

USER MANUAL

MODEL 1018RC Powered High Speed Short Range Modem: Rack Mount Card



Patton
Electronics Co.



An ISO-9001
Certified Company

Part# 07M1018RC-C
Doc# 013012UC
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SALES OFFICE
(301) 975-1000
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1.0 WARRANTY INFORMATION

Patton Electronics warrants all Model 1018RC 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 1018RC 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 1018RC 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 1018RC does cause interference to radio or television reception, which can be determined by turning the power off or removing the card, 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). In the event the user detects intermittent or continuous product malfunction due to nearby high power transmitting radio frequency equipment, the user is strongly advised to take the following steps: use only data cables with an external outer shield bonded to a metal or metalized connector; and, configure the rear card as shown in section 3.2.1 of this manual.

1.2 CE NOTICE

The CE symbol on your Patton Electronics equipment indicates that it is in compliance with the Electromagnetic Compatibility (EMC) directive and the Low Voltage Directive (LVD) of the Union European (EU). A Certificate of Compliance is available by contacting Technical Support.

1.3 SERVICE

All warranty and nonwarranty 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 Support: **(301) 975-1007**; <http://www.patton.com>; or, support@patton.com. **Notice:** 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 1018RC. 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 arise during installation or use of the unit, contact Patton Electronics Technical Support: (301) 975-1007.

2.1 FEATURES

- Switch-selectable carrier control
- Asynchronous operation
- Selectable data rates from 1200 to 57,600 bps
- Distances to 2.4 miles
- Point-to-point operation
- V.54 loopback tests and V.52 compliant BER tests
- Six easy-to-read LED indicators
- Transformer isolation
- Silicon Avalanche Diode surge protection
- Switchable 120V or 240V power supply
- Mounts in Patton's 16-card rack chassis

2.2 DESCRIPTION

The Patton Model 1018RC short range modem rack card 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 1018RC supports asynchronous data rates from 1.2 to 57.6 Kbps, and distances to 2.4 miles. The Model 1018RC incorporates two V.54 test modes (local analog loop and remote digital loop), which can be activated from the front panel via the RS-232 interface. Additionally, a built-in V.52 BER test generator can output 511 and 511E bit patterns. Five easy-to-read LED indicators monitor power, transmit data, carrier detect, test mode and test pattern. For protection against ground loops and transient surges, the Model 1018RC incorporates both isolation transformers and Silicon Avalanche Diode surge suppressors.

The Model 1018RC is designed to mount in Patton's 2U high 19" rack chassis. This 16-card chassis has a switchable 120/240 VAC power supply (optional 48 VDC) and mounts cards in a mid-plane architecture: The front card can be plugged into different rear cards. This means that the Model 1018RC card can have several interface options and can be switched with other Patton short haul cards.

3.0 CONFIGURATION

This section describes the location and orientation of the Model 1018RC's configuration switches and jumpers, and provides detailed instructions for all possible settings.

The Model 1018RC uses a combination of DIP switches and jumpers that allow configuration to an extremely wide range of applications. Designed around a mid-plane architecture, the Model 1018RC incorporates both front and rear cards. Configuration of both may be necessary. The switches/jumpers are accessible when the cards are slid out of the rack chassis. Once configured, the Model 1018RC is designed to operate transparently, without need for frequent re-configuration: just set it and forget it!

3.1 FUNCTION CARD CONFIGURATION

The Model 1018RC front card has two sets of eight switches (S1 & S2), which are mounted on the PC board (Figure 1, below). These configuration switches allow you to configure the Model 1018RC for a wide range of applications. The ON/OFF orientation of the DIP switches is shown in figure 2 (below). Jumpers JP1 through JP4 are primarily used for factory configuration, and should be left in their default positions.

