USER MANUAL

MODEL 2002 Series
RS-232 to TTL
Interface Converter

PATTON Electronics Co.

ISO 9001

1.0 WARRANTY INFORMATION

Patton Electronics warrants all Model 2002 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 Models 2002 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 2002 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 2002 does cause interference to radio or television reception, which can be determined by disconnecting the RS-232 or TTL interface, 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 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: **(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 2002. Technical Support 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

- Bi-directional, asynchronous data conversion between RS-232 and TTL
- Supports data rates to 230 kbps
- Two versions available:

    Model 2002FC-MT connects an RS-232 DTE to a TTL DCE

    Model 2002FT-MC connects an RS-232 DCE to a TTL DTE

- Passes TD & RD plus five control signals: CD, DTR, DSR, CTS & RTS
- Data and control signals independently selectable for inverting/non-inverting
- Interface powered–no AC required
- RS-232 interface is a DB-25 female, TTL interface is a DB-25 male

2.2 DESCRIPTION

The **Patton Model 2002 RS-232 to TTL Interface Converter** lets an asynchronous RS-232 device communicate bi-directionally with an asynchronous TTL device. Supporting data rates up to 230 kbps, the Patton Model 2002 passes data (TD, RD) plus five control signals (CD, DTR, DSR, CTS and RTS). In addition, the Patton Model 2002 allows data and control signals to be independently jumper-selected as "inverting" or "non-inverting."

The **Patton Model 2002** is available in two versions: DCE-to-DTE and DTE-to-DCE. The RS-232 interface is presented on a DB-25 female connector, while the TTL interface is presented on a   DB-25 male connector. Deriving power from the data and control signals, the Patton Model 2002 requires no AC power or batteries for operation.

3.0 CONFIGURATION

The Model 2002 is very easy to use.   Most applications require no configuration. Just plug it in and go!   However, some TTL circuitry requires data and/or control signals to be inverted (opposite) from their normal conditions. Please read the section below to determine if the default settings will work for you.

3.1 DEFAULT TTL LOGIC LEVELS

Systems represents data signals by alternating between "mark" (binary "1") and space (binary "0") conditions. TTL (Transistor-Transitor Logic) circuitry normally a represents a "mark" as a voltage between 2.4 and 5.0 Volts, and a "space" as a voltage between 0.4 and 0.4 Volts.   By contrast, TTL control signals (RTS, CTS, DSR, DCD and DTR) are either "active" (between 0.0 and 0.4 Volts), or "inactive" (between 2.4 and 5.0 Volts). Table 1, below, summarizes the above information.

Table 1. Default TTL Signal Levels		
Signal Level	Data Signals	Control Signals
0.0 to 0.4 Volts	space	active
2.4 - 5.0 Volts	mark	inactive

Table 1, above, shows the default configuration of the Model 2002. ***In most cases no modification is required!!*** However, if your TTL circuitry requires inverted signals for either the data or control signals, you must change the settings of one or two jumper switches. In order to change the jumper settings, you must open the case. Please follow the instructions below to do so.

3.2 OPENING THE CASE

TheJP1 and JP2 jumpers on the Model 2002 are located on the PC board. To open, insert a small flathead screw driver or similar tool between the DB-25 female connector and the lip of the case as shown in Figure 1.
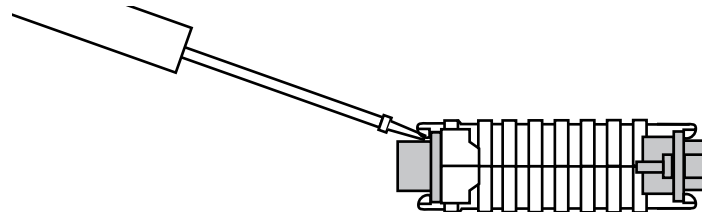

