

# USER MANUAL

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MODEL IM2RC/IA  
Ethernet Bridge Module

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**PE PATTON**  
**IE Electronics Co.**



An ISO-9001  
Certified  
Company

Part# 07MIM2RC/IA-A  
Doc# 078521UA  
Revised 06/24/99

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

## 1.0 WARRANTY INFORMATION

Patton Electronics warrants all Model IM2RC/IA 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 IM2RC/IA 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 IM2RC/IA has been tested and complies with the limits for a Class A computing device in accordance with the specification in Subpart J of Part 15 of FCC rules, that are designed to provide reasonable protection from such interference in a commercial installation. However, this is no guarantee that interference will not occur in a particular installation. If the Model IM2RC/IA 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, reorienting 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 use only a shielded twisted pair data cable that is bonded to metalized external outer shield plugs at both ends. The use of a shielded cable satisfies compliance with the Electromagnetic Compatibility (EMC) directive.

### 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 Patton 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 Service at:

Tel: **(301) 975-1007**  
Email: <http://www.patton.com>  
www: [support@patton.com](mailto: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 IM2RC/IA. Technical Service hours: **8AM to 5PM EST, Monday through Friday.**

**WARNING!**  This device is not intended to be connected to the public telephone network.

## 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 us at: **(301) 975-1007**, <http://www.patton.com>; [support@patton.com](mailto:support@patton.com).

### 2.1 FEATURES

- Installs in Patton's NetLink Rack Systems
- Provides MAC level connection between two peered **Ethernet LANs**
- RJ-45 line connection
- Operates transparently to higher level protocols such as TCP/IP, DECnet, NETBIOS and IPX
- No configuration necessary
- Automatically discovers, loads and deletes MAC addresses
- Modular 10Base-T connection (RJ-45)
- Two LED indicators: status & link integrity

### 2.2 DESCRIPTION

The **Patton IM2RC/IA, Ethernet Bridge Module** installs in the NetLink Rack system to provide seamless Ethernet LAN extension. The Patton IM2RC/IA performs the bridging function between two physically separate Ethernet LANs at the MAC level. Operation of the Patton IM2RC/IA is transparent to higher network level protocols such as TCP/IP, DECnet, NETBIOS and IPX.

Once installed in the local Patton NetLink rack, the Patton IM2RC/IA works in a "plug and play" manner to forward LAN broadcasts, multicasts and frames destined for the peered Ethernet LAN at the remote end (the Patton base unit at the remote end must be equipped with an IM1/I module). Using the Patton IM2RC/IA, peered Ethernet LANs can be linked over leased 2-wire/4-wire, DDS, PCM and campus fiber circuits.

### 2.3 TYPICAL APPLICATION

The Model IM2RC/IA is designed to plug directly into the rear of a Patton Electronics rack card modem (i.e. Model 1092ARC or 1095RC). The Model IM2RC/IA is designed to be used as one of a pair of units. Figure 1 (below) illustrates a typical Model IM2RC/IA installation.