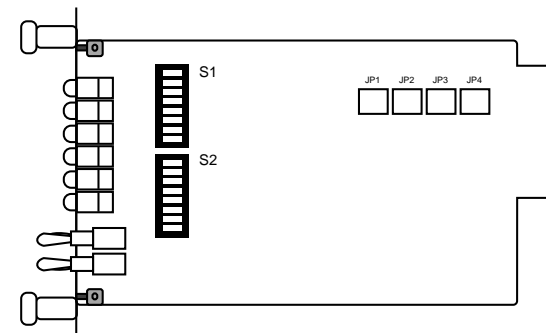


Figure 1. Model 1018RC board, showing location of switches/jumper

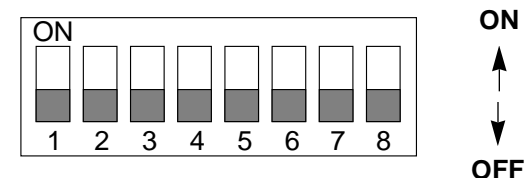


Figure 2. Close-up of DIP switches showing "ON" and "OFF" positions

3.1.1 CONFIGURATION SWITCH PACK “S1”

The eight DIP switches on pack S1 set Remote Test Activation and RTS/CTS Delay. Descriptions of all possible S1 switch settings, including the Patton factory default settings, are found on on pages 4 and 5.

S1 SUMMARY TABLE		
Position	Function	Factory Default
S1-1	DTE Control of LAL	On Enabled
S1-2	DTE Control of RDL	On Enabled
S1-3	Not Used	Off
S1-4	Not Used	Off
S1-5	Not Used	Off
S1-6	Not Used	Off
S1-7	RTS/CTS Delay	Off
S1-8	RTS/CTS Delay	Off

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

S1-1: DTE Control of LAL

The setting for switch S1-1 determines whether the Local Analog Loopback test on the Model 1018RC can be activated via pin 18 of the RS-232 interface.

S1-1	Setting
On	Enabled
Off	Disabled

S1-2: DTE Control of RDL

The setting for switch S1-2 determines whether the Remote Digital Loopback test on the Model 1018RC can be activated via pin 21 of the RS-232 interface.

S1-2	Setting
On	Enabled
Off	Disabled

S1-3 through S1-6: Not Used

S1-7 and S1-8: RTS/CTS Delay

The combined settings for switches S1-7 and S1-8 determine the amount of delay between the time the Model 1018RC “sees” RTS and when it sends CTS. Currently, the Model 1018RC 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.

S1-7	S1-8	Setting
Off	Off	0 mS delay No other valid settings

3.1.2 CONFIGURATION SWITCH SET “S2”

The eight DIP switches on pack S2 set Digital Reset, Carrier Control, Link Clocking, Async Data Rate and Microprocessor Reset. Factory default settings are summarized in Figure 4, below. Descriptions of all possible S1 switch settings, including the Patton factory default settings, are found on on pages 6 and 7.

S2 SUMMARY TABLE		
Position	Function	Factory Default
S2-1	V.54 Disable	Off Normal
S2-2	Control of Carrier	On Ctrl by DTR
S2-3	Link Clocking	On
S2-4	Link Clocking	On
S2-5	Async Data Rate	On
S2-6	Async Data Rate	On
S2-7	Async Data Rate	On
S2-8	Microprocessor Reset	Off Normal

Figure 4. Summary of DIP switch default settings for S2

S2-1: V.54 Disable

The setting for switch S2-1 determines whether the Model 1018RC's V.54 diagnostics are disabled or are in normal operating mode.

<u>S2-1</u>	<u>Setting</u>
On	V.54 Test Disabled
Off	V.54 Test Enabled (Normal)

S2-2: Carrier Control

The setting for switch S2-2 determines whether Carrier is "Constantly ON" or "Controlled by DTR".

<u>S2-2</u>	<u>Setting</u>
On	Controlled by DTR
Off	Constantly ON

S2-3 and S2-4: Link Clocking Method

Switches S1-7 and S1-8 are set in combination to determine the synchronous link clocking method for the Model 1018RC. This parameter is not user definable, hence there is only one valid setting.

<u>S2-1</u>	<u>S2-2</u>	<u>Setting</u>
On	On	Internal
No other valid settings		

S2-5 through S2-7: Asynchronous Data Rate Setting

Switches S2-5 through S2-7 are set in combination to determine the asynchronous (terminal) data rate for the Model 1018RC.

