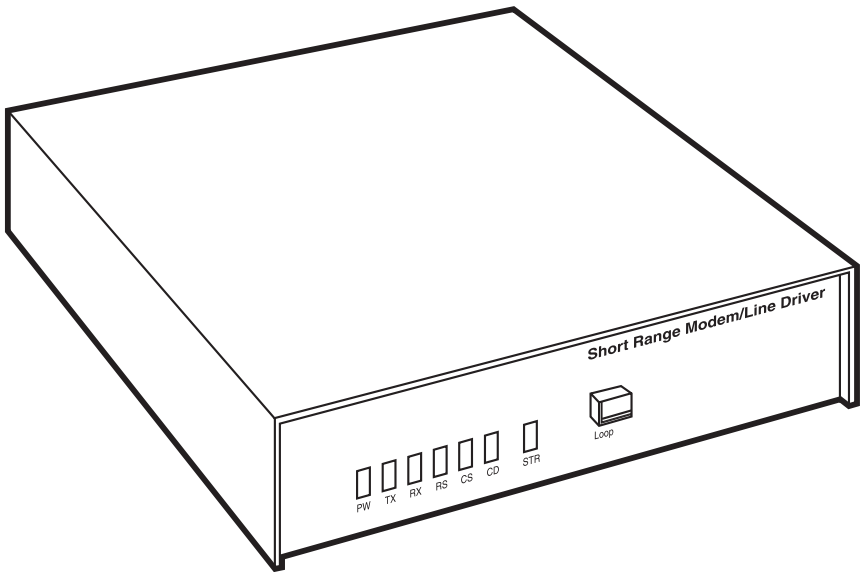




High-Speed Short-Range Modem/Line Driver



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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.

**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 conectado 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 física 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 líneas de energía.
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 objetos líquidos 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: Objetos 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.

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1. Specifications

Application: Full- or half-duplex, sync or async, point-to-point or multipoint

Data Format: Data is transparent

Data Rates: 1.2 kbps to 128 kbps

Driving Distance: 4000 ft. (1219.2 m) up to 128 kbps

Timing: Internal baud rate generator, receiver slave, external (Pin 24)

Channel Interface: EIA RS-232 (V.24) DB25 female connector

Line Requirements: Two- or four-wire private line, unloaded with no bridge taps

Line Interface: RJ-45 plug, RS-485 electrical specification

Indicators: Front panel: PW, TD, RD, RS, CS, CD, and AS

Switches: Front panel: Digital Loopback

Operating Temperature: 32 to 122°F (0 to 50°C)

Relative Humidity: 5 to 95% noncondensing

Altitude: Up to 10,000 ft. (3048 m)

Protection: Both common mode (longitudinal) and differential (metallic) surge suppressors are provided on the line transmit output and receive input connections.

Power: ME1084A: 100 to 120 VAC, 60 Hz, 0.16 A switchable;
ME1084AE: 200 to 240 VAC, 50 Hz, 0.08 A switchable

Size: 1.75"H x 8.9"W x 10"D (4.5 x 22.6 x 25.4 cm)

Weight: 2.25 lb. (1.02 kg)

2. Operation

The High-Speed Short-Range Modem/Line Driver is an RS-232 line driver. It enables you to interconnect synchronous or asynchronous, point-to-point or up to 32 multipoint terminal devices. Distances of up to 4000 ft. (1219.2 m) at 128 kbps can be achieved using 24 AWG wire.

2.1 Front Panel

The power indicator, marked PW on the front panel, lights green when AC voltage is applied to the Line Driver. The LED indicators light in conjunction with Transmit Data (TD) and Receive Data (RD), Request to Send (RS), Clear to Send (CS), Carrier Detect (CD), and Anti-Stream (AS) to give a clear picture of the Line Driver's operational status. The Digital Loopback switch verifies operation of the data communication circuit. When the button is not pressed, it appears black, and the Line Driver operates normally, providing communication from end to end. When the button is pressed, it lights yellow, and the Line Driver provides bilateral looping to facilitate testing of the Line Driver and communication circuit from either end.