Figure 1: Using a Small Screw Driver to Open the Model 2002 Case

Then *gently* twist the screw driver to pop the case open as shown in Figure 2. Be careful not to damage the case or connector as you twist the screw driver.
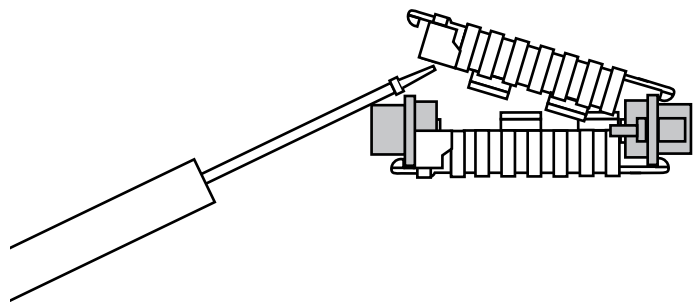

Figure 2: Using a Small Screw Driver to Open the Model 2002 Case

3.3 CHANGING THE JUMPER STRAPS

Once you have opened the case of the Model 2002, you will see two jumper straps located the top side of the PC board (See Figure 3, below.
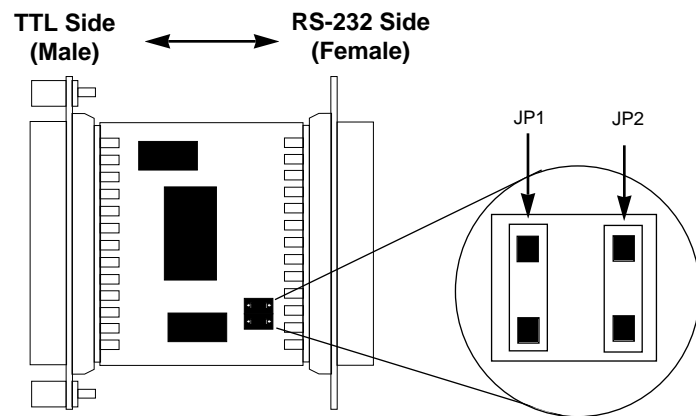

Figure 3: Close-Up of the Model 2002 Series Jumper Straps

To change the jumper strap settings, simply remove the jumpers and replace them on the jumper posts as described in the following section.

3.1 JUMPER SWITCHES JP1 AND JP2

Use Jumper Switches JP1 and JP2 to control the logic state of the data and/or control signals. ***In most cases no modification is required!!*** Consult the user manual of the TTL device or the device's manufacturer before changing the settings on JP1 and JP2. This section describes the jumper settings.

Non-Inverted Data and Control Signals *(Default Setting)*

Position JP1 and JP2 vertically on the jumper posts to select non-inverted data and control signals (default setting). Figure 4 shows the position of the jumpers on the pc board. Table 3 shows the relative signal levels.
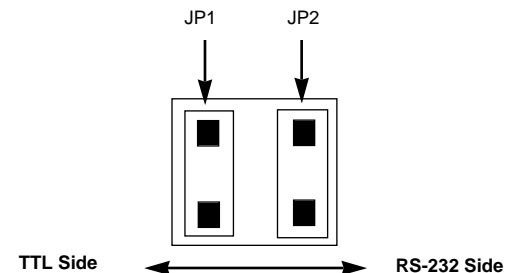

Figure 4: Non-Inverted Data and Control Signal Jumpers

Table 3. Non-Inverted Data and Control		
Signal Level	**Data Signals**	**Control Signals**
0.0 to 0.4 Volts	space	active
2.4 - 5.0 Volts	mark	inactive

Inverted Data and Control Signals

Position JP1 and JP2 horizontally on the jumper posts to select inverted data and control signals. Figure 5 shows the position of the jumpers on the pc board. Table 4 shows the relative signal levels.
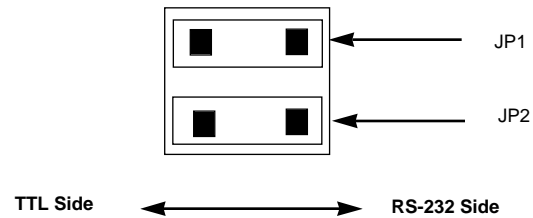
JP1

JP2

TTL Side ⟷ **RS-232 Side**

Figure 5: Inverted Data and Control Signal Jumpers

Table 4. Inverted Data and Control Signals		
Signal Level	**Data Signals**	**Control Signals**
0.0 to 0.4 Volts	mark	inactive
2.4 - 5.0 Volts	space	active

