

# USER MANUAL

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MODEL 1005 and  
1005S

*Async. Carrier Sense  
Short Range Modem*



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



An ISO-9001  
Certified Company

Part #07M1005-C  
Doc. #052031UC  
Revised 4/29/98

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

## 1.0 WARRANTY INFORMATION

*Patton Electronics* warrants all Model 1005 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 1005 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 1005 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 1005 does cause interference to radio or television reception, which can be determined by disconnecting the modem, the user is encouraged to try to correct the interference by one or more of the following measures: moving the computing equipment away from the receiver, re-orienting the receiving antenna and/or plugging the receiving equipment into a different AC outlet (such that the computing equipment and receiver are on different branches).

### 1.2 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 non-warranty repairs must be returned freight prepaid and insured to Patton Electronics. All returns must have a Return Materials Authorization number on the outside of the shipping container. This number may be obtained from Patton Electronics Technical Service at

telephone: *(301) 975-1007*,  
web address: *http://www.patton.com*;  
email: *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 1005. 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

- Ideal for UNIX operating systems
- Range to 17 miles (27.2 km)
- Data rates to 19,200 bps
- No AC power or batteries required
- Carrier sense handshaking
- Useful for troubleshooting or monitoring a line
- Very thin case for closely spaced computer ports
- Available with RJ-11, RJ-45 or terminal block with strain relief
- External DCE/DTE switch
- Connects directly to the RS-232 port
- Compatible with Patton Models 1000, 1004, 1009 and 1015
- Made in USA

### 2.2 DESCRIPTION

*The Patton Model 1005* Carrier Sense Short Range Modem allows RS-232 UNIX systems to communicate up to 17 miles (27.2 km) over two unconditioned twisted pair cable. Supporting data rates to 19.2 Kbps, the Model 1005 requires no AC power or batteries.

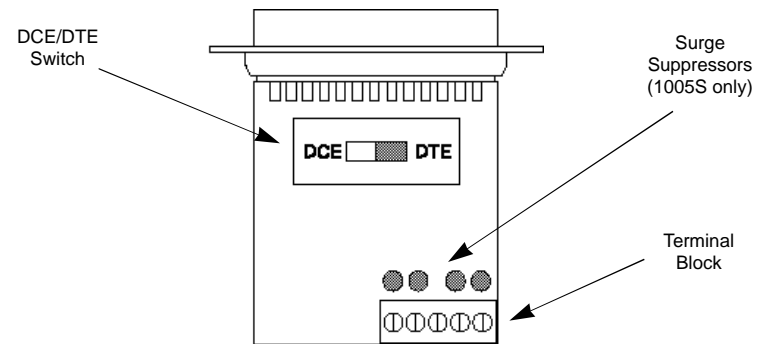
The Model 1005 has a unique carrier sense feature, which automatically detects the presence of a carrier on the line. This is particularly useful in UNIX environments, where the host must see a carrier before it sends a logon screen to the terminal. This feature also plays an important role in troubleshooting, where the presence or absence of a carrier indicates positive or negative line integrity.

Measuring only 2.66" x 2.10" x .73" (6.76 x 5.33 x 1.85 cm), the Model 1005 is housed in a pop-open ABS plastic case. The Model 1005 comes with a male or female DB-25 connector and a choice of interfaces (RJ-11 jack, RJ-45 jack, or terminal blocks with strain relief). For surge handling capability, the Model 1005S is compliant with IEC 801.5 level 2, 1kV.

## 3.0 CONFIGURATION

The Model 1005 is designed to be easy to use. There are no internal jumpers or configuration switches to set, so there is no need to open the case to configure the unit (you may need to open the case for wire connection—refer to Section 4.0). The only configuration necessary for operation is proper setting of the external DCE/DTE switch.

The figure below shows the location of the DCE/DTE switch on the PC board, as well as the location of the terminal block and surge suppressors ("S" model only).



### 3.1 SETTING THE DCE/DTE SWITCH

For your convenience, the Model 1005 has an externally accessible DCE/DTE switch (see diagram below). If the device connected to the Model 1005 is a modem or multiplexer (or is wired like one), set the switch to "DTE". This setting causes the Model 1005 to behave like Data Terminal Equipment and transmit data on pin 2.



