

USER MANUAL

MODEL 1180 Single Fiber Short Range Modem



Part# 07M1180-B
Doc# 017071UB
Revised 1/5/96

SALES OFFICE
(301) 975-1000
TECHNICAL SUPPORT
(301) 975-1007

1.0 WARRANTY INFORMATION

Patton Electronics warrants all Model 1180 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 1180 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 1180 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 1180 does cause interference to radio or television reception, which can be determined by turning the power off, 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 1180. 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 by Patton's qualified technicians. 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

- Operates over a single optical fiber
- Synchronous or asynchronous operation
- Loopback diagnostics
- Asynchronous data rates to 38.4 Kbps
- Synchronous data rates to 256 kbps
- Distances to 5 Km
- Internal or external clocking
- Hardware and software flow control
- Tri-state front panel LEDs
- Available with ST or SMA connectors

2.2 DESCRIPTION

The Model 1180 Single Fiber Short Range Modem accomplishes point-to-point RS-232 communication over a *single* optical fiber. Supporting synchronous data rates to 256 Kbps, and asynchronous data rates to 38.4 Kbps, the Model 1180 automatically adapts to hardware or software flow control. Synchronous timing can be set for internal or external clock.

The Model 1180 features extended data rate circuitry that allows for single fiber distances between 2.5 and 5 Km. Optical fiber may be connected to the Model 1180 using an ST or SMA type interface. The Model 1180 encodes the electrical signal using 3B4B modulation. The electrical signal is then converted to an optical signal and transmitted using an 880 nm light emitting diode.

The Model 1180 features two test modes: local and remote loopback. These loopback tests are activated via a front panel switch. The local loopback test is used to evaluate the RS-232 to modem connection. The remote loopback test is used to evaluate the condition of the connection between the modems.

3.0 CONFIGURATION

The Model 1180 uses a set of eight external DIP switches that allow configuration to a wide range of applications. Because all eight switches are in one externally accessible DIP package, there is no need to open the Model 1180's case for configuration. The switches allow you to control data rates and clocking methods. Figures 1, 2 and 3 summarize the switch locations, positions and functions.

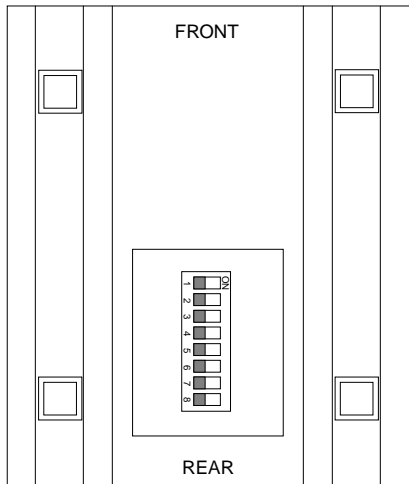


Figure 1. Switch locations underneath Model 1180

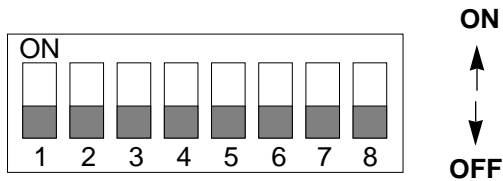


Figure 2. Close up of 1180 DIP switch package showing OFF/ON positions.

SWITCH SUMMARY TABLE		
Position	Function	Factory Default
Switch 1	RESERVED	Off
Switch 2	Data Rate (Sync Mode)	On
Switch 3	Data Rate (Sync Mode)	Off
Switch 4	Data Rate (Sync Mode)	Off
Switch 5	Data Rate (Sync Mode)	On
Switch 6	Reset	Off Operating Mode
Switch 7	Handshaking	On Control Signal Mode
Switch 8	Clocking Method	Off Internal Clock

Figure 3. Summary of switch settings, showing factory defaults

3.1 DETAILED SWITCH SETTINGS

This section provides detailed information about the function of each DIP switch and lists all possible settings. Use this section as configuration guide for applications where the Model 1180's default would not provide correct results.

Switch 1: Reserved for Future Use

Switches 2 through 5: Data Rate (Sync. Mode)

Switches 2 through 5 determine two configuration parameters: synchronous or asynchronous data rate and the mode of synchronization (Sync. Mode) between two Model 1180s. The "Sync. Mode" setting (active in both asynchronous and synchronous operating modes) defines the packet length of the data stream between the two Model 1180s.

Simply put, the "2X" setting doubles the space between data packets when compared with the "1X" setting. A Sync. Mode setting of "2X" facilitates communication distances up to 5 Km. A Sync. Mode setting of "1X" limits communication distances to 2.5 Km. The following table shows every possible data rate/Sync. Mode switch setting for the Model 1180.

