RAISECOM

RC801-60B-FV35, RC803-60B-FV35, RC805-60B-FV35 Series Standalone V.35＋E1 Dual Interface Fiber Optic Modem

User Manual

REV.N

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1. Cautions

Please read the following notices carefully before installing and using the device. Raisecom does not respond to any loss that caused by violating safety notice.

RC801/803/805-60B-FV35 series device provides V.35 synchronization data interface which complied with ITU standard. Please firstly connect the V.35 cable before the device power on. It is seriously forbidden to insert or pull out V.35 cable when the converter and the other end device are both power on, otherwise the V.35 interface will be damaged. This device also provides high sensitive optical interface. Before connect this device to Fiber media converter please test the transmitting optical power of the latter. If the optical power is beyond the overload point of this device please don't connect them, otherwise the optical module will be damaged.

This RC801/803/805-60B-FV35 series fiber-optic modem also provides E1 interface which complied with ITU-T G.703 standard. When connect it to other device please ensure that the grounding mode of the two devices which linked by the

coaxial-cable is consistent, and so that the shield layer of the coaxial-cable can has the same grounding.

There must be grounding protection for the sake of safety and stability. Do not disassemble the device yourself, we regard it as you waiver your rights of repair guarantee.

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2. Overview

2.1. Introduction

RC801/803/805-60B-FV35 series device is PDH fiber optic modem which is deployed to transmit V.35 signals and transparent E1 data line on fiber. It also provides solution for Router remote connection and is widely used in constructing Wide Area Networks.

RC801/803/805-60B-FV35 series device is standalone dual interface fiber optic modem which can be placed on desktop and has individual power supply. It is used in pairs and provides conversion between V.35 and E1 interfaces to fiber interface. It can also connect to RC802/804/806-60B series fiber optic modem module which is inserted in RC002-16 or RC002-4 chassis to realize SNMP network management and consequently manages remote devices.

2.2. Main features

- The first tributary of client side provides one ITU standard V.35 synchronized data DCE interface.
- The second tributary of client side provides one ITU-T G.703 E1 interface which has both 75Ω BNC connector and 120Ω RJ45 connector.
- The line side provides a dual strand fiber interface or a single strand dual wavelength interface.
- It provides the complete fiber line alarm and internal E1 detection alarm as well as the local and remote line alarm indication.
- It provides the local and remote loopback detection function of the two tributaries of client side to check the circuit and device and perform the maintenance.
- The features of the first tributary V.35 interface of client side:
  Realize V.35 interface bandwidth adjustment via ITU-T G.704 frame structure.
  It supports fractional /unframed (transparent) mode. The fractional mode can configure time slot freely. The first tributary of client side provides three kinds of clock modes: master (internal), slave (follow the fiber line clock) and V.35 terminal clock (follow V.35 interface clock).
  When the fist tributary of client side is used in pairs the remote time slot can automatically follow local time slot configuration.
  The internal error code test unit can diagnose and test circuit with the cooperation of many kinds of loopback styles.
  In the fractional mode the PCM30/PCM31 modes are optional and CRC4 verification function is auto-negotiation.
  It provides phase adjustment function for V.35 receiving data.

IT provides fault pass function to transfer alarm of line side to V.35 interface so that to judge E1 line error through router.

- Features of the second tributary E1 interface of client side:
  It complies with PDH transmission conception to realize the transparent transmission of E1 data and clock setting in fiber line.
  It has all the features of PDH fiber optic modem.
- Very large ASIC chip, low consumption, four level PCB design, high reliability.

2.3. Model Description

RC800-60B-FV35 series fiber optic modem includes the following types:

Model Type	Description
RC801-60B-FV35-S1(AC)	Standalone at the Customer Premises, one V.35 interface(M 34),one E1 interface(two BNC and one RJ45), one Optical interface, SM Dual strand(DSC),0-25km, AC
RC801-60B-FV35-S1(DC)	Standalone at the Customer Premises, one V.35 interface(M 34),one E1 interface(two BNC and one RJ45), one Optical interface, SM Dual strand(DSC),0-25km, DC
RC801-60B-FV35-S2(AC)	Standalone at the Customer Premises, one V.35 interface(M 34),one E1 interface(two BNC and one RJ45), one Optical interface, SM Dual strand(DSC),10-60km, AC
RC801-60B-FV35-S2(DC)	Standalone at the Customer Premises, one V.35 interface(M 34),one E1 interface(two BNC and one RJ45), one Optical interface, SM Dual strand(DSC),10-60km, DC
RC801-60B-FV35-S3(AC)	Standalone at the Customer Premises, one V.35 interface(M 34),one E1 interface(two BNC and one RJ45), one Optical interface, SM Dual strand(DSC),15-120km, AC
RC801-60B-FV35-S3(DC)	Standalone at the Customer Premises, one V.35 interface(M 34),one E1 interface(two BNC and one RJ45), one Optical interface, SM Dual strand(DSC),15-120km, DC
RC803-60B-FV35-S1(AC)	Standalone at the Customer Premises, one V.35 interface(M 34),one E1 interface(two BNC and one RJ45), one Optical interface, SM Single strand 1310(SC-PC),0-25km, AC
RC803-60B-FV35-S1(DC)	Standalone at the Customer Premises, one V.35 interface(M 34),one E1 interface(two BNC and one RJ45), one Optical interface, SM Single strand 1310(SC-PC),0-25km, DC
RC803-60B-FV35-S2(AC)	Standalone at the Customer Premises, one V.35 interface(M 34),one E1 interface(two BNC and one RJ45), one Optical interface, SM Single strand 1310(SC-APC),10-50km, AC
RC803-60B-FV35-S2(DC)	Standalone at the Customer Premises, one V.35 interface(M 34),one E1 interface(two BNC and one RJ45), one Optical interface, SM Single strand 1310(SC-APC),10-50km, DC
RC805-60B-FV35-S1(AC)	Standalone at the Customer Premises, one V.35 interface(M 34),one E1 interface(two BNC and one RJ45), one Optical interface, SM Single strand 1550(SC-PC),0-25km, AC
RC805-60B-FV35-S1(DC)	Standalone at the Customer Premises, one V.35 interface(M 34),one E1 interface(two BNC and one RJ45), one Optical interface, SM Single strand 1550(SC-PC),0-25km, DC
RC805-60B-FV35-S2(AC)	Standalone at the Customer Premises, one V.35 interface(M 34),one E1 interface(two BNC and one RJ45), one Optical interface, SM Single strand 1550(SC-APC),10-50km, AC
RC805-60B-FV35-S2(DC)	Standalone at the Customer Premises, one V.35 interface(M 34),one E1 interface(two BNC and one RJ45), one Optical interface, SM Single strand 1550(SC-APC),10-50km, DC
RC802-60B-S1	Module type, two E1 interfaces (four BNC or two RJ45), one optical port, SM dual strand (DSC),

