

FE1/V.35 Interface Converter

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1. Product Overview

FE1/V.35 framing structure interface converter adopting ASIC (application specific integrated circuit) design. It is capable of converting Nx64K continuous data flow into PCM signal of E1, with a rate up to 1984Kbps (time slot 0 is used to transmit synchronizing information). Subscriber data is put within E1 frame, occupying only the needed time slot. Time slot is distributed freely according to the demand of the subscriber. When subscriber data rate is up to 2048Kbps, line transmission is of full transparent mode, i.e., non-framing structure.

2. Product Features

- V.35 rate Nx64kbps($N=1\sim 31$ optional arbitrarily)
- Support four clock modes
- Support local analog/digital loopback
- Support remote loopback function
- Provide false random code test function
- V.35 interface uses M34 standard connector
- E1 interface supports framing and non-framing modes, with the occupied time slot selected arbitrarily
- E1 interface balanced 120 Ω /unbalanced 75 Ω optional
- Available with independent structure and 19-inch rack-mounted structure (rack-mounted structure can be inserted with 16 modules)
- AC 220V and DC -48V inputs may be selected for interface converters of both structures
- For rack-mounted interface converter, dual power supply heat backup is provided to ensure a high operating reliability

3. Technical Indexes

Protocol standard: G.703, G.704, G.706, G.823, I.431 and V.35

E1 interface:

Frame structure: framing/non-framing

Resistance: 75 Ω , physical interface BNC

120 Ω , physical interface RJ45

Code: HDB3

Receiving electric level: 0~-43db

Sending high electric level: 2.37V $\pm 10\%$ \square 75 Ω

3.00V $\pm 10\%$ \square 120 Ω

Sending low electric level: 0V ± 0.1 V

Transmission distance: 600m

Data port:

- Data port type: V.35/DCE
- Rate: N×64Kbps □N =1~□1□
- Physical interface: M34 □Female□
- Code: NRZ

Indicator lamps□To indicate the operating status of power supply, data and line interface.

Structure□Independent□140mm(depth) x 210mm(width) x 42mm(height)

Rack-mounted□ 19-inch 4.5U standard casing

Power supply□Independent□160V□270V AC input□5V/2A output

-40V□-60V DC input□5V/2A output

Rack-mounted□150V□260V AC input□5V/16A and 12V/1A output

-38V□-58V DC input□5V/16A and 12V/1A output

Power consumption□ 3W

Operating temperature□ 0□□50□

Storage temperature□ -20□□80□

Humidity□ 5%□90% (free of condensate)

4. Description on Installation and Panel

4.1 Unpacking

After the equipment is unpacked, a check shall be done for the completeness. If any part is found missing, please immediately contact our representative offices or agents. Complete packing shall include the following items (for an independent product):

- One set of FE1/V.35 Interface Converter
- One FE1/V.35 Interface Converter Operation Manual
- One power line□FE1/V.35 Interface Converter/AC□
- A couple of BNC connectors

Please also contact our representative offices or agents for any transportation damage found with this product.

4.2 Front/rear panels of an independent casing

- FE1/V.35 Interface Converter front panel, as shown□



Front Panel of FE1/V.35 Interface Converter

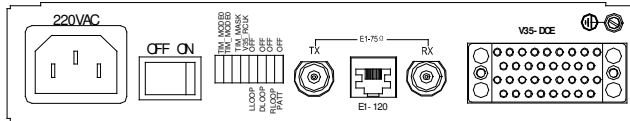
POWER□Power supply indicator lamp. Constantly lightening after the machine is turned on.

RXD□Data receiving indicator lamp at V.35 interface. Flash indicates that there is data output from V.35 interface. The quicker it flashes, the higher rate of data output from

V3.5interface.

