USER MANUAL

MODEL 1140
Miniature Fiber Optic Modem w/V.54 Diagnostics

SALES OFFICE
(301) 975-1000
TECHNICAL SUPPORT
(301) 975-1007
http:www.patton.com

1.0 WARRANTY INFORMATION

Patton Electronics warrants all Model 1140 components to be free from defects, and will—at our option—repair or replace the product should it fail within one year from the first date of shipment.

This warranty is limited to defects in workmanship or materials, and does not cover customer damage, abuse or unauthorized modification. If this product fails or does not perform as warranted, your sole recourse shall be repair or replacement as described above. Under no condition shall **Patton Electronics** be liable for any damages incurred by the use of this product. These damages include, but are not limited to, the following: lost profits, lost savings and incidental or consequential damages arising from the use of or inability to use this product. **Patton Electronics** specifically disclaims all other warranties, expressed or implied, and the installation or use of this product shall be deemed an acceptance of these terms by the user.

1.1 RADIO AND TV INTERFERENCE

The Model 1140 generates and uses 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 and television reception. The Model 1140 has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection from such interference in a commercial installation. However, there is no guarantee that interference will not occur in a particular installation. If the Model 1140 does cause interference to radio or television reception, which can be determined by disconnecting the RS-232 interface, the user is encouraged to try to correct the interference by one or more of the following measures: moving the computing equipment away from the receiver, re-orienting the receiving antenna and/or plugging the receiving equipment into a different AC outlet (such that the computing equipment and receiver are on different branches).

1.2 SERVICE

All warranty and non-warranty repairs must be returned freight prepaid and insured to Patton Electronics. All returns must have a Return Materials Authorization number on the outside of the shipping container. This number may be obtained from Patton Electronics Technical Service at **(301) 975-1007**. *Packages received without an RMA number will not be accepted.*

Patton Electronics' technical staff is also available to answer any questions that might arise concerning the installation or use of your Model 1140. Technical Service hours: **8AM to 5PM EST, Monday through Friday.**

2.0 GENERAL INFORMATION

Thank you for your purchase of this Patton Electronics product. This product has been thoroughly inspected and tested and is warranted for One Year parts and labor. If any questions or problems arise during installation or use of this product, please do not hesitate to contact Patton Electronics Technical Support at (301) 975-1007.

2.1 FEATURES

- Supports async. or sync. communication over dual optical fibers
- V.52 and V.54 diagnostics
- Data rates to 38.4 Kbps
- Range to 2 miles
- Immune to RFI/EMI noise, ground loops and transient surges
- Easily accessible Diagnostic & Configuration Switches
- Switch-selectable carrier control
- Requires no AC power or batteries
- Two easy-to-read status indicators
- Male or female DB-25 and SMA or ST connectors available

2.2 DESCRIPTION

The Patton Model 1140 miniature dual fiber optic modem brings fiber to the desktop. Combining the inviolability of fiber with the troubleshooting capabilities of V.52 and V.54 diagnostics, the Model 1140 is the best choice for your most critical RS-232 links. The Model 1140 operates async. or sync., supports data rates to 38.4 Kbps and plugs directly into a workstation's RS-232 port.

Like all fiber optic modems, the Model 1140 is inherently immune to RFI/EMI noise, ground loops and transient surges. The carrier may be switch selected as either "Continuously On" or "Controlled by RTS", while an easily accessible DCE/DTE switch eliminates the need for cumbersome RS-232 crossover cables. Two easy-to-read LED indicators monitor the Error and Test modes. Drawing all necessary power from the RS-232 interface, the Model 1140 requires no AC power or batteries to operate.

Measuring only 3.42" x 2.10" x .73", the Model 1140 is able to fit into tight installation spaces. On the RS-232 side, the Model 1140 comes equipped with either a male or female DB-25 connector; on the fiber side, it is available with a choice of SMA or ST connectors.

3.0 CONFIGURATION OVERVIEW

The Model 1140 is fairly simple to install and is ruggedly designed for excellent reliability: just set it and forget it. The following instructions will help you set up and install the Model 1140 properly. If you have any questions, don't hesitate to call Patton's Technical Support Hotline at (301) 975-1007 (9-5 PM, EST).