Switch 2	Switch 3	Switch 4	Switch 5	Data Rate (Sync. Mode)
On	Off	Off	On	0 - 19.2 (2X) Asynchronous
On	Off	Off	Off	0 - 38.4 (1X) Asynchronous
On	On	On	Off	2.4 (1X)
Off	On	On	Off	9.6 (1X)
Off	On	On	On	9.6 (2X)
On	On	Off	Off	19.2 (1X)
On	On	Off	On	19.2 (2X)
Off	On	Off	Off	38.4 (1X)
Off	On	Off	On	38.4 (2X)
On	Off	On	Off	48.0 (1X)
On	Off	On	On	48.0 (2X)
Off	Off	On	Off	56.0 (1X)
Off	Off	Off	Off	64.0 (1X)
Off	Off	Off	On	64.0 (2X)
Off	Off	On	On	192.0 (1X)
On	On	On	On	256.0 (1X)

Switch 8: Clocking Method

Switch 8 is used to specify the clocking method. The Model 1180 can provide an internal clock (pin 15) or receive an external clock (from pin 24).

Switch 8

On = External Clock
Off = Internal Clock

Switch 6: Reset

Switch 6 lets you reset the Model 1180 without powering down the unit. The default position of the switch allows normal operation.

Switch 6

On = Reset Condition
Off = Operating Condition

Switch 7: Handshake Mode

The setting for switch 7 determines whether the Model 1180 operates in Control Signal Mode or Standard Modem Mode. In Control Signal Mode, the two Model 1180s pass RTS/CTS and DTR/DSR between each other over the fiber link. In Standard Modem Mode, handshaking only occurs between each Model 1180 and its DTE, not over the fiber link.

Switch 7

On = Control Signal Mode
Off = Standard Modem Mode

(continued)

4.0 INSTALLATION

The Model 1180 is easy to install. After configuring the DIP switches, simply connect the single fiber cable, hook up the RS-232 interface, and plug the power supply adapter into the 1180. Figure 4 shows the location of the interface connections on the Model 1180 rear panel.

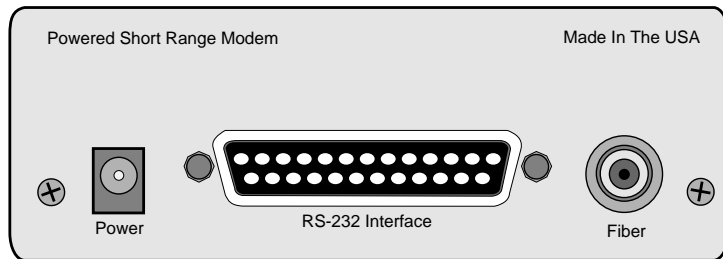


Figure 4. Rear panel of Model 1180 showing interface connections

4.1 SINGLE FIBER CONNECTION

These short range modems are designed to work in *pairs*. You will need one at each end of single multi-mode fiber cable. Depending upon the data rate setting you select, your cable may be a maximum of 2.5 or 5 Km long. The fiber cable connects to each Model 1180 using either an ST or an SMA connector. Figure 5 shows a close up of both connector types.

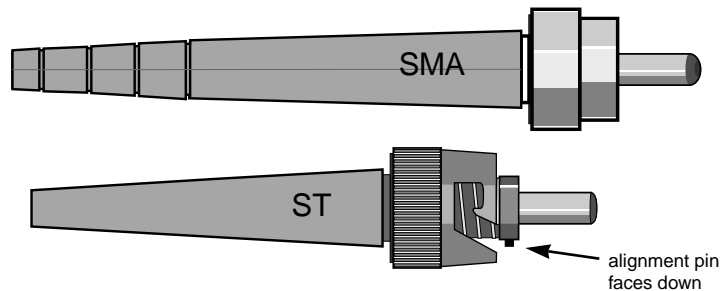


Figure 5. Close up of ST and SMA connections

4.2 RS-232 CONNECTION

The Model 1180 is configured as a DCE. Therefore it wants to connect to a DTE. When connecting the Model 1180 to DTE hardware such as a PC, host or terminal, use a *straight through* RS-232 cable. When connecting the Model 1180 to DCE hardware such as a modem, multiplexer or printer, use a *null modem* RS-232 cable. The diagrams below show some typical RS-232 null modem wiring configurations. Consult your hardware user manual for the specific pin configuration you need.