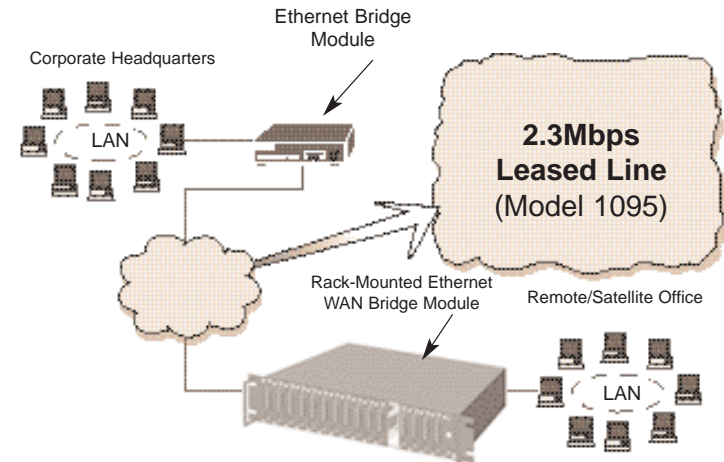


Figure 1. Typical Model IM2RC/IA application

### 3.0 CONFIGURATION

The Model IM2RC/IA module plugs into Patton's 1092ARC and 1095RC modems to provide Ethernet LAN extension. The IM2RC/IA has no switches or jumpers and does not need to be configured. However, factors such as the type of medium, throughput across the link and clocking mode must be determined by the settings of the baseband modems. Please refer to your baseband modem (i.e. 1092, and 1095) to make the following settings.

- 1) **Bit Rate:** The DTE rate setting of your base unit corresponds to the throughput of your IM2RC/IA bridge module. Use higher speeds to allow maximum throughput to your extended LAN. Use lower speeds to limit the access of your extended LAN.

**NOTE: The IM2RC/IA only supports synchronous speeds.**

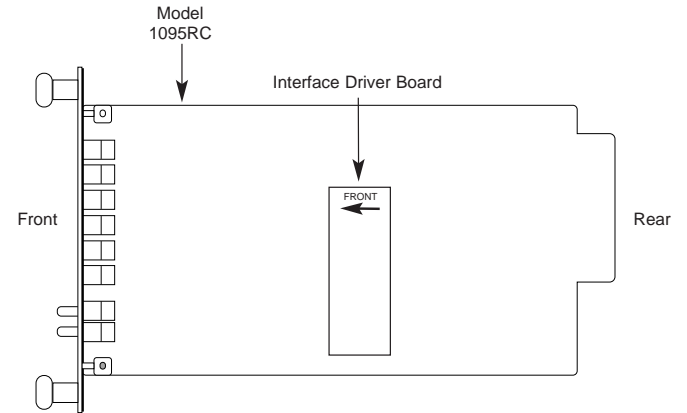
- 2) **Clocking Mode:** Set the clocking modes on the base units so that one unit is configured for Internal clocking mode and the other unit is set for Receive Recover clocking mode.

BASE UNIT CLOCK MODES	
Unit "A"	Unit "B"
Internal Clock Setting	Receive Recover Clock Setting
<b>NOTE:</b> Unit "A" and Unit "B" are arbitrarily chosen. It does not matter which unit is "A", and which is "B".	

- 3) When using the IM2RC/IA, DISABLE, the "Enable Loop from DTE" Switch on the front function card (1092ARC or 1095RC).
- 4) All other base unit settings depend upon your application and on the application medium (twisted pair or coaxial cable)

### 3.1 CONNECTING THE INTERFACE DRIVER BOARD

This package contains an interface driver board that allows you to configure your front function card for ethernet operation. Figure 2 shows the Interface Driver Board connected to a Model 1095RC front function card.



**Figure 2.** Model IM2RC/IA Driver Board mounted on Model 1095RC

Follow the instructions below to connect the interface driver board to the front function card:

1. With the function card (such as 1095RC, shown above) pulled out of the NetLink rack or clusterbox chassis, locate the driver board to be replaced on the top of the base unit front card.
2. Lift the old interface board gently off of the printed circuit board.
3. Position the IM2RC/IA driver board on top of the function card's pc board with the sockets oriented toward the male pins. Please be sure the label marked **FRONT** ← is pointed toward the front of the function card (toward the LEDs).
4. Push the Interface Driver Board gently onto the socket and re-install the function card into the rack or cluster system.

## 4.0 INSTALLATION

This section describes the NetLink Model 1001R14 rack chassis, included are installation instructions for the IM2RC/IA rear card, plus ethernet and line interface connections to the IM2RC/IA card. Please refer to the appropriate function card (i.e. 1092ARC) user manual to configure and install the function card.

