USER MANUAL

MODEL 1045RC

Powered High Speed Short Range Modem: Rack Mount Card

PATTON Electronics Co.

An ISO-9001 Certified Company

Part # 07M1045RC-B
Doc# 054051UB
Revised 3/14/97

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1.0 WARRANTY INFORMATION

Patton Electronics warrants all Model 1045RC 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 1045RC 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 1045RC 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 1045RC 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 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 Support at: **(301) 975-1007**; **http://www.patton.com**; or, **support@patton.com**. *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 1045RC. 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

- Switch-selectable carrier control
- Field-selectable electrical interfaces, RS-232 and V.35
- Synchronous or asynchronous operation
- Data rates of 32, 56 and 64 Kbps
- Distances to 6 miles
- Point-to-point or multipoint
- 2-wire or 4-wire operation
- V.54 loopback tests and V.52 compliant BER tests
- Seven 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
- Made in the U.S.A.

2.2 DESCRIPTION

The Model 1045RC high speed SRM supports sync. and async. data rates of 32, 56 and 64 Kbps, and distances to 6 miles. Sync. transmit clock options are internal, external and receive loopback clock.

The Model 1045RC incorporates two V.54 test modes: local analog loop and remote digital loop. These can be activated from the front panel, or via the RS-232 or V.35 interface. Additionally, a built-in V.52 BER test generator can output 511 and 511E bit patterns. Seven easy-to-read LED indicators monitor power, transmit data, receive data, RTS, carrier detect, test mode and test pattern. For protection against ground loops and transient surges, the Model 1045 incorporates both isolation transformers and Silicon Avalanche Diode surge suppressors.

The Model 1045RC 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 1045RC 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 1045RC's configuration switches and jumpers, and provides detailed instructions for all possible settings.

The Model 1045RC 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 1045RC 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 1045RC is designed to operate transparently, without need for frequent re-configuration: just set it and forget it!

3.1 FRONT CARD CONFIGURATION

The Model 1045RC front card has two sets of eight switches (S1 & S2), one jumper (JP3), and a reversible daughter board, which are all mounted on the PC board (Figure 1, below). These configuration devices allow you to select data rates, clocking methods, V.52 & V.54 tests, word lengths, extended signaling rates, async. or sync. mode, 2- or 4-wire operation, and RS-232 or V.35 terminal interface. The ON/OFF orientation of the DIP switches is shown in figure 2 (above).

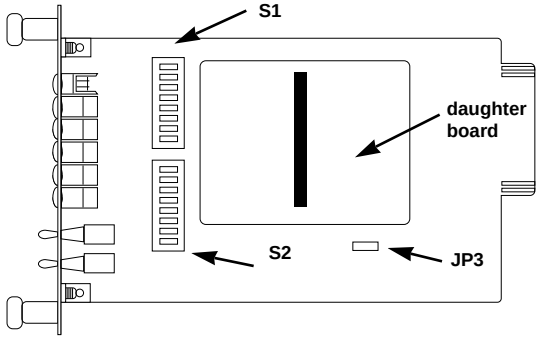


Figure 1. Model 1045RC board, showing location of switches/jumper

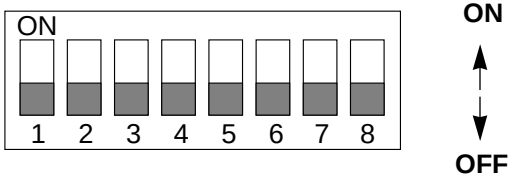


Figure 2. Close-up of DIP switches showing "ON" and "OFF" positions

3.1.1 CONFIGURATION SWITCH SET "S1"

The eight DIP switches on pack S1 set data rate, clock source, async/sync mode and carrier control method. Factory default settings are summarized in Figure in the table below. 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	Data Rate	Off	56 Kbps
S1-2	Data Rate	On	
S1-3	Data Rate	Off	
S1-4	Data Rate	Off	
S1-5	Clock Source	On	Internal
S1-6	Clock Source	On	
S1-7	Carrier Control	Off	Constantly On
S1-8	V.52/V.54 Tests	Off	Enable

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 1045RC.