	0-25km
RC802-60B-S2	Module type, two E1 interfaces (four BNC or two RJ45), one optical port, SM dual strand (DSC), 10-60km
RC802-60B-S3	Module type, two E1 interfaces (four BNC or two RJ45), one optical port, SM dual strand (DSC), 15-120km
RC804-60B-S1	Module type, two E1 interfaces (four BNC or two RJ45), one optical port, SM single strand 1310(SC-PC), 0-25km
RC804-60B-S2	Module type, two E1 interfaces (four BNC or two RJ45), one optical port, SM single strand 1310(SC-APC), 10-50km
RC806-60B-S1	Module type, two E1 interfaces (four BNC or two RJ45), one optical port, SM single strand 1550(SC-PC), 0-25km
RC806-60B-S2	Module type, two E1 interfaces (four BNC or two RJ45), one optical port, SM single strand 1550(SC-APC), 10-50km

The content with shadow background in above table are the device types described in this manual. And others are modular type devices.

The following products can work in pairs:

Central office module	Customer premises module
RC802-60B-S1 RC801-60B-FV35-S1	RC801-60B-FV35-S1
RC802-60B-S2 RC801-60B-FV35-S2	RC801-60B-FV35-S2
RC802-60B-S3 RC801-60B-FV35-S3	RC801-60B-FV35-S3
RC804-60B-S1 RC803-60B-FV35-S1	RC805-60B-FV35-S1
RC804-60B-S2 RC803-60B-FV35-S2	RC805-60B-FV35-S2

3. Parameters

3.1. Fiber Optic Interface Specification

Bit rate: 100Mbps
Line code: 4B5B
Fiber connecter: SC (RC801-60B-FV35-S1 dual strand fiber port also has FC type)

Model Type	Transmission Wavelength (Nm)	Laser Type	Receiver Type	Launch Power (dBmW)	Over Load Point (dBm)	Receiving Sensitivity (dBmW)	Typical Transmission Distance (Km)
RC801-60B-FV35-S1	1310	FP	PIN	-15,-8	>-8	<-34	0-25
RC801-60B-FV35-S2	1310	FP	PIN	-5,0	>-8	<-34	10-60
RC801-60B-FV35-S3	1550	DFB	PIN	-5,0	>-10	<-36	15-120
RC803-60B-FV35-S1	1310	FP	PIN	-12,-3	>-8	<-30	0-25
RC805-60B-FV35-S1	1550	DFB	PIN	-12,-3	>-8	<-30	0-25
RC803-60B-FV35-S2	1310	FP	PIN	-5,0	>-8	<-32	10-50
RC805-60B-FV35-S2	1550	DFB	PIN	-5,0	>-8	<-32	10-50

3.2. V.35 Interface Specification

Physical Characteristics: Complies with V.35 interface standard of ITU suggestions
Connector Type: ISO2593 female connector (M 34 interface)
Working Mode: DCE (support cross connection with other DCE device)
Interface Bit Rate: V.35 interface bit rate is N×64Kbps（N=1-31）at E1 fractional mode;
V.35 interface bit rate is 2048Kbps at E1 transparent mode

3.3. E1 Interface Specification

Electric Characteristic: Complies with ITU-T G.703 Suggestion
Other Characteristic: Fault pass, jitter capability complies with ITU-T G.823, G.724 and related suggestion
Interface type: 75Ω unbalanced BNC connector (default)
120Ω balanced RJ45 connector (configured by dip-switch on the bottom of the device)
Bit rate: 2048Kbps±50ppm

3.4. Cable Type

- V.35 interface cable type

When connect this series product with DTE equipments such as routers through M34 interface, please use the special DTE router cable. When the cable is not long enough please order the extended cable CBL-V35-M34M/M34F-D from Raisecom (in Appendix).

When connecting this series product with other DCE equipments, the cross cable CBL-V35-M34M/M34M-X-D is necessary, and please order it from Raisecom (in Appendix).

- E1 interface cable type

When connecting to BNC connector please use SYV 75 coaxial cable.
When connecting to RJ-45 connector please use 0.6mm(22AWG) Twisted Pair.

3.5. Power Supply & Power Consumption

Power Supply:	DC –48V, tolerance range is from –36V to –72V
	DC +24V, tolerance range is from +18 V to +36V
	AC 220V, tolerance range is from 165V to 265V
Power Consumption:	≤ 5W

3.6. Dimensions

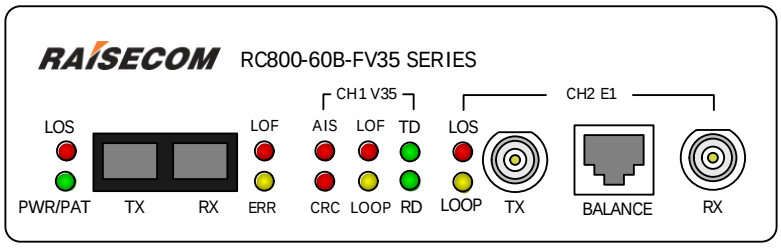
Standalone equipment can be placed on the table.
Dimension: 142 (width) x 38 (height) x 187 (depth) mm

3.7. Ambience

Working Temperature: 0 - 45℃
Humidity: ≤90%（25℃）

4. How to Use

4.1. Description of the Front Panel



View of the front panel

4.1.1. Power Supply/Error Code Test Indicator

PWR/PAT Green/Yellow:

Steady Green, built-in power works in good condition.

Yellow, when using built-in error code test function, if the fiber interface receives its own sending pseudo random sequence data the indicator will be in steady yellow. When it gets an error code the indicator will turns to green for at least 1 second.

Steady off, the device is power off.

4.1.2. Fiber Interface and Fiber Interface Alarm Indicator

For RC801-60B-FV35 dual strand device, TX stands for optical signal output (transmit) and RX stands for input (Receive).

For RC803/5-60B-FV35 single strand device, TX and RX has no actual meanings. In one fiber the transmission and receiving can be distinguished by different wave length.

LOS Red:

Steady light: Local optical receiving signal is lost;
Periodically flash: Remote optical receiving signal is lost;
Steady off: Local/remote optical receiving signal is normal.

LOF Red:

Steady light: Local optical receiving signal is out of frame;
Periodically flash: Remote optical receiving signal is out of frame;
Steady off: Local/remote optical receiving signal is not out of frame.