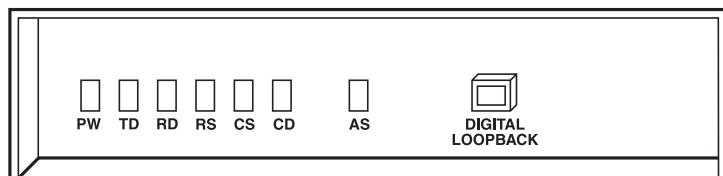


Figure 2-1. Front panel.

2.2 Point-to-Point/Multipoint Operation

The Line Driver uses RS-485 tri-state drivers and receivers. Both switched carrier and constant carrier operations are possible. When switched carrier is selected, up to 32 Line Drivers may be connected together to form a multipoint network. The distance from the master Line Driver to the last Line Driver in the network depends upon the data rate you selected and the gauge of wire used to connect the units. The higher the data rate and thinner the gauge of wire used, the shorter the

communication distance possible. During constant carrier operation, the Line Drivers are connected in a point-to-point configuration. As with multipoint operation, the higher the data rate and thinner the gauge of wire used, the shorter the communication distance possible. The Line Driver can also be used point-to-point in the switched carrier mode.

2.3 “Switch On Data” Mode

To enable terminals that do not respond to RS and CS control leads to operate in a multipoint or point-to-point network, the Line Driver includes “Switch on Data” mode. When a terminal sends data transmissions, the Line Driver will bring up its carrier and start to transmit. When the data transmissions stop for a period greater than the selected “No Data Time-out,” the carrier will drop and the Line Driver will return to an idle state. CS is constant when in “Switch on Data” mode.

2.4 Clocking

Rates up to 128 kbps are internally generated by the Line Driver for transmit clocking. Clocking may also be taken from an external device on the external transmit clock lead, Pin 24, for tail-circuit applications. To ensure synchronization clock through a system, receive clock may also be used as the transmit clocking source (slave clocking).

2.5 Four-Wire/Two-Wire Operation

Half-duplex two-wire operation as well as full-duplex four-wire operation is selectable via configuration switches.

2.6 Testing Modes

Local digital loopback is easily selected via a front-panel-mounted switch. The switch lights when the Line Driver is in loopback mode. The data line is looped bilaterally to enable both the local terminal and the remote terminal to be tested when in four-wire mode.

2.7 CTS Delays

CTS can be configured to respond to RTS regardless of the state of the transmitter. RTS to CTS delays can be set to constant, 0 ms, 8 ms, or 50 ms.

2.8 Anti-Streaming

When a terminal in a multipoint network fails with the RS signal lead active, the attached Line Driver will remain transmitting. This “streaming” terminal will cause the entire network to fail. To prevent this type of failure, the Line Driver provides anti-streaming protection. When anti-streaming is enabled, the control logic will turn off the Line Driver’s transmitter after seeing an RS signal for the selected period of time. The transmitter will not turn on again until the RS signal is released by the terminal.

3. Setup and Installation

3.1 Power Connection

Before connecting the Line Driver to an AC power source, you must install the top cover and secure it with the supplied #4-32 screws. The Line Driver has a 110/220 V voltage switch. Turn the switch with a coin or screwdriver to the appropriate voltage for your country. If the unit is set to 110 V, make sure that the fuses are 0.16 A slow-blow (Little Fuse 218.160). For 220-V operation, use 0.08 A (Little Fuse 218.080) slow-blow fuses.

EXAMPLE: For United States, set to 110 V. The Line Driver is supplied with a IEC power connector next to the voltage select switch. Plug the power cord into the connector until it is firmly seated. You may now connect the power cord into your AC outlet.

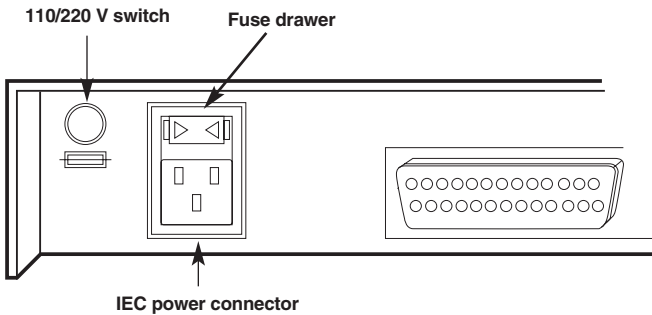


Figure 3-1. Power connector.

