V.35 Sync Modem Eliminator Card

FEDERAL COMMUNICATIONS COMMISSION
AND
INDUSTRY CANADA
RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

TRADEMARKS USED IN THIS MANUAL

Any trademarks mentioned in this manual are acknowledged to be the property of the trademark owners

NORMAS OFICIALES MEXICANAS (NOM)
ELECTRICAL SAFETY STATEMENT

INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.

2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.

3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.

4. Todas las instrucciones de operación y uso deben ser seguidas.

5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..

6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.

7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.

8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.

9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.

10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.

11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.

13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.

14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.

15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.

16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.

17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.

18. Servicio por personal calificado deberá ser provisto cuando:

    A: El cable de poder o el contacto ha sido dañado; u

    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o

    C: El aparato ha sido expuesto a la lluvia; o

    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o

    E: El aparato ha sido tirado o su cubierta ha sido dañada.

Contents

1. Specifications

**Transmission
Format:** Synchronous, CCITT V.35

Data Rates: 32, 48, 56, 64, 72, 112, 128,
and 144 kbps

Clocking: Internal, external, or receive
loopback

External Interface: UD-26 female, ports A1 and
B1

Internal Interface: Connection to MicroRack 2, 4,
8, or 16 chassis via male card
edge

Distance: 300 feet (91.4 m), DTE to DTE

Indicators: Independent bicolor LED
indicators for each port: TD,
CD, and DTR; common
"Power" indicator

Fuse: 400 mA for 120V applications;
200 mA for 240V applications

V.35 SYNC MODEM ELIMINATOR CARD

Power Supply: *PS460A*: Rackmount power
supply is switchable between
120 and 240 VAC; Chassis
supplies 10 VAC to the Card,
typical consumption is
700 mW/2.4 amp

PS461A: 48-VDC rackmount
power supply, typical
consumption is 700 mW/
2.4 amp

RTS/CTS Delay: Strap-selectable for 0, 7, or
53 ms (±15%)

MTBF: 111,647 hours

MTTR: 1 hour

Temperature: 32 to 122°F (0 to 50°C)

Humidity: 5 to 95%, noncondensing

Altitude: Up to 10,000 feet (3048 m)

Size: 3.1"H x 0.95"W x 5.4"D
(7.9 x 2.4 x 13.7 cm)

2. Introduction

2.1 Description

The V.35 Sync Modem Eliminator Card lets two synchronous hosts communicate with each other in the same room for a fraction of the cost of a pair of high-speed modems. Supporting synchronous data rates of 32, 48, 56, 64, 72, 112, 128, and 144 kbps, the Card can be configured to emulate dialup or leased-line service. Maximum distance between the connected hosts is 300 feet (91.4 m). Timing can be set for internal or external clock, and all necessary data, clocking, and control signals are supported.

The V.35 Sync Modem Eliminator Card is designed to mount in a 2U-high, 16-slot rack chassis (MicroRack 16, part number RM216), as well as in the 2-, 4-, or 8-slot desktop MicroRack (RM202, RM204, RM208). The MicroRack 16 features a switchable 120/240-VAC power supply (or optional 48-VDC, part number PS461A) and hot-swappable function/interface cards mounted in a mid-plane architecture. (MicroRacks 2, 4, and 8 do not come with a power supply. You must order the PS460A or PS461A. See "Power Supply" in **Chapter 1** for more information.)

Front-panel LEDs show TD, DTR, and CD activity for both ports, as well as power. The rear interface card has two UD-26 connectors for patching to the host devices.

2.2 Features

- •V.35 operation.

- •Synchronous data rates from 32 to 144 kbps.

- •Host-to-host distances up to 300 feet (91.4 m).

- •Constant or RTS-controller carrier selections.

- •RTS-CTS delay options of 0, 7, or 53 milliseconds.

- •Internal or external clocking.

- •All necessary data, clocking, and control signals supported.

- •Front-panel LEDs show TD, DTR, and CD activity for each port.

- •Two UD-26 (ultra-density) connectors on the rear interface card.

- •Switchable 120- or 240-VAC power supply.

- •Optional 48-VDC power supply.