ERR Yellow:

Steady light: There is 1E-6 error code alarm in local optical receiving signal;
Periodically flash: There is 1E-6 error code alarm in remote optical receiving signal;

Non-periodically flash: There is 1E-3 error code alarm in remote or local optical receiving signal;

Steady off: There is no error code alarm in local/remote optical receiving signal.

4.1.3. V.35 Interface Data Channel Indicator

AIS Red:

Steady Light: There is AIS alarm in E1 data channel of local optical receiving signal;

Flash: There is AIS alarm in E1 data channel of remote optical receiving signal;

Steady Off: There is no AIS alarm in E1 data channel of local/remote optical receiving signal;

CRC Red:

Steady Light: There is CRC4 checkout alarm in E1 data channel of local optical receiving signal;

Flash: There is CRC4 checkout alarm in E1 data channel of remote optical receiving signal;

Steady Off: There is no CRC4 checkout alarm in E1 data channel of local/remote optical receiving signal;

LOF Red:

Steady Light: There is G.704 out of frame alarm in E1 data channel of local optical receiving signal;

Flash: There is G.704 out of frame alarm in E1 data channel of remote optical receiving signal;

Steady Off: There is no G.704 out of frame alarm in E1 data channel of local/remote optical receiving signal;

LOOP Yellow:

Steady Light: Local bidirectional loopback indication;

Flash: Remote bidirectional loopback indication;

Steady Off: There is no loopback in local/remote side.

TD Green:

Flash: There is data transmission in V.35 interface, and the flash frequency stands for the different bit rate of V.35 interface. When the bit rate is 64Kbps the flash frequency is lowest and the 2048Kbps the highest.

Steady Off: There is no transmission in V.35 interface.

RD Green:

Flash: There is data receiving in V.35 interface, and the flash frequency stands for the different bit rate of V.35 interface. When the bit rate is 64Kbps the flash frequency is lowest and the 2048Kbps the highest.

Steady Off: There is no receiving data in V.35 interface.

Notice: This device provides CRC4 checkout's auto-negotiation function. If there is CRC4 checkout signal in E1 data of optical interface the CRC4 checkout function will be enabled automatically, and the CRC alarm indicator will be available when there is CRC4 error. On the contrary, if there is no CRC4 checkout signal in E1 data of optical interface the CRC4 checkout function will be disable and CRC alarm indicator unavailable.

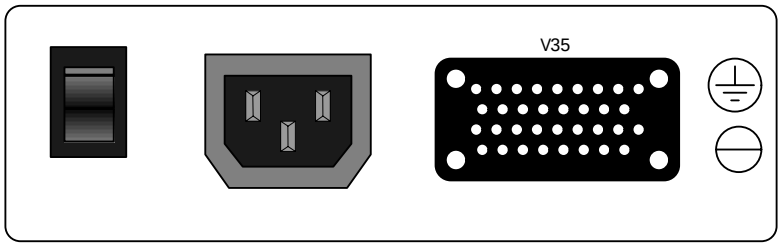
4.1.4. E1 Interface and It's Indicator

BNC Coaxial Interface: TX, 75Ω unbalanced signal transmission (output);
RX, 75Ω unbalanced signal receiving (input).
RJ-45 Interface: 1st, 2nd pin, 120Ω balanced signal transmission (output);
4th, 5th pin, 120Ω balanced signal receiving (input).

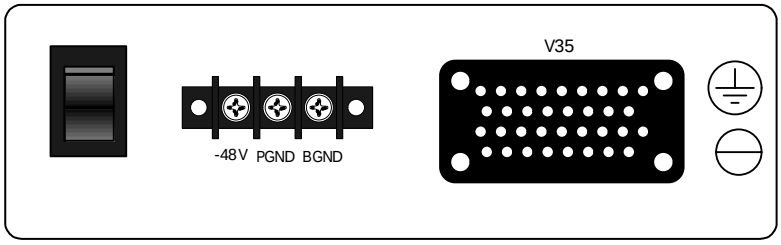
Notice: The 75Ω BNC Coaxial Interface is available in default. If the RJ-45 20Ω balanced Interface is needed please configure the SW7 on the bottom of the device.

LOS Red:
Steady light: Local E1 receiving signal is lost;
Periodically flash: Remote E1 receiving signal is lost;
Steady off: Local/remote E1 receiving signal is normal.
LOOP Yellow:
Steady Light: Local bidirectional loopback indication;
Flash: Remote bidirectional loopback indication;
Steady Off: There is no loopback in local/remote side.

4.2. Description of the Back Panel



Back Panel of the AC Device



Back Panel of the DC Device

4.2.1. Power Supply Switch

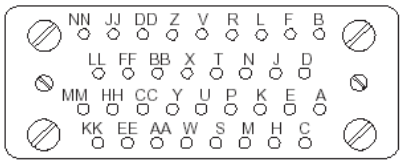
I stands for ON, **O** stands for OFF

4.2.2. Power Connector

AC Power connector: It is the standard three-phase power connector. Please make sure that the grounding is correct. If your AC power supply has no grounding signal please connect the grounding end on the right of the device to the protection grounding of the center office.

DC Power connector: It has three connection end: -48V, PGND and BGND. Please make sure that the PGND end is connected to protection grounding. The grounding end on the right of the device and the PGND are internally connected, so it is enough to connect any of it to protection grounding.

4.2.3. V.35 Connector



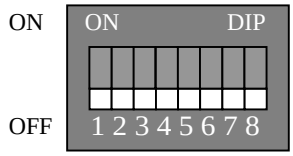
V.35/ISO 2593 Connector
DTE Connector Face — 34 Pin Male
DCE Connector Face — 34 Pin Female

Left figure is a standard ISO2593 connector of V.35 interface. This device has a DCE Connector Face-34 Pin Female connector which can be connected to standard DTE cable.
The description of this connector is as following table:
I-Input O-Output

