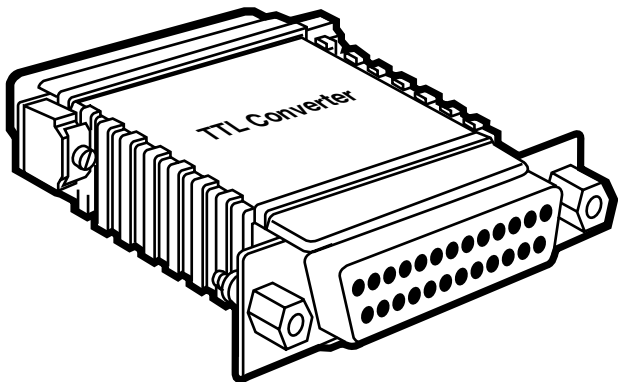


# TTL Converter



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## CUSTOMER SUPPORT INFORMATION

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**FEDERAL COMMUNICATIONS COMMISSION  
AND  
CANADIAN DEPARTMENT OF COMMUNICATIONS  
RADIO FREQUENCY INTERFERENCE STATEMENTS**

This equipment generates, uses, and can radiate 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 communication. It 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 against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

*This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.*

*Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.*



The CE symbol on your equipment indicates that it complies with the Electromagnetic Compatibility (EMC) directive and the Low Voltage Directive (LVD) of the Union European (EU).

## **NORMAS OFICIALES MEXICANAS (NOM) ELECTRICAL SAFETY STATEMENT**

### **INSTRUCCIONES DE SEGURIDAD**

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.

10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
  - A: El cable de poder o el contacto ha sido dañado; u
  - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
  - C: El aparato ha sido expuesto a la lluvia; o
  - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
  - E: El aparato ha sido tirado o su cubierta ha sido dañada.

### TRADEMARKS

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# 1. Specifications

**Transmission Format**—Asynchronous

**Data Rate**—0 to 230 kbps

**Interface**—Serial TTL (DTE) or serial RS-232 (DCE)

**Connectors**—(1) DB25 female for RS-232 interface, (1) DB25 male for TTL interface

**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**—32 to 122 °F (0 to 50 °C)

**Size**—2.2"H x 2.1"W x 0.7"D (5.6 x 5.3 x 1.8 cm)

**Weight**—2 oz. (0.1 kg)

## 2. Introduction

### 2.1 Description

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

The TTL Converter has a serial RS-232 interface (DCE) and a serial TTL interface (DTE). The RS-232 interface is presented on a DB25 female connector, while the TTL interface is presented on a DB25 male connector. Since it derives power from the data and control signals, the Converter requires no AC power or batteries for operation.

### 2.2 Features

- Bi-directional, asynchronous data conversion between RS-232 and TTL



## TTL CONVERTER

- Supports data rates to 230 kbps
- Connects an RS-232 DTE to a TTL DCE
- 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 DB25 female, TTL interface is a DB25 male

## 3. Configuration

The TTL Converter 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-Transistor Logic) circuitry normally represents a “mark” as a voltage between 2.4 and 5.0 Volts, and a “space” as a voltage between 0.0 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 3-1** summarizes the above information.

**Table 3-1. Default TTL Signal Levels.**

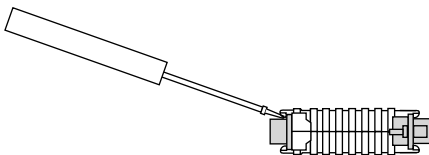
| Signal Level     | Data Signals | Control Signals |
|------------------|--------------|-----------------|
| 0 to 0.4 volts   | space        | active          |
| 2.4 to 5.0 volts | mark         | inactive        |

**Table 3-1**, shows the default configuration of the Converter. 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. To change the jumper settings, you must open the case. Please follow the instructions below.

### 3.2 Opening the Case

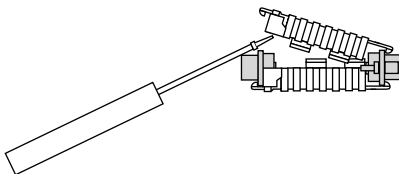
Remember that, for most applications, you will *not* have to change the jumper settings. Unless the default settings won't work for your application, skip the rest of this chapter and go on to **Chapter 4**.

The JP1 and JP2 jumpers on the TTL Converter are located on the PC board. To open the case, insert a small flathead screw driver or similar tool between the DB25 female connector and the lip of the case as shown in **Figure 3-1**.



