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## Short Haul Modem



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## 1. Specifications

### Power

Wall-mount type power supply  
9 VDC 500 mA, 115 VAC, UL, CSA

### Interface

EIA RS-232-C; CCITT V.24, V.28; ISO 2110

### Flow Control

Will pass XON/XOFF

### Size

1.5"H x 5.2"W x 5.2"L

### Weight

1.4 lb. includes supply

### Data Format

Asynchronous, Full-Duplex

### Speed

Up to 115200 bps at up to 4000 feet

Up to 57600 bps at up to 1 mile

Up to 9600 bps at up to 4 miles

### Interconnect

Two pair twisted-pair cable

### Connectors

(1) - DB9 female, (1) - 4 position terminal block,

(1) - RJ11, (1) - DC power jack

### Switches

(1) - 4-position dip, (1) - Slide DCE/DTE switch,

(1) - push-button switch

## 2. Introduction

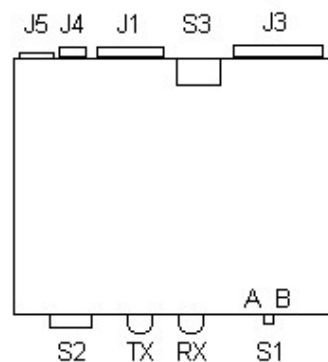
These short haul modems have the ability to remote your receiving device up to 4 miles from the sending device. They are switch selectable for either DCE or DTE application, eliminating the need for special cables and preventing confusion in installation. The short haul modems are connected with twisted-pair cable, using a connectorized 4-position terminal block, or RJ11. 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, Data Terminal Ready when DTE is selected) to indicate that the remote unit is online and ready to communicate. Two-color indicators on the front panel indicate the status of receive and transmit circuitry as well as proper polarity of twisted-pair connections.

## 3. Installation

Before you begin, make sure all equipment is off and the converters are not powered on.

Set the 4-position dip switch as appropriate for local control signal enable, and cable distance. Set the slide switch for either DCE to connect to a PC, or DTE to connect to a modem. 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. Once all connections are made, connect DB9 cables to equipment and power up the converters. Now power can be applied to your equipment. For testing purposes a loop-back function has been incorporated into the short haul modem. Placing the local unit in loop-back, allows the local unit to be tested without the line, and allows the remote unit to test the line. Placing the remote unit in loop back allows the local unit to test the line. Keep in mind that the unit in loop-back 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.

Figure 3.1 – Short Haul Modem Outline



### Connectors

J1 - Four Position Terminal Block

J3 - DB9 Female RS-232

J4 - DC Power Jack (9 VDC @ 500 mA)

J5 – RJ11 six position connector

Table 3.1A - Connector J1

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

Table 3.1B - Connector J5

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

Table 3.2 - Connector J3

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 Carrier 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.
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 inactive.
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

S2 - 2 Position Push Button Switch

S3 - 4 Position Dip Switch

Table 3.3 - Switch S1

Position	Function (See description of J3)
A	Configure as DCE for connection to PC serial port
B	Configure as DTE to simulate PC serial port output

Table 3.4 - Switch S2

Position	Function (See Figure 3.2)
OUT	Normal Operation
IN	Loop Back

Note: When switch S2 is in the loop back 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 loop back test will be successful. The local loop back path is compensated for zero length cable.

Figure 3.2 - Loop Back Function

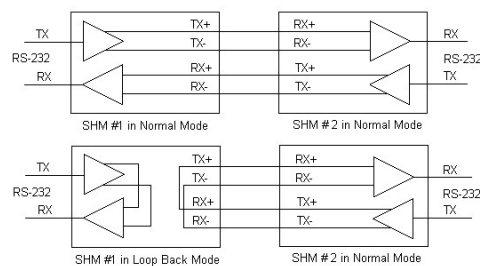


Table 3.5 - Switch S3  
(UP is OFF, DOWN is ON)

Switch Position	1	2	3	4
<b>Hardware Control Enable</b> (Note 1) Disabled Enabled	OFF ON			
<b>Line Distance</b> (Note 2) Short (less than 1000 ft) Long (greater than 1000 ft)		OFF ON	OFF ON	
<b>Reserved</b>				OFF ON

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.

**Indicators**

TX Indicator

This BI-Color LED will be green when the Transmitted Data is low, and red when the Transmitted Data is high.

RX Indicator

This BI-Color LED will be green when the Received Data is low, and red when the Received Data is high. This LED can be used to verify proper polarity of the interconnecting lines, as it should be green when no data is being transmitted. Red would indicate improper line polarity.

**4. Troubleshooting**

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

1. Are units powered on? Check to see if the power supplies are plugged into a working AC outlet.
2. Check to see if the inter-connect 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 loop back switch S2 is in the Normal position.

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