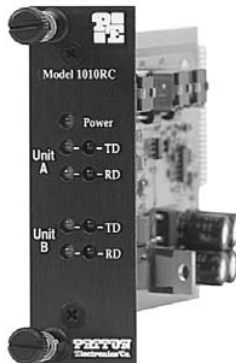


# USER MANUAL

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## MODEL 1010RC Miniature Short Range Modem with Transformer Isolation: Rack Mount Card



**PATTON**  
**Electronics Co.**



An ISO-9001  
Certified Company

Part #07M1010RC-B  
Doc. #039021U,  
Rev. C  
Revised 1/22/08

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

## 1.0 WARRANTY INFORMATION

**Patton Electronics** warrants all Model 1010RC 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 1010RC 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 1010RC 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 1010RC 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 3.3 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**.

**NOTE:** 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 1010RC. 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

- Convenient rack card features two short range modems
- Supports asynchronous communication over 2 twisted pair
- Data rates to 19.2 Kbps, distances to 9 miles (14.4 km)
- Loops back all handshaking signals on the RS-232 interface
- Transformer coupling between modems eliminates ground loops
- Silicon Avalanche Diode surge protection
- Features 9 front panel LEDs
- Fits conveniently in Patton's rack chassis
- Made in USA

### 2.2 DESCRIPTION

**The Patton Model 1010RC Transformer Isolated Short Range Modem Rack Card** is a dual rack card incorporating two short range modems. Attaining DC isolation through custom-designed ferrite core transformers, the Model 1010RC operates effectively between buildings. The Model 1010RC operates full duplex at data rates to 19,200 bps over two twisted pair. Ranges are to 9 miles (14.4 km) at 1200 bps and to 2.5 miles (4.4 km) at 19,200 bps. The Model 1010RC also incorporates Silicon Avalanche Diodes for protection against the damaging effects of nearby lightning strikes and other harmful transients.

The Model 1010RC uses the latest surface mount technology to attain high quality short range modem performance in a convenient rack card. Filling one function card slot on Patton's MODEL 1000R16P rack chassis, the Model 1010RC is available with RJ-11 or RJ-45 rear interface cards. For workgroup and desktop communications, the Model 1010RC also fits in Patton's 2, 4 and 8 slot clusterboxes. The combination of Rack Mount, ClusterBox and self-powered units provides a completely integrated Model 1010 "networking" solution.

### 3.0 CONFIGURATION

The Model 1010RC is designed to be easy to use. There are no internal jumpers or DIP switches to set on the Model 1010RC front card, so there is no need to configure the rack card. However, you may have to configure the jumpers on the rear card that you have selected.

#### 3.1 REAR CARD CONFIGURATION

The Model 1010RC has two interface card options: the 1Q11 (which comes equipped with two RJ-11 ports and two RJ-45 ports) and the 1Q45 (which comes equipped with four RJ-45 ports). Figure 1 illustrates these two different rear interface options.

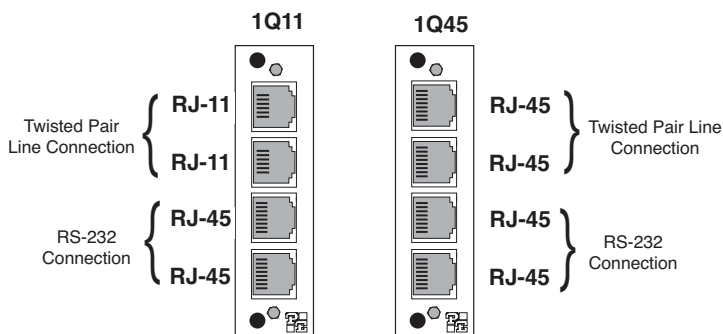


Figure 1. Model 1010RC Rear Interface Card Options

Prior to installation, you should examine the rear card you have selected and ensure that it is configured for your application. Each rear card is configured by setting straps on the PC board. Section 3.3 describes the strap locations and settings for each card.