Local Software Handshaking

RS-232 DCE DB-25 Pin No.	Model 1180 DB-25 Pin No.
1	1
2	3
3	2
4	4
5	5
6	6
8	8
20	20
7	7

Local Hardware Handshaking

RS-232 DCE DB-25 Pin No.	Model 1180 DB-25 Pin No.
1	1
2	3
3	2
4	5
5	4
6	20
8	8
20	6
	8
7	7

5.0 OPERATION

Once you have configured each Model 1180 properly (see Section 3.0) and connected the fiber and RS-232 cables (see Section 4.0), you are ready to operate the units. This section describes reading the LED status monitors, power-up and using the built-in loopback test modes.

5.1 LED STATUS MONITORS

The Model 1180 features six front panel status LEDs that indicate the condition of the modem and communication link. Figure 6 shows the front panel location of each LED. Following Figure 6 is a description of each LED's function.

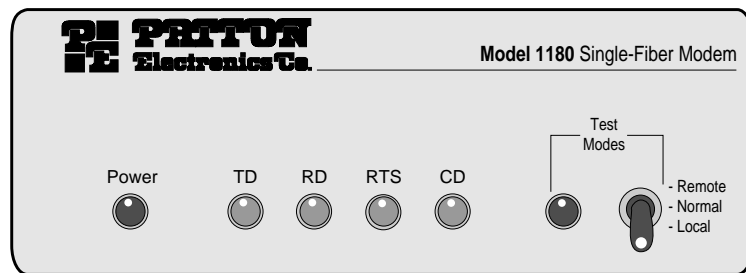


Figure 6. Front view of Model 1180

- The green “Power” LED glows if power is applied to the modem.
- The green “Test Modes” LED indicates that the modem is in a test mode.
- The “TD” and “RD” indicators blink red and green with data activity. Red indicates a low RS-232 logic level, green indicates a high RS-232 logic level. Note: RS-232 devices idle in a *low* state, so the LED will glow red if the connections are correct and the RS-232 device is in an idle state.
- The “RTS” and “CD” indicators are also tri-state and glows red for a “low” signal or green for a “high” signal. RTS lights for an incoming signal on RS-232 pin 4. CD lights for an incoming signal on the line side, and the resulting output signal on RS-232 pin 8.

5.2 POWER-UP / SYNCHRONIZATION

Apply AC power to the Model 1180 by plugging the separate AC power adapter first into the rear panel outlet of the Model 1180 and then into an acceptable AC power outlet. There is no power switch on the Model 1180: When the “power” LED is glowing steady, the Model 1180 is powered up. **Note: Make sure the front panel toggle switch on both Model 1180s is set to NORMAL.**

After both the local and remote Model 1180s are powered up, a synchronization process must occur between the two modems before a link can be established. Depending upon a number of factors, this synchronization process can take *as long as 60 seconds*. Any time one of the Model 1180s loses power (i.e., in a lightning storm), the local and remote units *must re-synchronize* before they can resume data transmission. Note: If your application cannot tolerate a 60 second synchronization phase, **turn the front panel “Test Modes” switch to REMOTE and then back to NORMAL to synchronize the units in a maximum of 250 mS.**

When the local and remote Model 1180s are *both* powered up, and are passing data *normally*, the following LED conditions will exist:

- PWR = green
- TD & RD = flashing red and green
- RTS & DCD = green
- TEST = off

5.3 LOOPBACK TEST MODES

The Model 1180 offers two loopback test modes to evaluate the condition of the modems and the communication link. These tests are activated from the front panel.

5.3.1 LOCAL LOOPBACK

The local loopback test checks the operation of the local Model 1180, and is performed separately on each unit. Any data sent to the local Model 1180 in this test mode will be echoed (returned) back to the user device. For example, characters typed on the keyboard of a terminal will appear on the terminal screen.

To perform a local loopback test, follow these steps:

A. Activate local loopback by moving the front panel toggle switch DOWN to “Local”. Once local loopback is activated, the Model 1180 transmit output is connected to its own receiver. The “test” LED should glow. Note: Even though the local Model 1180 cannot communicate with the remote Model 1180 in this mode, the synchronized connection between the two modems remains intact.

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 BERT (bit error rate) test on each unit. If the BERT test equipment indicates no faults, and the data terminal indicates a fault, follow the manufacturer’s checkout procedures for the data terminal. Also, check the RS-232 interface cable between the terminal and the Model 1180.

5.3.2 REMOTE LOOPBACK

The remote loopback test checks the performance of both the local and remote Model 1180s, *and* the communication link between them (Figure 7). Any characters sent to the remote Model 1180 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 1180 and looped back. To perform a remote loopback test, follow these steps:

A. Activate remote loopback by moving the front panel toggle switch UP to “Remote”. The “test” LED should glow.

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

C. If the BERT test equipment indicates a fault, and the local loopback test was successful for both Model 1180s, this suggests a problem with the fiber communication line connecting the modems. You should then test the fiber line for proper connections and continuity.