Model 1045RC:

S1-1	S1-2	S1-3	S1-4	Setting
Off	Off	On	Off	32.0 kbps
Off	On	Off	Off	56.0 kbps
On	Off	Off	Off	64.0 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 1045RC.

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

S1-7: Carrier Control Method

The setting for switch S1-7 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.

S1-7	Setting
Off	Constantly on
On	Controlled by RTS

S1-8: V.52 and V.54 Diagnostic Test

To reset the V.54 circuit, set switch S1-8 to the "ON" position, then back to the "OFF" position.

S1-8	Setting
Off	Enable (Normal Operation)
On	Test Disabled

3.1.2 CONFIGURATION SWITCH SET "S2"

The eight DIP switches on pack S2 set RTS/CTS delay, word length, extended signaling rate, async/sync mode and remote test initiation. Factory default settings are summarized in the table 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	RTS/CTS Delay	On	7 ms
S2-2	RTS/CTS Delay	On	
S2-3	Word Length	Off	10 bits
S2-4	Word Length	Off	
S2-5	Extended Signaling	Off	-2.5% to +1%
S2-6	Async/Sync	Off	Sync
S2-7	DTE Control of LAL	On	Enable
S2-8	DTE Control of RDL	On	Enable

S2-1 and S2-2: RTS/CTS Delay

The combined settings for switches S2-1 and S2-2 determine the amount of delay between the time the Model 1045RC "sees" RTS and when it sends CTS. Options are no delay, 7 ms and 53 ms.

S2-1	S2-2	Setting
On	On	7 ms
On	Off	53 ms
Off	On	No delay
Off	Off	No delay

S2-3 and S2-4: Word Length

Switches S2-3 and S2-4 are set in combination to determine the word length for asynchronous data.

S2-3	S2-4	Setting
Off	On	8 bits
On	On	9 bits
Off	Off	10 bits
On	Off	11 bits

S2-5: Extended Signaling Rate

The setting for switch S2-5 determines the range of variability the Model 1045RC "looks for" in asynchronous data rates (i.e., the actual variance from a given frequency level the Model 1045RC will tolerate).

S2-5	Setting
Off	-2.5% to +1% (normal)
On	-2.5% to +2.3% (extended)

S2-6: Asynchronous/Synchronous Mode

The setting for switch S2-6 determines whether the Model 1045RC is in asynchronous or synchronous operating mode.

S2-6	Setting
On	Asynchronous*
Off	Synchronous

*Note: in asynchronous mode, the Clock Source must be set to "Internal" (S1-5 = On, S1-6 = On)

S2-7: RS-232/V.35 Initiation of Local Analog Loopback Test

The setting for switch S2-7 determines whether or not the Model 1045RC's local analog loopback test can be initiated by raising pin 18 on the RS-232 interface (pin N on the V.35 interface).

S2-7	Setting
On	RS-232/V.35 initiation enabled
Off	RS-232/V.35 initiation disabled

S2-8: RS-232/V.35 Initiation of Remote Digital Loopback Test

The setting for switch S2-8 determines whether or not the Model 1045RC's remote digital loopback test can be initiated by raising pin 21 on the RS-232 interface (pin L on the V.35 interface).

S2-8	Setting
On	RS-232/V.35 initiation enabled
Off	RS-232/V.35 initiation disabled

3.1.3 CONFIGURATION JUMPER "JP3"

Jumper JP3 is used to set 2-wire or 4-wire operation. Figure 3 (below) shows the possible positions of the strap on its pegs. Please note the orientation of the jumper on the PC board.