### 4.1 THE MODEL 1001R14 RACK CHASSIS

The Model 1001R14 Rack Chassis (Figure 3, below) has fourteen baseband modem card slots, plus its own power supply. Measuring only 3.5" high, the Model 1001R14 is designed to occupy only 2U in a



Figure 3. Model 1001R14 Rack Chassis with power supply

19" rack.

#### 4.1.1 The Rack Power Supplies

The Patton NetLink rack system is designed to allow single or redundant (dual) power supplies. Using the same mid-plane architecture as the function/rear cards, the front function card and the power supply slide in from the front, while the rear card and power entry modules slide 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. 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.

**NOTE:** Please refer to the Model 1001RP Series User Manual *AC and DC Rack Mount Power Supplies* for fuse and power card replacement information.

### 4.2 INSTALLING THE REAR IM2RC/IA CARD AND FRONT FUNCTION CARD

The Model IM2RC/IA is a rear-mountable ethernet interface card that works with Patton Models 1092RC and 1095RC access products. 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 IM2RC/IA and its function card mate into the rack chassis:

**WARNING!** The IM2RC/IA card contains sensitive integrated circuitry. Failure to ground yourself during installation may result in damage to the IM2RC/IA card or the front function card.

1. Slide the IM2RC/IA rear card into the back of the chassis along the metal rails provided.
2. Secure the IM2RC/IA rear card using the metal screws provided.
3. Slide the front function card into the front of the chassis. It should meet the IM2RC/IA rear card when it is 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.

### 4.3 CONNECTING TO THE 10BASE-T ETHERNET PORT

The Model IM2RC/IA provides line side connections through a terminal block or through a RJ-45 connector. Figure 4 below, shows the rear panel options and the locations of the connectors.

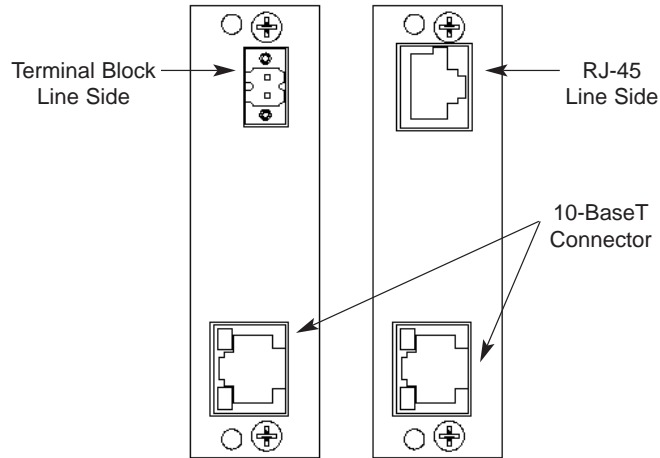


Figure 4. IM2RC/IA, Rear Panel Options

The RJ-45 Ethernet port on Model IM2RC/IA is designed to connect directly to a 10BaseT network. Figure 5 (below) shows the 10BaseT RJ-45 port pin description. You may make connections up to 330 feet using Type 4 or 5 cable.

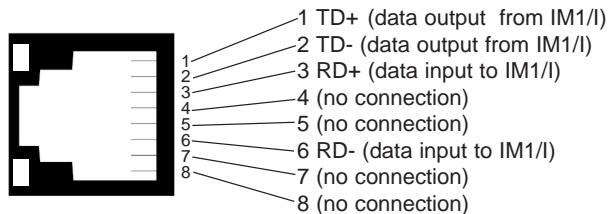
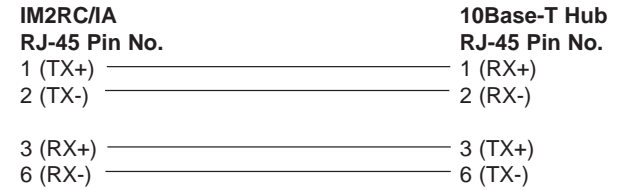


