

USER MANUAL

MODEL 1018
**High Speed Short Range
Modem w/ Extra Controls**



PA PATTON
Electronics Co.

Part# 07M1018-B
Doc# 013021UB
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SALES OFFICE
(301) 975-1000
TECHNICAL SUPPORT
(301) 975-1007

1.0 WARRANTY INFORMATION

Patton Electronics warrants all Model 1018 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 1018 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 1018 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 1018 does cause interference to radio or television reception, which can be determined by disconnecting the unit, 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 1018. 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

- Switch-selectable carrier control
- Asynchronous operation
- Data rates of 1.2, 2.4, 4.8, 9.6, 19.2, 28.8, 38.4 & 57.6 Kbps
- Flow control (RTS/CTS)
- Session control (DTR/DCD)
- Distances to 2.4 miles
- Point-to-point operation
- V.54 loopback tests and V.52 compliant BER tests
- Five easy-to-read LED indicators
- AC powered
- Transformer isolation
- Silicon Avalanche Diode surge protection

2.2 DESCRIPTION

The Patton Model 1018 high speed short range modem passes two "session" control signals (DTR/DCD), as well as two channel-independent flow control signals (RTS/CTS). This capability makes the Model 1018 suitable for SLIP (Serial Line Internet Protocol) and PPP (Point-to-Point Protocol) applications, as well as other serial applications requiring extra controls.

The Model 1018 supports asynchronous data rates to 57.6 Kbps and distances to 2.4 miles over two twisted pair. Diagnostics include V.54 loopback tests, a built-in V.52 BER test generator, and tri-state LED indicators. Communication is protected from transient surges by built-in surge protectors, and from ground loops by 1500V RMS isolation transformers.

The Model 1018's miniature size (3.55" x 2.10" x 0.78") allows the unit to plug directly into the RS-232 port of a host, terminal server, PC or other device. Power is supplied to the Model 1018 by a wall-mount AC transformer. Configuration is facilitated by two sets of externally accessible DIP switches, so there is no need to open the case to set switches. The Patton Model 1018 made in the USA.

3.0 CONFIGURATION

The Model 1018 provides sixteen configuration switches, which allow selection of data rates, clocking methods, V.54 test modes, and extended signalling rates. This section describes switch locations and explains all possible switch configurations.

3.1 CONFIGURATION SWITCHES

The Model 1018's unique set of sixteen internal DIP switches allows configuration to an extremely wide range of applications. These switches are grouped into two eight-switch sets and are located on the inside of the unit (Figure 1). For instructions on opening the Model 1018 case, see Section 3.2.

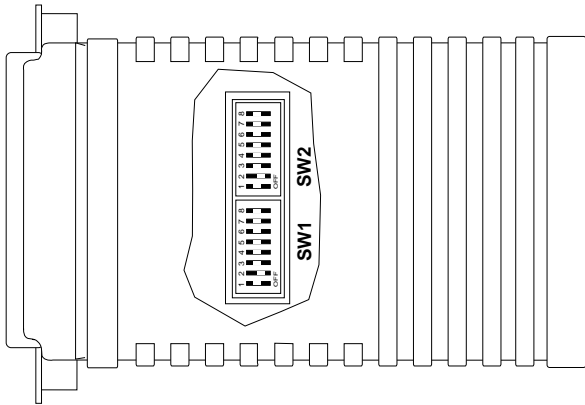


Figure 1. The inside of the Model 1018

Figure 2 shows the orientation of the switches, including the ON/OFF positions.

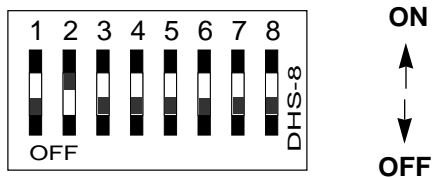
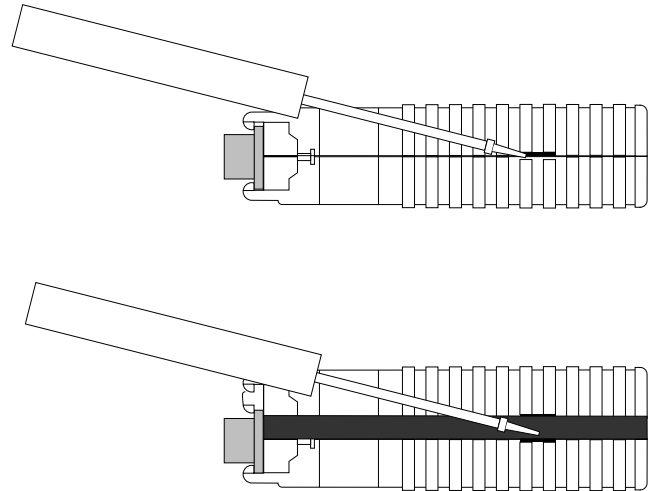


Figure 2. Close up of configuration switches

3.2 OPENING THE CASE

Open the unit by gently inserting a screwdriver into the special pry slot on the plastic case (below). You don't have to worry about breaking the plastic.



