

RLH Industries, Inc.
Fiber Optic Link RS422/485 Card

Part Number	Description
8806-1532-01	Multimode ST
8805-1532-01	Multimode SC
8806-1542-01	Single-mode ST
8805-1542-01	Single-mode SC



Figure 1. RS422/485 Card

Contents	pg.
1. General	1
2. Features	1
3. Applications	1
4. Installation	1-3
5. Testing	3
6. Specifications	4
7. Repair and Return	4
8. Ordering Information	4

1. GENERAL

The RLH Fiber Optic Link RS-422 and RS-485 Interface Card converts serial data signals to an Optical transmission signal of either multimode or single-mode fiber. Multimode and single-mode cards provide transmission of the serial data signals over a fiber optic facility to extend the circuit and provide dielectric isolation between the network and distant connection.

1.2 This section of the document is reserved for explanation of future modifications or changes.

2. FEATURES

The RS422/485 Card provides:

- Automatic full-duplex baud rate detection
- Data rate of 110 to 921,600 baud
- Extends network span up to 5 Km (3 mi.) on multimode and 30 Km (18 mi.) on single-mode fiber.
- DTE or DCE DB-9 connection
- Remote fiber loopback for ease of testing
- LED display for status monitoring

3. APPLICATIONS

3.1 Telecommunication equipment in high voltage areas can be at risk due to Ground Potential Rise (GPR). A copper telephone line referenced to a remote ground can become a path for high voltages during a ground fault. Placement of all-dielectric fiber optic cable (instead of copper) completely eliminates the presence of a remote ground, which dramatically increases safety of personnel and reliability of equipment.

4. INSTALLATION

4.1 Multimode and single-mode RS422/485 cards are equipped with two ST or SC female optical connectors. Connect fibers to the Transmit (TX) and Receive (RX) optical connectors. The TX optical on the CO Card must be connected to the RX on the SUB Card. See Figure 2.

4.2 The serial connection is made via the DB-9 female connector located on the front of the card. The DB-9 will connect to a RS-422 or RS-485 device. See Figure 3 for DB-9 pin-out assignments.

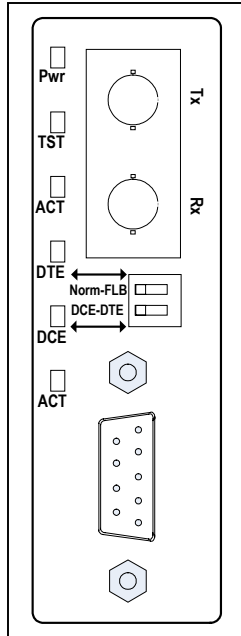


Figure 2. LED Indicators

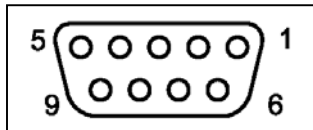


Figure 3. DB-9 Pin Assignment

Pin-Out Signal Assignment Table					
PIN No.	Full-Duplex		Full-Duplex	Half-Duplex	
	Normal (Point-to-Point)		Multi-Point	Multi-Point	
	Signal	DTE	DCE	-	-
1	Ground	-	-	Reserved	Ground
2	RTS+	OUT	IN	Reserved	Reserved
3	RTS-	OUT	IN	Reserved	Reserved
4	TXD+	OUT	IN	TXD+ (IN)	DATA+
5	TXD-	OUT	IN	TXD- (IN)	DATA-
6	CTS+	IN	OUT	Reserved	Reserved
7	CTS-	IN	OUT	Reserved	Reserved
8	RXD+	IN	OUT	RXD+ (OUT)	Reserved
9	RXD-	IN	OUT	RXD- (OUT)	Reserved

Table-1

4.3 Front panel DIP-switches

Normal and Fiber Loopback (Norm-FLB). When the switch 1 is in the normal position (factory default), the fiber loopback is disabled. Setting the switch the "FLB" position will enable a fiber loopback test on either end of

the link. The card with the fiber loopback enabled will act as the master and the remote end card with the switch in normal will act as the slave. The test LED on the master will blink fast (10 times per second) and the test LED on the slave will blink slow (1 time per second). If the loopback test fails the master test LED will be solid. If both ends are set to the "FLB" position then both cards would display master mode results.