Figure 5. Model IM2RC/IA Ethernet Connector Pinout

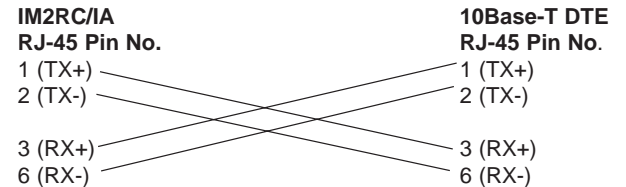
#### 4.3.1 Connecting the 10Base-T Ethernet Port to a Hub

The Model IM2RC/IA 10Base-T interface is configured as DTE (Data Terminal Equipment), just like a 10Base-T network interface card in a PC. Therefore, it "expects" to connect to a 10Base-T Hub using a straight-through RJ-45 cable. Use the diagram below to construct a cable to connect the IM2RC/IA to a 10Base-T Hub.



#### 4.3.2 Connecting the 10Base-T Ethernet Port to a PC (DTE)

The Model IM2RC/IA 10Base-T interface is configured as DTE (Data Terminal Equipment). If you wish to connect the IM2RC/IA to another DTE device such as a 10Base-T network interface card in a PC, you must construct a 10Base-T crossover cable as shown in the diagram below.



#### 4.3.3 CONNECTING THE LINE INTERFACE

The Model IM2RC/IA is to be used with Patton function card access products (i.e. 1092ARC) There are two essential requirements for connecting the line interface on Model IM2RC/IA:

1. These units work in *pairs* with one IM2RC/IA connected to another IM2RC/IA (or IM1/I) over 2 or 4-Wire Twisted pair (2 or 4-Wire operation is determined by the front function card).

2. To function properly, the Model IM2RC/IA needs one or two **twisted** pairs of metallic wire (two or four wire). The twisted pairs must be **unconditioned**, dry, metallic wire, between 19 (.9mm) and 26 AWG (.4mm) (Appendix B describes cable requirements) . Standard dial-up telephone circuits, or leased circuits that run through signal equalization equipment, or standard, flat modular telephone type cable, are *not acceptable*. Figure 6, below,

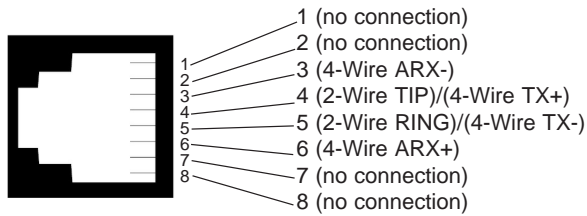


Figure 6. RJ-45 Line Interface

**NOTE:** Two-Wire Modems use RJ-45 pins 4 and 5 and 4-Wire Modems use RJ-45 pins 3, 4, 5 and 6, as shown above. Please see the Function Card User Manual for more details.

## 5.0 OPERATION

Once the Model IM2RC/IA is installed, it should operate transparently. The following sections describes the power-up, general operating instructions, and the LED status monitors.

### 5.1 OPERATING INSTRUCTIONS

In order to operate, the Model IM2RC/IA must be installed in the rack unit. It also requires a 10Base-T connection. After power is applied, the IM2RC/IA automatically starts performing the bridging function without further user intervention. MAC addresses discovered are automatically loaded into the MAC address table. They are automatically deleted from the MAC address table if they experience an inactivity of 8 minutes.

### 5.2 POWER-UP

The Model IM2RC/IA is a hot-swappable rear card that receives power from the NetLink rack power bus. Therefore, it is powered up as soon it is plugged into the rack and the rack power supply is turned on.

### 5.3 LED STATUS MONITORS

The Model IM2RC/IA features two LEDs that monitor general operating status and the 10Base-T twisted pair link integrity. Figure 6 (below) shows the LEDs located directly beneath the RJ-45 jack. Following Figure 6 is a description of each LEDs function.