3.3 SWITCH SETTINGS

All possible settings for the Model 1018's configuration switches are presented in the summary table and descriptions below. If you have additional questions regarding configuration, contact Patton Technical Support at (301) 975-1000.

SWITCH SET SW1

The configuration switches on switch set SW1 set analog loopback, digital loopback and V.54 enable/disable. The default settings are summarized in Figure 3.

S1 SUMMARY TABLE			
Position	Function	Factory Default	
S1-1	DTE Control of LAL	Off	Disabled
S1-2	DTE Control of RDL	Off	Disabled
S1-3	Not Used	Off	N/A
S1-4	Microprocessor Reset	Off	Normal
S1-5	Data Rate	On	} 57.6 Kbps
S1-6	Data Rate	On	
S1-7	Data Rate	On	
S1-8	V.52/V.54 Tests	Off	Enabled

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

S1-1: DTE Initiation of Local Analog Loopback Test

The setting for switch S1-1 determines whether or not the Model 1018's local analog loopback test can be initiated by raising pin 18 on the DTE.

S1-1	Setting
On	Pin 18 Initiation Enabled
Off	Pin 18 Initiation Disabled

S1-2: DTE Initiation of Remote Digital Loopback Test

The setting for switch S1-2 determines whether or not the Model 1018's remote digital test can be initiated by raising pin 21 on the DTE.

S1-2	Setting
On	Pin 21 Initiation enabled
Off	Pin 21 Initiation Disabled

S1-3: Not Used

S1-4: Microprocessor Reset

Switch S1-4 may be used to reset the microprocessor and associated circuitry. The switch should remain in the "OFF" position for normal operation.

S1-4	Setting
On	Reset microprocessor
Off	Normal operation

S1-5 through S1-7: DTE Data Rate Setting

Switches S1-5 through S1-7 are set in combination to determine the asynchronous DTE data rate for the Model 1018.

S1-5	S1-6	S1-7	Setting
Off	Off	Off	1.2 Kbps
On	Off	Off	2.4 Kbps
Off	Off	On	4.8 Kbps
On	Off	On	9.6 Kbps
Off	On	Off	19.2 Kbps
On	On	Off	28.8 Kbps
Off	On	On	38.4 Kbps
On	On	On	57.6 Kbps

S1-8: V.54 Enable/Disable

The setting for switch S1-8 determines whether or not the Model 1018's V.54 circuits are enabled.

S1-8	Setting
On	V.54 Test Functions Disabled
Off	V.54 Test Functions Enabled

SWITCH SET S2

The configuration switches on switch set S2 set data rate, clock source, carrier control and RTS/CTS delay. The default settings are summarized in Figure 4.

S2 SUMMARY TABLE		
Position	Function	Factory Default
S2-1	Not Used	Off
S2-2	Not Used	Off
S2-3	Not Used	Off
S2-4	Clock Source	On
S2-5	Clock Source	On
S2-6	Carrier Control	On DTR Controlled
S2-7	RTS/CTS Delay	Off
S2-8	RTS/CTS Delay	Off

Figure 4. Summary of DIP switch default settings for S2

S2-4 and S2-5: Clock Source

Switches S2-4 and S2-5 are set in combination to determine the synchronous link clock source for the Model 1018. (Note: Although the Model 1018 supports only asynchronous DTE communication, the link between two Model 1018s is actually synchronous.) The Model 1018 may be set for either internal clock or receive recover clock.

<u>S2-4</u>	<u>S2-5</u>	<u>Setting</u>
On	On	Internal Transmit Clock
Off	On	Receive Recover Clock

S2-6: Carrier Control Method

The setting for switch S2-6 determines whether the carrier is “constantly on” or “controlled by DTR”. This setting allows for operation in switched carrier, multipoint and/or hardware handshaking applications.

<u>S2-6</u>	<u>Setting</u>
Off	Constantly On
On	Controlled by DTR

S2-7 and S2-8: RTS/CTS Delay

The combined settings for switches S2-7 and S2-8 determine the amount of delay between the time the Model 1018 “sees” RTS and when it sends CTS. Currently, the Model 1018 does not have optional delay settings. “No Delay” is defined as between 500 nsec and 1 msec. The switches should remain in the “OFF” position.