<u>S2-5</u>	<u>S2-6</u>	<u>S2-7</u>	<u>Setting</u>
Off	Off	Off	1.2 Kbps
Off	Off	On	2.4 Kbps
Off	On	Off	4.8 Kbps
Off	On	On	9.6 Kbps
On	Off	Off	19.2 Kbps
On	Off	On	28.8 Kbps
On	On	Off	38.4 Kbps
On	On	On	57.6 Kbps

S2-8: Microprocessor Reset

The setting for switch S2-8 determines whether the Model 1018RC's microprocessor is in normal operating mode or "reset" mode. This switch is used primarily for factory test purposes, since removing the card from the chassis resets the microprocessor automatically.

<u>S2-8</u>	<u>Setting</u>
On	Reset Mode
Off	Normal Operating Mode

3.1.3 CONFIGURATION JUMPERS

Configuration jumpers (JP1 through JP4) on the Model 1018RC Function Card are primarily intended for factory configuration of the RS-232 interface. We recommended that you do not re-configure these jumpers unless instructed to do so by a Patton Technical Support Representative.

3.2 REAR CARD CONFIGURATION

The Model 1018RC has four rear interface card options: DB-25 & RJ-11, DB-25 & RJ-45, RJ-11 & RJ-45 and dual RJ-45 (see figure 5, below). Each of these options supports one terminal connection and one line connection.

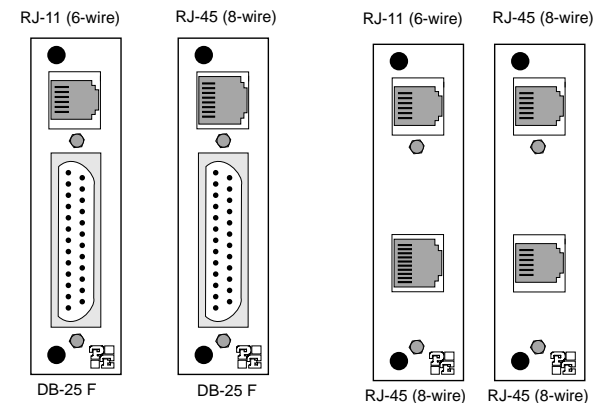


Figure 5. Model 1018RC interface card options

Each of the four rear card options for the Model 1018RC has a distinct model number. The four options and their model numbers are shown on the following page.

Interface Combination	Model Number
DB-25 & RJ-11	1000RCM12511
DB-25 & RJ-45	1000RCM12545
RJ-11 & RJ-45	1000RCM1D11
Dual RJ-45	1000RCM1D45

Prior to installation, you will need to examine the rear card you have selected and make sure it is properly configured for your application. Each rear card is configured by setting straps located on the PC board. Section 3.5.1 describes the strap locations and possible settings for each rear card.

3.2.1 REAR CARD JUMPER SETTINGS

Figure 6 (below) shows jumper locations for the four rear card options. These jumpers determine various grounding characteristics for the RS-232 and twisted pair lines.

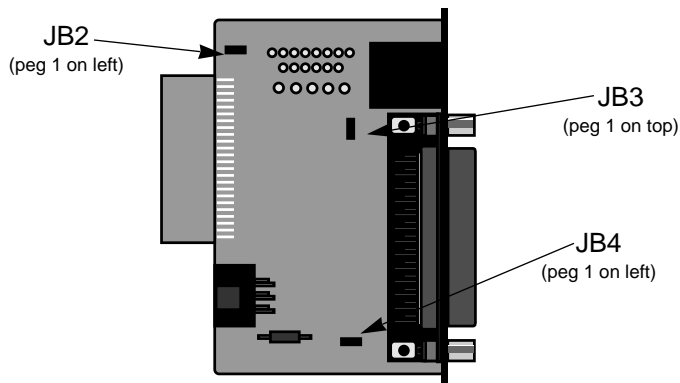


Figure 6. Rear card jumper locations

Figure 7 (below) shows the orientation of the rear interface card jumpers. The jumper can either be on pegs 1 & 2, or on pegs 2 & 3.

