V.35 Sync Modem Eliminator

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 la 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

Compliance —   CE; FCC Part 15 Class A, DOC Class/MDC classe A

Interface —   Serial ITU-TSS V.35

Protocol —   Synchronous

Clock Source —   Either internal for both ports or external for
Port A and recovered for Port B(user-selectable)

Flow Control —   Transparent to software flow control; does not
support hardware flow control, but emulates RTS-to-
CTS delay of 0, 7, or 53 ms ±15% (user-selectable)

Operation —   Point-to-point

Data Rate —   32, 48, 56, 64, 72, 112, 128, or 144 kbps (user-
selectable)

Maximum Distance —   300 ft. (91.4 m) from one attached DTE to the other

User Controls —   (4) Internal:
(1) Four-position DIP switch for data rate;
(3) Jumpers for RTS/CTS delay, carrier control,
and clock source

Indicators —   None

Connectors —   (2) End-mounted M/34 ("34-pin M-block") female

MTBF —   144,600 hours

V.35 SYNC MODEM ELIMINATOR

Maximum Altitude — 10,000 ft. (3048 m)

**Temperature
Tolerance —** 32 to 122˚F (0 to 50˚C)

**Humidity
Tolerance —** 5 to 95% noncondensing

Power — From the V.35 Interface on both ports: 5 VDC, 6 mA drawn from each port's RTS and DTR signals (Pins C and H); maximum total consumption approximately 120 mW

Size — 0.8"H x 2"W x 3"D (2 x 5.1 x 7.6 mm)

Weight — 3.3 oz. (95 g, 0.2 lb., 0.1 kg)

2. Introduction

With our V.35 Synchronous Modem Eliminator (SME), two synchronous hosts that are not farther apart than 300 ft. (91.4 m) can communicate with each other for a fraction of the cost of a pair of high-speed modems. The V.35 SME supports synchronous data rates of 32, 48, 56, 64, 72, 112, 128, and 144 kbps, and can be configured to emulate dialup or leased-line service. Timing can be set for internal or external clock, and all necessary data, clocking, and control signals are supported.

   The V.35 SME implements the V.35 electrical interface on two standard M/34 ("34-pin M-block") female connectors. The unit draws its power directly from the Request to Send (RTS) and Data Terminal Ready (DTR) signal leads (Pins C and H) on both ports, so no AC power or batteries are required.

   You can configure the V.35 SME's behavior in several other ways. For example, you can set it to keep carrier constantly ON or to have carrier follow RTS; you can also set it to immediately respond to RTS with CTS or to emulate an RTS-to-CTS delay of 7 or 53 ms.

3. Configuration

The V.35 Synchonous Modem Eliminator has seven internal user controls—one four-position DIP switch and six jumpers—with which you can configure the unit for a wide range of applications. This chapter tells you how to open, set, and reclose the V.35 SME, and describes all of the unit's possible configuration settings (including its factory defaults).

3.1 Opening the Housing

Before you go any farther, answer these questions:

First, will your devices be using the V.35 SME's internal clock, and do you want carrier constantly ON and an RTS-to-CTS delay of 7 ms (the factory-default settings for these options)? If not, you will need to open both the middle portion and the top of the Port-B end of the unit's housing: Skip ahead and follow the directions in **Sections 3.1.1** and **3.1.2**.

Second, will your devices be communicating through the V.35 SME at 32 kbps (the factory-default data rate)? If not, you will need to open just the middle portion of the unit's housing: Skip ahead and follow the directions in **Section 3.1.1** *only* (do *not* do **Section 3.1.2**).

If you are satisfied with all of the factory-default settings, you don't need to configure the unit at all; skip ahead to **Chapter 4**.