Note: The fiber loopback test does not interfere with signal transmission.

The DCE-DTE switch is factory set to DCE. The DCE connects to Data Communications Equipment such as modems or printers. The DTE connects to Data Terminal Equipment such as a computer or controller.

Note: the DCE-DTE switch is disabled when the card is in Half-Duplex or Multi-Point mode

4.4 PCB DIP-switches

The RS422/485 card has 2 8-position switches located on the PCB. S2 dip switches 1-4 configure the baud rate when the card is operating in Half-Duplex mode or in multi-point full-duplex mode. These switches are deactivated when the RS422/485 is operating in point-to-point full duplex RS-422 mode. See figure 4 for more details.

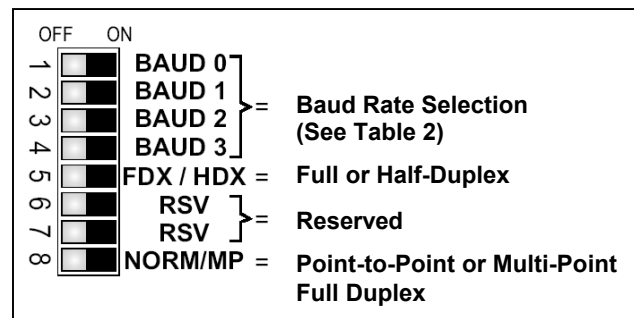


Figure 4. Baud Rate DIP-Switches

When the Full/Half Duplex selection DIP-switch is in the OFF position (factory default), the RS422/485 operates in full duplex mode, typically used in RS-485 protocol. When the switch is in the ON position the card operates in half duplex mode, the point-to-point/multi-

point switch has no effect. Half-Duplex baud rate is configured with switches 1-4.

Baud Rate DIP-Switch Configuration Table				
Baud Rate	SW1	SW2	SW3	SW4
110	OFF	OFF	OFF	OFF
300	ON	OFF	OFF	OFF
1200	OFF	ON	OFF	OFF
2400	ON	ON	OFF	OFF
4800	OFF	OFF	ON	OFF
9600	ON	OFF	ON	OFF
19.2K	OFF	ON	ON	OFF
38.4K	ON	ON	ON	OFF
57.6K	OFF	OFF	OFF	ON
115K	ON	OFF	OFF	ON
230K	OFF	ON	OFF	ON
460K	ON	ON	OFF	ON
921K	OFF	OFF	ON	ON
921K	ON	OFF	ON	ON
921K	OFF	ON	ON	ON
921K	ON	ON	ON	ON

Table-2

Termination DIP-Switches

The Head termination "HEAD" DIP-switches 1 and 2 configure the RS422/485 termination setting on the data line. When these switches are OFF (factory default), no termination is provided. Setting to the ON position provides pull-up or pull-down on the line. See the termination table 3 and figure 5 for more detail.

NOTE: The termination DIP-Switches on both cards must be set to the same position.

The Mid termination "MID/H-T" DIP-switches 3-6 configure The RS422/485 termination with parallel settings. In the "MID" position (factory default), no termination is provided. The "H-T" provides parallel termination. See the termination table 3 and figure 5 and 6 for more detail.

NOTE: The termination DIP-Switches on both cards must be set to the same position.