3. Configuration

The V.35 Sync Modem Eliminator Card uses a combination of DIP switches and jumpers that allow configuration to an extremely wide range of applications. Designed around a mid-plane architecture, the V.35 Sync Modem Eliminator Card incorporates both front and rear cards. Configuration of both may be necessary. The switches/jumpers are accessible when the Cards are slid out of the rack chassis. Once configured, the V.35 Sync Modem Eliminator Card is designed to operate transparently, without need for frequent re-configuration: Just set it and forget it.

3.1 Function-Card Configuration

All switches and jumpers are located on the V.35 Sync Modem Eliminator Card's PC board. To access the PC board, loosen the two thumbscrews on the front panel and slide the card out of the chassis. As Figure 3-1 illustrates, the DIP switches are located on the daughterboard and the jumpers are located on the main PC board.
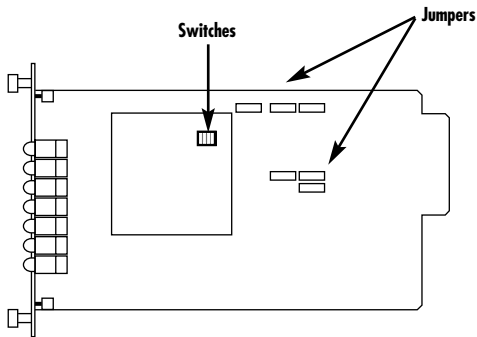
Figure 3-1. Locating switches and jumpers.

3.2 Function-Card DIP Switch

The V.35 Sync Modem Eliminator Card has one four-position DIP switch mounted on the daughterboard. Figure 3-2 shows the numbering of the individual switches and their ON/OFF positions relative to the daughterboard.
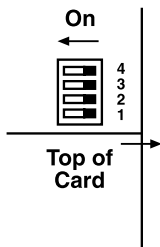
Figure 3-2. DIP-switch orientation on the daughterboard.

S1 through S3: Data Rate Setting

Switches S1 through S3 are set in combination to determine the synchronous data rate for the V.35 Sync Modem Eliminator Card. Switch S4 is not active.

<u>S1</u>	<u>S2</u>	<u>S3</u>	<u>S4</u>	<u>Setting</u>
Off	Off	Off	N/A	32 kbps
On	Off	Off	N/A	48 kbps
Off	On	Off	N/A	56 kbps
On	On	Off	N/A	64 kbps
Off	Off	On	N/A	72 kbps
On	Off	On	N/A	112 kbps
Off	On	On	N/A	128 kbps
On	On	On	N/A	144 kbps

3.3 Function-Card Jumpers

The V.35 Sync Modem Eliminator Card has two ports (Port A and Port B), and each must be configured independently. Therefore, every function (such as clocking) has *two* jumpers associated with it. As Figure 3-3 shows, each jumper has three possible positions: strap covering posts 1 and 2, strap covering posts 2 and 3, or removing the strap altogether. The illustration below shows all valid strap positions.
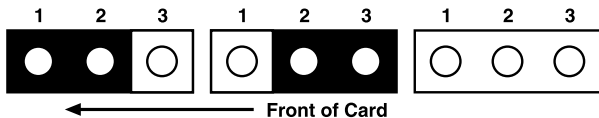

Figure 3-3. Possible function-card strap positions.

The V.35 Sync Modem Eliminator Card has six jumpers (JP1 through JP6) mounted on the PC board (see Figure 3-4). These jumpers set clocking, carrier, and RTS/CTS delay independently for ports A and B.
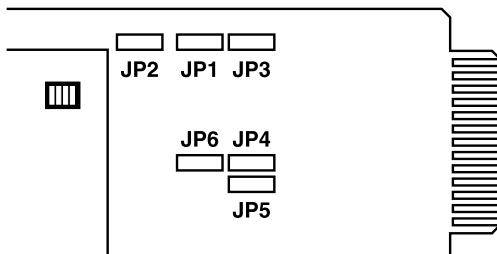

Figure 3-4. Jumper locations on the PC board.

JP1: RTS/CTS Delay (Port A)

The setting for jumper JP1 determines—with respect to Port A—the amount of delay between the time the V.35 Sync Modem Eliminator Card "sees" RTS and when it sends CTS. In order to emulate either dialup or leased-line modems, you can set this strap at either 0, 7, or 53 ms.