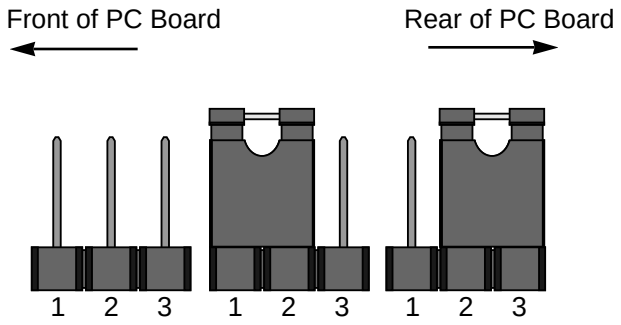


Figure 5 Orientation of jumper JP3

(continued)

JP3: 2-Wire/4-Wire Mode Selection

The setting for jumper JP3 determines whether the Model 1045RC is operating in 2-wire or 4-wire mode. Be careful not to lose the jumper!

JP3	Setting
Jumper on pins 1 & 2	2-wire (half duplex only)*
Jumper on pins 2 & 3	4-wire (full or half duplex)
Jumper removed	Not a valid setting

*Note: in 2-wire mode, the Carrier Control Method switch must be set to "RTS Control" (S1-7 = On)

3.1.4 REVERSIBLE "DAUGHTER BOARD"

The Model 1045RC supports both RS-232 and V.35 electrical interfaces for the terminal connection port. Which electrical interface is active is determined by the orientation of the small reversible daughter board on the front card (see Figure 4, below). The daughter board is clearly marked **"This side up for RS-232"** and **"This side up for V.35"**. Note: When plugging the daughter board into the socket, the **arrow** should always point toward the front of the PC board.

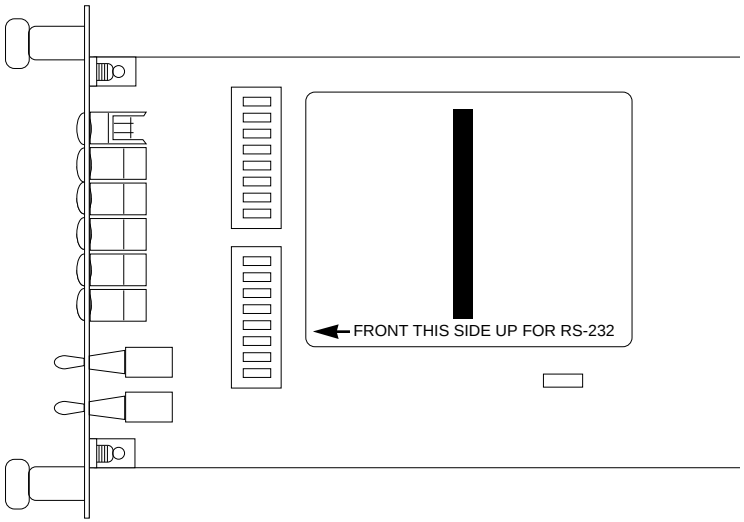


Figure 4. Terminal interface selection "daughter board"

3.2 REAR CARD CONFIGURATION

The Model 1045RC has four rear interface card options: DB-25 & RJ-11, DB-25 & RJ-45, M/34 & RJ-11 and M/34 & RJ-45 (see Figure 5, below). Each of these options supports one terminal connection and one line connection.

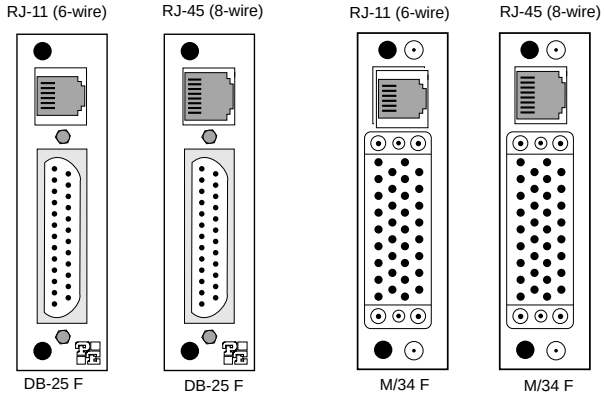


Figure 5. Model 1045RC interface card options

Each of the four rear card options for the Model 1045RC has a distinct model number. The four options and their model numbers are shown below:

Interface Combination	Model Number
DB-25 & RJ-11	1000RCM12511
DB-25 & RJ-45	1000RCM12545
M/34 & RJ-11	1000RCM13411
M/34 & RJ-45	1000RCM13445

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/V.35 and twisted pair lines.