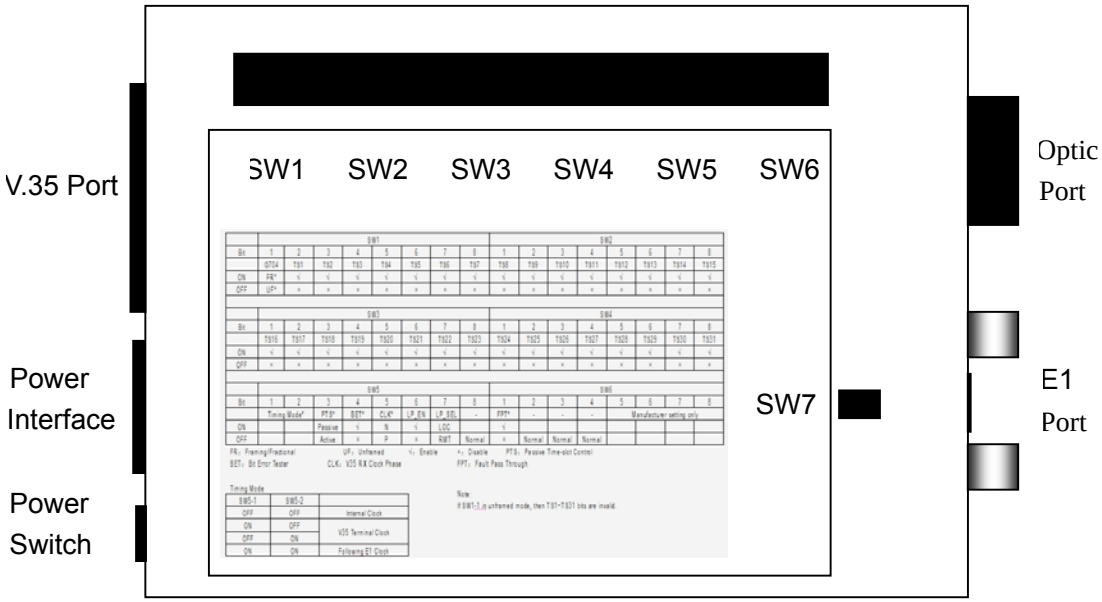
Signal Name	I/O	Pin Name
Chassis Ground — CGND	-	A
Signal Ground — GND	-	B
Receive Data (A) — RD(A)	O	R
Receive Data (B) — RD(B)	O	T
Receive Timing (A) — RCK(A)	O	V

Receive Timing (B) — RCK(B)	O	X
Send Data (A) — TD(A)	I	P
Send Data (B) — TD(B)	I	S
Send Timing (A) — TCK(A)	O	Y
Send Timing (B) — TCK(B)	O	AA
Terminal Timing (A) — SCTE(A)	I	U
Terminal Timing (B) — SCTE(B)	I	W
Request to Send — RTS	I	C
Clear to Send — CTS	O	D
Data Set Ready — DSR	O	E
Data Carrier Detect — DCD	O	F
Data Terminal Ready — DTR	I	H

4.3. Dip-switch on the bottom



There are seven group eight-bit dip-switches that are SW1, SW2, SW3, SW4, SW5, SW6 and SW7 on the bottom of the device. **The configuring of these dip-switches must be performed before power on! If the switches are configured during running status, the device must be restarted to make the configuration effective.** Each dip-switch is shown as the left figure. The DOWN indicates OFF and UP indicates ON when from left to right the bit is 1st to 8th. There is also a note pasted on the bottom of the device as the following figure:



Configuration Note on the device bottom

4.3.1. Setup of Timeslot Dip-switch (SW1 to SW4)

Timeslot switches are SW1, SW2, SW3 and SW4.

"√" indicates enable; "×" indicates disable

SW1 definition (default is all OFF)

	1st bit	2nd bit	3rd bit	4th bit	5th bit	6th bit	7th bit	8th bit
SET	Frame Status	TS1	TS2	TS3	TS4	TS5	TS6	TS7
ON	Fractional	√	√	√	√	√	√	√
OFF	Unframed	×	×	×	×	×	×	×

SW2 definition (default is all OFF)

	1st bit	2nd bit	3rd bit	4th bit	5th bit	6th bit	7th bit	8th bit
SET	TS8	TS9	TS10	TS11	TS12	TS13	TS14	TS15
ON	√	√	√	√	√	√	√	√
OFF	×	×	×	×	×	×	×	×

SW3 definition (default is all OFF)

	1st bit	2nd bit	3rd bit	4th bit	5th bit	6th bit	7th bit	8th bit
SET	TS16	TS17	TS18	TS19	TS20	TS21	TS22	TS23
ON	√	√	√	√	√	√	√	√
OFF	×	×	×	×	×	×	×	×

SW4 definition (default is all OFF)

	1st bit	2nd bit	3rd bit	4th bit	5th bit	6th bit	7th bit	8th bit
SET	TS24	TS25	TS26	TS27	TS28	TS29	TS30	TS31
ON	√	√	√	√	√	√	√	√
OFF	×	×	×	×	×	×	×	×

Notice:

When the SW1-1 is OFF (unframed mode) the TS1 to TS31 is invalid.

When the SW1-1 is ON(Fractional mode) the TS1 to TS31 bits are valid and can not be all OFF. That is to say there must be some timeslot which is enabled.

4.3.2. Function Dip-switch (SW5)

In below table "√" indicates enable; "×" indicates disable

Definition of SW5 (The 1st and 2nd bits are ON in default and others are OFF)

	1st bit	2nd bit	3rd bit	4th bit	5th bit	6th bit	7th bit	8th bit
Set	**Timing1**	**Timing2**	**TS_FLOW**	**BET**	**RX CLK**	**LP1_EN**	**LP2_EN**	**LP_SEL**

	Clock 1st	Clock 2nd	Timeslot Follow	Error Code Test	Phase	1st Tributary Bidirectional loopback	2nd Tributary Bidirectional loopback	Loop back position
ON	*	*	√	√	Reverse	√	√	Local
OFF	*	*	×	×	Positive	×	×	Remote

1. The 1st and 2nd bit: Clock mode choosing dip-switch Timing1, Timing2 (default is ON)

The Clock mode is defined by the 1st bit and 2nd bit of SW5, detail is shown in below table:

SW5-1	SW5-2	Clock Mode
OFF	OFF	Master Clock (Internal clock)
OFF	ON	V.35 terminal Clock (Follow V.35 interface clock)
ON	OFF	
ON	ON	Slave Clock (Follow fiber line clock)

2. The 3rd bit: Timeslot auto follow function TS_FLOW (default OFF)

SW5-3	Timeslot auto follow function
ON	Enable
OFF	Disable

To make local timeslot follow remote timeslot, below three conditions should be ensured:

(1) This series device is used point to point in pair.
(2) There is no PCM device which occupy the Sa bit linked in E1 line.
(3) Local device works on slave clock mode.
When all of above condition is satisfied, setting the SW5-3 of local device as ON to open timeslot auto-follow function, the timeslot and frame mode (PCM30/PCM31) of local device will follow the configurations of remote device automatically.