3.1.1 OPENING THE MIDDLE SECTION

Carefully insert a screwdriver, knife, or other tool with a very thin flat blade into the seam along the side of the middle part of the V.35 SME's housing (the section with the model- and lot-number stickers). Gently twist the tool until the all-plastic top and bottom panels of this housing section begin to pop apart. (You will probably hear a snapping noise; this is normal.) If they don't come all the way off, carefully pry them the rest of the way off with your fingers. See Figure 3-1 below.
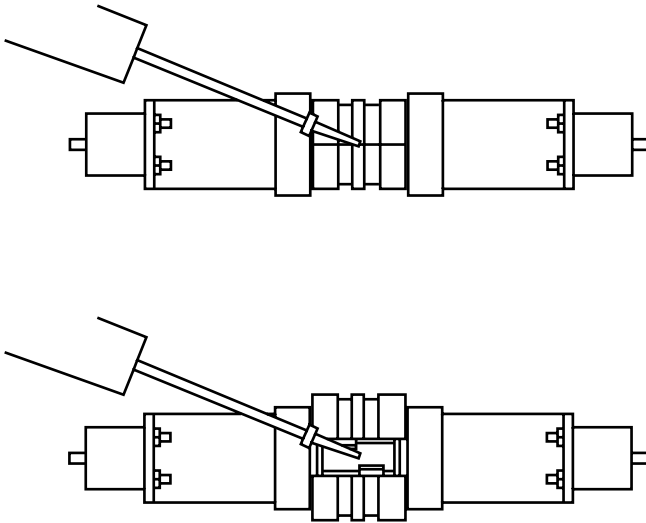
Figure 3-1. Removing the middle section.

3.1.2 OPENING THE TOP OF THE PORT-B END

This is a tricky procedure, so follow these instructions very carefully. Now that you have the middle section open, find the DIP switch. It is mounted in plain view on top of the V.35 SME's insides, in one corner of one of the unit's circuit boards; refer to Figure 3-3 on the next page. If you hold the unit so that this DIP switch is in the *lower left* corner of the exposed area, the housing panel you need to remove is the *nearest* one to the Switch, the one to its *left*. If you look closely, you will see that this panel partially obscures a copyright notice printed on the DIP switch's circuit board, as well as the edge of this board (the jumpers you need to get at are on the unit's main board, beyond and below this edge).
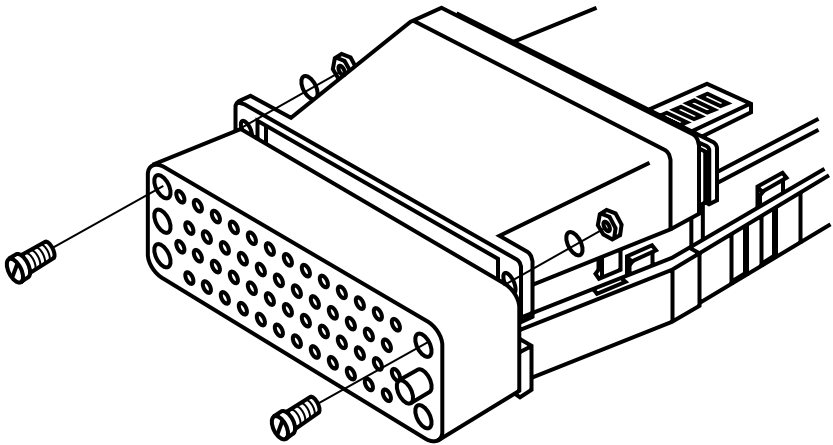
**Figure 3-2. Removing the top panel on the Port-B end.**

To remove this panel, you need to unscrew and remove the two screws that hold it on. These are at the very end of the unit: They are the top two screws in Port B's M/34 connector (one in the upper left corner, one in the upper right—see Figure 3-2 below). Use a long, thin flathead screwdriver to back these screws out one at a time. As you unscrew each screw, try to hold the unit with the opposite side of Port B angled upward, so that when the associated nut and lug washer come loose, they fall into your hand rather than into the adjacent hole in the V.35 SME's housing. (If any of the nuts or washers should happen to fall into the unit, don't panic; they can be shaken through to the

open middle section and out of the unit without damaging it. Just make sure to shake them out over a partitioned-off area of a counter, desktop, etc., so that you don't lose them if you miss catching them when they come out.)

Once you've removed both of these screws, firmly grip the housing panel that has to come off and carefully pry it away from the rest of the unit. (You will probably hear a snapping noise; this is normal.)