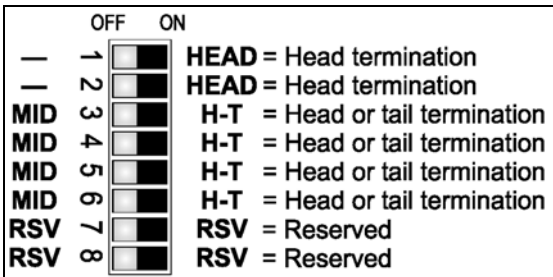


Figure 5. Termination DIP-Switches

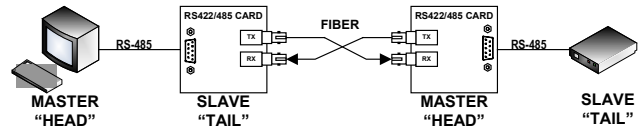


Figure 6A. Head and Tail Termination Diagram

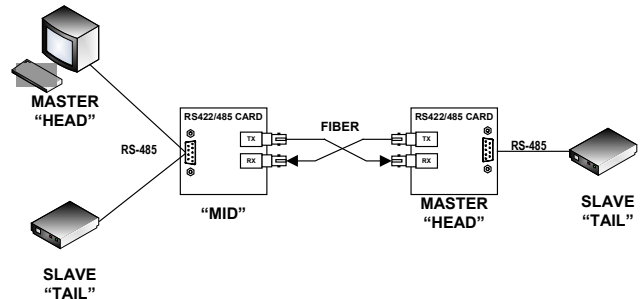


Figure 6A. Mid and Head Termination Diagram

Termination Table						
Switch No.	Full-Duplex Mode			Half-Duplex Mode		
	Head	Tail	Mid	Head	Tail	Mid
1	OFF	OFF	OFF	ON	OFF	OFF
2	OFF	OFF	OFF	ON	OFF	OFF
3	ON	ON	OFF	ON	ON	OFF
4	ON	ON	OFF	ON	ON	OFF
5	ON	ON	OFF	ON	ON	OFF
6	ON	ON	OFF	ON	ON	OFF

Table-3

5. TESTING

5.1 Two DIP switch settings are located on the front of the card. Refer to Figure 3 for correct application settings.

5.2 If signal is not present, replace card and retest. If card is determined to be defective, then contact RLH for replacement or repair. See Section 7

5.3 The RS422/485 Card provides LED Indicators on the front of the PCB. LED's show availability of power, the modes of operation, and data being received by the fiber and DB-9 ports. See figure 3.

6. SPECIFICATIONS

Protocols: Serial RS-422, RS-485
Data Rates: 110-921,600 baud
Copper interface: DB-9 female DTE/DCE
Copper distance: 50 feet (15.2m)
Fiber connector: ST or SC
Fiber types:
 Multimode: 62.5/125, 50/125
 Single-mode: 9/125 μ m
Fiber Distances:
 Multimode: 5 km / 3 miles
 Single-mode: 30 km / 18 miles
LED Indicators:
Power (PWR): Amber, Power applied
Test (TST): Green, Fiber test detected
 On: TX pattern sent with no RX
 Fast Blink (10Hz): Master mode test pattern received
 Slow Blink (1Hz): Slave mode test pattern received
 Off: Normal operation
Activity (ACT): Green, Fiber activity
 Solid: Fiber link active
 Blinking: Fiber data transmission
 Off: No fiber link
DTE: Green, DTE mode selected
DCE: Green, DCE mode selected
Activity (ACT): Green, Serial data received
Power Requirements: 24-56VDC @ 100mA
PCB Dimensions: 7.0"x4.0"x1.0"
Temperature: -40 to +60 degrees C
Humidity: 0-90% non-condensing

7. REPAIR AND RETURN

7.1 RLH Industries, Inc. Fiber Optic Link assemblies are warranted to be free of defects in materials and workmanship for the life of the product. This lifetime warranty is effective for RLH products sold from February 2, 1988 to the present.

7.2 This warranty is UNCONDITIONAL and is valid even when the RLH Fiber Optic Link assemblies have been abused or mishandled, where unauthorized repairs have been attempted or performed, or product has been damaged as a result of a natural disaster.

7.3 RLH Industries, Inc. will repair or replace any product, or part thereof, that fails for any reason, provided the defective part is returned to RLH, freight prepaid. In the event that a Card requires repair, contact RLH Industries for a RMA (return material authorization) number and send the Card with a description of the problem to:

RLH Industries, Inc.
Attn: Repair and Return
936 N. Main Street
Orange, CA 92867

8.0 ORDERING INFORMATION

8.1 To place an order for RLH Industries, Inc. equipment, call or Fax inside sales at (800)-877-1672, (714) 532-1885

8.2 To order, please indicate the appropriate model number listed below and the quantity required:

Multimode Cards

8806-1532-01 RS422/485 CO/Sub ST

8805-1532-01 RS422/485 CO/Sub SC

Single-Mode Cards

8806-1542-01 RS422/485 CO/Sub ST

8805-1542-01 RS422/485 CO/Sub SC