If the device connected to the Model 1005 is a PC, terminal, or host computer (or is wired like one), set the switch to "DCE". This setting causes the Model 1005 to behave like Data Communications Equipment and transmit data on pin 3.

## 4.0 INSTALLATION

Once you have properly configured the DCE/DTE switch, you are ready to connect the Model 1005 to your system. This section tells you how to connect the Model 1005 to the twisted pair and RS-232 interfaces, and how to operate the Model 1005.

### 4.1 CONNECTION TO THE TWISTED PAIR INTERFACE

The Model 1005 supports data-only communication between two RS-232 devices at distances to 17 (27.2 km) miles and data rates to 19.2 Kbps. There are two essential requirements for installation:

1. These units work in pairs. Therefore, you must have one Model 1005 at each end of a two twisted pair interface.
2. To function properly, the Model 1005 needs two twisted pairs of metallic wire. The pairs must be unconditioned, dry metallic wire, between 19 and 26 AWG (the higher number gauges may limit distance). Standard dial-up telephone circuits or leased circuits that run through signal equalization equipment are not acceptable.

For your convenience, the Model 1005 is available with three different twisted pair interfaces: RJ-11 jack, RJ-45 jack and terminal blocks with strain relief.

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

The RJ-11 and RJ-45 connectors on the Model 1005's twisted pair interface are pre-wired for a standard TELCO wiring environment (see Figure 1). The table on the following page shows the signal/pin relationships.

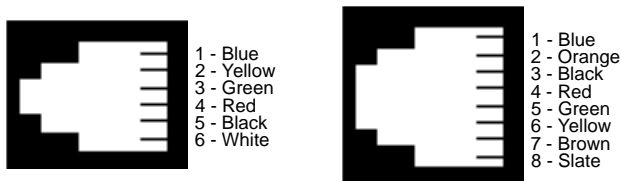


Figure 1. AT&T standard modular color codes

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

When connecting two Model 1005s, it is necessary to use a "crossover" cable. The diagram below shows how a crossover cable should be constructed for an environment where both Model 1005s use a 4-wire RJ-11 connector. Similar logic should be followed when using RJ-45 connectors or a combination of the two.

<u>SIGNAL</u>	<u>PIN#</u>	<u>COLOR<sup>‡</sup></u>	<u>COLOR</u>	<u>PIN#</u>	<u>SIGNAL</u>
GND <sup>†</sup>	1	Blue-----	White	6	GND <sup>†</sup>
RCV-	2	Yellow-----	Red	4	XMT-
XMT+	3	Green-----	Black	5	RCV+
XMT-	4	Red-----	Yellow	2	RCV-
RCV+	5	Black-----	Green	3	XMT+
GND <sup>†</sup>	6	White-----	Blue	1	GND <sup>†</sup>

<sup>†</sup>Connection to ground is optional

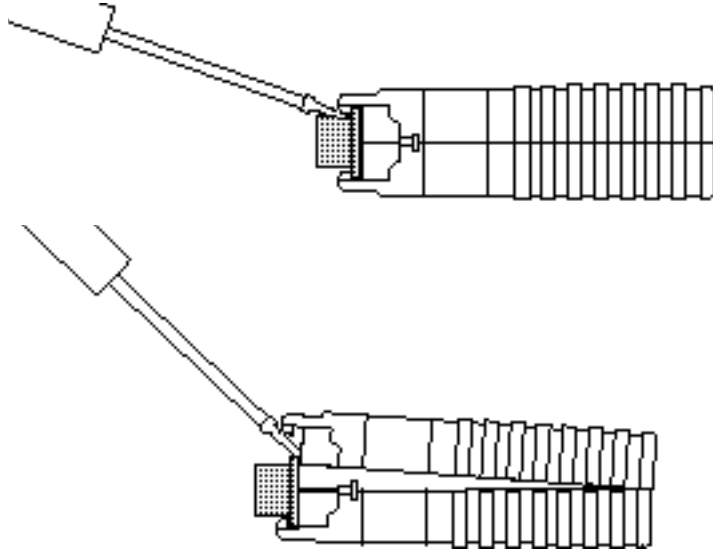
<sup>‡</sup>Standard color codes—yours may be different

#### 4.1.2 TWISTED PAIR CONNECTION USING TERMINAL BLOCKS

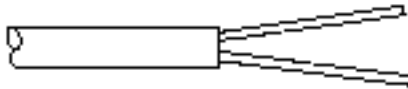
If your RS-232 application requires you to connect two pairs of bare wires to the Model 1005, you will need to open the case to access the terminal blocks. The following instructions will tell you how to open the case, connect the bare wires to the terminal blocks, and fasten the strain relief collar in place so that the wires won't pull loose.