#### 3.2 MOVING THE CONFIGURATION STRAPS

Figure 2 shows the orientation of the rear interface card straps. The strap can either be on pegs 1 and 2, or on pegs 2 and 3.

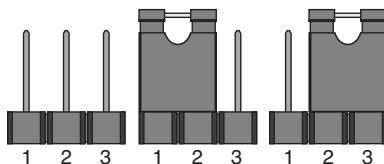


Figure 2. Orientation of interface card straps

### 3.3 REAR CARD STRAP SETTINGS

Figure 3 shows the strap locations for the 1Q11 and the 1Q45 rear cards. These straps determine various grounding characteristics for the RS-232 and twisted pair lines.

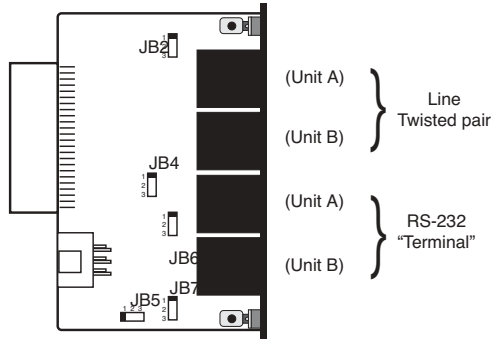


Figure 3. Strap locations for both rear cards

The table below provides a summary of strap functions for both of the rear cards. The next page describes each strap’s function.

INTERFACE CARD STRAP SUMMARY TABLE #1		
Strap	Position 1&2	Position 2&3
JB2	Line A Shield	No Shield <sup>†</sup>
JB4	Line B Shield	No Shield <sup>†</sup>
JB5	SGND & FRGND	Open <sup>†</sup>
JB6	DTE A DSR <sup>†</sup>	N/A
JB7	DTE B DSR <sup>†</sup>	N/A

Summary of strap settings, <sup>†</sup> indicates factory default

#### Line A Shield & Line B Shield (JB2 & JB4)

This strap pertains to the line interface. In the connected (closed) position, the strap links RJ-11 pins 1 and 6 (RJ-45 pins 2 and 7) to frame ground. These pins can be used as connections for the twisted pair cable shield. In the open (disconnected) position, pins 1 and 6 (or 2 and 7) remain connected, but are “lifted” from frame ground.

JB2

Position 1&2 = Line A Shield Connected

Position 2&3 = No Shield

JB4

Position 1&2 = Line B Shield Connected

Position 2&3 = No Shield

**SGND & FRGND (JB5)**

In the connected (closed) position, this strap links signal ground and frame ground. In the open (disconnected) position, pin 1 is “lifted” from frame ground.

JB5

Position 1&2 = SGND and FRGND Connected

Position 2&3 = SGND and FRGND Not Connected

**DTE as DSR or RI (JB6 & JB7)**

Because this rear card is designed to function in more applications than the Model 1010RC, this jumper must be installed only in one position. Place the jumper across pins 1&2 so that the terminal (DTE) sees DSR as high when the DTE raises DTR. The other positions—across pins 2&3, are for Ring Indicate as defined by EIA/TIA-561. The RI function is irrelevant (and on the Model 1010RC is also disconnected) and can cause improper operation if the jumper is installed incorrectly.

JB6 & JB7

Position 1&2 = DSR

Position 2&3 = N/A

## 4.0 INSTALLATION

This section describes the functions of the Model 1000R16 rack chassis, tells how to install front and rear Model 1010RC 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 4) features sixteen short range modem card slots, plus its own power supply. Measuring only 3.5" (8.9 cm) 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.

