



**M82xxD
Fiber Optic
RS-232 MicroModem
Technical Manual**

Revision C

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Safeguarding Communications Since 1958

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1 DESCRIPTION OF EQUIPMENT

1.1 INTRODUCTION

This manual provides general and detailed information on the installation and operation of the RS-232 fiber optic MicroModem. Section 1 provides a general description of the equipment. Section 2 provides installation instructions. Section 3 provides operating instructions. Section 4 provides the theory of operation. Section 5 provides maintenance and troubleshooting information. Note: These MicroModems can also be used with RS-423 and MIL-STD-188-114A(unbalanced) data signals.

1.2 DESCRIPTION OF EQUIPMENT

1.2.1 Functional Characteristics

The M82xxD Series MicroModems are designed for use as an interface extender (see Illustration 4 and 5) or as a modem link (see Illustration 6). The M821xD units are DCE devices and typically connect to a DTE, while the M822xD units are DTE devices and typically connect to a DCE. The M82xxD Series MicroModems use a pair of fiber optic cables and an SFP optic module for transmission up to 30km. The link is fully transparent in both directions at any data rate from 1 bps to 128 kbps. The units fully support the interface control signals associated with RS-232, RS-423, and MIL-STD-188-114A(unbalanced) unbalanced standards. This is accomplished by multiplexing the control signals with the clock and data signals and transmitting the combined signal to the remote unit. At the remote end the combined signal is demultiplexed and applied to the interface.

1.2.2 Physical Characteristics

The M82xxD Series MicroModems measure 2.4" high x 1.0" wide x 4.5" deep and are small enough to be mounted directly onto terminal interface connectors of data transmission equipment. VERSITRON also offers a 19" standard rack-mount chassis for holding up to 16 units. The chassis allows the units to utilize a common power supply with power redundancy as an option. Stand-alone applications require a wall transformer for operation, with a one-pin connector for electrical input. There is a DB25 connector for the digital interface and an LC connector for the fiber optic interface.

1.3 RS Modem Specification:

1.3.1 General Specifications:

Models	M82xxD
Dimensions	(2.4" H x 1" W x 4.5" L) (6.2 x 2.5 x 11.4 cm)
Weight	6.7oz (0.19kg)
Operating Temperature	0° to 50°C (32° to 100°F)
Humidity	Up to 95% relative humidity (non-condensing)
Altitude	Up to 10,000 ft

1.3.2 Electrical Interface:

Models	M82xxD
Power Requirements	12VDC, 1.0Amp
Data Connector	DB25, 25-pin female(DCE) or male(DTE)

Data Signal	RS-232/RS-423 MIL-STD-188-114 (Unbalanced)
Terminal Timing Data Rate	DC to 128 kbps
Source Timing Data Rate*	DC to 100 kbps
Note: * in Source Timing TXC and RXC must be the same rate and phase.	

1.3.3 **Fiber Optic Interface:**

See SFP module datasheet.

1.3.4 **Major Features:**

- DB25 Port mountable
- Will accept a variety of SFP modules for Fiber-optic interface
- Rack mount chassis option
- Compatible with VERSITRON F280XD Series fiber optic FOMII Modems.
- DB25 Pin 9 power option



Illustration 1: Overall View of M82XXD

2 INSTALLATION

2.1 GENERAL

This section contains detailed information on the installation and initial checkout of the M82xxD RS-232 MicroModem. Section 2.2 contains general information on site selection and mounting. Section 2.3 contains the description for selecting different options on the Modem. Sections 2.4 and 2.5 contain detailed instructions for connecting M82xxD products to your system. Section 2.6 contains initial checkout procedures.

2.2 SITE SELECTION AND MOUNTING

The M82xxD Series MicroModems may connect directly to the serial port (DB25 Connector) of the terminal equipment with two hand-tightened screws. When mounting to a PC, facsimile equipment or other equipment, securely position the unit allowing space for the power transformer unit.