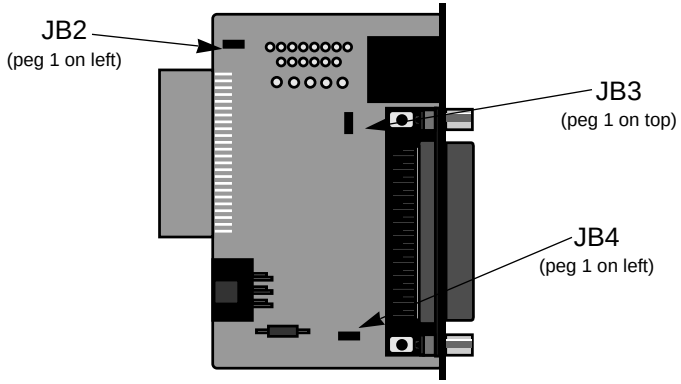


Figure 6. Rear card jumper locations

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.

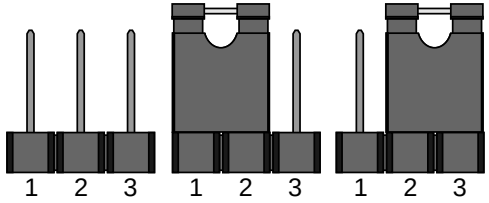


Figure 7. Orientation of interface card straps

The table 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.

REAR CARD STRAP SUMMARY			
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*

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 & Frame Ground (JB3)

In the connected position, this jumper links DB-25 pin 1 (M/34 pin A) & frame ground. In the open position, pin 1(pin A) is "lifted" from frame ground.

JB3
Position 1&2 = DTE Shield (DB-25 Pin 1 or M/34 Pin A) and FRGND Connected

Position 2&3 = DTE Shield (DB-25 Pin 1 or M/34 Pin A) and FRGND Not Connected

Signal Ground & Frame Ground (JB4)

In the connected position, this jumper links DB-25 pin 7 or M/34 pin B (Signal Ground) and frame ground. In the open position, pin 1 (or pin B) is "lifted" from frame ground.

JB4
Position 1&2 = SGND (DB-25 pin 7 or M/34 pin B) and FRGND Connected

Position 2&3 = SGND (DB-25 pin 7 or M/34 pin B) 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 1045RC 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 8) 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.

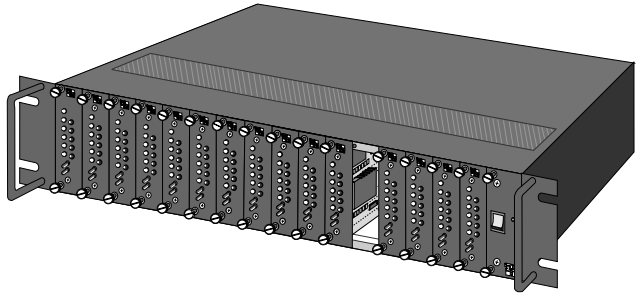


Figure 8. Model 1000R16 Rack Chassis with power supply

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 1000RC. Voltage setting changes and fuse replacement should only be performed by qualified service personnel. Contact Patton Electronics Technical support at (301)975-1007 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 1045RC INTO THE CHASSIS

The Model 1045RC 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 1045RC 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 1000R16 chassis allows "hot swapping" of cards, it is *not necessary to power down* the rack when you install or remove a Model 1045RC.

4.3 WIRING THE MODEL 1045RC

Each of the rear interface cards compatible with the Model 1045RC has one terminal interface port (DB-25 or M/34) and one 4-wire, twisted pair port (RJ-11 or RJ-45). This section describes connection procedures for the terminal cable and twisted pair cable.