- TXD□Data sending indicator lamp at V.35 interface. Flash indicates that there is data input to V3.5 interface. The quicker it flashes, the higher rate of data input to V3.5interface.
- LOF□ Alarm indicator lamp of input signal out-of-frame in E1 line. Constantly lightening indicates the alarm with local device; flash indicates the alarm with opposite device. This is effective only under framing mode.
- LOS□ Alarm indicator lamp for code missing in E1 line. Constantly lightening indicates the alarm with local device. Flash indicates the alarm with opposite device.
- LOOP□ Indicator lamp of loopback test status. When local device is at a loopback status, the lamp is constantly lightening; when opposite device is at a loopback status, the lamp flashes. When local device is not at a framing mode, it is unable to detect whether opposite device is at a loopback test status.
- PTOK/CRC□Indicator lamp of false random code test or alarm indicator lamp of CRC verification. When the device is at a loopback status, false random code test can be made. If this lamp is constantly lightening, it indicates that false random code passes the test.

■ FE1/V.35 Interface Converter/AC rear panel, as shown:



FE1/V.35 Interface Converter Rear Panel Schematic

220V AC□ 3-phase AC power socket.

E1-75Ω TX□RX: BNC receiving/sending socket at E1 interface, resistance 75Ω.

E1-120Ω:RJ45 socket at E1 interface, resistance 120Ω.

V.35: V.35 interface, with a M34 cored socket.

There is a coded switch S5 on the panel, which is used as the system configuration switch to set such functions as clock, time slot, phase, loopback and false random code test etc.

Wherein, S5.1 and S5.2 are for clock settings.

S5.1□OFF, S5.2=OFF□Clock in synchronism with V35 interface.

S5.1□OFF, S5.2□ON□Clock in synchronism with the receiving clock at E1 interface.

Remote time slot setting can be tracked only under this status.

S5.1=ON, S5.2=OFF: Clock in synchronism with the sending clock at E1 interface.

S5.1=ON, S5.2□ON□using local crystal OSC generating clock

S5.3: time slot setting

S5.3□OFF□using remote time slot setting S5.3□ON□using local time slot setting

S5.4: for V35 receiving clock phase selection

S5.4=OFF, using positive phase S5.4=ON, using negative phase

S5.5: Local loopback setting (E1 interface in direct loopback), ON valid.

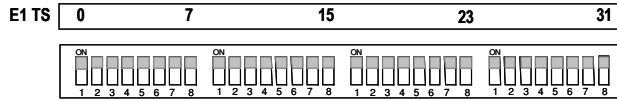
S5.6: Local digital loopback (V35 interface loopback), ON valid.

S5.7: Remote digital loopback (V35 interface loopback), ON valid.

Valid under framing mode (0 time slot unused).

S5.8: False random code test, ON valid, Valid under loopback status.

- FE1/V.35 Interface Converter bottom coded switch, as shown

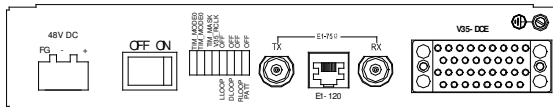


Baseplate Coded Switch

After time slot 0 is valid, other coded switches in whatever positions are all valid.

Select the number of time slots according to the expected rate. Normally for an independent type, a time slot setting of automatic tracking Central Site module is selected. Coded switches of plate-clip time slot correspond to S1, S2, S3 and S4.

- FE1/V.35 Interface Converter/DC rear panel, as shown



FE1/V.35 Interface Converter/DC Rear Panel Schematic

48V DC -48Vdc input socket

4.3 Front and rear panels of rack-mounted casing

- RACK front panel, as shown

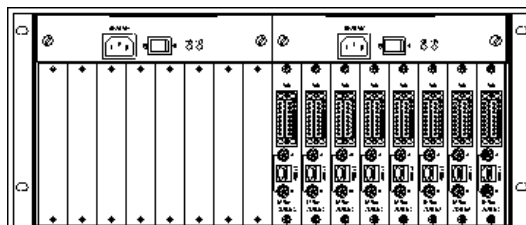


RACK Front Panel

+5V 5V main power supply indicator lamp

+12V 12V fan power supply indicator lamp

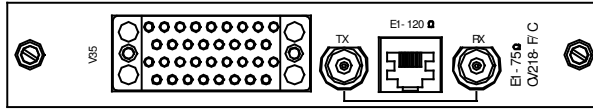
- RACK rear panel, as shown



RACK Rear Panel

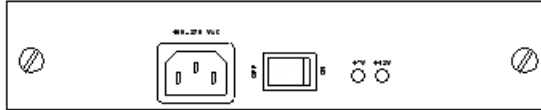
This panel is composed of three small panels, as described below