For chassis installations, up to 16 MicroModems may be mounted in a VERSITRON Model MRR-16 19" standard rack-mount chassis. VERSITRON Model M0004 provides power to the chassis and a jumper cable, VERSITRON Model M0001, connects each MicroModem to the power bar of the chassis. For power redundancy, two M0004 Power Supplies may be used.

2.3 SWITCH AND JUMPER SETTINGS

There is one 8 position switch and one single position switch provided for configuration of selectable options. Switch locations are shown in Illustration 3. Switch settings are as follows:

2.3.1 Modem Configuration Settings

Table 1: S1 and S2 Switch Settings

Position	On	Off
S1-1		Factory setting*
S1-2		Factory setting*
S1-3	Factory setting*	
S1-4	Factory setting*	
S1-5	Source Timing (DTE Only)**	Terminal Timing (DTE); DCE
S1-6	Data Inverted	Normal
S1-7		Factory setting*
S1-8		Factory setting*
S2	Pin 9 Power Enabled	Pin 9 Power Disabled

* **Note:** Factory setting for the marked S1 positions as indicated by *. Do Not Change.
** **Note:** This setting(S1-5 ON) should only be made for DTE in Source Timing.

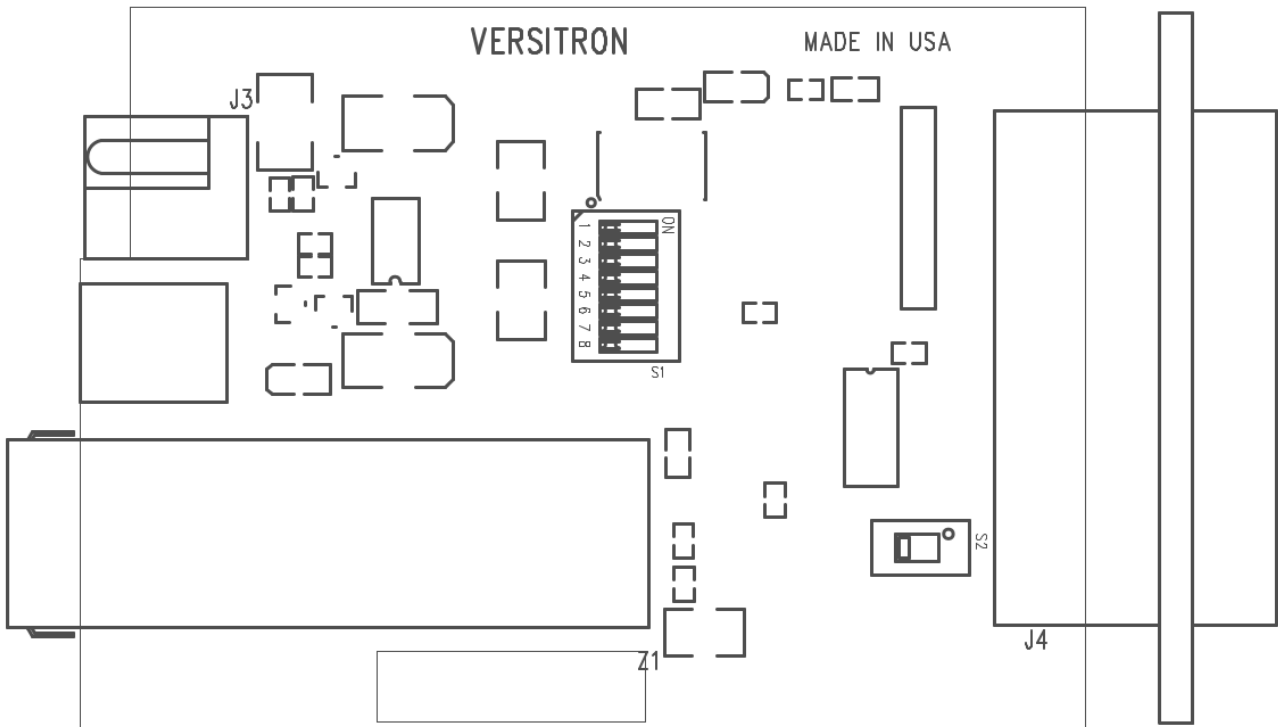


Illustration 2: Switch and Connector Locations

2.4 POWER REQUIREMENTS

The M82xxD products are designed to operate from an AC power transformer or a DC power source in the range of +5 to +15 VDC.