<u>S2-7</u>	<u>S2-8</u>	<u>Setting</u>
Off	Off	No Delay
		No Other Valid Settings

Once the Model 1018 is properly configured, it is ready to connect to your system. This section tells you how to properly connect the Model 1018 to the twisted pair and RS-232 interfaces.

4.1 CONNECTION TO THE TWISTED PAIR INTERFACE

The Model 1018 supports communication between two RS-232 devices at distances to 2.4 miles and data rates to 57.6 Kbps. Here are the two essential requirements for installing the Model 1018:

1. These units work in *pairs*. Therefore, you must have one Model 1018 (or a compatible model) at each end of a two twisted pair interface.
2. To function properly, the Model 1018 needs two **twisted** pairs of metallic wire. These twisted pairs must be **unconditioned**, dry, metallic wire, between 19 and 26 AWG (the higher number gauges may limit distance somewhat). Standard dial-up telephone circuits, or leased circuits that run through signal equalization equipment, or standard, flat modular telephone type cable, are *not acceptable*.

For your convenience, the Model 1018 is available with two different twisted pair interfaces: RJ-11 jack and RJ-45 jack.

4.1.1 TWISTED PAIR CONNECTION USING RJ-11 OR RJ-45

The RJ-11 and RJ-45 connectors on the Model 1018’s twisted pair interface are pre-wired for a standard TELCO wiring environment (see Figure 5). The signal/pin relationships are shown on the table on the following page:

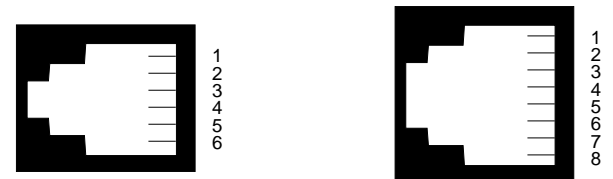


Figure 5. Standard AT&T color codes

<u>RJ-11</u>	<u>SIGNAL</u>	<u>RJ-45</u>	<u>SIGNAL</u>
1.....	GND†	1	N/C
2.....	RCV	2	GND†
3.....	XMT	3	RCV
4.....	XMT	4	XMT
5.....	RCV	5	XMT
6.....	GND†	6	RCV
		7	GND†
		8	N/C

†Connection to ground is optional

When connecting two Model 1018s, it is necessary to use a twisted pair “crossover” cable. The diagram below shows how a crossover cable should be constructed for an environment where both Model 1018s use a 6-wire RJ-11 connector. Similar logic should be followed when using RJ-45 connectors or a combination of the two.

<u>SIGNAL</u>	<u>PIN#</u>	<u>PIN#</u>	<u>SIGNAL</u>
GND†	1	6	GND†
RCV	2	4	XMT
XMT	3	5	RCV
XMT	4	2	RCV
RCV	5	3	XMT
GND†	6	1	GND†

†Connection to ground is optional

†Standard color codes—yours may be different

4.2 CONNECTION TO THE RS-232 INTERFACE

Once you have connected the twisted pair wires correctly, simply plug the Model 1018 directly into the DB-25 port of the RS-232 device. After doing so, remember to insert and tighten the two captive connector screws.

4.2.1 CONNECTION TO A “DTE” DEVICE

The Model 1018 is wired as a DCE, and therefore “wants” to plug into a DTE such as a terminal, PC or host. A direct connection to the RS-232 DTE port is most desirable.

(continued)

If you must use a cable to connect the Model 1018 to the DTE port, make sure it is a *straight through* cable of the shortest possible length—we recommend 6 feet or less.

4.2.2 CONNECTION TO AN RS-232 “DCE” DEVICE

Since the Model 1018 is wired as a DCE, you cannot connect it directly to another DCE such as a modem, multiplexer or printer. If you need to connect the Model 1018 to another RS-232 DCE device, you must use a *null modem cable* wired according to diagram below. We recommend a cable of the shortest possible length, preferably 6 feet or less.

<u>Connection to Model 1018†</u>	<u>Connection to DCE Device</u>
<u>DB-25 Pin No.</u>	<u>DB-25 Pin No.</u>
1	1
2	3
3	2
4	8
8	4
6	20
20	6
17	24
24	17
7	7

†Note: When connected to another DCE device, the Model 1018 should be configured for “external clock” (see Section 3.3).

5.0 OPERATION

Once the Model 1018 is properly configured and installed, it should operate transparently—as if it were a standard cable connection. Section 5.0 describes reading the LED status monitors, powering-up and using the built-in V.52 and V.54 test modes. The Model 1018 is powered by a 7.5V DC external wall mount transformer. To power up the unit, connect the power supply cord to the power jack on the rear of the Model 1018 and plug the power adapter into the wall. There is no ON/OFF switch.