- FE1/V.35 Interface Converter module panel, as shown



FE1/V.35 Interface Converter Module Panel

- RACK/AC AC redundancy power supply panel, as shown



RACK/AC AC Redundancy Power Supply Panel

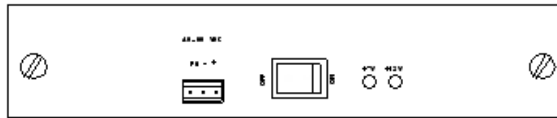
160~270 VAC AC 220V input socket

ON OFF Power switch

+5V 5V main power supply indicator lamp

+12V 12V fan power supply indicator lamp

- RACK/DC DC redundancy power supply panel, as shown



RACK/DC DC Redundancy Power Supply Panel

40~60 VDC DC-48V input connector (FG grounded, with“- +” terminals connected with 48V input)

ON OFF power switch

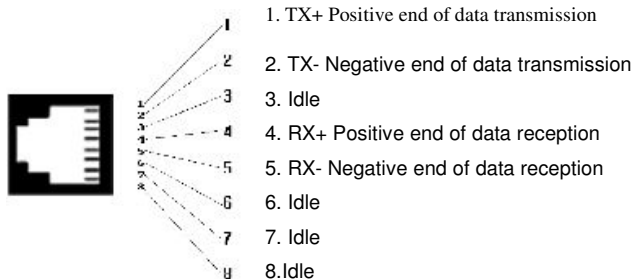
+5V 5V main power supply indicator lamp;

+12V 12V fan power supply indicator lamp

5. FE1/V.35 Interface Converter Application

5.1 Definition of RJ45 balanced twisted-pair wire sequence at E1 interface

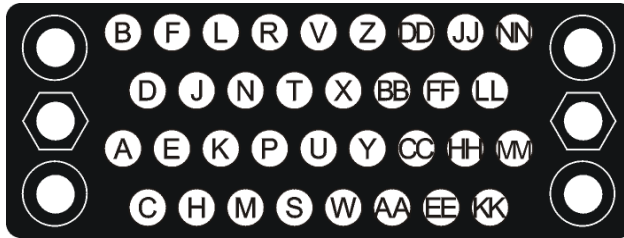
1 and 2 are transmitting lines, 4 and 5 are receiving lines:



RJ45 Balanced Twisted-Pair Wire Sequence at E1 Interface

5.2 Definition of signal lines at V.35 interface

5.2.1 Arrangement of leading feet at M34 cored socket:



Scatter Diagram of Leading Feet at M34 Cored Socket

5.2.2 Definition of signal lines at V.35 interface (work mode: DCE)

V.35 Feet	Signal	Function	Direction
A	CGND	casing ground	—
B	GND	signal ground	—
C	RTS	request to send	input
D	CTS	consent to send	output
E	DSR	data set ready	output
F	DCD	data carrier detection	output
H	DTR	data terminal ready	input
P	TXD A	sending data line A	input
S	TXD B	sending data line B	input
R	RXD A	receiving data line A	output
T	RXD B	receiving data line B	output
U	EXTCLK A	exterior clock line A	input
W	EXTCLK B	exterior clock line B	input
V	RXCL A	receiving clock line A	output
X	RXCL B	receiving clock line B	output
Y	TXCL A	sending clock line A	output
AA	TXCL B	sending clock line B	output