4.3.1 TERMINAL INTERFACE CONNECTION

The Model 1045RC is wired as a DCE, and allows for three possible terminal interface connections:

- RS-232C/V.24 (electrical) + DB-25 female (physical)
- V.35/RS-530 (electrical) + DB-25 female (physical)
- V.35 (electrical) + M/34 female (physical)

To select the appropriate *electrical* interface, please refer to **Section 3.1.4** of this manual. To select or construct a cable with the appropriate *physical* interface pin-outs, please refer to the diagrams in **Appendix D and Appendix E** of this manual.

Notice! Any terminal cable connected to the Patton Model 1045RC 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 1045RC supports communications between RS-232 or V.35 devices at distances to 6 miles and data rates up to 64 Kbps. The Model 1045RC is designed to operate in a closed data circuit with other 1045RCs or 1045 plug-in units.

To function properly, the Model 1045RC needs two twisted pairs of unconditioned, dry metallic wire between 19 and 26 AWG (higher number gauges may limit distance somewhat). Both shielded and unshielded wire yield favorable results. Flat modular telephone type cable, dial-up analog circuits or leased lines that run through signal/equalization equipment are NOT acceptable. For further information about acceptable wire grades, please refer to the diagram in appendix B.

Point-to-Point Twisted Pair Connection

The 6-position RJ-11 and 8-position RJ-45 jack options for the Model 1045RC are prewired for a standard TELCO wiring environment. Connection of a 2-wire or 4-wire twisted pair circuit between two or more Model 1045RCs requires a *crossover cable* as shown in the following diagrams.

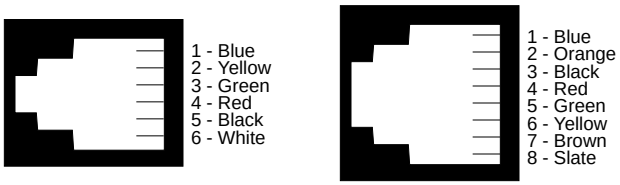
RJ-11/4-Wire

SIGNAL	PIN#	PIN#	SIGNAL
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-45/4-Wire

SIGNAL	PIN#	COLOR	COLOR	PIN#	SIGNAL
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
‡Standard color codes—yours may be different
◊The Model 1045RC is not sensitive to polarity



AT&T standard modular color codes

Notice! Any modular twisted pair cable connected to the Model 1045RC 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 1045RC 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 1045RC: Power is automatically applied to the Model 1045RC 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 1045RC 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 1045RC 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 1045RC, and is *performed separately on each unit.* Any data sent to the local Model 1045RC 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 SW1-8 is enabled). Once LAL is activated, the Model 1045RC 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 1045RC and move it to the right. 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 left, 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 1045RC'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 1045RC is wired straight through, and is plugged in properly. Also, ensure that the Model 1045RC 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 1045RCs, *and* the communication link between them. Any characters sent to the remote 1045RC 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 1045RC 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 1045RC and move it to the right. 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 left, 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 1045RC's built-in "511" generator and detector are working properly.

5. If the remote BER test indicates that errors *are* present, and the local analog loopback/BER tests showed that both Model 1045RCs 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 1045RC'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 1045RC. To use the V.52 BER test by itself, both operators should simultaneously follow these steps:

1. Locate the lower of the two toggle switches on the front panel of the Model 1045RC and move it to the right. 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 1045RCs must be turned on.

2. If the test indicates no errors are present, move the V.52 toggle switch to the left, 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 1045RC's built-in "511" generator and detector are working properly.

APPENDIX A

1045RC SPECIFICATIONS

Transmission Format:	Synchronous or asynchronous, 2-wire or 4-wire
Internal Interface:	Connection to Model 1000R16 rack chassis via 50 pin male card edge
External Interface:	DB-25 female (RS-232), M/34 female (V.35) RJ-11 or RJ-45 (line)
Transmission Line:	2-wire or 4-wire unshielded twisted pair (UTP), 19-24 AWG
Data Rates:	32, 56, 64 Kbps
Clocking:	Internal, external or receive recover
RTS/CTS Delay:	No delay, 7mS, 53mS
Controls:	Carrier constantly "ON" or "controlled by RTS"
Indicators:	Bi-color LED indicators for TD, RD, RTS & DCD; single LED indicators for Power, 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
Temperature:	0-50°C / 32-122°F
Humidity:	4-95%, noncondensing
Dimensions:	0.95"w x 3.1"h x 5.4"l