3.2 Setting the DIP Switch

As you can see, the V.35 SME's four-position data-rate DIP switch is mounted on an internal daughterboard. Figure 3-3 below shows the location of this switch, the numbering of its individual switch positions, and the directions of their ON and OFF settings relative to the rest of the unit.
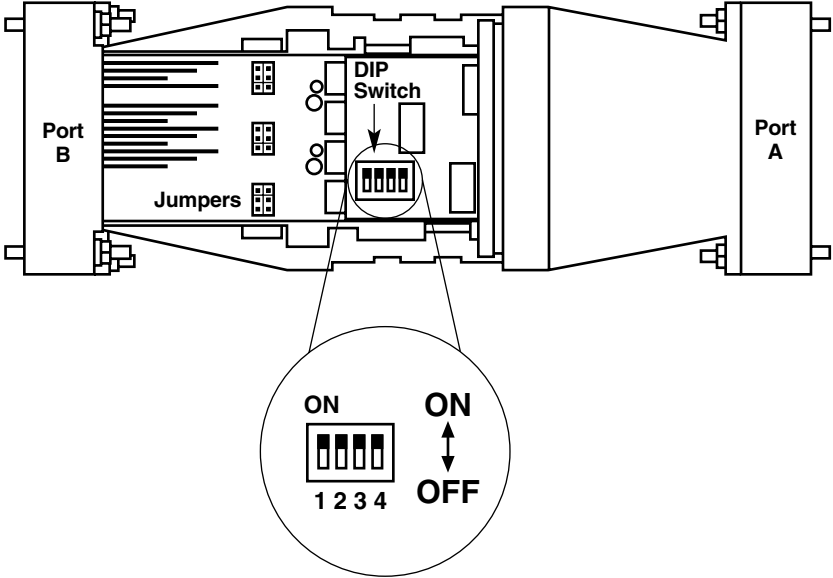
Figure 3-3. The internal controls: The DIP switch.

Move positions 1, 2, and 3 of this switch as necessary to select your desired synchronous data rate. (Position 4 is reserved for future use.) Table 3-1 below shows the V.35 SME's possible data-rate settings.

Table 3-1. Data-Rate Settings

P. 1	P. 2	P. 3	Data Rate
Off	Off	Off	32 kbps *(factory default)*
On	Off	Off	48 kbps
Off	On	Off	56 kbps
On	On	Off	64 kbps
Off	Off	On	72 kbps
On	Off	On	112 kbps
Off	On	On	128 kbps
On	On	On	144 kbps

3.3 Setting the Jumpers

The V.35 SME also has three pairs of jumpers—JP1, JP2, and JP3—mounted on its main circuit board (see Figure 3-4 below; the jumpers are shown in their factory-default settings). Use these jumpers to independently set clocking, carrier, and RTS/CTS delay for Ports A and B. (You will probably have to use needle-nosed pliers to move the jumpers.)
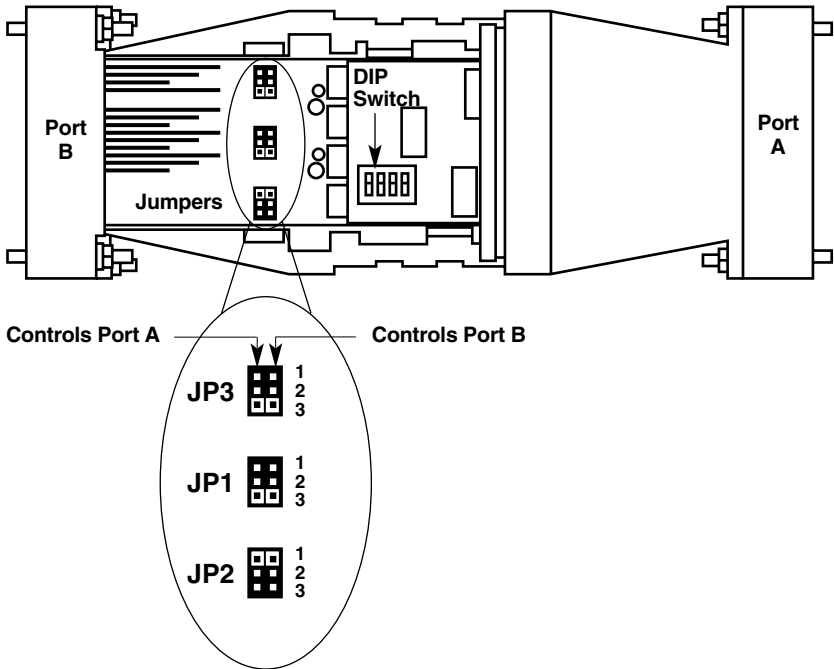

Figure 3-4. The internal controls: The jumpers.

Notice that in each pair of jumpers, one jumper controls the setting of Port A and the other controls that of Port B. Also notice that each jumper has three possible settings: covering posts 1 and 2, covering posts 2 and 3, or "removed" (usually left covering only a single post, so it doesn't get lost). The detailed descriptions of each jumper pair on the next page list all possible jumper settings.