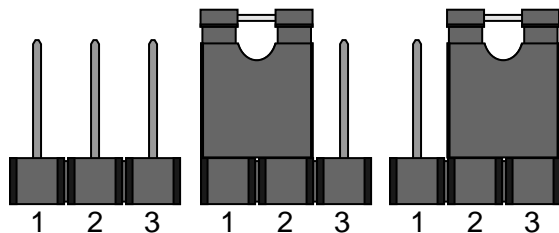


Figure 7. Orientation of interface card straps

Figure 8 (below) provides an overview of interface jumper functions for the rear interface cards. Following this overview is a detailed description of each jumper's function.

INTERFACE CARD STRAP SUMMARY TABLE #1			
Strap	Function	Position 1&2	Position 2&3
JB2	Line Shield & FRGND	Connected	Open*
JB3	DTE Shield (Pin1) & FRGND	Connected	Open*
JB4	FRGND & SGND	Connected	Open*

Figure 8. Summary of strap settings, * indicates factory default

Line Shield & FRGND (JB2)

This jumper affects the line interface. In the connected (closed) position, it links RJ-11 pins 1 & 6, or RJ-45 pins 2 & 7 to frame ground. These pins can be used as connections for the twisted pair cable shield. In the open (disconnected) position, pins 1 & 6 (or 2 & 7) remain connected to each other, but are "lifted" from the frame ground.

JB2

Position 1&2 = Line Shield and FRGND Connected
 Position 2&3 = Line Shield and FRGND Not Connected

DTE Shield & FRGND (JB3)

In the connected position, this jumper links DB-25 pin 1 & frame ground. In the open position, pin 1 is "lifted" from frame ground.

JB3

Position 1&2 = DTE Shield (DB-25 Pin 1) and FRGND Connected
 Position 2&3 = DTE Shield (DB-25 Pin 1) and FRGND Not Connected

SGND & FRGND (JB4)

In the connected position, this jumper links DB-25 pin 7 (Signal Ground) and frame ground. In the open position, pin 7 is "lifted" from frame ground.

JB4

Position 1&2 = SGND (DB-25 pin 7) and FRGND Connected
 Position 2&3 = SGND (DB-25 pin 7) and FRGND Not Connected

4.0 INSTALLATION

This section describes the functions of the Model 1000R16 rack chassis, tells how to install front and rear Model 1018RC cards into the chassis, and provides diagrams for wiring the interface connections correctly.

4.1 THE MODEL 1000R16 RACK CHASSIS

The Model 1000R16 Rack Chassis (Figure 9) has sixteen short range modem card slots, plus its own power supply. Measuring only 3.5" high, the Model 1000R16 is designed to occupy only 2U in a 19" rack. Sturdy front handles allow the Model 1000R16 to be extracted and transported conveniently.

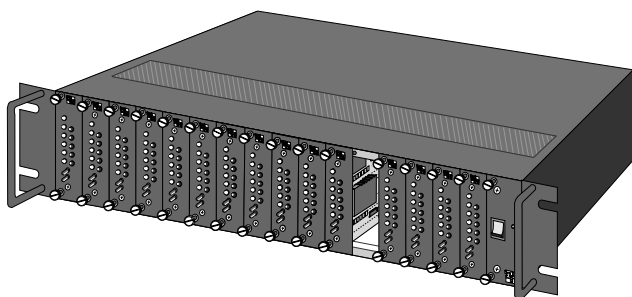


Figure 9. Model 1000R16 Rack Chassis with power supply

4.1.1 THE RACK POWER SUPPLY

The power supply included in the Model 1000R16 rack uses the same mid-plane architecture as the modem cards. The front card of the power supply slides in from the front, and the rear card slides in from the rear. They plug into one another in the middle of the rack. The front card is then secured by thumb screws and the rear card by conventional metal screws.

WARNING! There are no user-serviceable parts in the power supply section of the Model 1018RC. Voltage setting changes and fuse replacement should only be performed by qualified service personnel. Contact Patton Electronics Technical support at (301)975-1007, <http://www.patton.com>, or support@patton.com for more information.

Switching the Power Supply On and Off

The power supply on/off switch is located on the front panel. When plugged in and switched on, a red front panel LED will glow. Since the Model 1000R16 is a "hot swappable" rack, **it is not necessary for any cards to be installed before switching on the power supply.** The power supply may be switched off at any time without harming the installed cards.