3.2 Factory Configuration Switch Settings

The Line Driver is configured before shipment with the switches set to the following default positions:

3.2.1 SWITCH S1

Switch 1: 2 and 5 set to OFF; 1, 3, 4, and 6 set to ON

Baud rate: 64 kbps

CS Delay: 0 ms

3.2.2 SWITCH S2

Switch 2: 1, 2, and 6 OFF; 3, 4, and 5 ON

Switch on RS

Full-duplex

Anti-stream disabled

Signal ground not connected to chassis ground

3.2.3 SWITCH S4

Switch 4: 1, 3, 5, and 6 OFF; 2 and 4 ON

Constant carrier

TX clock from internal

Sync operation

Receiver termination OUT

3.2.4 JUMPERS

Jumpers: J1, J2, and J3 IN; J4 and J5 OUT

Factory test jumpers J1–J3 must be IN for proper operation

4-wire operation

If the system application requires one or more of the default settings to be changed, you must remove the top cover of the enclosure to access and change the DIP switches on the printed circuit board.

3.3 Disassembly**WARNING**

Unplug the power cord before opening the enclosure. If you don't, YOU MIGHT BE SHOCKED!

Unplug the power cord before proceeding, then remove the top cover by unscrewing the Phillips-head screws on the left and right sides of the unit. The configuration switches and jumpers are located on the printed circuit board (PCB). After you select the switches, reinstall the cover before connecting to an AC power source.

3.4 Installation

Select an appropriate location, accessible to and within six feet of an AC power outlet. Use a straight-through shielded cable between the attached terminal device and the Line Driver (the Line Driver has a DB25 female connector). Connect the RS-232 terminal device to the connector marked J4. The Line Drivers are connected using a standard, cross-pinned, RJ-45 telephone cable. Plug the cable into Connectors J2 or J3, which are parallel to each other, to enable connection of multiple Line Drivers for multipoint operation. Standard telephone cords can be used if the wire pairs are reversed.

CAUTION

Never connect the RJ-45 line connectors to the Public Switched Telephone Network!

3.5 Equipment Grounding (SW2-6)

SW2 Position 6 provides for grounding interconnection in those systems requiring a connection between frame ground and signal ground. Set to ON *only* if required.

3.6 Point-to-Point/Multipoint Connectors J2 and J3

J2 and J3 are parallel RJ-45 connectors. Pin 1 on J2 is connected to Pin 1 on J3, Pin 2 on J2 is connected to Pin 2 on J3 and likewise for the remainder of the pins. This enables two Line Drivers to be connected by simply installing a standard cross-pinned telephone cable between the units. When adding additional Line Drivers for a multipoint application, chain the J2 or J3 from one unit to another, using a standard straight-through telephone cable. It is not important which connector is used, as J2 and J3 are electrically equivalent to each other. All the slave Line Driver receivers (Pins 7 and 8) must be tied together and connected to the transmitter of the master Line Driver, and all the slave Line Driver transmitters (Pins 1 and 2) must be tied together and connected to the receiver of the master Line Driver.

3.7 Full-/Half-Duplex Selection (SW2-2)

SW2 Position 2 selects full- or half-duplex Line Driver operation. When SW2-2 is OFF, the Line Driver will operate in full-duplex mode. When SW2-2 is ON, the Line Driver will operate in half-duplex mode.

3.8 Two-Wire/Four-Wire (JP4 and JP5)

For half-duplex, two-wire operation, install Jumpers JP4 and JP5. This will connect the input pins to the output pins, 2 to 7 and 1 to 8. To operate in four-wire mode, remove the jumpers (see **Appendix A**).

3.9 Baud Rate Selection (SW1-1, 2, 3, 4)

Baud rates are selected via SW1 Positions 1 through 4. Table 3-1 outlines the available speeds and corresponding switch setting. The selected baud rate will take effect immediately upon moving the switch. It is not necessary to power cycle the Line Driver for any switch selection to go into effect.

Table 3-1. Baud rate.