JP3: Clock Source
The settings of the JP3 jumpers determine whether (a) both devices connected to the V.35 SME use the SME's internal clock or (b) the device on Port A uses external clock and the device on Port B uses recovered (received) clock. (Port A cannot be set for recovered clock; Port B cannot be set for external clock. Do *not* set one port for internal clock and the other for external or recovered clock; the system will not work.)

JP3 (Port A)	Setting
On positions 1 and 2	Internal clock *(factory default)*
On positions 2 and 3	External clock
Removed	(This setting is reserved for future use)

JP3 (Port B)	Setting
On positions 1 and 2	Internal clock *(factory default)*
On positions 2 and 3	Recovered (received loopback) clock
Removed	(This setting is reserved for future use)

JP1: RTS/CTS Delay
The settings of the JP1 jumpers determine the amount of delay after the V.35 SME detects RTS before it sends CTS in response. In order to emulate dialup or leased-line modems, you can set either of these jumpers for 0 ms, 7 ms, or 53 ms of delay. The jumpers for Ports A and B can be configured independently (that is, you can set them differently).

JP1	Setting
On positions 1 and 2	7-ms delay *(factory default)*
On positions 2 and 3	53-ms delay
Removed	0-ms delay (no delay, instant response)

JP2: Carrier Control
The settings of the JP2 jumpers determine whether the V.35 SME holds carrier constantly ON or turns it ON and OFF in response to RTS. The jumpers for Ports A and B can be configured independently (that is, you can set them differently).

JP2	Setting
On positions 1 and 2	Carrier controlled by RTS
On positions 2 and 3	Carrier constantly ON *(factory default)*
Removed	(This setting is reserved for future use)

3.4 Reclosing the Housing

Before you go any further, make absolutely sure the jumper settings are correct, because the last thing you want to do is get the V.35 SME put back together and then have to turn around and disassemble it again.

3.4.1 CLOSING THE TOP OF THE PORT-B END

Take the housing panel that you removed in **Section 3.1.2** and place it in position to be reattached, with the "snap flanges" on either side of the panel lined up flush against the matching flanges on the still-attached bottom panel. When the panel is in the right position, grasp the Port B end of the V.35 SME firmly on both sides and press the top and bottom panels together to snap the top panel back into place.

Now take one of the two screws you removed in **Section 3.1.2** and thread it back into its screwhole in the M/34 connector. Push it in just far enough so that its pointy end slightly protrudes from the other side of the hole. Now, with a screwdriver holding the screw in place, fit the washer over the end of the screw, then lay the nut on the end of the screw and turn the nut or the screw just far enough for them to grip. (You might want needle-nosed pliers for this step. If the washer and/or the nut slip through the adjacent hole and into the V.35 SME, just carefully shake them out through the open middle section of the unit onto your work surface and start over.) Now use a fingertip to hold the nut in place and turn the screwdriver until the screw is securely fastened. Repeat this process with the other screw.

3.4.2 CLOSING THE MIDDLE SECTION

Take the top and bottom panels of the middle section of the V.35 SME's housing, which you removed in **Section 3.1.1**, and slide them back into position to be reattached, with the "snap flanges" on either side of each panel lined up flush against the matching flanges on the opposite panel. Then press them together until they snap into place.

4. Installation and Operation

Once the V.35 Synchronous Modem Eliminator is properly configured, installation and operation are very simple. The V.35 SME draws all necessary operating power from the V.35 interface, so it doesn't need AC or battery power. There is no ON/OFF switch; just like a cable, the unit should operate transparently and continuously when the connected devices are turned ON and communicating. To install the unit, take these steps:

1. Turn OFF the host (DTE) devices to which the V.35 SME is to be connected.

2. If either of the host devices has a M/34 male V.35 port, you can plug the V.35 SME directly into that device. Then connect the V.35 SME to the other host device using a multipair cable. (If neither device has an M/34 male V.35 port, you'll have to run multipair cable to both devices.) The total cable length between the two devices must not exceed 300 feet (91.4 m). Refer to Figure 4-1 below.