1. Open the unit by gently inserting a screwdriver between the DB-25 connector and the lip of the plastic case (see below). You don't have to worry about breaking the plastic, but be careful not to bend the D-sub connector.

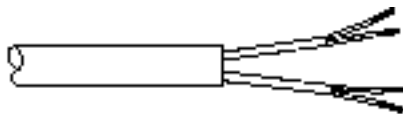
Once the unit has been opened, you will be able to see the terminal blocks located at the rear of the PC board.



2. Strip the outer insulation from the twisted pairs about one inch from the end.

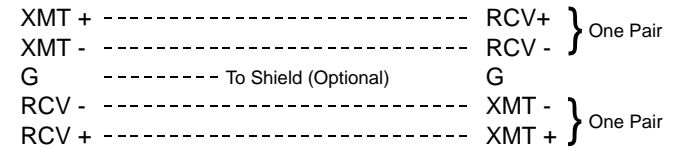


3. Strip the insulation on each of the twisted pair wires about .25".

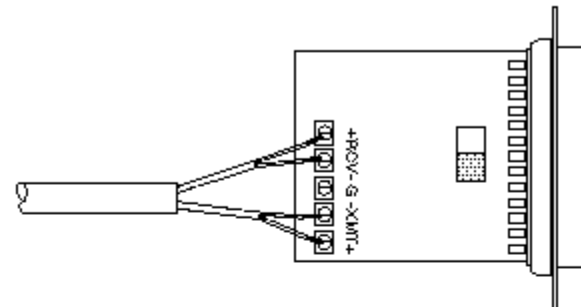


4. Connect *one pair* of wires to XMT+ and XMT- (transmit positive and negative) on the terminal block, making careful note of which color is positive, and which color is negative.
5. Connect the *other pair* of wires to RCV+ and RCV- (receive positive and negative) on the terminal block, again making careful note of which color is positive and which color is negative.

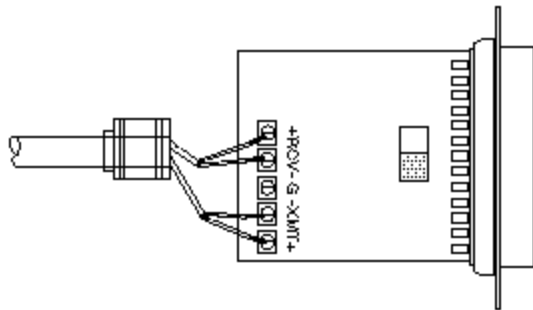
Ultimately, you will want to construct a two pair crossover cable that connects the two short hauls as shown below:



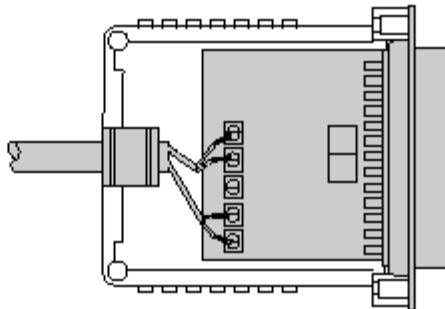
6. If there is a shield around the telephone cable, it may be connected to "G" on the terminal block. To avoid ground loops, we recommend connecting the shield at the computer end only. A ground wire is *not necessary* for proper operation of the Model 1005.
7. When you finish connecting the wires to the terminal block, the assembly should resemble the diagram below:



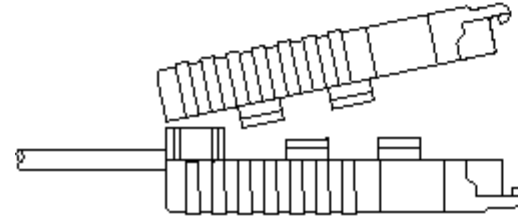
- Place the 2 halves of the strain relief assembly on either side of the telephone wire and press together very lightly. Slide the assembly so that it is about 2 inches from the terminal posts and press together firmly. If your cable diameter is too small or too large for our strain relief, please contact our technical support. We have strain relief assemblies to accommodate most cable diameters.