4.2 INSTALLING THE MODEL 1018RC INTO THE CHASSIS

The Model 1018RC is comprised of a front card and a rear card. The two cards meet inside the rack chassis and plug into each other by way of mating 50 pin card edge connectors. Use the following steps as a guideline for installing each Model 1018RC into the rack chassis:

1. Slide the rear card into the back of the chassis along the metal rails provided.
2. Secure the rear card using the metal screws provided.
3. Slide the card into the front of the chassis. It should meet the rear card when it's almost all the way into the chassis.
4. Push the front card *gently* into the card-edge receptacle of the rear card. It should "click" into place.
5. Secure the front card using the thumb screws.

Note: Since the Model 1018RC16P chassis allows "hot swapping" of cards, it is **not necessary to power down** the rack when you install or remove a Model 1018RC.

4.3 WIRING THE MODEL 1018RC

Each of the rear interface cards compatible with the Model 1018RC has one terminal interface port and one 4-wire (twisted pair) port. These cards provide a female DB-25 for the terminal interface connection.

4.3.1 TERMINAL INTERFACE CONNECTION

The **RS-232 versions** of the Model 1018RC use a DB-25 female to connect the terminal interface to your computing hardware. It is pinned according to the RS-232C/V.24 and EIA-530 interface standards. For specific interface pin-outs, please refer to the diagram in Appendix D of this manual.

The **EIA-561 versions** of the Model 1018RC use a 10 pin RJ-45 to connect the terminal interface to your computing hardware. It is pinned according to the EIA-561 DCE interface standard. For specific interface pin-outs, please refer to the diagram in Appendix D of this manual.

Notice! Any terminal cable connected to the Patton Model 1018RC must be shielded cable, and the outer shield must be 360 degree bonded—at both ends—to a metal or metalized backshell.

4.3.2 TWISTED PAIR CONNECTION

The Model 1018RC operates over two twisted pair. In *all* applications, the twisted pair wire must be 26 AWG or thicker, unconditioned, dry, metallic wire. Both shielded and unshielded wire yield favorable results. **Note:** The Model 1018RC can only communicate in a closed data circuit, and is compatible with the following Patton short hauls: Model 1018RC, Model 1018, Model 1080A, Model 1080ARC. Dial-up analog circuits, such as those used with a standard Hayes-type modem, are **not acceptable**. For further information about acceptable wire grades, please refer to the diagrams in Appendix B.

Point-to-Point Twisted Pair Connection

The 6-position RJ-11 and 8-position RJ-45 jack options for the Model 1018RC are prewired for a standard TELCO wiring environment. Connection of a 2-wire or 4-wire twisted pair circuit between two or more Model 1018RCs requires a **crossover cable** as shown in the following diagrams.

RJ-11 Cable

<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†

RJ-45 Cable

<u>SIGNAL</u>	<u>PIN#</u>	<u>PIN#</u>	<u>SIGNAL</u>
GND†	2-----	7	GND†
RCV-	3-----	5	XMT-
XMT+	4-----	6	RCV+
XMT-	5-----	3	RCV-
RCV+	6-----	4	XMT+
GND†	7-----	2	GND†

†Connection to ground is optional

‡The Model 1018RC is not sensitive to polarity

Notice! Any modular twisted pair cable connected to the Model 1018RC must be shielded cable, and the outer shield must be properly terminated to a shielded modular plug on both ends of the cable.

5.0 OPERATION

Once you have configured each Model 1018RC and connected the cables, you are ready to operate the units. Section 5.0 describes the power-up procedure and the built-in V.54 and V.52 test modes.

5.1 POWER-UP

There is no power switch on the Model 1018RC: Power is automatically applied to the Model 1018RC when its card-edge connector makes contact with the chassis' mid-plane socket, or when the chassis' power supply is turned on. *Note: The Model 1018RC is a "hot swappable" card—it will not be damaged by plugging it in or removing it while the rack is powered up.*

5.2 TEST MODES

The Model 1018RC offers two V.54 test modes and two V.52 test modes to evaluate the condition of the modems and the communication link. Both sets of tests can be activated physically from the front panel. The V.54 test can also be activated from the RS-232 interface.