5.3 Standard V.35 crossover cable connection diagram

	V.35 feet		V.35 feet	
CGND	A	=====	A	CGND
GND	B	=====	B	GND
RTS	C	=====	D	CTS
CTS	D	=====	C	RTS
DSR	E	=====	H	DTR
DTR	H	=====	E	DSR
TXDA	P	=====	R	RXDA
TXDB	S	=====	T	RXDB
RXDA	R	=====	P	TXDA
RXDB	T	=====	S	TXDB

EXCA	U		V	RXCA
EXCB	W		X	RXCB
RXCA	V		U	EXCA
RXCB	X		W	EXCB

Standard V.35 crossover cable connection diagram

5.4 Sitings of switches and jumpers

Independent device has totally 5 setting switches, with S5 located on the rear panel and S1~S4 under the bottom cover. The user can easily make settings without the need to open the cover.

5.4.1 E1 interface resistance setting

Slip stitches S7, S8 and XS5 on the printed circuit board are used for setting physical connection mode of E1 interface. To accomplish this, the casing must be opened for an independent product, and the module must be pulled out for a rack-mounted product. There are two settings as follows:

- (1) When both S7 and S8 jump to “75” end, XS5 becomes short-circuited and physical connection of E1 interface turns to 75Ω unbalanced coaxial cable interface;
- (2) When both S7 and S8 jump to “120” end, XS5 is not short-circuited and physical connection of E1 interface turns to 120Ω balanced twisted-pair wire interface;

Note: (1) is the ex-works default setting.

5.4.2 Clock setting

Detailed description is available on the rear panel and in the Product Overview.

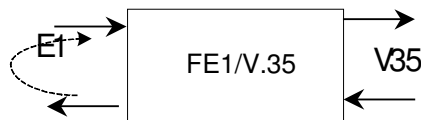
5.4.3 Phase selection

S5.4 is used for the receiving phase selection of V.35 interface.

5.4.4 Settings of loopback test and false random code test

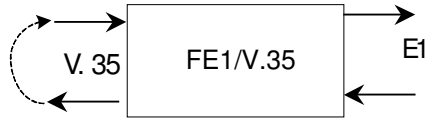
S5.5□S5.8 of coded switch S5 are used for setting the loopback test and false random code test.

S5.5 is local loopback control □LLOOP□ and E1 interface is directly looped back to V35 interface. “OFF” indicates normal operation; “ON” indicates local loopback test. The default is “OFF”. It is used for testing whether local device is in normal operation.



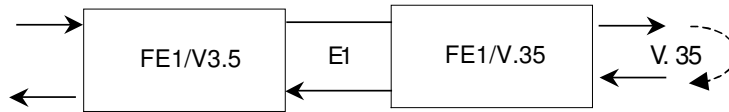
Local Loopback Schematic

S5.6: local digital loopback control (DLOOP). “OFF” indicates normal operation; “ON” indicates local digital loopback. The default is “OFF”. With a loopback from local V35 interface to E1 interface, it is used for testing whether the remote device and E1 line are in normal operation.



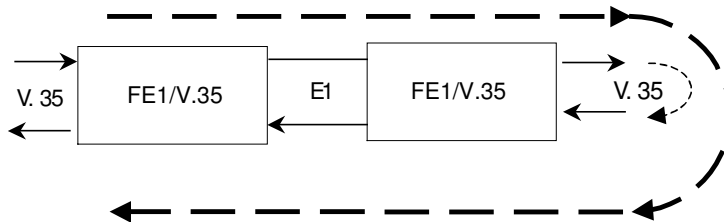
Local Digital Loopback

S5.7: Remote loopback control (RLOOP). “OFF” indicates normal operation □ “ON” indicates command remote loopback. The default is “OFF”. As this command must be sent through E1 line to remote end for validness, it will become invalid at the following two cases: □ the remote end is not FE1/V.35 Interface Converter device; □ FE1/V.35 Interface Converter is working under a non-framing status, at this moment all time slots of E1 are used for transmitting the data from V.35 interface at a rate of 2048Kbps. Through a transmission of loopback command from local device to remote device, the command remote loopback is achieved.