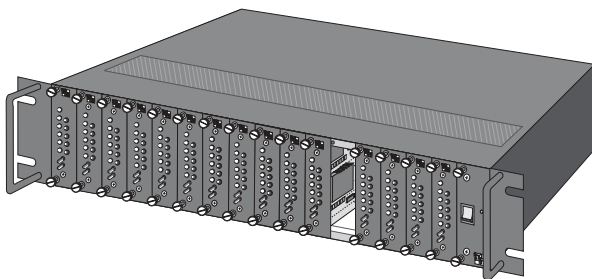


Figure 4. Model 1000R16 Rack Chassis with Power Supply

#### 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 1010RC. 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](mailto:support@patton.com) for more information.



## Switching the Power Supply On and Off

The power 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.

**NOTE:** Please refer to the Model 1000RP Series User Manual *AC and DC Rack Mount Power Supplies* for fuse and power card replacement information.

## 4.2 INSTALLING THE MODEL 1010RC INTO THE CHASSIS

The Model 1010RC is comprised of a front card and a rear card. The two cards meet inside the rack chassis and plug into each other via a mating 50 pin card edge connector. Use the following steps to install each Model 1010RC into the Model 1000R16 rack chassis:

1. Slide the rear card into the back of the chassis on the metal rails.
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 is almost completely in 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 1010RC.

## 4.3 RS-232 CONNECTION

The RS-232 ports are always the *lower* ports on the interface card. The 10-pin RJ-45 is pinned according to Patton’s Modified Modular Interface Standard (based on the EIA/TIA-561 Standard). For specific interface pin-outs, please refer to the diagrams in Appendix D.

**Notice!** Any terminal cable connected to the Patton Model 1010RC must be shielded cable, and the outer shield must be 360 degree bonded—at both ends—to a metal or metalized backshell.

The Model 1010RC is wired as a DCE (Data Communications Equipment). Therefore, it wants to connect to a DTE (Data Termination Equipment). If your RS-232 output device is a DTE, you may need to use a special cable (such as a DB-25 to modular cable). If your RS-232 output device is DCE, call Patton Technical Support at (301) 975-1007 for specific installation instructions.

#### 4.4 TWISTED PAIR CONNECTION

The Model 1010RC operates full duplex over two twisted pair. In *all* applications, the twisted pair wire must be 26 AWG (.4mm) or thicker, unconditioned, dry, metallic wire. Both shielded and unshielded wire yield favorable results.

**Note:** The Model 1010RC can only communicate in a closed data circuit with another Model 1010RC. 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.

##### 4.4.1 POINT-TO-POINT TWISTED PAIR CONNECTION

The 6-position RJ-11 and 8-position RJ-45 jack options for the Model 1010RC (always the *upper* jacks on the rear interface card) are pre-wired for a standard TELCO wiring environment. Connection of a 4-wire twisted pair circuit between two or more Model 1010RCs requires a *crossover cable* as shown in the figures below and on the following page.

#### RJ-11

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

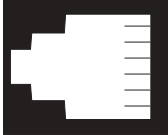
(Continued)

## RJ-45

<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

‡Standard color codes—yours may be different



1 - Blue  
2 - Yellow  
3 - Green  
4 - Red  
5 - Black  
6 - White



1 - Blue  
2 - Orange  
3 - Black  
4 - Red  
5 - Green  
6 - Yellow  
7 - Brown  
8 - Slate

AT&T standard modular color codes

**Notice!** Any modular twisted pair cable connected to the Model 1010RC 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 1010RC and connected the cables, you are ready to operate the units. Section 5.0 describes the LED status monitors and the power-up procedure.

### 5.1 LED STATUS MONITORS

The Model 1010RC features nine front panel status LEDs that indicate the condition of the modem and communication link. Figure 5 shows the front panel positions of the LEDs. Following Figure 5 is a description of each LED's function.

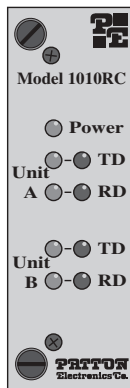


Figure 5. The Model 1010RC front panel, showing LED positions

- The green “PWR” LED glows when power is being applied to the modem card through its mid-plane chassis connection.
- The green “TD” and “RD” indicators blink to show positive state data activity. The red “TD” and “RD” indicators blink to show negative state data activity. Solid red indicates a connection in an idle state.

