
2	Blue • （Black）	R1a
3	Pink • （Red）	T2a
4	Pink • （Black）	R2a
5	Green • （Red）	T5a
6	Green • （Black）	R5a
7	Brown • （Red）	T6a
8	Brown • （Black）	R6a
9	Grey • （Red）	T9a
10	Grey • （Black）	R9a
11	Blue • • （Red）	T10a
12	Blue • • （Black）	R10a
13	Pink • • （Red）	T13a
14	Pink • • （Black）	R13a
15	Grey • • （Red）	GND

CN1	Cable Colour	Name
16	Blue • • • （Red）	T3a
17	Blue • • • （Black）	R3a
18	Pink • • • （Red）	T4a
19	Pink • • • （Black）	R4a
20		
21		
22	Brown •••••• （Red）	M4
23	Brown • • • • • • （Black）	E4
24	Green •••••• （Red）	M3
25	Green • • • • • • （Black）	E3
26	Pink •••••• （Red）	M2
27	Pink •••••• （Black）	E2
28	Blue •••••• （Red）	M1
29	Blue •••••• （Black）	E1
30	Grey • • （Black）	GND

CN1	Cable Colour	Name
31	Green •• （Red）	T14a
32	Green • • （Black）	R14a
33	Green • • • • （Red）	T16a
34	Green • • • • （Black）	R16a
35	Green • • • （Red）	T7a
36	Green • • • （Black）	R7a
37	Brown • • • （Red）	T8a
38	Brown • • • （Black）	R8a
39	Grey ••• （Red）	T11a
40	Grey • • • （Black）	R11a
41	Blue • • • • （Red）	T12a
42	Blue • • • • （Black）	R12a
43	Pink • • • • （Red）	T15a
44	Pink • • • • （Black）	R15a

Note：This cable is used in 16 voice interfaces of 2-wire telephone of **H5001**.

5. 🕮Data Cable Connection

5.1 V.35 Data Interface Cable Connection

There is a 25-pin D type connector (DB25) on the rear panel. It is used to connect

two V.35 data interfaces. The definition of V.35 data cable pins is shown in Table5.1-1.

Table 5.1-1 The definition of V.35 data cable

Pin	Name	Explanation
1	CGND	Connect to the shell
2	TD(A)-1	As DCE:104（A）,as DTE:103(A)
3	RD(A)-1	As DCE:103(A), as DTE: 104(A)
4	TD(A)-2	To the second interface: DCE_104（A）
5	RD(A)-2	To the second interface: DCE_103(A)
6	Open	
7	GND	SGND
8	115B-2	To the second interface: RC(B),DCE→DTE
9	DTE－115B-1	To the first interface DTE: RC(B)
10	115A-2	To the second interface: RC(A),DCE→DTE
11	DCE－115B-1	To the first interface DCE: RC(B)
12	114B-1	To the first interface: TC(B)
13	CGND	Connect to the shell
14	TD(B)-1	As DCE:104（B）,as DTE:103(B)
15	114A-1	To the first interface: TC(A),DCE→DTE
16	RD(B)-1	As DCE:103(B), as DTE:104(B)
17	DTE－115A-1	To the first interface DTE: RC(A)
18	TD(B)-2	To the second interface: DCE_104（B）
19	RD(B)-2	To the second interface: DCE_103(B)
20	Open	
21	114B-2	To the second interface: TC(B),DCE→DTE
22	Open	
23	114A-2	To the second interface: TC(A),DCE→DTE
24	DCE－115A-1	To the first interface DCE: RC(A)
25	CGND	Connect to the shell

Note: The first V.35 data interface can be setted DCE mode or DTE mode user selected, and the second V.35 data interface only be setted DCE mode.

According to ISO standard, V.35 data interface usually adopts ISO-2593 connector, then need the DB25 to standard V.35 ISO-2593 DCE connector conversion cable, the signal relationship of conversion cable is given in Table 5.1-2 and Table 5.1-3.