3. The 4th bit: Error code test function choosing dip-switch BET (default OFF)

SW5-4	Internal Error Code Test Function
ON	Enable
OFF	Disable

There is an error code test unit inside this series device, and the main purpose of this unit is producing pseudo random sequence (2E15-1 STD) and sending them to optical line. This sequence can be uploaded to proper data channel by configuration, and then via many loopback modes the returned sequence is sent to device for testing. The testing result will be displayed by the PWR/PAT indicator on front panel. When error code is captured the PWR/PAT indicator will turn to green and keep for at least one second. If there is no new error code occurs the PWR/PAT indicator will come back to steady yellow status.

The device will add test sequence to user data channel after the error code test function is enabled. This function is available in fractional mode and unframed (transparent) mode, and when this function is enabled the V.35 operation will intermit.

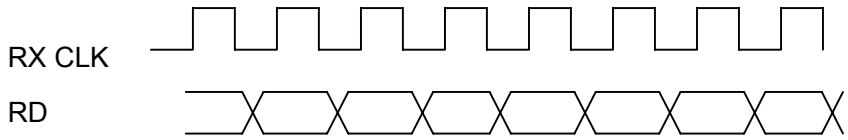
Notice: The error code test function can be operated with many loop back tests. When the local bidirectional loop back function is disabled the loop back can be simulated by fiber, but the dual-fiber S3 and all single fiber device can not. At the time if PWR/PAT indicator is steady yellow, it indicates that correct test code was received. If the remote bidirectional loop back is enabled accompanied with error code test, it means the whole information process will be tested.

4. The 5th bit: V.35 RX CLK Phase Choosing Dip-switch (default OFF)

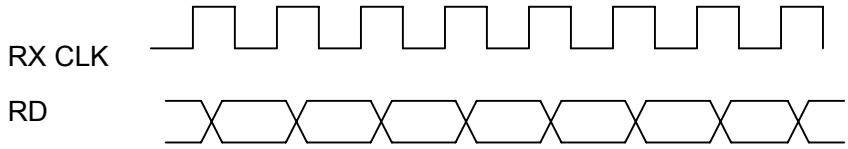
SW5-5	Phase Choosing
ON	RX CLK Reverse Phase
OFF	RX CLK Positive Phase

The RX CLK phase choosing is provided because of the different V.35 clock and data phase of different brand router. On Cisco series router the test result of V.35 synchronization WAN interface is passing when this device is connected and its RX CLK is Positive.

RX CLK is Positive: Data will be sent to RD signal during RX CLK falling edge.



RX CLK is Reverse: Data will be sent to RD signal during RX CLK rising edge.



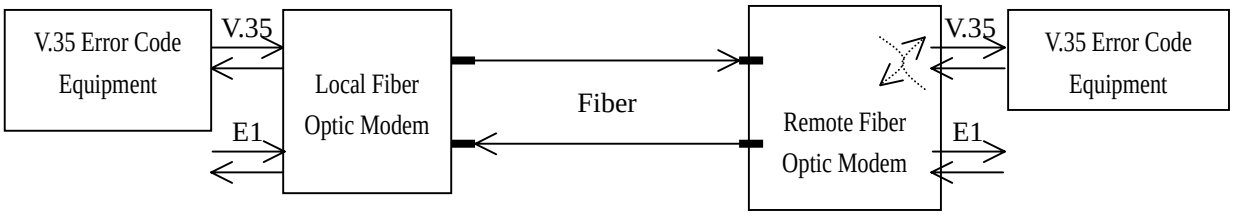
Notice: The relationship of TX CLK and TD phase of this series device is auto-adjusted, so users need not to configure it.

5. The 6th, 7th and 8th bit: Loop back dip-switch (default OFF)

	SW5-6	SW5-7	SW5-8
ON	1st Tributary Bidirectional loopback enable	2nd Tributary Bidirectional loopback enable	Local loopback

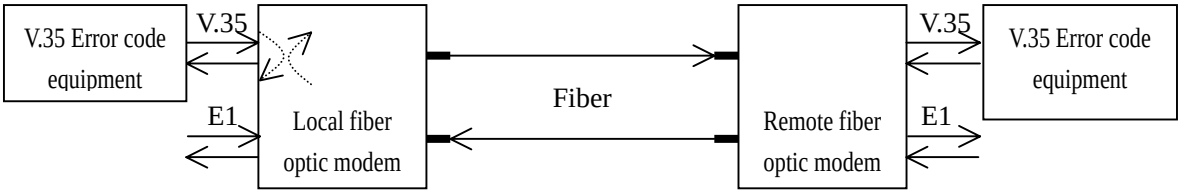
OFF	1st Tributary Bidirectional loopback disable	2nd Tributary Bidirectional loopback disable	Remote Loopback

1st Tributary V.35 interface remote bidirectional loopback sketch map:



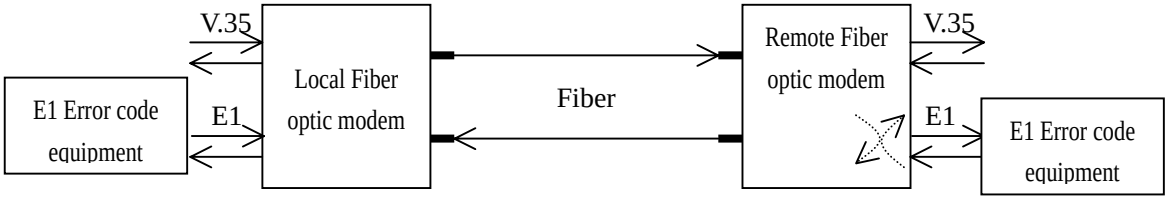
Above figure is the result of configuring remote bidirectional loopback of 1st tributary V.35 interface on "local fiber optic modem". At the same time the remote fiber optic modem's loopback dip-switch should be all OFF in default.

1st Tributary V.35 interface local bidirectional loopback sketch map:



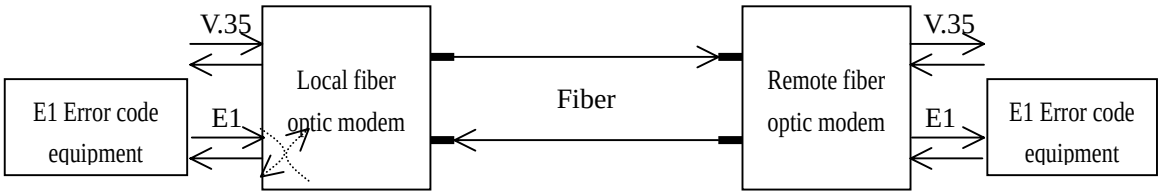
Above figure is the result of the configuring local bidirectional loopback of 1st tributary V.35 interface on "local fiber optic modem". At the same time the remote fiber optic modem's loopback dip-switch should be all OFF in default.