Inverted Data and Non-Inverted Control Signals

Position JP1 horizontally top jumper posts and remove JP2 to select inverted data and non-inverted control signals. Figure 6 shows the position of the jumpers on the pc board. Table 5 shows the relative signal levels.
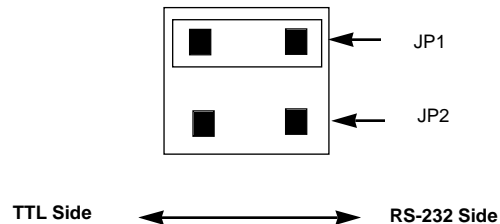
JP1

JP2

TTL Side ⟷ **RS-232 Side**

Figure 6: Inverted Data and Non-Inverted Control Signal Jumpers

Table 5. Inverted Data, Non-Inverted Control Signals		
Signal Level	**Data Signals**	**Control Signals**
0.0 to 0.4 Volts	mark	active
2.4 - 5.0 Volts	space	inactive

Inverted Control and Non-Inverted Data Signals

Position JP2 horizontally on bottom jumper posts to select inverted control and non-invert data signals. Figure 7 shows the position of the jumpers on the pc board. Table 6 shows the relative signal levels.
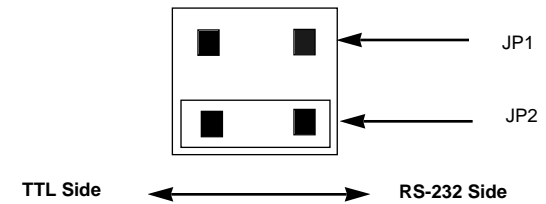
JP1

JP2

TTL Side ⟷ **RS-232 Side**

Figure 7: Inverted Control and Non-Inverted Data Signal Jumpers

Table 6. Inverted Control, Non-Inverted Data Signals		
Signal Level	**Data Signals**	**Control Signals**
0.0 to 0.4 Volts	space	inactive
2.4 - 5.0 Volts	mark	active

3.0 INSTALLATION

The Patton Model 2002 is very simple to install. Just plug it in like a normal cable and you're ready to go. Since the Model 2002 is available in two gender and DTE/DCE orientations, many applications are possible.

> **NOTE:** The Model 2002 Series always uses a DB-25 female connector on the RS-232 interface and a DB-25 male connector on the TTL Interface.

4.1 CONNECTING THE MODEL 2002FC-MT

Connect the 25 pin male port (TTL side) directly to a TTL DCE device. Connect the 25 pin female port (RS-232 side) of Model 2002FC-MT to an RS-232 DTE device using a straight-through cable of the shortest possible length (less than 50 feet). Figure 8 shows a typical application of the 2002FC-MT.
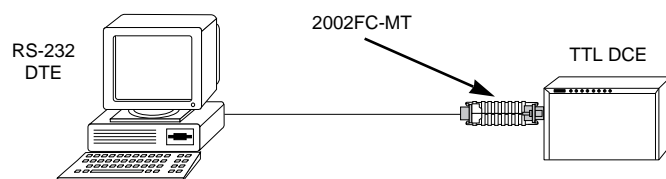