2.4.1 Installation with AC Power

Before inserting the VERSITRON power transformer, PSAC08 (US) or PSAC09 (EUR), into an AC power source, the plug should be connected to the MicroModem. There are no special tools required.

2.4.2 Installation with DC Power

DC power may be used instead of a power transformer. This requires a 2.5 mm socket, J3 (location shown in Illustration 3) with the positive voltage on the center and the common on the concentric supplying 12VDC at 1.0A as shown below (Illustration 3):

Center = 12VDC, 1.0A
Clip = Ground

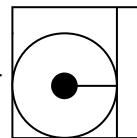


Illustration 3: DC Power Supply Connection

Alternatively, DC power can be supplied to pin 9 of the DB25 interface when S2 switch is placed in the 'ON' position. This can be in the range of 5VDC to 15VDC.

2.5 INTERFACE WIRING

The MicroModem interfaces can be wired as shown in Illustrations 4, 5, and 6 below.

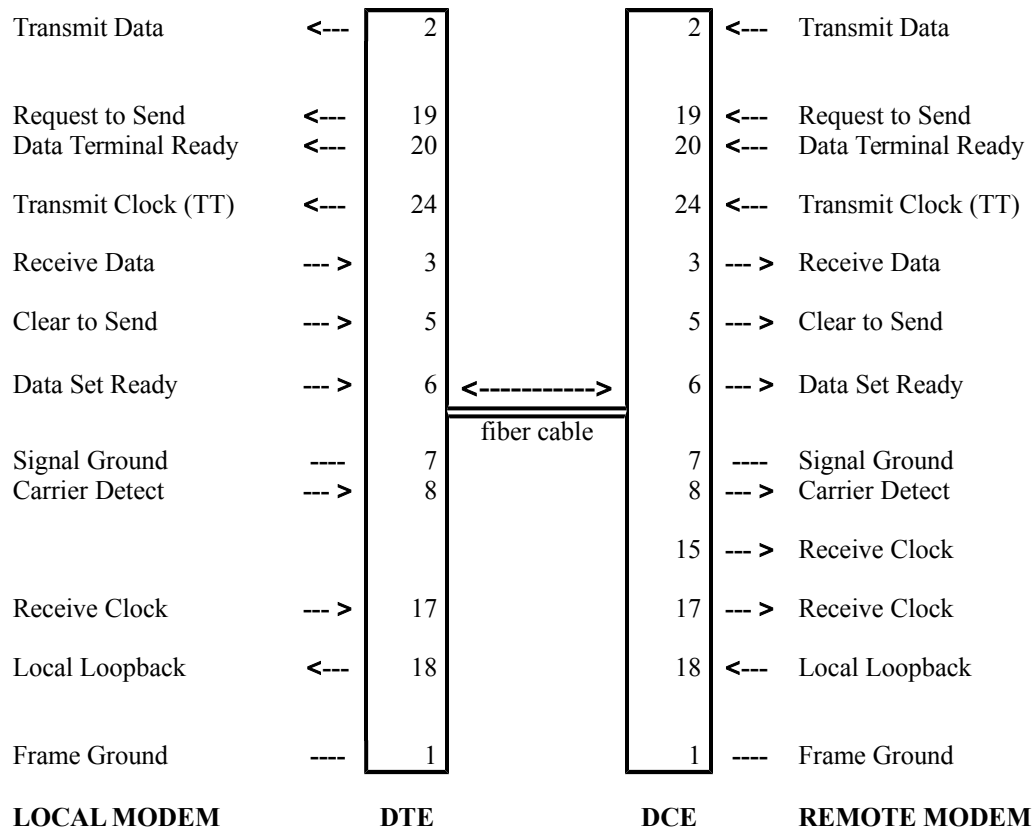


Illustration 4: Interface Extender Configuration(Terminal Timing)