2nd Tributary E1 interface remote bidirectional loopback sketch map:



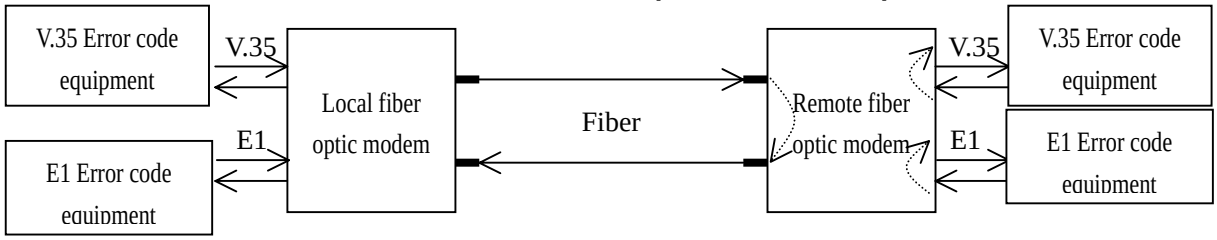
Above figure is the result of the configuring remote bidirectional loopback of 2nd tributary E1 interface on "local fiber optic modem". At the same time the remote fiber optic modem's loopback dip-switch should be all OFF in default.

2nd Tributary E1 interface local bidirectional loopback sketch map:



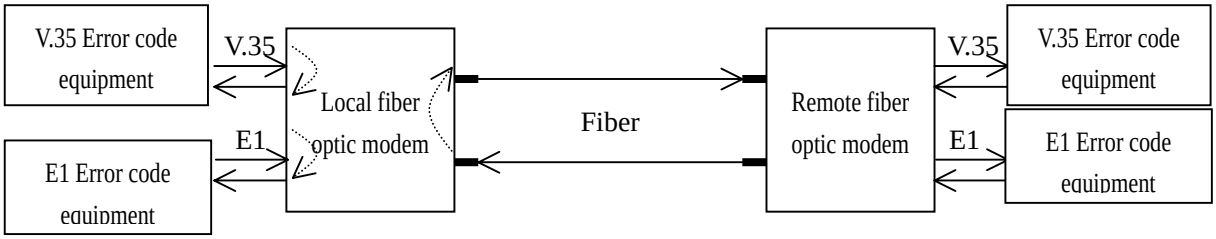
Above figure is the result of the configuring local bidirectional loopback of 2nd tributary E1 interface on "local fiber optic modem". At the same time the remote fiber optic modem's loopback dip-switch should be all OFF in default.

V.35 and E1 interface both remote bidirectional loopback sketch map:



Above figure is the result of the configuring remote bidirectional loopbacks of both V.35 interface and E1 interface on "local fiber optic modem". At the same time the remote fiber optic modem's loopback dip-switch should be all OFF in default.

V.35 and E1 interface both local bidirectional loopback sketch map:



Above figure is the result of the configuring local bidirectional loopbacks of both V.35 interface and E1 interface on "local fiber optic modem". At the same time the remote fiber optic modem's loopback dip-switch should be all OFF in default.

4.3.3. Function Dip-switch (SW6)

	1st bit	2nd bit	3rd bit	4th bit	5th bit	6th bit	7th bit	8th bit
Set	**Fault Pass**	**Reserved**	**Reserved**	**Reserved**	Configuration of vendor			
ON	Enable				Forbidden to be changed by users			
OFF	Disable	Normal	Normal	Normal				

1. The 1st bit: Fault Pass dip-switch (Default is OFF)

SW6-1	Fault Pass Function
ON	Enable
OFF	Disable

When the fault pass function is enabled, the alarms on fiber receiving side and transmitting side will be transferred to DCD and CTS signals on 1st tributary V.35 interface; when the fault pass function is disabled, the DSR, DCD and CTS signals on V.35 interface will be always valid.

When the fault pass function is enabled, and if there is local alarm on fiber optic modem, that is to say there are errors on fiber receiving side, the DCD signal of V.35 interface will

be closed and DTE device will have some reflection.

When the fault pass function is enabled, and if there is remote alarm on fiber optic modem, that is to say there are errors on fiber transmitting side, the CTS signal of V.35 interface will be closed and DTE device will have some reflection.

The DSR signal of this series device will be always valid after power on.

2. the 2nd, 3rd and 4th bit: Reserved (Default is OFF)

These bits are reserved for testing and they should be all OFF when the device works normally.

3. the 5th, 6th, 7th and 8th bit: Vendor configuration bits

These bits are configured by vendor during the producing process and should not be changed by users.

4.3.4. Impedance Choosing Dip-switch SW7

The SW7 is E1 interface impedance choosing dip-switch and "ON, ON, ON, OFF" is in default.

75Ω BNC unbalanced interface

1st bit	2nd bit	3rd bit	4th bit
ON	ON	ON	
			OFF

120Ω RJ-45 balanced interface

1st bit	2nd bit	3rd bit	4th bit
			ON
OFF	OFF	OFF	

1st bit: transmitting side "TX-"is grounding.
2nd bit: receiving side "RX-"is grounding.
3rd bit: impedance adjustment of receiving side.
4th bit: impedance adjustment of transmitting side.

4.4. Relationship of Dip-switch Configuration and Software Configuration

The relationship of dip-switch configuration and software management ability is shown in below table:

Dip-switch	Whether the software can change dip-switches' configuration or not
SW1-SW4	Can
SW5	Can
SW6	Can Not
SW7	Can Not

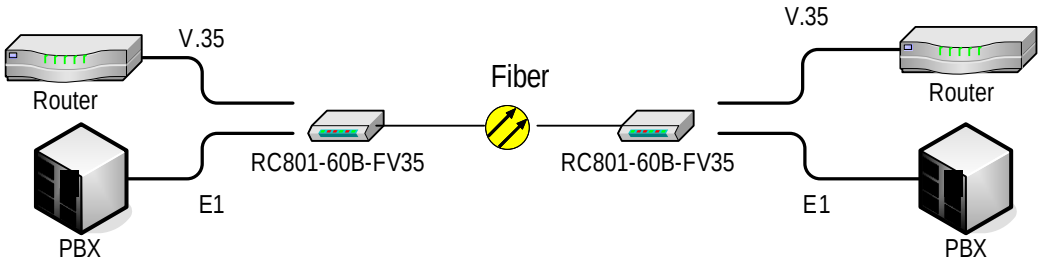
4.5. Basic Connection Type

The connection topologies introduced in this part is only for user reference. Users are advised to design and deploy the most appropriate topology according to their specific environment.