Table 5.1-2 DB25—ISO2593（F）DCE Conversion cable signal list（BH4.851.054）

Signal	Shield	103 (A)	103 (B)	104 (A)	104 (B)	R T S	C T S	D S R	D T R	G N D	DCD	113 (A)	113 (B)	114 (A)	114 (B)	115 (A)	115 (B)
DB25(F) pin	1	3	16	2	14	4	5	6	20	7	－	17	9	15	12	24	11
ISO-2593 pin	A	P	S	R	T	C	D	E	H	B	F	U	W	Y	AA	V	X

Table 5.1-3 DB25—ISO2593（M）DTE Conversion cable signal list

Signal	Shield	103 (A)	103 (B)	104 (A)	104 (B)	RTS	CTS	DSR	DTR	GND	DCD	113 (A)	113 (B)	114 (A)	114 (B)	115 (A)	115 (B)
DB25(F) pin	1	2	14	3	16	4	5	6	20	7	—	24	11	15	12	17	9
ISO-2593 pin	A	P	S	R	T	C	D	E	H	B	F	U	W	Y	AA	V	X

When only one of the V.35 data interfaces(the first interface) is used, the cable can be directly connected to the DB25 pocket, but two V.35 data interfaces are used, the conversion cable（**BH4.851.086**）is needed to connect the DB25 pocket. The conversion cable is given in Figure5.1-1 and Table5.1-4.

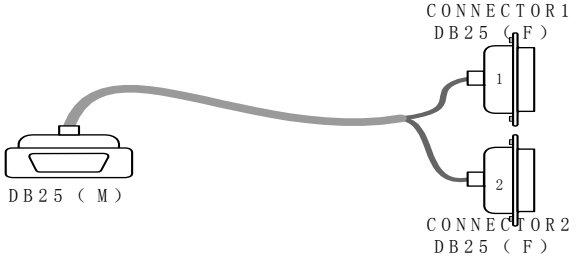


Figure5.1-1 The shape of two V.35 data interfaces conversion cable

Table5.1-4 Conversion cable signal list（**BH4.851.086**）

Connector DB25(M)pin	Connector 1 pin	Connector 2 pin
1	1	1
2	2	
3	3	
4		2
5		3
7	7	7
8		11
9	9	
10		24
11	11	
12	12	
13	13	13
14	14	
15	15	
16	16	
17	17	
18		14
19		16
21		12
23		15
24	24	

5.2 V.35N Data Interface Cable Connection

The data cable（BH4.851.092）is used for H5PCM.V35N data card.

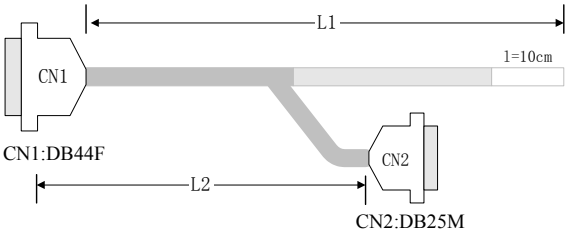


图 5.2-1 BH4.851.092 Cable

Table5.2-1 Conversion cable signal list (BH4.851.092)

CN1	Cable Colour	CN2	Name	CN1	Cable Colour	CN2	Name	CN1	Cable Colour	CN2	Name
1	Blue • (Black)		T1a	16				31	Grey • • (Black)	15	114A
2	Blue • (Red)		R1a	17				32	Grey • • (Red)	12	114B
3	Pink • (Black)		T2a	18				33			
4	Pink • (Red)		R2a	19				34			
5	Green • (Black)		T3a	20				35			
6	Green • (Red)		R3a	21				36			
7	Grey • (Black)		T4a	22				37			
8	Grey • (Red)		R4a	23				38			
9	Blue • • (Black)		T5a	24				39	Grey • • • (Black)		T5b
10	Blue • • (Red)		R5a	25				40	Grey • • • (Red)		R5b
11	Pink • • (Black)		T6a	26				41	Pink • • • (Black)		T6b
12	Pink • • (Red)		R6a	27				42	Pink • • • (Red)		R6b
13	Green • • (Black)	2	104A	28				43	Blue • • • (Black)	3	103A
14	Green • • (Red)	14	104B	29				44	Blue • • • (Red)	16	103B
15	Pink • • • • (Red)	1	GND	30	Pink • • • • (Black)	7	GND				

Note: CN2:Pin24(115A) is connected to pin15, pin11(115B) is connected to pin12.