**Figure 3-1.** Using a small screwdriver to open the TTL Converter case.

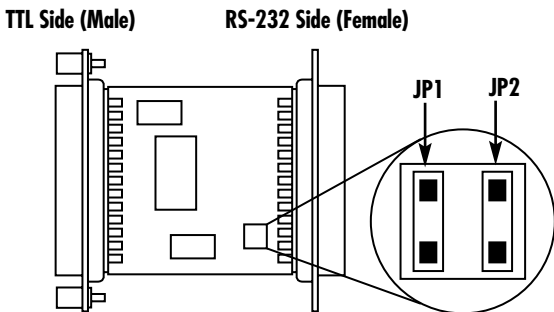
Then gently twist the screwdriver to pop the case open as shown in **Figure 3-2**. Be careful not to damage the case or connector as you twist the screwdriver.



**Figure 3-2.** Using a small screwdriver to open the TTL Converter case.

### 3.3 Changing the Jumper Straps

Once you have opened the case of the TTL Converter, you will see two jumper straps located on the top side of the PC board (see **Figure 3-3**).



**Figure 3-3.** Location of the TTL Converter's Jumper Straps.

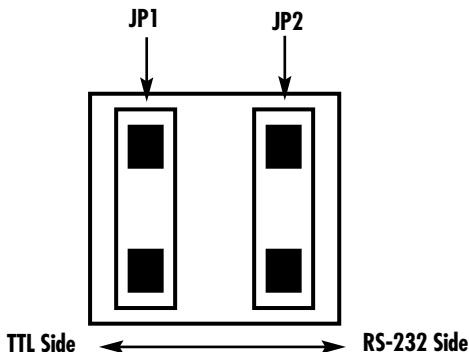
To change the jumper-strap settings, simply remove the jumpers and replace them on the jumper posts as described below.

## 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, you will **NOT** have to modify these settings.* Consult the user manual of the TTL device or the device's manufacturer before changing the settings on JP1 and JP2.

### *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 3-4** shows the relative signal levels.



**Figure 3-4.** Non-Inverted Data and Control Signal Jumpers.

Table 3-2. Non-Inverted Data and Control.

| Signal Level     | Data Signals | Control Signals |
|------------------|--------------|-----------------|
| 0 to 0.4 volts   | space        | active          |
| 2.4 to 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 3-5** shows the position of the jumpers on the PC board. **Table 3-3** shows the relative signal levels.

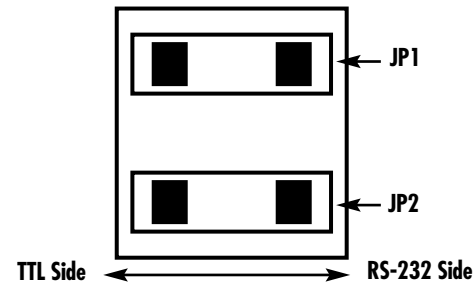


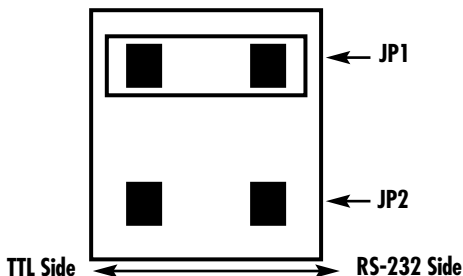
Figure 3-5. Inverted Data and Control-Signal Jumpers.

Table 3-3. Inverted Data and Control-Signal Jumpers.

| Signal Level     | Data Signals | Control Signals |
|------------------|--------------|-----------------|
| 0 to 0.4 volts   | mark         | inactive        |
| 2.4 to 5.0 volts | space        | active          |

*Inverted Data and Non-Inverted Control Signals*

Position JP1 horizontally on the jumper posts and remove JP2 to select inverted data and non-inverted control signals. **Figure 3-6** shows the position of the jumpers on the PC board. **Table 3-4** shows the relative signal levels.



**Figure 3-6.** Inverted Data and Non-Inverted Control-Signal Jumpers.

**Table 3-4.** Inverted Data and Non-Inverted Control-Signal Jumpers.

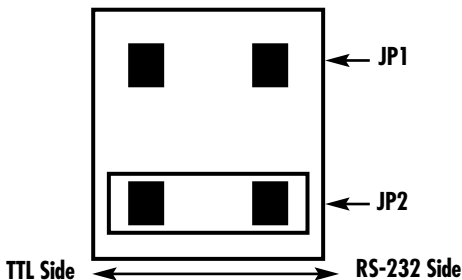
| Signal Level     | Data Signals | Control Signals |
|------------------|--------------|-----------------|
| 0 to 0.4 volts   | mark         | active          |
| 2.4 to 5.0 volts | space        | inactive        |



## *Inverted Control and Non-Inverted Data Signals*

Position JP2 horizontally on the bottom jumper posts to select inverted control and non-invert data signals.