13

JP1	Setting
Position 1 and 2	7-ms delay (factory default)
Position 2 and 3	53-ms delay
Strap Removed	0-ms delay

JP6: RTS/CTS Delay (Port B)

The setting for jumper JP6 determines—with respect to Port B—the amount of delay between the time the V.35 Sync Modem Eliminator Card "sees" RTS and when it sends CTS. In order to emulate either dialup or leased-line modems, you can set this strap at either 0, 7, or 53 ms.

JP6	Setting
Position 1 and 2	7-ms delay (factory default)
Position 2 and 3	53-ms delay
Strap Removed	0-ms delay

JP2: Carrier Control (Port A)

The setting for jumper JP2 determines—with respect to Port A—whether the V.35 Sync Modem Eliminator Card's carrier is constantly on or controlled by RTS.

JP2	Setting
Position 1 and 2	Carrier constantly ON (factory default)
Position 2 and 3	Carrier controlled by RTS
Strap Removed	Not a valid setting

JP3: Carrier Control (Port B)

The setting for jumper JP3 determines—with respect to Port B—whether the V.35 Sync Modem Eliminator Card's carrier is constantly on or controlled by RTS.

JP3	Setting
Position 1 and 2	Carrier constantly ON (factory default)
Position 2 and 3	Carrier controlled by RTS
Strap Removed	Not a valid setting

JP5: Clock Source (Port A)

The setting for jumper JP5 determines—with respect to Port A—whether clocking is internal or external.

NOTE

Only Port A may be set for external clock.

JP5 (Port A)	Setting
Position 1 and 2	External Clock
Position 2 and 3	Internal Clock (factory default)
Strap Removed	Not a valid setting

NOTE

DSR will raise upon the activating of DTR from remote.

JP4: Clock Source (Port B)

The setting for jumper JP4 determines—with respect to Port B—whether clocking is internal or receive loopback.

NOTE

If Port B is set for receive loopback clock, Port A *must* be set for external clock.

Port B may *not* be set for external clock.

JP4 (Port B)	Setting
Position 1 and 2	Received Loopback Clock
Position 2 and 3	Internal Clock (factory default)
Strap Removed	Not a valid setting

3.4 Rear-Card Configuration

The rear interface card for the V.35 Sync Modem Eliminator Card is equipped with two female UD-26 connectors, one for each DTE host port. This card has one configuration jumper (JB4). Figure 3-5 shows the location of this jumper on the PC board.
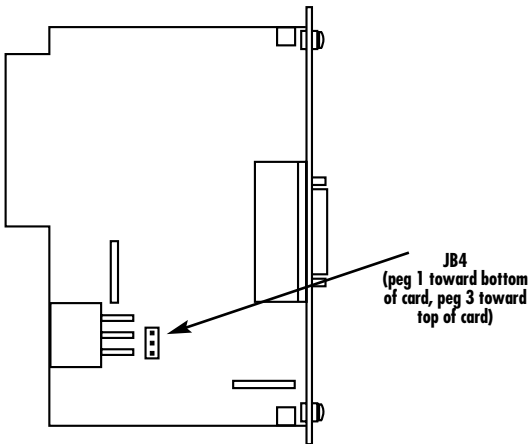
JB4
**(peg 1 toward bottom
of card, peg 3 toward
top of card)**

Figure 3-5. Rear-card jumper location.

SGND & FRGND (JB4)

In the connected position, this jumper links UD-26
pin 7 (Signal Ground) and frame ground. In the
open position, pin 1 is "lifted" from frame ground.

JB4
Position 1 & 2 = SGND (UD-26 pin 7) and FRGND Connected
Position 2 & 3 = SGND (UD-26 pin 7) and FRGND Not Connected

4. Installation

This chapter describes the functions of the MicroRack 2, 4, 8, and 16 chassis, tells how to install front and rear V.35 Sync Modem Eliminator Cards into the chassis, and provides diagrams for wiring the interface connections correctly.

4.1 The MicroRack and Power Supplies

The MicroRack comes with two, four, eight, or sixteen card slots, plus its own power supply. The MicroRack 16 includes its own power supply. If you will be using the MicroRack 2, 4, or 8, you must order a power supply (see **Chapter 1** for more information on PS460A and PS461A). Measuring only 3.5 inches high, the MicroRack is designed to occupy only 2U in a 19-inch rack. Sturdy front handles allow the MicroRack 16 to be extracted and transported conveniently.
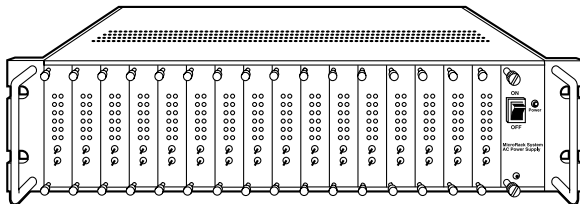
Figure 4-1. The MicroRack 16.