### 5.2 POWER-UP

There is no power switch on the Model 1010RC: Power is automatically applied to the Model 1010RC 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 1010RC is a “hot swappable” card—it will not be damaged by plugging it in or removing it while the rack is powered up.*

## APPENDIX A

### PATTON MODEL 1010RC SPECIFICATIONS

<b>Transmission Format:</b>	Asynchronous, full duplex
<b>Transmission Line:</b>	Two unconditioned twisted pair 19 - 26 AWG (0.4 to 0.9 mm)
<b>Range:</b>	(See table below)
<b>Interfaces:</b>	EIA RS-232, CCITT V.24
<b>Data Rates:</b>	300 - 19.2 Kbps
<b>Isolation:</b>	Minimum 1500 V RMS via custom transformers
<b>Surge Protection:</b>	Compliant with IEC 801.5 level 2, 1kV
<b>Connectors:</b>	RJ-45 on RS-232 side; RJ-11 or RJ-45 on line side
<b>Power Supply:</b>	Rack-mount power supply is switchable between 120V and 240V AC; rack chassis supplies 10V AC to the Model 1010RC, typical consumption is 700 mW
<b>Internal Interface:</b>	Connection to the Model 1000R16 rack chassis via 50 pin male card edge
<b>Power Supply:</b>	None required; uses power from EIA data and control signals
<b>Temperature Range:</b>	0-50°C (32-122°F)
<b>Altitude:</b>	0-15,000 feet
<b>Humidity:</b>	5 to 95% non-condensing
<b>Dimensions:</b>	0.9"W x 3.1"H x 5.4"L (2.4 x 7.9 x 13.7 cm)

## APPENDIX B

### PATTON MODEL 1010RC CABLE RECOMMENDATIONS

The Patton Model 1010RC operates at frequencies of 20kHz 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/.9mm	83nf/mi or 15.72 pf/ft.	.0163 Ohms/ft.
24 AWG/.5mm	83nf/mi or 15.72 pf/ft.	.05165 Ohms/ft.
26 AWG/.4mm	83nF/mi or 15.72 pF/ft.	.08235Ω/ft.

Using or simulating cable with the above characteristics, the following data rate/distance results were obtained by Patton during bench tests:

**Model 1010RC Distance Table in Miles (km)**

Data Rate (bps)	Wire Gauge		
	19 AWG (0.9 mm)	24 AWG (0.5 mm)	26 AWG (0.4 mm)
19,200	2.5(4.0)	2.1(3.3)	1.3(2.0)
9,600	3.7(5.9)	2.3(3.6)	1.7(2.7)
4,800	4.9(7.8)	4.9(7.8)	2.5(4.0)
2,400	8.2(13.1)	5.8(9.3)	4.6(7.4)
1,200	10.0(16.0)	8.3(13.2)	6.8(10.8)

To gain optimum performance from the Model 1010RC, 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.
- Many environmental factors can affect the maximum distances obtainable at a particular site. Use the above data rate/distance table as a *general guideline only*.

## APPENDIX C

### PATTON MODEL 1010RC FACTORY REPLACEMENT PARTS

The Patton Model 1010RC rack system features interchangeable rear half cards, power cords/fuses for international various operating environments and other user-replaceable parts. Model numbers and descriptions 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
05R16FPB1.....	Single Width Blank Front Panel
05R16FPB4.....	4-Wide Blank Front Panel
05R16RPB1 .....	Single Width Blank Rear Panel
05R16RPB4 .....	4-Wide Blank Rear Panel
0821R4.....	400 mA Fuse (5x20mm) Littlefuse 239.400 or equivalent
0821R2.....	200 mA Fuse (5x20mm) Littlefuse 239.200 or equivalent
056S1 .....	Set of 16 #4 pan head screws/washers