**Figure 3-7** shows the position of the jumpers on the PC board. **Table 3-5** shows the relative signal levels.



**Figure 3-7. Inverted Control and Non-Inverted Data Signal Jumpers.**

**Table 3-5. Inverted Control and Non-Inverted Data Signal Jumpers.**

| Signal Level     | Data Signals | Control Signals |
|------------------|--------------|-----------------|
| 0 to 0.4 volts   | space        | inactive        |
| 2.4 to 5.0 volts | mark         | active          |

## 4. Installation

The TTL Converter is very simple to install. Just plug it in like a normal cable and you're ready to go.

### NOTE

The TTL Converter uses a DB25 female connector on the RS-232 interface and a DB25 male connector on the TTL Interface.

### CONNECTING THE TTL CONVERTER

Connect the 25-pin male port (TTL side) directly to a TTL DCE device. Connect the 25-pin female port (RS-232 side) of the TTL Converter to an RS-232 DTE device using a straight-through cable of the shortest possible length (less than 50 feet). **Figure 4-1** shows the typical application of the TTL Converter.

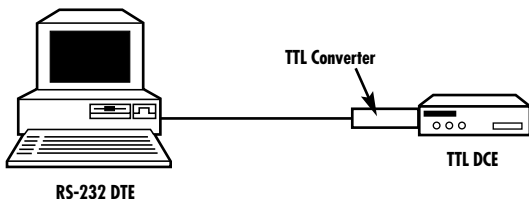


Figure 4-1. Connecting the TTL Converter.

## Appendix A: Interface Pin Assignments

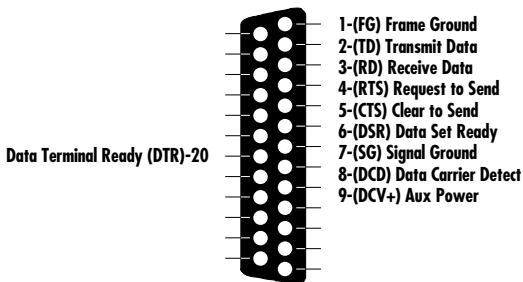


Figure A-1. RS-232 Interface.

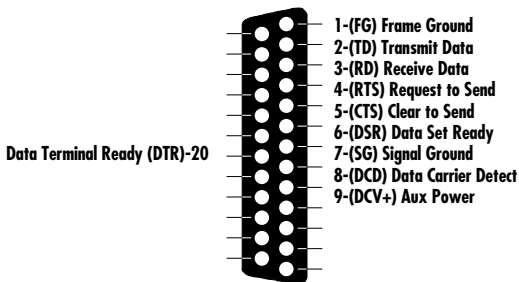
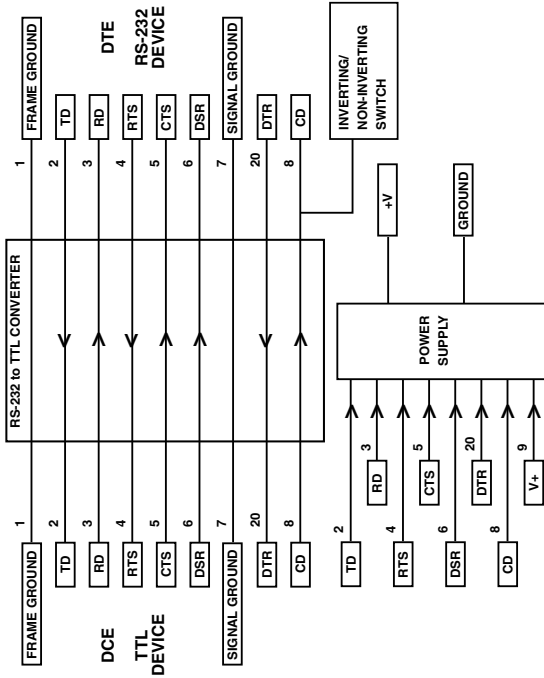


Figure A-2. TTL Interface.

# Appendix B: Block Diagram





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