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Short-Haul Modem

Place a receiving device up to 4 miles from the sending device.

Select DCE or DTE via a DIP switch, so you won't need special cables.



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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.

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 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.

Table of Contents

Table of Contents

1. Specifications	7
2. Introduction	8
3. Installation	10
4. Troubleshooting	15

1. Specifications

Technical Specifications

Approvals	Power supply: UL®, CSA
Data	Flow Control: X-ON/X-OFF; Data Format: Asynchronous, full-duplex
Interconnect	Two-pair twisted-pair cable
Speed	Up to 115,200 bps at up to 4000 feet (1250 m); Up to 57,600 bps at up to 1 mile; Up to 9600 bps at up to 4 miles
User Controls	(1) 4-position DIP switch, (1) DCE/DTE slide switch, (1) push-button switch
Interface	EIA RS-232-C; CCITT V.24, V.28; ISO 2110
Connectors	(1) DB9 female; (1) 4-position terminal block; (1) RJ-11; (1) DC power jack
Indicators	TX: This dual Red/Green LED will be green when the Receive Data is low, and red when the Receive Data is high. RX: This LED can be used to verify proper polarity of the interconnecting lines: it should be green when no data is being transmitted. Red indicates improper line polarity.
Environment	Temperature Tolerance: Operating: 23 to 86° F (-5 to +30° C); Storage: 23 to 140° F (-5 to +60° C); Humidity: 0 to 95% relative humidity, non-condensing
Power	Wallmount power supply: 12 VDC, 625 mA, 7.5W 100-240 VAC, 50/60Hz, 0.3A Max
Dimensions	1.5"H x 5.2"W x 5.2"D (3.8 x 13.2 x 13.2 cm)
Weight	1.4 lb. (0.6 kg), including power supply

2. Introduction

These short-haul modems enable you to place a receiving device up to four miles from the sending device. They are switch-selectable for either DCE or DTE application, eliminating the need for special cables and preventing confusion during installation. The short-haul modems are connected with twisted-pair cable, using a 4-position terminal block or RJ-11. The units are optically isolated to provide protection from differences in ground potential between the units. The units provide line status (Data Carrier Detect when DCE is selected and Data Terminal Ready when DTE is selected) to indicate that the remote unit is online and ready to communicate. Two dual RED/GREEN indicators on the front panel indicate the status of receive and transmit circuitry as well as proper polarity of twisted-pair connections.

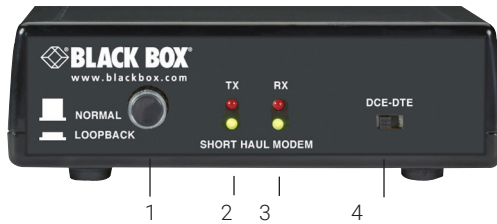


Figure 2-1. Front panel.

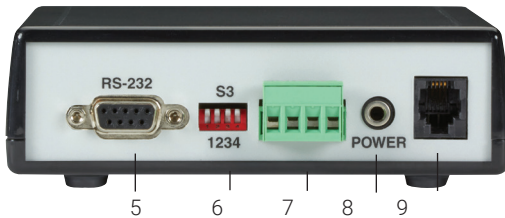


Figure 2-2. Back panel.

Table 2-1. Components.

Number	Component	Description
1	Pushbutton	Press this button for Loopback operation. The button is not pressed in Normal operation.
2	(2) TX LEDs	This dual Red/Green LED will be green when the Received Data is low, and red when the Received Data is high.
3	(2) RX LEDs	This LED can be used to verify proper polarity of the interconnecting lines: it should be green when no data is being transmitted. Red indicates improper line polarity.
4	DCE/DTE DIP switch	Slide left to configure the modem as a DCE. Slide right to configure the modem as a DTE.
5	(1) DB9 connector	Links to RS-232 interface.
6	4-position DIP switch S3	See Table 3-6.
7	Terminal block	Interconnect
8	Power connector	12VDC, 625mA, 7.5W
9	RJ-11 interconnect	6-position connector

3. Installation

Before you begin, make sure all equipment, including the converters, are not powered on.

1. Set the 4-position DIP switch as appropriate for local control signal enable and cable distance.
2. Set the slide switch for either DCE to connect to a PC or DTE to connect to a modem.
3. Connect the two short-haul modems with twisted-pair cable, making sure to connect TX+ and TX- on the local unit to RX+ and RX- respectively on the remote unit, and vice versa. You can use either the RJ-11 connector or the 4-wire terminal block.
4. Once the modems are connected together, connect DB9 cables to equipment and power up the converters.
5. Next, power up your equipment. For testing purposes, a loopback function has been incorporated into the short-haul modem. Placing the local unit in loopback enables the local unit to be tested without the line, and enables the remote unit to test the line. Placing the remote unit in loopback allows the local unit to test the line. Keep in mind that the unit in loopback sees a cable of zero length, while the other unit sees twice the cable length. This may affect the DIP switch settings and the baud rate at which the test will be successful.