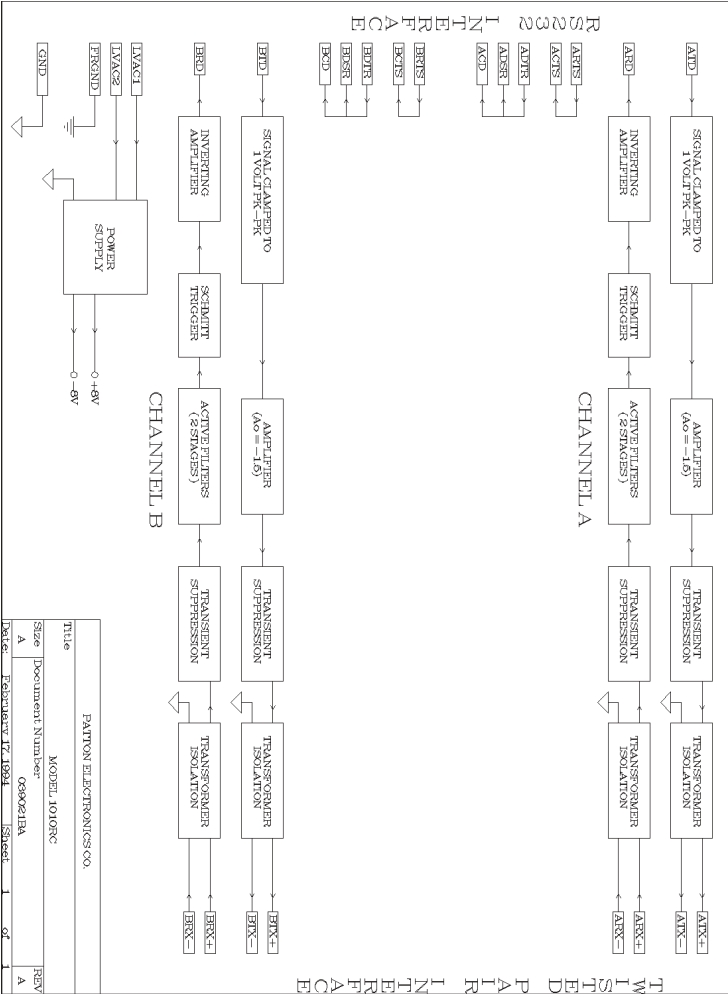
**APPENDIX D**  
**INTERFACE SETTINGS**

<b>PATTON MODULAR INTERFACE - 10 Wire RJ-45</b>		
<b>Contact Number</b>	<b>Circuit</b>	<b>Description</b>
1	N/A	Not Used
2	125	DSR
3	109	Received Line Signal Indicator
4	108 / 2	DTE Ready
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.



## APPENDIX E BLOCK DIAGRAM







Dear Valued Customer,

Thank you for purchasing Patton Electronics products! We do appreciate your business. I trust that you find this user manual helpful.

We manufacture one of the widest selections of data communications products in the world including CSU/DSU's, network termination units, powered and self-powered short range modems, fiber optic modems, interface converters, baluns, electronic data switches, data-line surge protectors, multiplexers, transceivers, hubs, print servers and much more. We produce these products at our Gaithersburg, MD, USA, facility, and can custom manufacture products for your unique needs.

We would like to hear from you. Please contact us in any of the following ways to tell us how you like this product and how we can meet your product needs today and in the future.

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Support E-mail:	<a href="mailto:support@patton.com">support@patton.com</a>
Phone - Sales	(301) 975-1000
Phone - Support	(301) 975-1007
Fax:	(301) 869-9293
Mail:	Patton Electronics Company 7622 Rickenbacker Drive Gaithersburg, MD 20879 USA

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It is our business to serve you. If you are not satisfied with any aspect of this product or the service provided from Patton Electronics or its distributors, please let us know.

Thank you.

Burton A. Patton  
Vice President

P.S. Please tell us where you purchased this product:

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