3.1 CONFIGURATION SWITCHES

The Model 1140 uses a unique set of 16 external mini DIP switches that allow configuration to an extremely wide range of applications. These 16 DIP switches are grouped in two eight-switch sets, and are externally accessible from the underside of the Model 1140 (see Figure 1). Since all configuration DIP switches are externally accessible, **there is no need to open the Model 1140's case for configuration.**

The configuration switches allow you to select data rates, clocking methods, V.52 & V.54 tests, word lengths, extended signaling rates, async. or sync. mode. The drawings, text and tables on the following pages describe all switch locations, positions and functions.
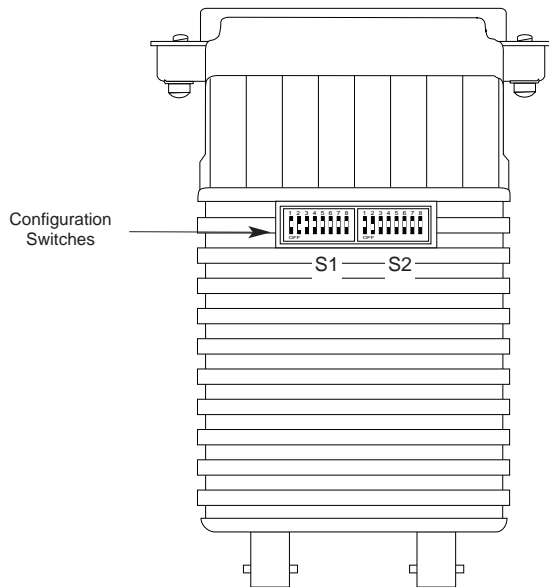

Figure 1. Model 1140 Configuration Switches External Position

The Model 1140 has two sets of eight switches, yielding 16 total DIP switches. The three sets will be referred to as S1 and S2. As Figure 2 shows, the orientation of all DIP switches is the same with respect to "ON" and "OFF" positions.
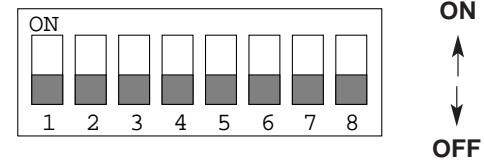

Figure 2. Close-up of DIP switches showing "ON" and "OFF" positions

3.2 CONFIGURATION SWITCH SET "S1"

The DIP switches on S1 set data rate, clock source, async./sync. mode and carrier control method. The default settings are summarized in the table below.

S1 SUMMARY TABLE		
Position	**Function**	**Factory Default**
S1-1	Data Rate	On
S1-2	Data Rate	Off
S1-3	Data Rate	Off
S1-4	Data Rate	On
S1-5	Clock Source	On
S1-6	Clock Source	On
S1-7	Async./Sync.	On Async.
S1-8	Carrier Control	Off Constantly On

(S1-1 through S1-4: 9,600 bps) (S1-5, S1-6: Internal)

Figure 3. Summary of DIP switch default settings for set S1

S1-1 through S1-4: Data Rate Setting

Switches S1-1 through S1-4 are set in combination to determine the asynchronous and synchronous data rate for the Model 1140.

S1-1	S1-2	S1-3	S1-4	Setting
On	On	On	On	1.2 Kbps
Off	On	On	On	1.8 Kbps
On	Off	On	On	2.4 Kbps
Off	Off	On	On	3.6 Kbps
On	On	Off	On	4.8 Kbps
Off	On	Off	On	7.2 Kbps
On	Off	Off	On	9.6 Kbps
Off	Off	Off	On	14.4 Kbps
On	On	On	Off	19.2 Kbps
Off	On	On	Off	28.8 Kbps
On	On	Off	Off	38.4 Kbps
Off	On	Off	Off	57.6 Kbps

S1-5 and S1-6: Clock Source

Switches S1-5 and S1-6 are set in combination to determine the transmit clock source for the Model 1140.

S1-5	S1-6	Setting
On	On	Internal transmit clock
Off	On	Receive recover clock
On	Off	External transmit clock

S1-7: Asynchronous/Synchronous Mode

The setting for switch S1-7 determines whether the Model 1080A is in asynchronous or synchronous operating mode.

S1-7	Setting
On	Asynchronous
Off	Synchronous

S1-8: Carrier Control Method

The setting for switch S1-8 determines whether the carrier is "constantly on" or "controlled by RTS". This setting allows for operation in switched carrier, multipoint and/or hardware handshaking applications.

S1-8	Setting
Off	Constantly On
On	Switched Carrier

3.3   CONFIGURATION SWITCH SET "S2"

The DIP switches on S2 set word length, extended signaling rate, RTS/CTS delay and V.52 and V.54 diagnostic test.

S2 SUMMARY TABLE		
Position	Function	Factory Default
S2-1	Word Length	Off ⎫ 10 bits
S2-2	Word Length	Off ⎭
S2-3	Extended Signaling Rate	Off -2.5% to +2.3%
S2-4	RTS/CTS Delay	On ⎫ 7 mS
S2-5	RTS/CTS Delay	On ⎭
S2-6	Future Use	-
S2-7	Future Use	-
S2-8	V.52/V.54 Tests	Off Enable

Figure 4. Summary of DIP switch default settings for S2

S2-1 and S2-2: Word Length

Switches S2-1 and S2-2 are set in combination to determine the word length for asynchronous data.