5.1 FRONT PANEL SWITCHES

During normal operation, both front panel switches should be in the “normal” center position. To operate a test mode, see Section 5.3.

5.2 LED STATUS MONITORS

The Model 1018 features five front panel LEDs that monitor transmit data, carrier detect, two test modes and power. Figure 6 shows the front panel location of each LED. Following Figure 6 is a description of each LED's function.

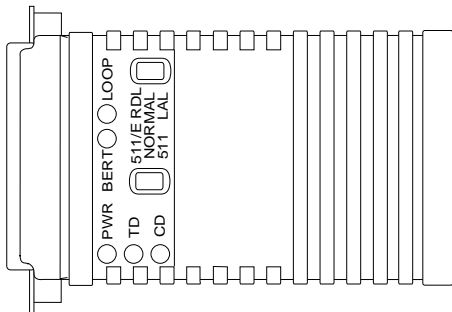


Figure 6. Model 1018's LED indicators and test switches

- PWR = Glows green when the Model 1018 is powered up.
- TD = Glows red for a “space” on transmit data.
- CD = Glows red for high on carrier detect.
- BERT = Glows red when bit errors occur in test mode (511 pattern); Lights when 511/E test pattern has been selected.
- LOOP = Glows red when the Model 1018 is in remote digital loopback or local analog loopback mode.

5.3 TEST MODES

The Model 1018 offers two V.54 test modes to evaluate the condition 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 1018 are available for point-to-point applications only.

5.3.1 Local Analog Loopback (LAL)

The Local Analog Loopback (LAL) test checks the operation of the local Model 1018, and is performed separately on each unit. Any data sent to the local Model 1018 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 LAL test, follow these steps:

- 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 raising pin 18 on the interface. (Note: Make sure DIP switch SW1-8 is OFF). Once LAL is activated, the Model 1018 transmit output is connected 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 terminal. Also, check the interface cable between the terminal and the Model 1018.

5.3.2 Remote Digital Loopback (RDL)

The Remote Digital Loopback (RDL) test checks the performance of both the local and remote Model 1018s, and the communication link between them. Any characters sent to the remote Model 1018 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 1018 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 SW1-8 is OFF).

APPENDIX A
SPECIFICATIONS

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 1018s, you may have a problem with the twisted pair line between the modems. You should then check the twisted pair line for proper connections and continuity.

5.3.3 Using the V.52 BER Test Independently

The V.52 BER test can be used independently of the V.54 loopback tests. This requires two operators: one to initiate and monitor the test at the local Model 1018, and one at the remote Model 1018. To use the V.52 BER test by itself, both operators should simultaneously follow these steps:

1. Locate the "511/511E" toggle switch on the front panel of the 1018 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 1018s 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 1018's built-in "511" generator and detector are working properly.

5.4 POWER-DOWN

Turn off the Model 1018 by unplugging the AC power adapter from the wall. There is no power switch on the Model 1018.

DTE Transmission Format: Asynchronous

Link Transmission Format: Synchronous

Transmission Line: Unconditioned twisted pair 19 - 26 AWG

Link Clocking: Internal

Distance: 2.4 miles

Interfaces: EIA RS-232 / CCITT V.24

DTE Data Rates: 1.2, 2.4, 4.8, 9.6, 19.2, 28.8, 38.4 and 57.6 Kbps (switch selectable)

Isolation: Minimum 1500 V RMS via isolation transformers

Surge Protection: 600W power dissipation at 1 mS and response time of 1 pS

Carrier: "Constantly on" or "Controlled by DTR"

Connectors: DB-25 female or male on RS-232 side; RJ-11 or RJ-45 on line side

Power Supply: 7.5V DC wall mount transformer

Temperature Range: 0-60°C (32-140°F)

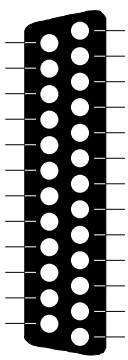
Altitude: 0-15,000 feet

Humidity: Up to 95% non-condensing

Dimensions: 3.55" x 2.1" x .80"

Weight: 2 oz.

APPENDIX B PIN CONFIGURATIONS

DIRECTION	RS-232 PIN-OUT REFERENCE (DB-25)	DIRECTION
To Model 1018	Local Analog Loopback - 18	Common
To Model 1018	Data Term. Ready (DTR) - 20	To Model 1018
From Model 1018	Remote Digital Loopback - 21	From Model 1018
From Model 1018	Test Mode - 25	To Model 1018
		From Model 1018

APPENDIX C BLOCK DIAGRAM