5.2.1 LOCAL ANALOG LOOPBACK (LAL)

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

1. Activate LAL. This may be done in one of two ways: First, by moving the upper front panel toggle switch RIGHT to "Analog". Second, by raising pin 18 on the RS-232 interface (note: be sure DIP switch SW1-6 is enabled). Once LAL is activated, the Model 1018RC transmit output is connected to its own receiver. The "Test" LED should be lit.
2. Verify that the data terminal equipment is operating properly and can be used for a test.
3. Locate the lower of the two toggle switches on the front panel of the Model 1018RC and move it to the left. This will activate the V.52 BER test mode and inject a "511" test pattern into the local loop. If any errors are present in the loop, the red "Error" LED will blink sporadically.

4. If the BER test indicates *no errors* are present, move the V.52 toggle switch to the right, thus activating the "511/E" test with periodic errors. If the test is working properly, the red "Error" LED will glow. A successful "511/E" test will confirm that the loop is in place, and that the Model 1018RC's built-in "511" generator and detector are working properly.
5. If the BER test indicates that errors *are* present, check to see that the RS-232 cable connecting the DTE to the Model 1018RC is wired straight through, and is plugged in properly. Also, ensure that the Model 1018RC is configured properly. Then re-check your DTE equipment. If you still have errors, call **Patton Technical Support at (301) 975-1007**.

5.2.2 REMOTE DIGITAL LOOPBACK (RDL)

The Remote Digital Loopback (RDL) test checks the performance of both the local and remote Model 1018RCs, *and* the communication link between them. Any characters sent to the remote 1018RC 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 1018RC and looped back. To perform an RDL test, follow these steps:

1. Activate RDL. This may be done in two ways: First, by moving the upper front panel toggle switch LEFT to "Remote". Second, by raising pin 21 on the RS-232 interface.
2. Verify that the DTE equipment on the local end is operating properly and can be used for a test.
3. Locate the lower of the two toggle switches on the front panel of the 1018RC and move it to the left. This will activate the V.52 BER test mode and inject a "511" test pattern into the remote loop. If any errors are present in the loop, the red "Error" LED will blink sporadically.
4. If the BER test indicates *no errors* are present, move the V.52 toggle switch to the right, thus activating the "511/E" test with periodic errors. If the test is working properly, the red "Error" LED will glow. A successful "511/E" test will confirm that the loop is in place, and that the Model 1018RC's built-in "511" generator and detector are working properly.

- If the remote BER test indicates that errors *are* present, and the local analog loopback/BER tests showed that both Model 1018RCs were functioning properly, this suggests a problem with the twisted pair communication line connecting the two modems. A common problem is improper crossing of the pairs. Also, verify that the modular connections are pinned properly, and the twisted pair line has continuity. If you still have errors, call **Technical Support at (301) 975-1007**.

5.2.3 USING THE V.52 BER TEST INDEPENDENTLY

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

- Locate the lower of the two toggle switches on the front panel of the Model 1018RC and move it to the left. This will activate the V.52 BER test mode and transmit 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 independent test to function, the "511" switch on *both* Model 1018RCs must be turned on.
- If the test indicates no errors are present, move the V.52 toggle switch to the right, thus 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 1018RC's built-in "511" generator and detector are working properly.

APPENDIX A

PATTON MODEL 1018 RC SPECIFICATIONS

Transmission Format:	Asynchronous to terminals; synchronous between units
Internal Interface:	Connection to Model 1000R16 rack chassis via male card edge
External Interface:	DB-25 female (RS-232), RJ-11 or RJ-45 (line)
Transmission Line:	4-wire unshielded twisted pair (UTP), 19-24 AWG
Asynchronous Data Rates:	1.2, 2.4, 4.8, 9.6, 19.2, 28.8, 38.4 and 57.6 Kbps (switch selectable)
Link Clocking / Sync	
Data Rate:	Internal / 76.8 Kbps (fixed)
RTS/CTS Delay:	No delay
Controls:	Carrier constantly "ON" or "controlled by DTR"
Indicators:	Bi-color LED indicators for TD, RD, RTS & DCD; single LED indicators for Test and Error
Diagnostics:	V.52 compliant bit error rate pattern; V.54 compliant— Local Analog Loopback and Remote Digital Loopback, activated by front panel switch or via terminal interface
Transformer Isolation:	1500 V RMS
Surge Protection:	Silicon Avalanche Diodes
Power Supply:	Rack-mount power supply is switchable between 120V and 240V AC; chassis supplies 10V AC to the Model 1018RC, typical consumption is 700mW
Temperature:	0-50°C / 32-122°F
Humidity:	5-95%, non-condensing
Dimensions:	0.95"w x 3.1"h x 5.4"l