S2-1	S2-2	Setting
Off	On	8 bits
On	On	9 bits
Off	Off	10 bits
On	Off	11 bits

S2-3: Extended Signaling Rate

The setting for switch S2-3 determines the range of variability the Model 1140 "looks for" in asynchronous data rates (i.e., the actual variance from a given frequency level the Model 1140 will tolerate).

S2-3	Setting	
Off	-2.5% to +1%	Basic
On	-2.5% to +2.3%	Extended

S2-4 and S2-5: RTS/CTS Delay

The combined settings for switches S2-4 and S2-5 determine the amount of delay between the time the Model 1140 "sees" RTS and when it sends CTS. Options are no delay, 7 ms and 53 ms.

S2-4	S2-5	Setting
On	On	7 mS
Off	On	53 mS
On	Off	No delay
Off	Off	No delay

S2-8: V.54 Loopback Test Enable

To reset the V.54 circuit, set switch S2-6 to the "ON" position, then back to the "OFF" position..

S2-8	Setting
Off	V.54 Enable
On	V.54 Disable

The Model 1140 is easy to install. After configuring the DIP switches, simply connect the two fiber cables and then connect the RS-232 interface. Figure 5 shows the location of the fiber connections on the Model 1140's rear panel.
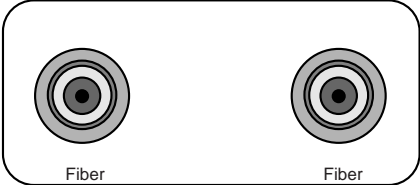

Figure 5 Close up of ST and SMA connections

4.1 FIBER CONNECTIONS

The Model 1140 short range modems are designed to work in *pairs*. You will need one at each end of a dual fiber cable. This cable connects to each Model 1140 using either an ST or an SMA connector. Figure 6 shows a close up of each of these connector types.
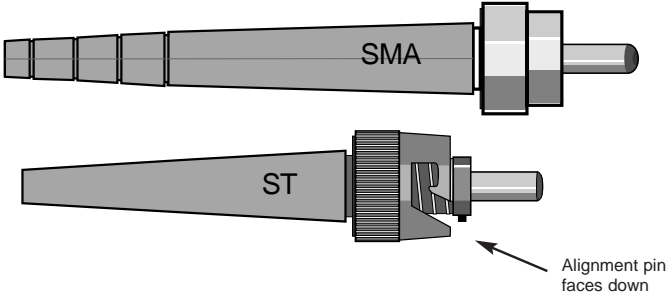

Alignment pin
faces down

Figure 6. Close up of ST and SMA connections

4.2 RS-232 CONNECTION

The Model 1140 is designed to remain in DCE mode.

Once you have configured each Model 1140 properly and connect-ed the fiber and RS-232 cables, you are ready to operate the units This section describes the LED status monitors, the V.52 and V.54 diagnostics and the power up process.

Leds
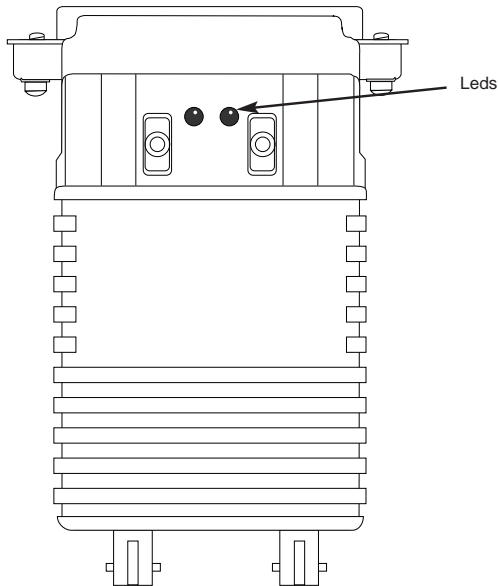
5.2 TEST MODES

The Model 1140 offers two V.54 test modes to evaluate the condi-tion of the modems and the communication link. These tests can be activated physically from the front panel, or via the interface. Note: V.54 test modes on the Model 1140 are available for point-to-point applications only.