- Insert the strain relief assembly with the wire going through it into the slot in the bottom half of the modem case and set it into the recess in the case.



- TIP the top half of the case as necessary to place it over the strain relief assembly. Do not snap the case together yet.



- Insert one captive screw through a saddle washer and then insert the entire piece through the hole in the DB-25 end of the case. Snap that side of the case closed. Repeat the process for the other side. This completes the cable installation process.

#### 4.2 CONNECTION TO THE RS-232 INTERFACE

Once you have configured the Model 1005 for DTE or DCE and connected the twisted pair wires correctly, simply plug the 1005 directly into the DB-25 port of the RS-232 device. After doing so, remember to insert and tighten the two captive connector screws.

Note: If you must use a cable to connect the Model 1005 to the RS-232, make sure it is a *straight through* cable of the shortest possible length—we recommend 6 feet or less. The Model 1005 requires a cable that incorporates pins 2, 3, 4, 5, 6, 7, 8 and 20.

#### 4.3 OPERATING THE MODEL 1005

Once the Model 1005 is properly installed, it should operate transparently—as if it were a standard cable connection. Operating power is derived from the RS-232 data and control signals; there is no “ON/OFF” switch.

**APPENDIX A**

***PATTON MODEL 1005 SPECIFICATIONS***

**Transmission Format:** Asynchronous

**Data Rate:** 0 to 19,200 bps (no strapping)

**Control Signal:** *DCE Mode:* CTS (Pin 5) turns ON immediately after the terminal raises RTS (Pin 4); DSR (Pin 6) turns on when is powered-up (connected); DCD (Pin 8) turns ON after detecting the receive signal from the line; *DTE Mode:* RTS (Pin 4) turns "ON" immediately after the modem raises CTS (Pin 5); DTR (Pin 20) turns "ON" after recognizing the receive signal from the line; Pins 11, 19 and 20 are hardwired together on the DB-25 side of the DCE/DTE switch

**Transmit Line:** 4-wire, unconditioned line

**Transmit Mode:** Full duplex, 4-wire

**Transmit Level:** 0 dBm

**Connection:** Either a male or female DB-25

**Line Connection:** RJ-11 or RJ-45 jack or 5 screw terminal posts (4 wires and 1 ground) and a strain relief insert

**Power Supply:** No additional power required, uses ultra low power from EIA data and control signals; additional power can be added at pin 9 for +V DC when DB-25 is below the RS-232 standard requirements

**Surge Protection:** Compliant with IEC 801.5 level 2, 1kV (Model 1005S Only)

**Size:** 2.66" x 2.10" x 0.73" (6.76 x 5.33 x 1.85 cm)

**APPENDIX B**

**PATTON MODEL 1005 CABLE RECOMMENDATIONS**

The Patton Model 1005 operates at frequencies of 20kHz or less and has been performance tested by Patton technicians using twisted-pair cable with the following characteristics:

<i>Wire Gauge</i>	<i>Capacitance</i>	<i>Resistance</i>
19 AWG/.9mm	83nf/mi or 15.72 pf/ft.	.0163 Ohms/ft.
22 AWG/.6mm	83nf/mi or 15.72 pf/ft.	.0326 Ohms/ft.
24 AWG/.5mm	83nf/mi or 15.72 pf/ft.	.05165 Ohms/ft.

To gain optimum performance from the Model 1005, please keep the following guidelines in mind:

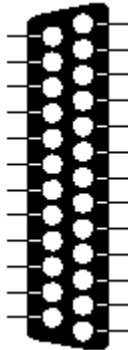
- Always use *twisted pair wire*—this is not an option.
- Use twisted pair wire with a capacitance of 20pf/ft or less.
- Avoid twisted pair wire thinner than 26 AWG (i.e. avoid higher AWG numbers than 26)
- Use of twisted pair with a resistance greater than the above specifications may cause a reduction 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*.