APPENDIX B

PATTON MODEL 1018RC CABLE RECOMMENDATIONS

The Patton Model 1018RC operates at frequencies of 40kHz or less and has been performance tested by Patton technicians using twisted-pair cable with the following characteristics:

<u>Wire Gauge</u>	<u>Capacitance</u>	<u>Resistance</u>
19 AWG	83nf/mi or 15.72 pf/ft.	.0163 Ohms/ft.
22 AWG	83nf/mi or 15.72 pf/ft.	.0326 Ohms/ft.
24 AWG	83nf/mi or 15.72 pf/ft.	.05165 Ohms/ft.

To gain optimum performance from the Model 1018RC, please keep the following guidelines in mind:

- Always use **twisted pair** wire—this is not an option.
- Use twisted pair wire with a capacitance of 20pf/ft or less.
- Avoid twisted pair wire thinner than 26 AWG (i.e. avoid higher AWG numbers than 26)
- Use of twisted pair with a resistance greater than the above specifications may cause a reduction in maximum distance obtainable. Functionality should not be affected.
- Environmental factors too numerous to mention can affect the maximum distances obtainable at a particular site. Use “maximum distance” figures as a **general guideline only**.

APPENDIX C

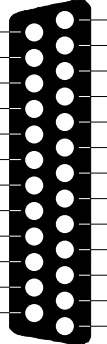
**PATTON MODEL 1018RC
FACTORY REPLACEMENT PARTS**

The Patton Model 1018RC rack system features interchangeable rear cards, power cords/fuses for international various operating environments and other user-replaceable parts. Model numbers, descriptions and prices for these parts are listed below.

<u>Patton Model #</u>	<u>Description</u>
1000RPEM.....	120/240V Rear Power Entry Module
1000RPSM-2.....	120/240V Front Power Supply Module
1000RPEM-DC	DC Rear Power Entry Module
1000RPSM-48A	48V Front Power Supply Module
1000RPEM-V	120/240V CE Compliant Rear Power Entry Module
1000RPSM-V	120/240V CE Compliant Front Power Supply Module
0805US	American Power Cord
0805EUR.....	European Power Cord CEE 7
0805UK	United Kingdom Power Cord
0805AUS.....	Australia/New Zealand Power Cord
0805DEN.....	Denmark Power Cord
0805FR	France/Belgium Power Cord
0805IN.....	India Power Cord
0805IS.....	Israel Power Cord
0805JAP.....	Japan Power Cord
0805SW	Switzerland Power Cord
0516FPB1	Single Width Blank Front Panel
0516FPB4	4-Wide Blank Front Panel
0516RPB1.....	Single Width Blank Rear Panel
0516RPB4.....	4-Wide Blank Rear Panel
056S1	Set of 16 #4 pan head screws/washers

APPENDIX D

**PATTON MODEL 1018RC
INTERFACE STANDARDS**

DIRECTION	STANDARD RS-232C/V.24 "DCE" SETTING	DIRECTION
To 1018RC		To 1018RC
To 1018RC		From 1018RC
To 1018RC		From 1018RC
From 1018RC		From 1018RC
	Analog Loop - 18 Data Term. Ready (DTR) - 20 Digital Loop - 21 Test Mode - 25	

PATTON MODULAR INTERFACE - 10 Wire RJ-45		
Contact Number	Circuit	Description
1	N/A	Not Used
2	125	DSR
3	109	Received Line Signal Indicator (CD)
4	108 / 2	DTE Ready (DTR)
5	102	Signal Common
6	104	Received Data
7	103	Transmitted Data
8	106	Clear to Send
9	105 / 133	Request to Send / Ready for Receiving
10	N/A	Not Used

Pins 2-9 conform to the EIA/TIA-561 eight position non-synchronous interface standard.

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Vice President

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