When CN2 is used, the conversion cable（BH4.851.054）is needed, please see Table 5.1-2 for signal relationship.

5.3 10/100Base-Tx Ethernet Interface Connection

The RJ45 connector (Marking: 10/100Base-Tx) is provided on the rear of H5000 and H5001. The RJ45 connector is connected to 10/100Base-Tx Ethernet interface. when using **100Base_Tdata card**, the RJ45 connector is in effect. The signal list of the RJ45 port pin is given in Table 5.3-1.

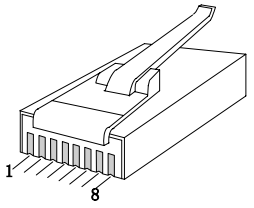


Figure5.3-1 RJ45 connector

Table 5.3-1 Signal list for RJ45 port

Pin	1	2	3	4	5	6	7	8
Signal	TxD+	TxD-	RxD+			RxD-		

5.4 RS232/RS422 Data Card Connection

When RS232/RS422 data card is used, the DB25 connector on the rear panel is connectted to 4 RS232 or RS422 data interfaces. The definition of DB25 connector is shown in Table5.4-1.

Table 5.4-1 The definition of DB25 connector for RS232/RS422 data interfaces

Pin	Name	Explanation
1	GND	GND
2	TxD1_RS232	the first RS232 interface : Transmitted data
3	RxD1_RS232	the first RS232 interface : Received data
4	TxD2_RS232	the second RS232 interface : Transmitted data
5	RxD2_RS232	the second RS232 interface : Received data
6	Open	
7	GND	GND
8	TxD2P_RS422	the second RS422 interface : Transmitted positive data
9	TxD2N_RS422	the second RS422 interface : Transmitted negative data
10	RxD2P_RS422	the second RS422 interface : Received positive data
11	RxD2N_RS422	the second RS422 interface : Received negative data
12	Open	

13	GND	GND
14	TxD3_RS232	the third RS232 interface : Transmitted data
15	RxD3_RS232	the third RS232 interface : Received data
16	TxD4_RS232	the fourth RS232 interface : Transmitted data
17	RxD4_RS232	the fourth RS232 interface : Received data
18	GND	GND
19	TxD4P_RS422	the fourth RS422 interface : Transmitted positive data
20	Open	
21	TxD4N_RS422	the fourth RS422 interface : Transmitted negative data
22	Open	
23	RxD4P_RS422	the fourth RS422 interface : Received positive data
24	RxD4N_RS422	the fourth RS422 interface : Received negative data
25	GND	GND

The conversion cable for RS232/RS422 data card is given in Figure5.4-1 and Table5.4-2.

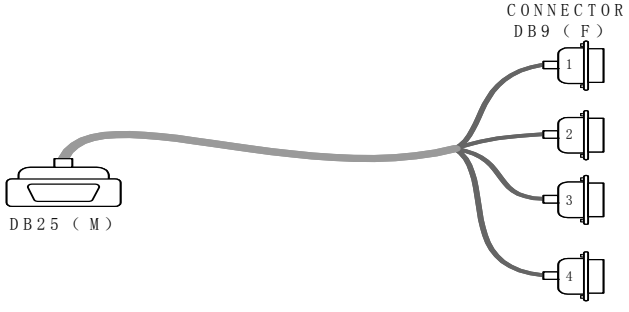


Figure 5.4-1 The conversion cable for RS232/RS422 data card（**BH4.851.091**）

Table 5.4-2 Signal list for the conversion cable（**BH4.851.091**）

DB25(M)	Connector1	Connector 2	Connector 3	Connector 4
1	**5**			
2	**3**			
3	**2**			
4		**3**		
5		**2**		
6				
7		**5**		
8		**9**		
9		**8**		
10		**7**		
11		**6**		
12				
13			**5**	

14			**3**	
15			**2**	
16				**3**
17				**2**
18				**5**
19				**9**
20				
21				**8**
22				
23				**7**
24				**6**
25				