Figure 8: Connecting the Model 2002FC-MT

4.2 CONNECTING THE MODEL 2002FT-MC

Connect the 25 pin male port (TTL side) directly to a TTL DTE device. Connect the 25 pin female port (RS-232 side) of the Model 2202FT-FC to an RS-232 DCE device using a straight-through cable of the shortest possible length (less than 50 feet). Figure 9 shows the typical application of the 2002FT-MC.
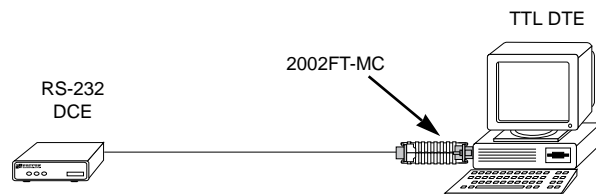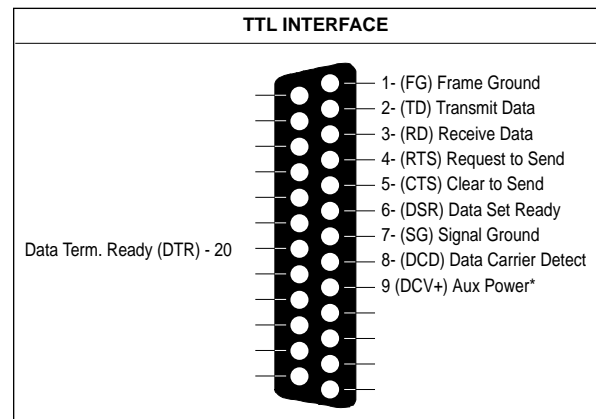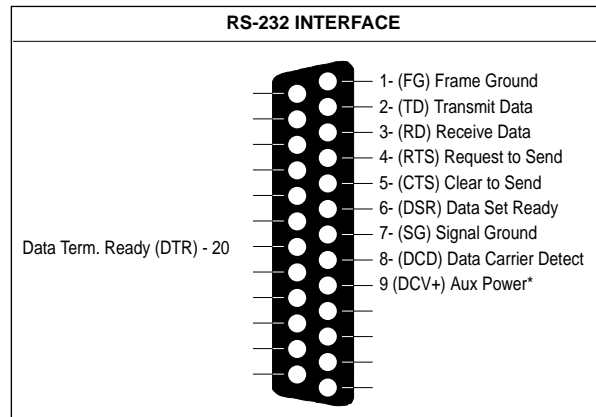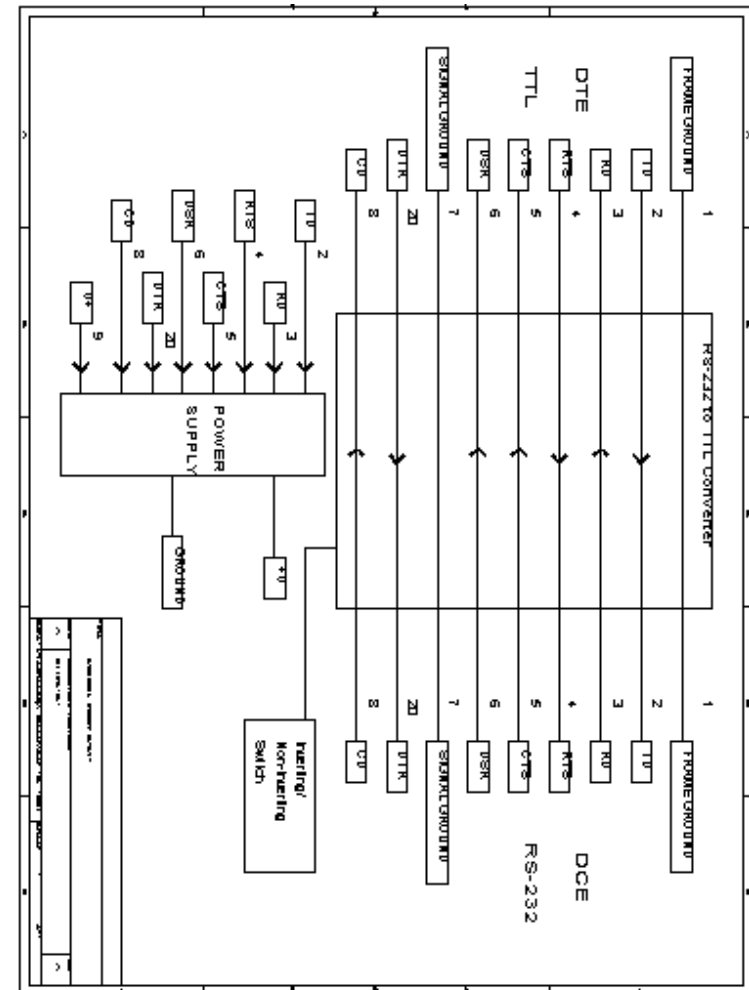