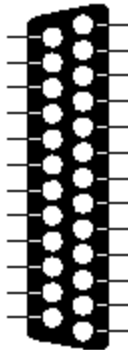
*Model 1005 Distance Table in Miles (km)*

<i>Data Rate (bps)</i>	<i>Wire Gauge</i>		
	19 AWG (0.9 mm)	24 AWG (0.5 mm)	26 AWG (0.4 mm)
19,200	6.2(10.0)	3.7(6.0)	1.2(1.9)
9,600	7.5(12.1)	4.9(7.9)	2.5(4.0)
4,800	8.7(14.0)	5.6(9.0)	3.7(6.0)
2,400	11.8(19.0)	8.0(12.9)	4.9(7.9)
1,200	17.0(27.4)	11.8(19.0)	8.0(12.9)

APPENDIX C

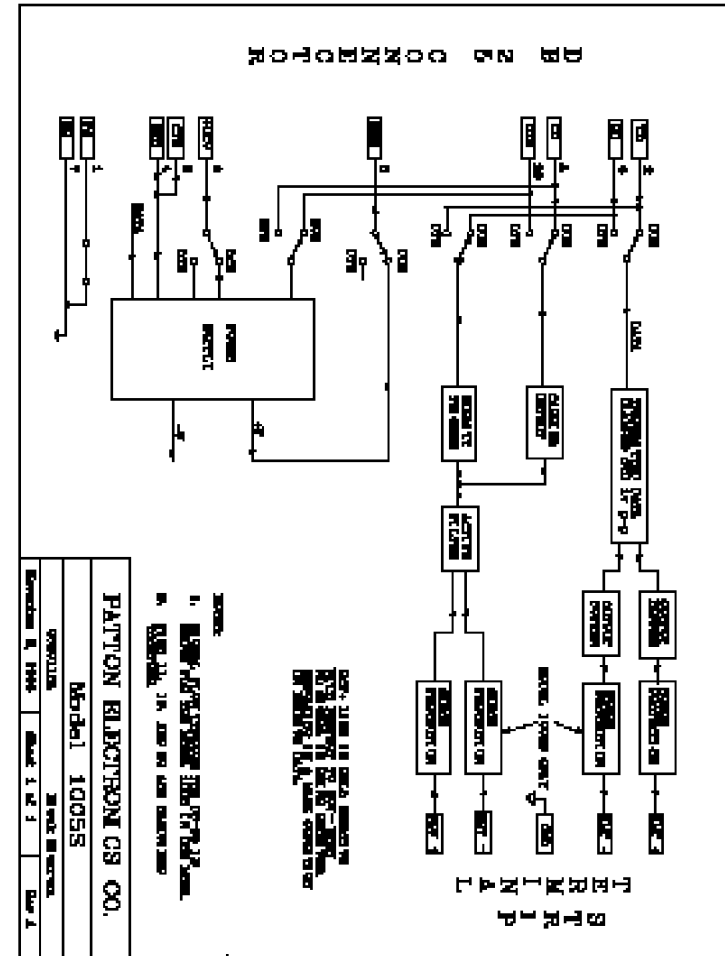
PATTON MODEL 1005 PIN/SIGNAL ASSIGNMENTS

DIRECTION	STANDARD "DCE" SETTING	DIRECTION
To Model 1005	 <p>1- (FG) Frame Ground 2- (TD) Transmit Data 3- (RD) Receive Data 4- (RTS) Request to Send 5- (CTS) Clear to Send 6- (DSR) Data Set Ready 7- (SG) Signal Ground 8- (DCD) Data Carrier Detect</p>	<p>To Model 1005 From Model 1005 To Model 1005 From Model 1005 From Model 1005 From Model 1005</p>
	Data Term. Ready (DTR) - 20	From Model 1005

DIRECTION	STANDARD "DTE" SETTING	DIRECTION
From Model 1005	 <p>1- (FG) Frame Ground 2- (TD) Transmit Data 3- (RD) Receive Data 4- (RTS) Request to Send 5- (CTS) Clear to Send 6- (DSR) Data Set Ready 7- (SG) Signal Ground 8- (DCD) Data Carrier Detect</p>	<p>From Model 1005 To Model 1005 From Model 1005 To Model 1005 To Model 1005 To Model 1005</p>
	Data Term. Ready (DTR) - 20	To Model 1005

APPENDIX D

PATTON MODEL 1005 BLOCK DIAGRAM



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