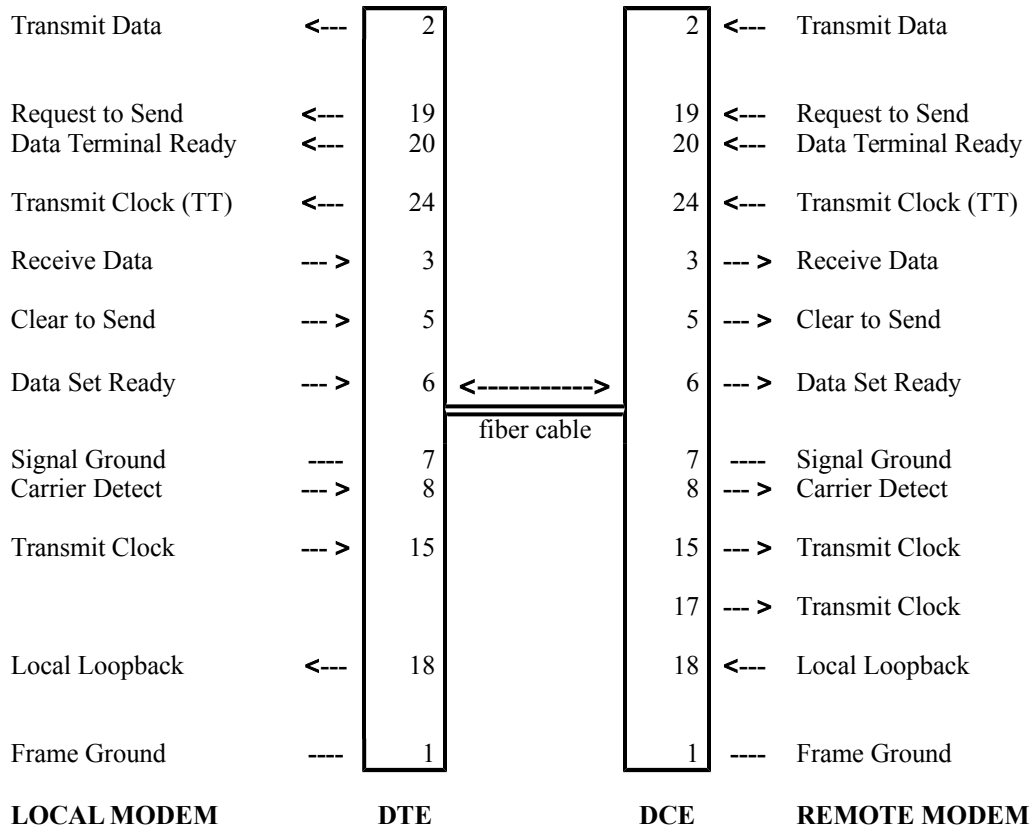


Illustration 5: Interface Extender Configuration (Source Timing; S1-5 = ON; DTE ONLY)