5.4 POWER-DOWN

Turn off the Model 1180 by simply unplugging the AC power adapter from the wall. There is no power switch on the the Model 1180.

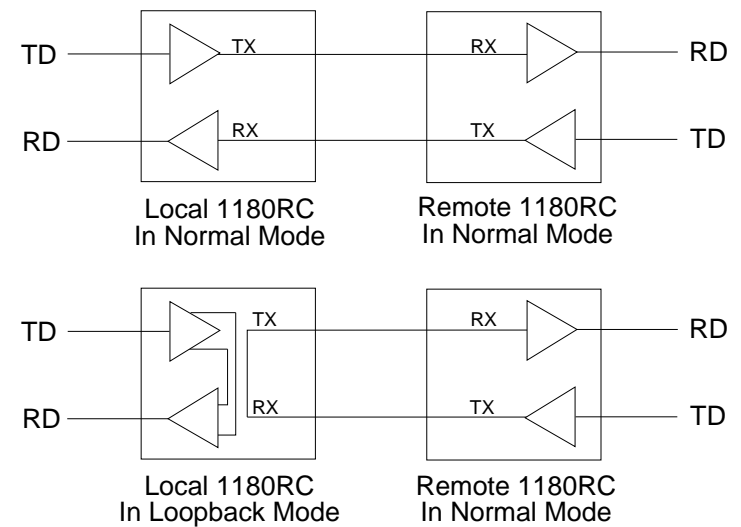


Figure 7. Local and remote loopback test modes

APPENDIX A
TROUBLESHOOTING

SYMPTOM	PROBLEM	SOLUTION
LEDs do not light when AC power transformer is plugged into wall	Loose power connection	Make sure the AC connection is flush
	Outlet is defective	Try a different outlet
	AC power cord is defective	Remove the cord from the outlet and check for continuity
Carrier Detect (CD) LED is <i>low</i> or Carrier Detect (CD) LED is <i>high</i>, but 1180s are not communicating	AC transformer is not plugged into the Model 1180	Plug transformer into Model 1180
	If CD is low, possible synchronization loss	Check for ongoing power loss or break in fiber if CD does not go high within 60 seconds
	Test Mode switch is in the wrong position	Make sure the Test Mode switch is set to NORMAL on both Model 1180s
	DIP switches are set improperly	Check all DIP switch settings, esp. Reset and Data Rate , against Section 3; make sure both Model 1180s are configured the same way
	Fiber link is connected improperly	Check the ST or SMA connection on the back of both Model 1180s
	RS-232 connections are faulty or cables are pinned wrong	Check RS-232 cable continuity and pinning

SYMPTOM	PROBLEM	SOLUTION
Data passes, but hardware flow control doesn't work	Incorrect DIP switch setting	Switch 7 must be in the ON condition for hardware flow control signals to pass between Model 1180s; both units must be set the same way
Model 1180s work in async. mode, but not sync. mode	Incorrect DIP switch setting	Switch 8 (internal/external clock) must be set the same way for both Model 1180s

APPENDIX B
SPECIFICATIONS

Transmission Format: Asynchronous or synchronous

Range: 2.5 Km at all data rates, 5 Km at specified data rates

Data rates: 0 to 38.4 Kbps (async.); 2.4, 9.6, 19.2, 38.4, 56, 64, 192 and 256 Kbps (sync.)

Interface: EIA RS-232 / CCITT V.24

Transmit Mode: Single 62.5 or 50 μ core, multi-mode fiber cable

Clocking: Internal or external

Handshaking: Software (X-ON/X-OFF) or hardware (RTS/CTS), both modes available at all times

Application: Point-to-point

Typical Link Budget: 8 dB with 50 μ cable; 12 dB with 62.5 μ cable

Responsivity Minimum: 0.12 A/w

LED Indicators: TD, RD, RTS, CTS, Power, Test

Diagnostics: Local and remote loopback

Connectors: DB-25 female (RS-232), ST or SMA (fiber)

Dimensions: 4.127" w x 1.52" h x 5.0" l

Power Supply: Wall-mount, 10VAC, 700mA

APPENDIX C
RS-232 INTERFACE STANDARD

DIRECTION	STANDARD "DCE" SETTING	DIRECTION
From Model 1180	Transmitting Timing - 15	To Model 1180
From Model 1180	Receiver Timing - 17	From Model 1180
To Model 1180	Data Term. Ready (DTR) - 20	To Model 1180
To Model 1180	Transmitting Timing LXC - 24	From Model 1180