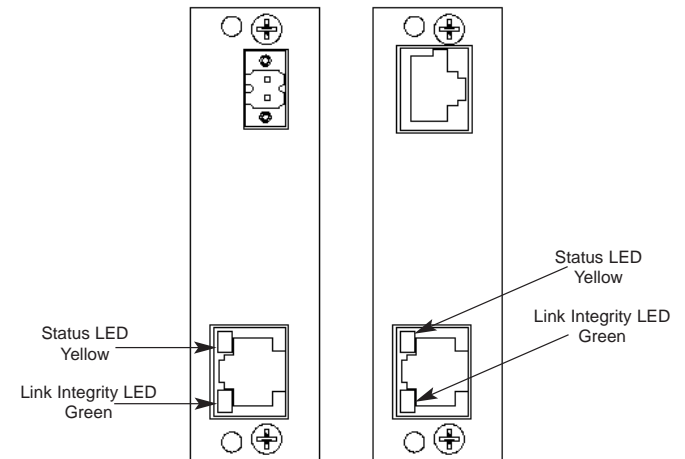


Figure 7. IM2RC/IA, Rear Panel, LED Locations

**Status** Blinks yellow from one to eleven times to indicate system status. Each pulse pattern is separated by a 2 second "off" period. Greater pulse patterns have higher priority (buffer saturation has greater priority than an empty MAC table). Valid system statuses are:

- 1 pulse = system status ok
- 2 pulses = No MAC entries in the MAC address table
- 3 pulses = Clear to send (CTS) or Carrier Detect (DCD) from base unit are not asserted
- 4 pulses = IMRC2/IA buffer is saturated
- 5 pulses = WAN receive frame(s) too large
- 6 pulses = WAN receive frame(s) not Octet aligned
- 7 pulses = WAN receive frame(s) aborted
- 8 pulses = Detected WAN receive frame(s) with bad CRC
- 9 pulses = Detected LAN receive frame(s) too large
- 10 pulses = Detected LAN receive frame(s) not Octet aligned
- 11 pulses = Detected LAN receive frame(s) with bad CRC

After a status code is displayed eight times and the associated condition is removed, the status code will no longer appear.

**Link** Glows green to indicate good link integrity on the 10Base-T twisted pair line.

## APPENDIX A

### PATTON ELECTRONICS MODEL IM2RC/IA SPECIFICATIONS

<b>LAN Connection:</b>	RJ-45, 10Base-T, 802.3 Ethernet
<b>Line Connection</b>	RJ-45, female connector or terminal block
<b>MAC Address Table Size:</b>	4096 entries
<b>MAC Address Aging:</b>	MAC addresses deleted after 8 minutes inactivity
<b>On-board Memory:</b>	512 KB RAM; 128 KB FLASH
<b>Frame Latency:</b>	1 frame
<b>Interface:</b>	Card-edge connection to Patton modems
<b>LED Indicators:</b>	(1) general status; (1) link integrity
<b>Power Consumption:</b>	250mA @ 5VDC, supplied by front card modem
<b>Temperature Range:</b>	32 to 122°F (0 to 50° C)
<b>Dimensions:</b>	2.04" x 3.24" (5.2 mm x 8.26 mm)
<b>Compliance:</b>	FCC part 15 Class A, CE marked per EEC Directive 89/336/EEC, and Low Voltage directive 73/23/EEC



## APPENDIX B

### IM2RC/IA FACTORY REPLACEMENT PARTS AND ACCESSORIES

<u>Patton Electronics Model #</u>	<u>Description</u>
1000RCM70364DB .....	Ethernet Daughter Board
07MIM2RC/IA .....	IM2RC/IA User Manual

## APPENDIX C

### IM2RC/IA INTERFACE PIN ASSIGNMENT

#### 10BASE-T Interface Pin Description (RJ-45 Female Connector) (DTE Configuration)

<b>Pin #</b>	<b>Signal</b>
1	TD + (data output from IM2RC/IA)
2	TD - (data output from IM2RC/IA)
3	RD +(data input to IM2RC/IA)
4	no connection
5	no connection
6	RD - (data input to IM2RC/IA)
7	no connection
8	no connection