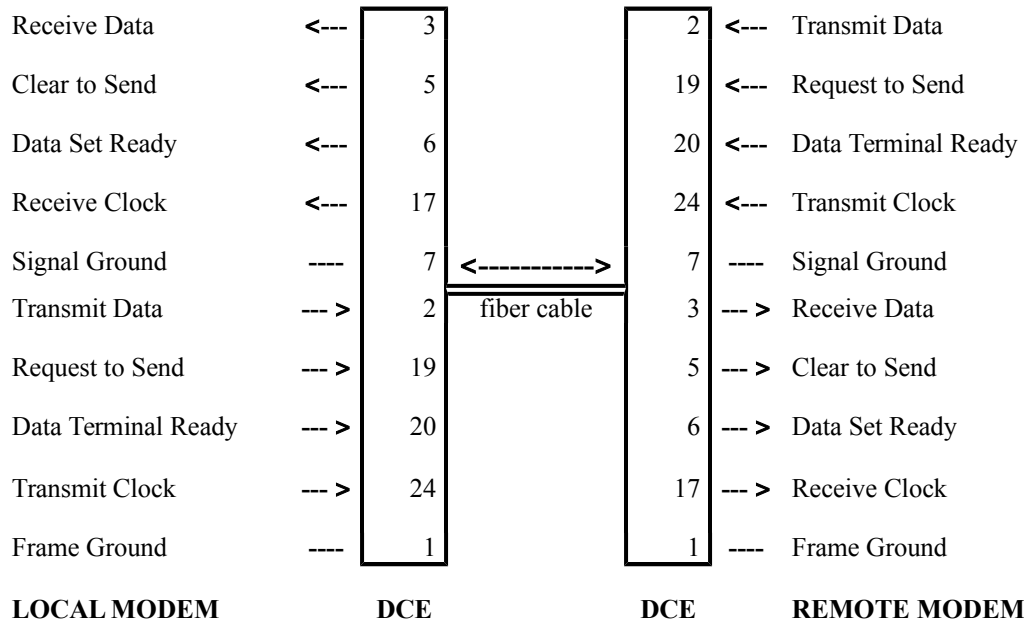


Illustration 6: Modem Link Configuration

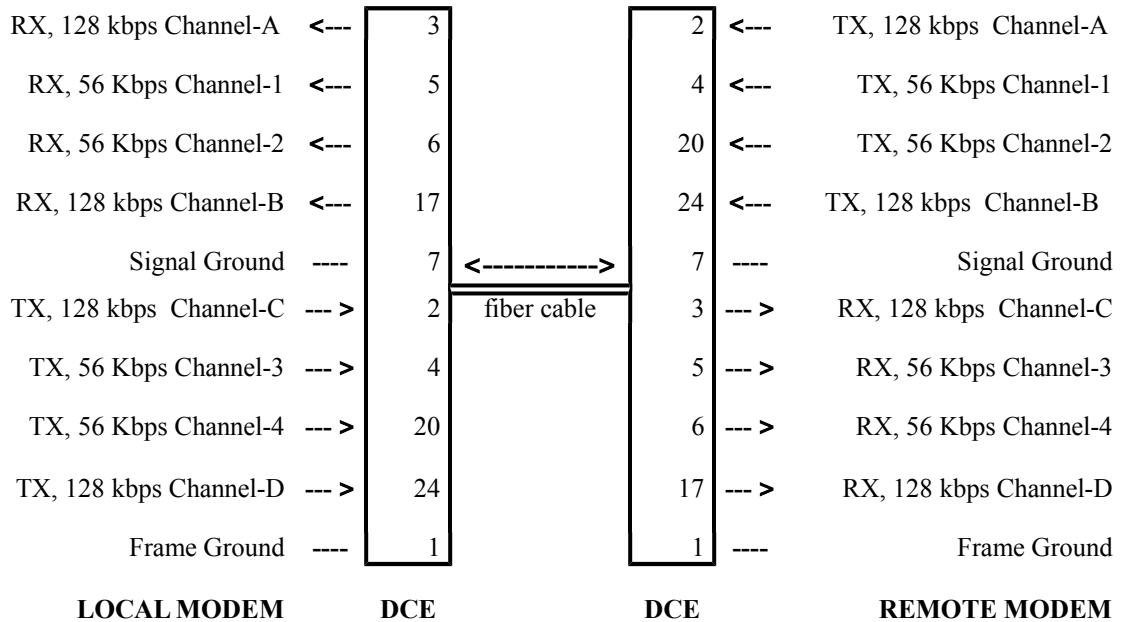


Illustration 7: Multiplexer Configuration

2.5.1 Fiber Optic Cable Installation

After the electrical and digital interface cables have been wired according to sections 2.4 and 2.5, insert the SFP module into the SFP cage (Z1) and attach the fiber optic cable to it (see Illustration 3 for location of Z1). The SFP module slides into the RFI Cage label side up. There will be a slight click when it locks into place. After the SFP module is installed the fiber optic cable can be installed. The cable must be an LC type connection. The cable should be oriented with the thumb tab at the top, when completely inserted the tabs will click into place.