4.5.1. Point-to-point, 'Master Clock – Slave Clock' Topology

When connecting Routers or other V.35 interface equipment point to point, routers should work in DTE mode. For the convenience of installation and test, it is advised to set the local modem 'Master Clock Mode', and remote modem 'Slave Clock Mode'. That is to say the timing resource is from the local V.35 interface modem.

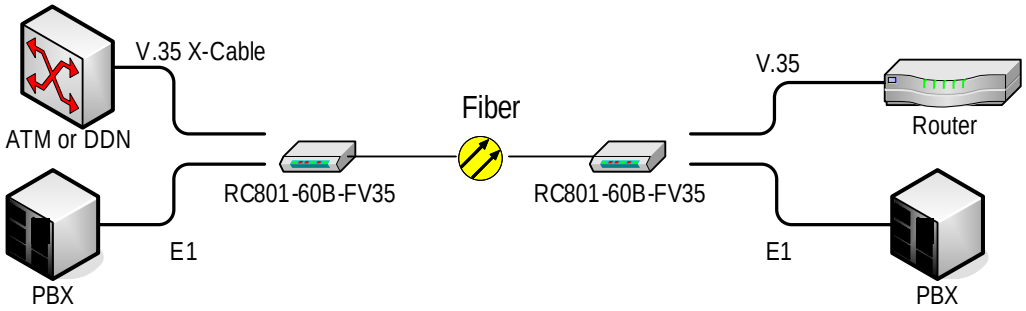
In "Master Clock-Slave Clock" topology, if DXC, MUX devices are in E1 link, the DXC, MUX and remote modem should all be slave clock mode (follow the clock of E1 link)



4.5.2. Point-to-point 'Terminal Clock – Slave Clock' Topology

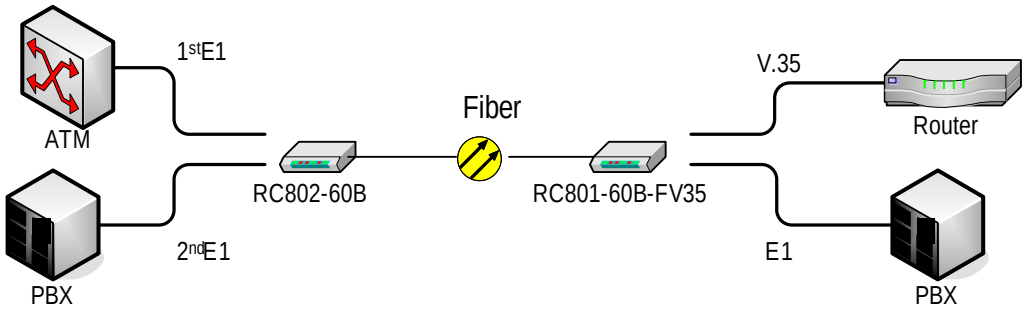
When the remote DTE device must follow the timing resource of local DTE device's clock, that is to say the TX CLOCK of local DTE is internal clock source, it is advised to set the local V.35 interface modem 'Terminal Clock Mode', and remote V.35 interface modem 'Slave Clock Mode'.

In "Terminal Clock-Slave Clock" topology, if DXC, MUX devices are in E1 link, the DXC, MUX and remote V.35 interface modem should all be slave clock mode (follow the clock of E1 link).



4.5.3. Extended Connection Type

This series device can not be connected to fiber interface device of other vendor. But it can be connected with remote RC802/804-60B series dual-E1 fiber optic modem module. The device RC802-60B and RC804-60B with two E1 interface has been introduced in section “Model Description”.



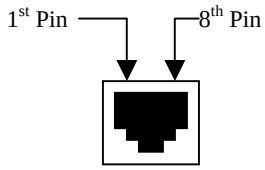
It needs to pay attention to:

1. The 1st E1 of RC802-60B should be connected to 1st tributary V.35 interface of RC801-60B-FV35;
2. The 2nd E1 of RC802-60B should be connected to 2nd tributary E1 interface of RC801-60B-FV35;
3. Local RC802-60B can transfer the first tributary in optical signal to G.703 E1 signal which can be connected by E1 interface of wide network, such as ATM, SDH and etc. In this method the V.35 data channel of RC801-60B-FV35 should using slave clock mode (fiber resuming clock).
4. In this connection type, the E1 CRC checkout function of ATM device is commonly disabled, but the V.35 data channel CRC checkout function of Raisecom RC801-60B-FV35 is enabled, so please adjust their CRC property to consistent.
5. Additionally please pay attention to the choosing of PCM30/31 mode and time slot status of E1 fractional mode.

5. Installation & Preparation

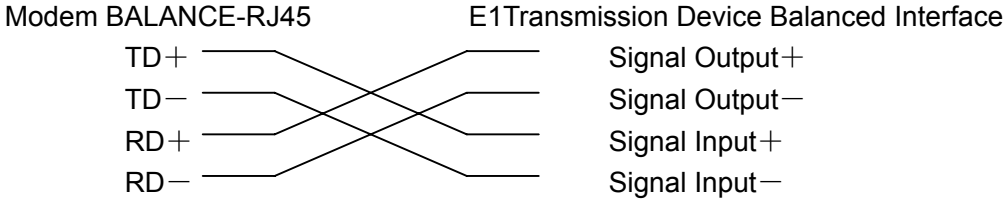
5.1. Before installation

- Please make sure that your V.35 cable matches the equipment you want to connect
- Please check whether the equipment has been destroyed
- If you do not use network management, please configure the device through DIP-switch before installation.
- The E1 interface is 75Ω BNC in default, if Balance interface is needed please configure the SW7 on the bottom of device.
- Using of E1 balanced interface cable
  The definition of each pin on E1 balanced interface is shown in below table:



PIN NO.	1	2	3	4	5	6	7	8
Signal Name	TD+	TD-	N/A	RD+	RD-	N/A	N/A	N/A
Meaning	Output +	Output -	-	Input +	Input -	-	-	-

When connect the 120Ω balanced interface to other device, the pin definition of the device should be aware. The connection type of twisted pair cable is shown as following:



NOTE: The TD+ and TD- should be two lines which are twisted together. And it is the same to RD+ and RD-.

5.2. Cautions before Applying the Power Supply

- It is strictly forbidden to hot-swap the V.35 interface cable.
- If adopts the DC –48V power supply, please firstly connect the Protecting Ground (the middle pin PGND). They must not be reversely connected, connect -48V with low voltage input, BGND with high voltage input.

5.3. Equipment Deployment

- Keep the center office clean
- The deployment and settlement should be in order.
- Configure the clock mode, time slot, master/slave setting and other parameters according to the specific connection type.