Figure 9. Connecting the Model 2002FT-MC

APPENDIX A

MODEL 2002 SERIES SPECIFICATIONS

Transmission Format:	Asynchronous
Data Rate:	0 to 230 kbps
Interface:	Serial TTL or serial RS-232; DCE-to-DTE or DTE- to-DCE
Connectors:	RS-232 interface, DB-25 female; TTL interface, DB-25 male
Control Signals Supported:	CD, DTR, DSR, CTS and RTS, passed directly through
Signal Inversion:	data signals and control signals can be independently configured for "inverting" or "non-inverting" using internal jumpering
Power Supply:	none required, draws all necessary operating power from RS-232 and TTL data and control signals
Temperature Range:	32 to 122ºF (0 to 50º C)
Dimensions:	2.2" x 2.1" x 0.7" (5.6 x 5.3 x 1.8 cm)

APPENDIX B

PATTON MODEL 2002 INTERFACE PIN ASSIGNMENTS

RS-232 INTERFACE

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
9 (DCV+) Aux Power*

Data Term. Ready (DTR) - 20

TTL INTERFACE

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
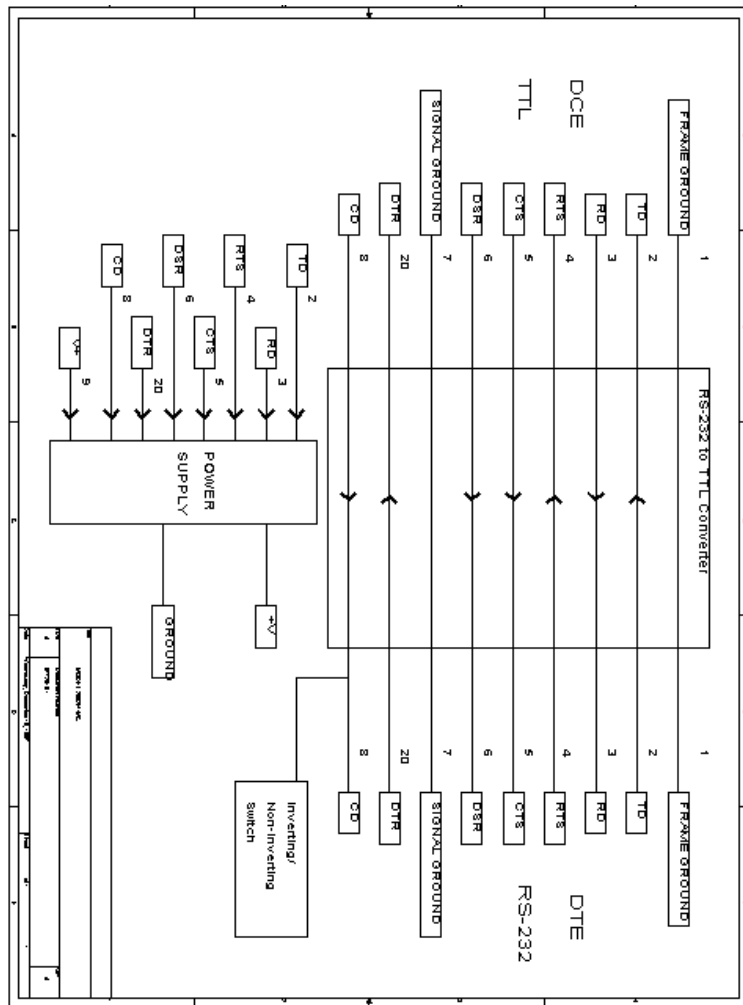9 (DCV+) Aux Power*

Data Term. Ready (DTR) - 20

APPENDIX C

MODEL 2002FC-MT BLOCK DIAGRAM

MODEL 2002FT-MC 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.

Web:	http://www.patton.com
Sales E-mail:	sales@patton.com
Support E-mail:	support@patton.com
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

We are committed to a quality product at a quality price. Patton Electronics is BABT and ISO 9001 certified. We meet and exceed the highest standards in the industry (CE, UL, etc.).

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:
_____
_____
_____
_____
_____
_____