APPENDIX B

MODEL 1045RC CABLE RECOMMENDATIONS

The Patton Model 1045RC operates at frequencies of 64KHz or less and has been performance tested by Patton technicians using twisted-pair cable with the following characteristics:

Wire Gauge	Capacitance	Resistance
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 1045RC, 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 the above data rate/distance table as a *general guideline only.*

APPENDIX C

MODEL 1045RC FACTORY REPLACEMENT PARTS

The Patton Model 1045RC 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:

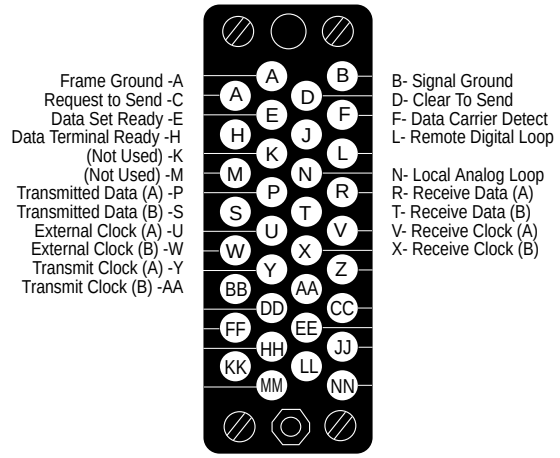
Patton Model #	Description
1000RPEM	120/240V Rear Power Entry Module
1000RPSM-2	120/240V Front Power Supply Module
1000RPEM-DC	DC Rear Power Entry Module
1000RPSM-48A	48V Front Power Supply Module
1000RPEM-V	120/240V CE Compliant Rear Power Entry Module
1000RPSM-V	120/240V CE Compliant Front Power Supply 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

V.35 INTERFACE STANDARDS (DCE)

DIRECTION	CCITT V.35/EIA-530 INTERFACE (DB-25)		DIRECTION
		1 - (FG) Frame Ground	Common
To 1045RC	Transmit Data B - 14	2 - Transmit Data A	To 1045RC
From 1045RC	Transmit Clock A - 15	3 - Receive Data A	From 1045RC
From 1045	Receive Data B - 16	4 - (RTS) Request to Send	To 1045RC
From 1045RC	Receive Clock A - 17	5 - (CTS) Clear to Send	From 1045RC
To 1045RC	Local Analog Loop (LAL) - 18	6 - (DSR) Data Set Ready	From 1045RC
		7 - (SG) Signal Ground	Common
To 1045RC	Data Term. Ready (DTR) - 20	8 - (CD) Carrier Detect	From 1045RC
To 1045RC	Remote Digital Loop (RDL) - 21	9 - Receive Clock B	From 1045RC
		11 - External Clock B	To 1045RC
To 1045RC	External Clock A - 24	12 - Transmit Clock B	From 1045RC

CCITT V.35 Interface (M/34 Female)



APPENDIX E

RS-232 INTERFACE STANDARDS (DCE)

DIRECTION	RS-232C/V.24 INTERFACE (DB-25)		DIRECTION
		1- (FG) Frame Ground	
From 1045RC	Transmit Clock - 15	2- (TD) Transmit Data	To 1045RC
		3- (RD) Receive Data	From 1045RC
From 1045RC	Receive Clock - 17	4- (RTS) Request to Send	To 1045RC
To 1045RC	Analog Loop - 18	5- (CTS) Clear to Send	From 1045RC
		6- (DSR) Data Set Ready	From 1045RC
		7- (SG) Signal Ground	
To 1045RC	Data Term. Ready (DTR) - 20	8- (DCD) Data Carrier Detect	From 1045RC
To 1045RC	Digital Loop - 21		
To 1045RC	External Clock - 24		