   Remember that if one of the devices (rather than the V.35 SME) will be supplying the clock signal, you need to orient the V.35 SME so that the device configured for external clock is connected to Port A and the device configured for recovered clock is connected to Port B.
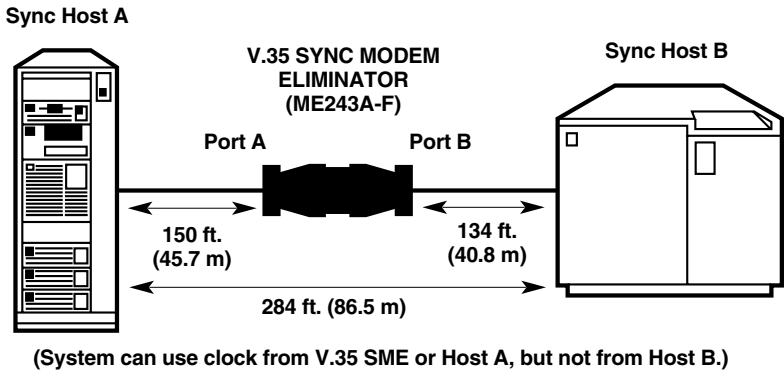
Figure 4-1. A typical installation.

3. Turn ON both host devices. They should communicate normally as if connected by a simple cable. If they do not communicate properly, first make sure that all cabling is connected securely, then check the configuration of the V.35 SME and of each host device: Which one is supplying the clock? What's the data-rate setting of each device? And so on. If you're still having trouble, contact Black Box for technical support (see **Section 5.1**).

5. Troubleshooting

5.1 Calling Black Box

If you determine that your V.35 Synchronous Modem Eliminator is malfunctioning, *do not attempt to alter or repair the unit.* It contains no user-serviceable parts. Contact Black Box Technical Support at (724) 746-5500.

Before you do, make a record of the history of the problem. We will be able to provide more efficient and accurate assistance if you have a complete description, including:

- the nature and duration of the problem.

- when the problem occurs.

- the components involved in the problem.

- any particular application that, when used, appears to create the problem or make it worse.

- the results of any testing you've already done.

5.2 Shipping and Packaging

If you need to transport or ship your V.35 SME:

- Package it carefully. We recommend that you use the original container.

- If you are returning the V.35 SME, make sure you include everything your received with it. Before you ship the unit back to us for whatever reason, contact Black Box to get a Return Authorization (RA) number.

Appendix: Block Diagram

The figure below is a vastly simplified block diagram showing the general layout of the V.35 Synchronous Modem Eliminator's circuitry.

BLACK BOX ®

NETWORK SERVICES
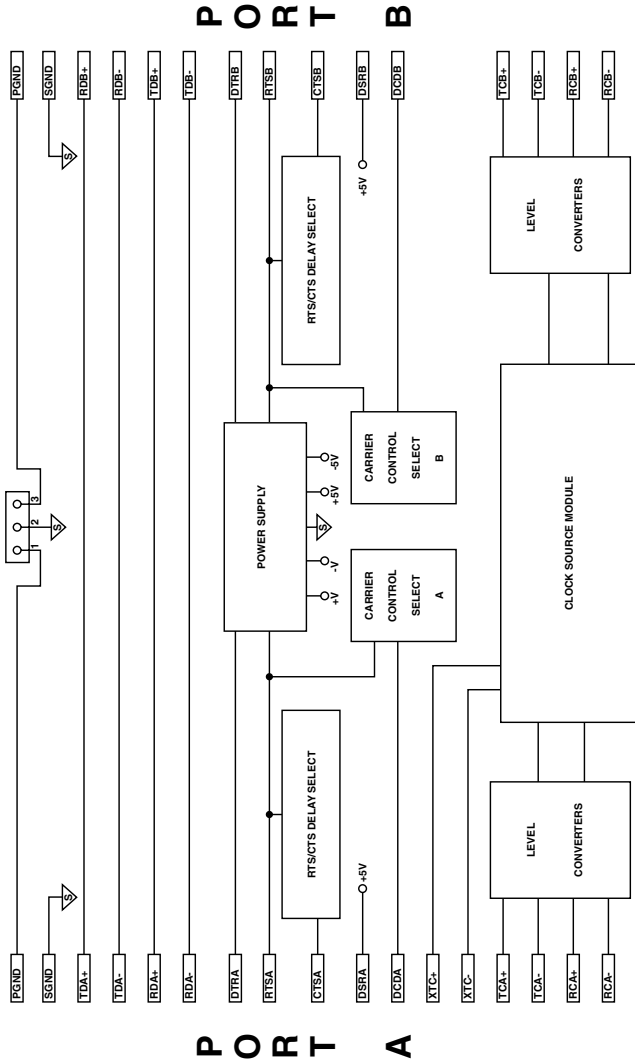
1000 Park Drive • Lawrence, PA 15055-1018 • 724-746-5500 • Fax 724-746-0746