Table 3-1. Four-position screw terminal connector.

Position	Function
1	TX+
2	TX-
3	RX+
4	RX-

Table 3-2.
RJ-11 connector

Position	Function
1	No connection
2	RX+
3	TX+
4	TX-
5	RX-
6	No connection

Table 3-3. DB9 RS-232 connector

Pin-Signal	DCE Interface Function (S1-A)	DTE Interface Function (S1-B)
1 - Data Carrier Detect	Output	Input
2 - Received Data	Output	Input
3 - Transmitted Data	Input	Output
4 - Data Terminal Ready	Input	Output
5 - Signal Ground	Ground	Ground
6 - Data Set Ready	Output (Pulled High)	Input (Pulled High)
7 - Request To Send	Input (connected to pin 8)	Output (connected to pin 8)
8 - Clear To Send	Output (connected to pin 7)	Input (connected to pin 7)
9 - Ring Indicator	Open	Open

DCE—Data Communications Equipment (can connect to a PC)

DTE—Data Terminal Equipment (configured the same as a PC)

NOTES:

1. When configured as DCE, Data Carrier Detect will be active when the remote unit is driving the line.

Chapter 3: Installation

NOTES (continued):

2. When configured as DCE, Data Terminal Ready and Request to Send signals may be used to disable the line driver (see S3). The remote unit will sense this condition and its Data Carrier Detect signal will become negative.
3. When configured as DTE, Data Terminal Ready will be active when the remote unit is driving the line.
4. When configured as DTE, Data Carrier Detect and Clear to Send signals may be used to disable the line driver (see S3). The remote unit will sense this condition and its Data Terminal Ready signal will become inactive.

Switches

S1 2-position slide switch (DTE/DCE)

S2 2-position push button switch (loopback); Push button will be in "out" position for loopback.

S3 4-position DIP switch (option switches)

Table 3-4. S1 switch.

Position	Function (See description of RS-232 DB9 connector)
A	Configure as DCE for connection to PC serial port
B	Configure as DTE to simulate PC serial port output

Table 3-5. S2 switch.

Position	Function (See Figure 3-2)
OUT	Normal operation
IN	Loopback

NOTE: When switch S2 is in the loopback position, the output of the local unit is fed back to its input, and the line is looped back so the remote unit can test the line integrity. The remote unit will actually see twice the distance of the line. This should be taken into consideration when determining the maximum baud rate at which the loopback test will be successful. The local loopback path is compensated for zero length cable.

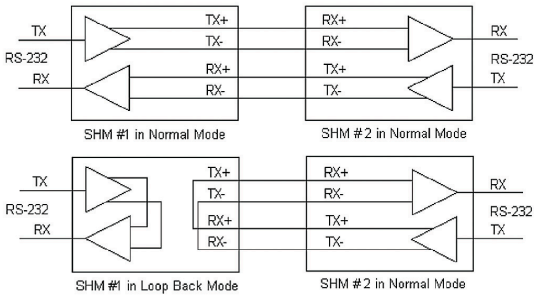


Figure 3-1. Loopback function.

Table 3-6. S3 switch (UP is OFF, DOWN is ON).

Switch Position	1	2	3	4
Hardware Control Enable (Note 1) Disabled	OFF			
Line Distance (Note 2) Short (less than 1000 ft.)		OFF	OFF	
Reserved				OFF

NOTES:

1. When hardware control is enabled, both control input signals must be high for transmission to be enabled.
2. The long and short line distance switches control the current output of the line driver. These switches should be OFF for distances less than 1000 feet, and should be ON for distances greater than 1000 feet.

Table 3-7. Indicators.

Indicator	Function
TX	The Green LED is on when the Receive Data is low, and the Red LED is on when the Receive Data is high.
RX	This LED can be used to verify proper polarity of the interconnecting lines: it should be green when no data is being transmitted. Red indicates improper line polarity.

4. Troubleshooting

If the units fail to operate, check the following before calling for technical support.

1. Are the units powered on? Check to see if the power supplies are plugged into a working AC outlet.
2. Check to see if the interconnect wire is connected properly, TX+ to RX+, TX- to RX-, at both ends.
3. Check that switch S3 is set for the proper cable length.
4. If hardware control is enabled, DTR and RTS must be high to enable data transmission to the remote unit.
5. Check that the loopback switch S2 is in the Normal position.