Remote Loopback

S5.8: False random code test control (PATT). “OFF” indicates normal operation; “ON” indicates false random sequence test. The default is “OFF”. It generates a false random sequence code to be transmitted to E1 output and tests whether E1 input signal is in compliance with this sequence standard, so as to judge whether the device and line transmission have an error code.

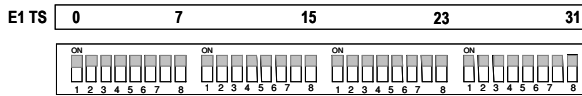


False Random Code Test

Remark: False random sequence code test can be made only under a loopback status. At this moment, constantly lightening of LOOP and PTOK/CRC lamps shows local status, flash shows remote status; TXD and RXD lamps are used for showing the status of local TXD or RXD.

5.4.5 Framing/non-framing and time slot settings

Totally 32 coded switches S1, S2, S3 and S4 are used for E1 time slot setting.



E1 Time Slot Setting

- 1st switch (S1.1) is used for controlling E1 framing/non-framing. “ON” refers to non-framing mode(2.048Mbps).
- 31 switches, from 2nd—32nd(S1.2~S1.8, S2, S3, S4), are respectively used for controlling the selection of 1st—31st time slots. Set at “ON”, the corresponding time slot is selected; set at “OFF”, the corresponding time slot is not selected. The rate of V.35 interface is completely dependent on the number of the selected time slots.

For example: the setting of 3rd switch to “ON” and all other switches to “OFF” indicates that 2nd time slot is selected, at this moment the rate is 64K; the setting of 7th and 8th switches to “ON” and all other switches to “OFF” indicates that 6th and 7th time slots are selected, with a rate of 2*64K=128K. TSO setting is used for specifying E1 frame to be transparent or framing: “0”--framing, “1”--non-framing. But the bit has to be specified in combination with other time slots. TS16 setting is used for controlling E1 framing structure to be PCM30□CAS□or PCM31□CCS□: ‘0’—PCM30, at this moment 16th time slot must not be used for transmission service; ‘1’—PCM31, 16th time slot can be used for transmission service. Besides, TS1—TS31 are respectively used for controlling the selection of 1st—31st time slots: ‘1’—the corresponding time slot is selected; ‘0’—the corresponding time slot is not selected.

- Typical application□
 Non-framing mode: 1st switch is set to “ON”, and all other switches to “OFF” (other switches are located in such a way that the setting of non-framing is unaffected)
 Framing mode: 1st switch is set to “OFF”, and all other switches are set according to the time slot positions to be used by E1 channel and the rate of V.35 interface. (If it is set to tracking remote time slot, the time slot switch will become invalid)

Attention: Ex-works S1, S2, S3 and S4 are all set to “OFF”.

Attention: The setting of tracking remote time slot: S5.2 to“ON”; S5.1 and S5.3 to“OFF”.

6. Common Problems

No.	Failure	Cause	Solution
1	Power indicator lamp is not lightened after power supply is connected	Failure in power line	1. Power is not supplied yet from Municipal Power Grid; check that power line is in good contact or power switch is well closed. 2. Internal circuit of the interface converter is damaged; it needs to be sent back to the vendor for repair.
2	LOS lamp is constantly lightened after E1 interface cable is connected	Line signal gets lost or is unable to be synchronized	1. Check if coaxial cable or UTP5 twisted-pair wire is broken or short-circuited and if the connector is inserted in place. 2. Ex-works default setting is 75Ω BNC interface. If 120 Ω RJ45 interface is being used, then switches S7, S8 and XS5 have to be reset. 3. Internal circuit of the interface converter is damaged; it needs to be sent back to the vendor for repair.
3	LOF lamp is constantly lightened after E1 interface cable is connected	Line frame synchronism gets lost	1. Check that the time slot settings of the two devices are consistent. 2. Check the loopback settings of the two devices.
4	TXD data sending lamp is not lightened	V.35 interface is not connected properly or the router etc. is not turned on.	Check the connection lines and terminal device.