2.6 INITIAL CHECKOUT PROCEDURE

M82xxD MicroModems contain no power on/off switch. Once power is connected the modem will go through its power-up sequence, usually 1-2 seconds, then it will be ready for use. Before beginning system operation check the following to verify proper installation:

1. Verify that the power plug is seated fully into the modem.
2. Verify that the fiber optic cable is connected on each end.
3. Verify that a DTE MicroModem is used with a DCE device and a DCE MicroModem is used with a DTE device.

If a malfunction is detected during the initial checkout procedure, refer to Section 5 for information on isolating the malfunction in the unit.

3 OPERATION

3.1 INTRODUCTION

This chapter contains a description of the operating controls and indicators associated with the M82xxD MicroModems. Since the MicroModem is designed for continuous and uninterrupted operation, there are no setting requirements after the unit is operational. Once the Modem is powered up it should remain in service as long as required.

3.2 STATUS INDICATORS

There are no status indicators associated with the M82xxD MicroModems

4 THEORY OF OPERATION

4.1 INTRODUCTION

The M82xxD MicroModem is a RS-232 standard modem available configured as either Data Communications Equipment(DCE) or Data Terminal Equipment(DTE). These modems are designed to be used in pairs as a transparent interface extension over a fiber optic link.

4.2 POWER SUPPLY AND ALARM CIRCUITRY

4.2.1 Power Supply Circuit

When 12VDC is applied to the circuit, the unit should draw approximately 100mA. The unit has a switching power supply circuit, which converts 12V to 3.3VDC, and 1.2VDC. .

4.2.2 Alarm Circuit

This unit does not have an alarm circuit.

4.3 FUNCTIONAL DESCRIPTION

The unit consists of the following circuits:

- 4.3.1- Logic Conversion
- 4.3.2- FPGA (Mux/Demux)
- 4.3.3- Fiber Optic Transceiver Circuit

4.3.1 Logic Conversion

There is a transceiver chipset that converts the RS-232 interface signals to logic level signals for processing and transmission over the fiber optic link.

4.3.2 FPGA (Mux/Demux)

The FPGA is used to multiplex/demultiplex the RS-232 interface signals from the chipset for transmission over the fiber optic link. The FPGA is a proprietary VERSITRON design that provides serial conversion and synchronization of the RS interface signals on the fiber optic link.

4.3.3 Fiber Optic Transceiver Circuit

Fiber-optic communications are handled by the SFP module. The power for this module is isolated from the other power circuits through filters. This helps reduce the supply noise being coupled into the SFP module. The SFP interfaces directly with the FPGA.

5 MAINTENANCE AND TROUBLESHOOTING

5.1 INTRODUCTION

This chapter contains general information designed to isolate a malfunction in the M82xxD MicroModems to a replaceable unit. These units are not equipped with redundancy. Therefore, a failure in one of these units will interrupt service.

5.2 FAULT ISOLATION

Since there are no status indicators on the MicroModem, you must remove the transmit fiber optic cable to verify that the unit is emitting light (transmitting). If no light is present, check the power adapter plug to ensure that it is seated correctly and power is applied to the unit. If light is still not present then swap out power adapters to check for a bad power unit. If both units are emitting light, and the transmit fiber optic line of the local unit is connected to the receive terminal of the remote unit in both directions, then measure the optical levels at both ends (if possible) to determine if there is a problem with the fiber optic cable. If problems still persist contact VERSITRON Customer Service for assistance.