The power supply (PS460A or PS461A) used in the MicroRack uses the same mid-plane architecture as the modem cards. The front card of the power supply slides in from the front, and the rear card slides in from the rear. They plug into one another in the middle of the rack. The front card is then secured by thumbscrews and the rear card by conventional metal screws.

WARNING

There are no user-serviceable parts in the power supply. Voltage settings and fuse replacement should only be performed by qualified service personnel.

Switching the Power Supply On and Off

The power supply on/off switch is located on the front panel. When the power supply is plugged in and switched on, a red front-panel LED will glow.

Since the MicroRack is a "hot swappable" rack, it is not necessary for any cards to be installed before switching on the power supply. The power supply may be switched off at any time without harming the installed cards.

Replacing the Power-Supply Fuse

The rack chassis power supply uses a 400-mA fuse for 120-VAC circuits, and a 200-mA fuse for 240-VAC circuits. The fuse compartment is located just below the AC socket on the rear card. To replace the fuse, follow these steps:

1) Turn the power switch off and remove the power cord.

2) Using a small screwdriver, pop the compartment open (it will slide open like a drawer).

Depending upon the exact part used, the drawer may slide completely out of the fuse holder, or it may stop partway out.

3) Note that there are two fuses in the drawer. The front fuse is the spare, and the rear fuse is the "active" fuse.

4) If the active fuse appears to be blown, remove it from the clips and replace it with the spare from the front compartment. Note the size and rating of the blown fuse before discarding it.

5) Buy a replacement fuse at an electronics store. (Note: For continued protection against the risk of fire, replace only with the same type and rating of fuse.)

Switching the Power Supply Between 120 and 240 Volts

Although the MicroRack is shipped from the factory with a customer-specified power-supply configuration, you may change the configuration yourself. Here are the steps to switch the configuration of the power supply between 120 and 240 VAC:

1) Remove the front power-supply card and locate the two-position switch near the back of the card. Slide the switch to the desired voltage. (Note: The actual values on the switch may be "110/220" or "115/230.")

2) Verify that the existing fuse is the correct value (400 mA for the 120-volt, 200 mA for the 240-volt).

3) Connect the power-supply cord.

4.2 Installing the V.35 Sync Modem Eliminator Card in the MicroRack Chassis

The V.35 Sync Modem Eliminator Card is made up of a front card and a rear card. The two cards meet inside the MicroRack chassis and plug into each other by way of mating 50-pin card edge connectors. Use the following steps as a guideline for installing each V.35 Sync Modem Eliminator Card into the chassis.

1) Slide the rear card into the back of the chassis along the metal rails provided.

2) Secure the rear card using the metal screws provided.

3) Slide the card into the front of the chassis. It should meet the rear card when it's almost all the way into the chassis.

4) Push the front card gently into the card-edge receptacle of the rear card. It should click into place.

5) Secure the front card using the thumbscrews.

NOTE

Since the MicroRack chassis allows hot-swapping of cards, it is not necessary to power-down the rack when you install or remove a V.35 Sync Modem Eliminator Card.

4.3 Host (DTE) Connection

The V.35 Sync Modem Eliminator Card rear card has two UD-26 connectors, labeled "A1" and "B1" (see Figure 4-2). These correspond to host (DTE) connection Port A and Port B.
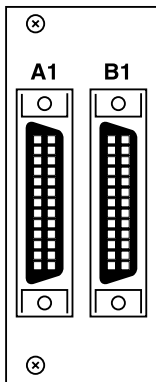
Figure 4-2. The rear interface card, showing connectors.

To connect V.35 host (DTE) devices A and B to the
V.35 Sync Modem Eliminator Card:

1. Configure the V.35 Sync Modem Eliminator Card
   for your specific application according to the
   instructions in **Chapter 3**.