5.2.1 LOCAL ANALOG LOOPBACK (LAL)

The Local Analog Loopback (LAL) test checks the operation of the local Model 1140, and is performed separately on each unit. Any data sent to the local Model 1140 in this test mode will be echoed (returned) back to the user device. For example, characters typed on the key-board of a terminal will appear on the terminal screen. To perform a LAL test, follow these steps:

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A. Activate LAL. This may be done in one of two ways: First, by moving the front panel toggle switch DOWN to "LAL". Second, by rais-ing pin 18 on the interface. (Note: Make sure DIP switch SW2-8 is OFF). Once LAL is activated, the Model 1140 transmit output is con-nected to its own receiver. The "test" LED should be lit.

B. Verify that the data terminal equipment is operating properly and can be used for a test. If a fault is indicated, call a technician or replace the unit.

C. Perform a BER (bit error rate) test on each unit. If the BER test equipment indicates no faults, but the data terminal indicates a fault, follow the manufacturer's checkout procedures for the data termi-nal. Also, check the interface cable between the terminal and the Model 1140.

5.2.2 REMOTE DIGITAL LOOPBACK (RDL)

The Remote Digital Loopback (RDL) test checks the performance of both the local and remote Model 1140s, and the communication link between them. Any characters sent to the remote Model 1140 in this test mode will be returned back to the originating device. For example, characters typed on the keyboard of the local terminal will appear on the local terminal screen after having been passed to the remote Model 1140 and looped back. To perform an RDL test, follow these steps:

A. Activate RDL. This may be done in two ways: first, by moving the front panel toggle switch UP to "RDL". Second, by raising pin 21 on the interface. (Note: Make sure SW2-8 is OFF).

B. Perform a BER (bit error rate) test on the system.

C. If the BER test equipment indicates a fault, and the Local Analog Loopback test was successful for both Model 1140s, you may have a problem with the twisted pair line between the modems. You should then check the fiber line for proper connections and continuity.

5.2.3 USING THE V.52 BER TEST INDEPENDENTLY

The V.52 BER test can be used independently of the V.54 loop-back tests. This requires two operators: one to initiate and monitor the test at the local Model 1140, and one at the remote Model 1140. To use the V.52 BER test by itself, both operators should simultane-ously follow these steps:

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1. Locate the "511/511E" toggle switch on the front panel of the 1140 and move it DOWN. This activates the V.52 BER test mode and transmits a "511" test pattern to the other unit. If any errors are present, the receiving modem's red "Error" LED will blink sporadically. Note: For this test to function, the "511" switch on both Model 1140s must be on.

2. If the test indicates no errors are present, move the V.52 toggle switch UP, activating the "511/E" test with errors present. If the test is working properly, the receiving modem's red "Error" LED will glow. A successful "511/E" test will confirm that the link is in place, and that the Model 1140's built-in "511" generator and detector are working properly.

5.3 POWER UP

Once the Model 1140 is properly installed, it should operate transparently—as if it were a standard cable connection. Since operating power is derived from the RS-232 data and control signals; there is no "ON/OFF" switch. All data signals from the RS-232 interface are passed straight through.

Transmission Line: Dual optical cable

Transmission Mode: Async. or sync., half or full duplex

Interfaces: EIA RS-232, CCITT V.24

Data Rates: 0 - 38.4 Kbps

Distance: 2 miles over continuous fiber

RTS/CTS Delay: Switch-selectable: No delay, 9.0 mS, 79.5 mS

Receiver Sensitivity: -45 dBm

Coupled Power Output: -30 to -36 dBm

Optic Wavelength: 850 nm

LED Indicators: Carrier Detect and Fiber Optic Output

Connectors: DB-25 male or female on RS-232 side; ST or SMA connectors on fiber side

Power Supply: No external power required; uses power from RS-232 data and control signals
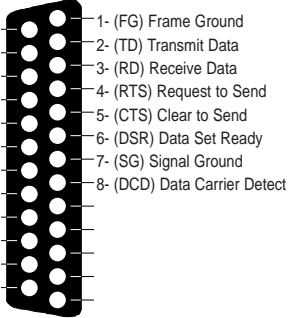
Temperature Range: 0-60°C (32-140°F)

Altitude: 0-15,000 feet

Humidity: Up to 95% non-condensing

Weight: 2 oz.

Dimensions: 23.42" x 2.10" x 0.73"

APPENDIX B
PIN CONFIGURATIONS

DIRECTION	"DCE" STANDARD SETTING		DIRECTION
		1- (FG) Frame Ground	
		2- (TD) Transmit Data	To Model 1140
		3- (RD) Receive Data	From Model 1140
		4- (RTS) Request to Send	To Model 1140
		5- (CTS) Clear to Send	From Model 1140
		6- (DSR) Data Set Ready	From Model 1140
		7- (SG) Signal Ground	
To Model 1140	Data Term. Ready (DTR) - 20	8- (DCD) Data Carrier Detect	From Model 1140