SW1-1	SW1-2	SW1-3	SW1-4	Rate
ON	ON	ON	ON	128 kbps
OFF	ON	ON	ON	72 kbps
ON	OFF	ON	ON	64 kbps
OFF	OFF	ON	ON	56 kbps
ON	ON	OFF	ON	48 kbps
OFF	ON	OFF	ON	38.4 kbps
ON	OFF	OFF	ON	28.8 kbps
OFF	OFF	OFF	ON	19.2 kbps
ON	ON	ON	OFF	14.4 kbps
OFF	ON	ON	OFF	9.6 kbps
ON	OFF	ON	OFF	7.2 kbps
OFF	OFF	ON	OFF	4.8 kbps
ON	ON	OFF	OFF	3.6 kbps
OFF	ON	OFF	OFF	2.4 kbps
ON	OFF	OFF	OFF	1.8 kbps
OFF	OFF	OFF	OFF	1.2 kbps

3.10 “Switch On RS” or “Switch On Data” Mode (SW2-1)

SW2 Position 1 determines the action required to turn the carrier on and off. When SW2-1 is OFF, the carrier is turned on whenever the RS (Pin 4) interface lead is active. The carrier is removed whenever the RS interface lead is inactive. Setting SW2-1 to ON will select “Switch On Data” mode. Whenever data transmissions are present on the TD (Pin 2) interface lead, the carrier will be activated.

3.11 CTS Delay Selection When “Switch On RS” Is Enabled (SW1-5, 6)

SW1-5 and 6 determine the RS to CS (Pin 5) delay when SW2-1 is OFF.

Table 3-2. CTS delay.

SW1-5	SW1-6	CS Operation
ON	ON	Constant
OFF	ON	Delayed 0 ms
ON	OFF	Delayed 8 ms
OFF	OFF	Delayed 50 ms

3.12 Carrier Control (SW4-1)

SW4 Position 1 determines constant carrier or switched carrier operation. Set SW4-1 to OFF if point-to-point, continuous, full-duplex operation is desired. Set SW4-1 to ON if multipoint or half-duplex operation is desired.

3.13 Receiver Termination (SW4-5)

Termination of the master Line Driver and the farthest slave Line Driver in a multipoint network is provided by setting SW4-5 to ON. Only the farthest slave Line Driver in the network should have the termination enabled. In point-to-point applications, termination should be enabled on both Line Drivers.

3.14 Transmit Clock Source (SW4-2, 3)

SW4 Positions 2 and 3 determine the source of the transmit clock. Table 3-3 outlines the available options.

Table 3-3. Transmit clock options.

SW4-2	SW4-3	TX Clock Source
ON	ON	Slave from RXC
ON	OFF	Internal
OFF	OFF	External (pin 24)

3.15 Sync or Async Operation (SW4-4)

SW4 Position 4 configures the Line Driver for synchronous or asynchronous operation. Set SW4-4 to ON if synchronous operation is required and OFF if asynchronous operation is required.

3.16 Antistreaming (SW2-3, 4, 5)

Antistreaming protection is provided via SW2 Positions 3 through 5. SW2-3, 4, and 5 ON will disable antistreaming. When antistreaming is enabled, SW2-3, 4, and 5 determine the number of bits of continuous data (switch on data mode) or RS (switch on RS mode) that indicates the terminal connected to the Line Driver is in a streaming condition. Table 3-4 gives the selections available for streaming cutoff.

Table 3-4. Antistreaming.

SW2-3	SW2-4	SW2-5	Antistream Timer
ON	ON	ON	Disabled
OFF	ON	ON	1024 bps
ON	OFF	ON	2048 bps
OFF	OFF	ON	4096 bps
ON	ON	OFF	16 kbps
OFF	ON	OFF	64 kbps
ON	OFF	OFF	256 kbps
OFF	OFF	OFF	1 Mbps

3.17 Factory Straps (JP1, JP2, JP3)

JP1, JP2, and JP3 are used for testing the Line Driver during production. These jumpers must be installed for the unit to function properly.