5.4. Connection Diagnoses

- Check whether there is any alarm on local equipment
- Test whether data communication can be performed between local DTE and remote equipment

If the test is failed, please try the following steps.

1. Local bidirectional loopback test. Refer to previous dip-switch setup for configuration details or configure by software. If the Router indicates loopback successful, the V.35 interface is working in good condition. If the Router indicates loopback fails, please firstly check the timing resource and bandwidth setup at local site, and then try to adjust the TX CLK and RX CLK phase option switch.
2. If the E1 interface of remote equipment is connected with the ATM E1 interface, please make sure that there is only on clock source in the network and the time slot configuration of both equipments is the same.

If the link still remains disconnected, please get technical support from the local distributors.

6. F & Q

If there is any problem during installation and operation, please try the following solutions. If the problems still cannot be solved, please contact distributors for technical support.

- **Power/Error code test indicator (PWR/PAT) is not on**
  Answer: Power supply fails. Check whether the power supply of chassis is working properly.
- **In unframed mode there is AIS alarm after connecting the fiber**
  Answer: In unframed mode the AIS alarm indicator will be steady on when optical interface receives AIS. It may be caused by E1 line intermit .If the line works normal, please check the following conditions: V.35 interface of remote site device does not connect to router, remote router is powered off or V.35 interface of remote router is shutdown. When work with few venders' router, there maybe yellow steady on or interval on, but they can communicate with each other. It is because few remote routers will send AIS when there is no data transporting. If this exceptional phenomenon doesn't affect communication please ignore it.

- **V.35 Interface Data channel alarm**
  Answer: If there is LOF and CRC alarm please check the line quality, clock mode, framed mode and etc. You can use the internal error code test function and loopback function to check the device and the line.

- **Enable loopback function, using the internal error code tester and power on, but the status of PWR/PAT is not stable.**
  Answer: Firstly make sure that the connection of optical interface is normal and there is no error code, and then make sure there is no loopback configuration on remote site equipment. In the first 15 seconds after being powered on, the local and remote equipments will change information with each other, so the unstable indicator is normal. Please wait for some moments and then judge error code status according to PWR/PAT indicator.

- **PRI of network management and DIP-switch**
  Answer: CPU will read the DIP-switch configuration when it is powered on, and then network management has higher privilege. (Notice that network management cannot configure Fault-Pass function)

- **Severe Packet Loss**
  Answer: This may be caused by the following conditions:
  There is more than one clock source in the network;
  Check the status of router's V.35 interface, if there is RX/TX data error, please adjust RX CLK phase of local and remote device.

- **Compatibility**

  Answer: The optical interface of this equipment deploys PDH technology, so the optical interface can only communicate with Raisecom RC800 series optical modem. But if the remote site is E1 interface fiber optic modem, the E1 interface can communicate with all the other venders' equipments.

- **Compatibility of V.35 interface**

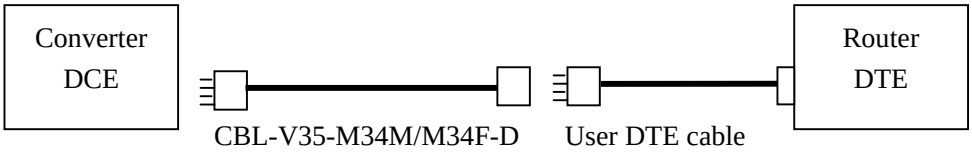
  Answer: RC800-60B-FV35 series can work with other Raisecom V.35 equipments, and can provide a flexible network topology, including:

  - Standalone RC903-V35FE1 V.35 to fractional E1 interface converter
  - Modular RC904-V35FE1 V.35 to fractional E1 interface converter
  - SUBM-FV35 (N×64K V.35) card which is installed in extension slot of some Raisecom optical multiplexer

Appendix A: Introduction of Cable Making

1. CBL-V35-M34M/M34F-D Cable making Instruction

This cable is used to extend V.35 cable if the DET cable is not long enough.



When you order this cable from Raisecom or our agency please make sure the length you want.

If you want to make the cable by yourself please refer to below table:

ISO2593Male（M34M）	V.35 STD Name	ISO2593 Female（M34F）
A	PGND	A
P	TD(A)	P
R	RD(A)	R
C	RTS	C
D	CTS	D
E	DSR	E
B	GND	B
F	DCD	F
S	TD(B)	S
Y	TCP(A)	Y
W	SCTE(B)	W
V	RCP(A)	V
H	DTR	H
T	RD(B)	T
AA	TCP(B)	AA
U	SCTE(A)	U
X	RCP(B)	X

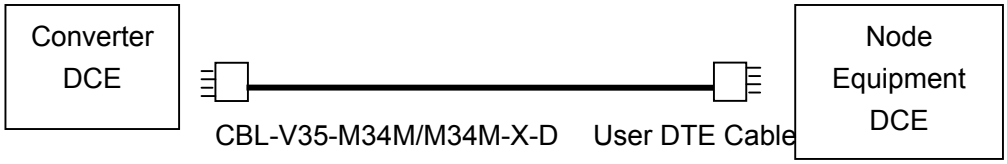
Other pins have no connection.

Request: The cable material is not lower than 80℃ 30V.

2. CBL-V35-M34M/M34M-X-D Cable making Instruction

This cable is cross connection cable which is used to link the V.35 (DCE) interface of node equipment such as DDN to the V.35 interface of the RC802-60B-FV35 series

device. When using this cable if the clock source is provided by node equipment the RC802-60B-FV35 series device should be configured to V.35 terminal mode. If the clock is provided by fiber optic modem, the node equipment's clock should be slave mode.



When you order this cable from Raisecom or our agency please make sure the length you want.

If you want to make the cable by yourself please refer to below table:

The two ends of the cable are both M34 connector.

Signal Name	Pin NO.		Pin NO.	Signal Name
TD (A)	P	←	R	RD (A)
TD (B)	S	←	T	RD (B)
RD (A)	R	→	P	TD (A)
RD (B)	T	→	S	TD (B)
RCLK (A)	V	→	U	SCTE (A)
RCLK (B)	X	→	W	SCTE (B)
SCTE (A)	U	←	V	RCLK (A)
SCTE (B)	W	←	X	RCLK (B)
SGND	A	—	A	SGND
GND	B	—	B	GND
TCLK (A)	Y	N/A	Y	TCLK (A)
TCLK (B)	AA	N/A	AA	TCLK (B)
DCD	F		F	DCD
DSR	E		E	DSR
CTS	D		D	CTS
RTS	C		C	RTS
DTR	H		H	DTR

Other pins have no connection.

Request: The cable material is not lower than 80℃ 30V.

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