2. Connect host devices A and B to the V.35 Sync
   Modem Eliminator Card using multipair adapter

cables (call for information on EHN1206-01 and
EHN1206-02). Note the following conditions
when making connections.

a) Each multipair cable *must not exceed 150 feet
    (45.7 m) in length* (see Figure 4-3).

b) If external clock is used, the host (DTE) de-
    vice supplying the clock *must* be connected to
    Port A. The V.35 Sync Modem Eliminator
    Card *can't* receive an external clock on Port B.

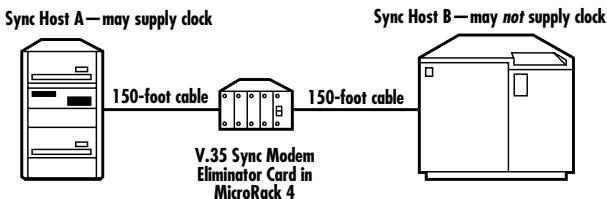c) If receive clock is used on Port B, Port A *must*
    supply an external clock.

Sync Host A—may supply clock   **Sync Host B—may *not* supply clock**

150-foot cable   150-foot cable

**V.35 Sync Modem
Eliminator Card in
MicroRack 4**

Figure 4-3. Maximum allowable cable distances.

NOTE

**Any cable connected to the card must be shielded
cable, and the outer shield must be 360 degree
bonded—at both ends—to a metal or metalized
backshell.**

5. Operation

Once you have configured the V.35 Sync Modem Eliminator Card and connected the cables to host A and host B, you are ready to operate the unit. This section describes the LED status monitors and power-up procedure.
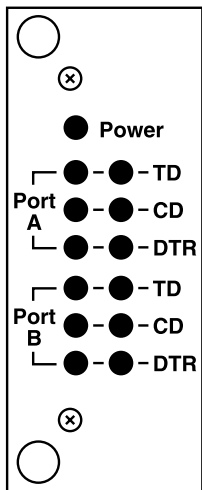

Figure 5-1. The Card's front panel, showing LEDs.

5.1 LED Status Monitors

The V.35 Sync Modem Eliminator Card has 13 front-panel status LEDs that indicate the condition of the Card and Ports A and B (see Figure 5-1).

- •PWR glows green when power is applied to the V.35 Sync Modem Eliminator Card through its mid-plane-chassis connection.

- •Two TD LEDs monitor the status of each port's data transmission. The red LED glows when the signal is in an idle (negative) state. The green LED glows when the signal is in a transmitting (positive) state. Both LEDs will normally blink when data transmission is occurring.

- •Two CD LEDs monitor the status of each port's carrier-detect signal. The red LED glows when the receive channel is not active (negative condition). The green LED glows when the receive channel is active (positive condition).

- •Two DTR LEDs monitor the status of DTR for each port. The red LED glows to indicate that the host device connected to that port is not ready to communicate (negative condition). The green LED glows to indicate that the host device connected to that port is ready to communicate (positive condition).

5.2 Power-Up

There is no power switch on the V.35 Sync Modem
Eliminator Card: Power is automatically applied to
the Card when its card-edge connector makes
contact with the chassis's mid-plane socket, or when
the chassis's power supply is turned on.

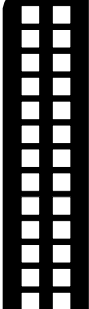### NOTE

The V.35 Sync Modem Eliminator Card is a "hot-swappable" card. It will not be damaged by plugging it in or removing it while the rack is powered up.

When the V.35 Sync Modem Eliminator Card is
powered up, and both ports are passing data
normally, the following LED conditions will exist:

- •PWR will glow green.
- •TD will be blinking red and green.
- •CD will glow green.
- •DTR will glow green.

Appendix: Interface Standards

V.35 INTERFACE - A1 & B1

Not Used -26
Not Used -25
Network Clock (XTC) -24
Not Used -23
Not Used -22
Not Used -21
Data Term Ready (DTR) -20
Not Used -19
Not Used -18
Receive Clock (RC) -17
Receive Data (/RD) -16
Transmit Clock (TC) -15
Transmit Data (/TD) -14

1- (FG) Frame Ground
2- (TD) Transmit Data
3- (RD) Receive Data
4- (RTS) Request To Send
5- (CTS) Clear To Send
6- (DSR) Data Set Ready
7- (SG) Signal Ground
8- (CD) Carrier Detect
9- (/RC) Receive Clock
10- Not Used
11- (/XTC) Network Clock
12- (/TC) Transmit Clock
13- Not Used

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