Appendix. Pinouts and Hookups

A.1 RS-232 Pinout

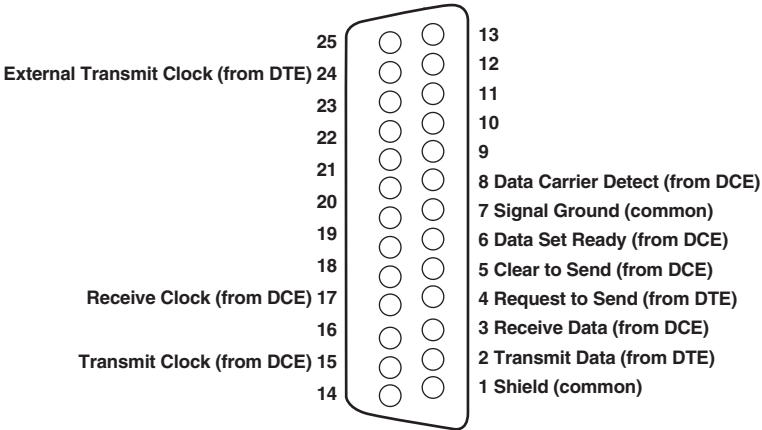


Figure A-1. RS-232 pinout.

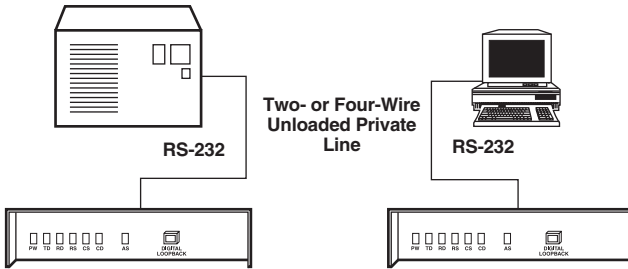


Figure A-2. Application.

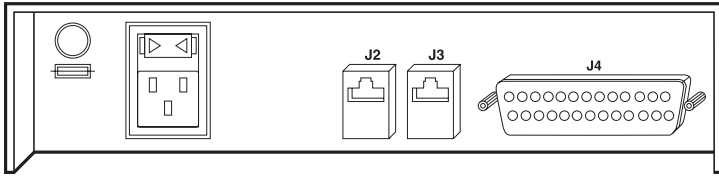


Figure A-3. Rear panel view..

A.2 Hookups

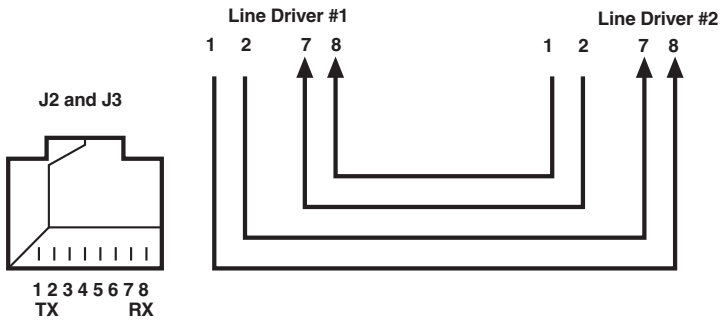


Figure A-4. Four-wire hook-up point-to-point.



Figure A-5. Two-wire hook-up point-to-point.

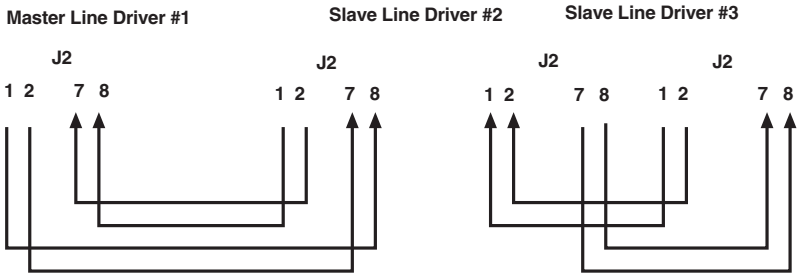


Figure A-6. Four-wire hookup multipoint.

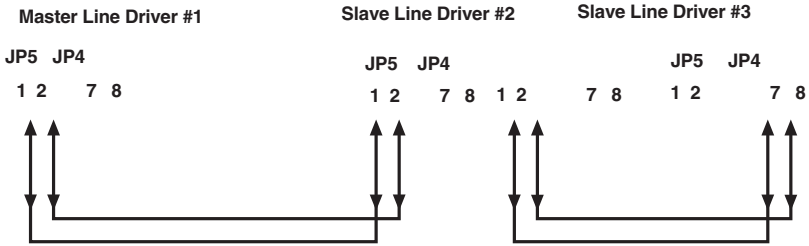


Figure A-7. Two-wire hookup multipoint.



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