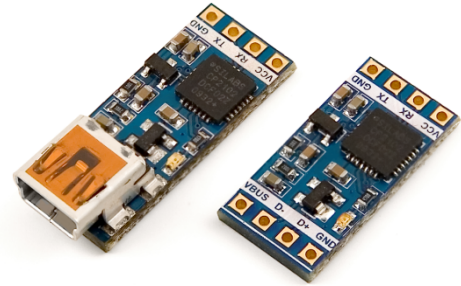




Interface Module UART to USB Serial Bridge Adapter

Features

- Input Logic: 2V to 5V (TTL Compatible)
- Utilizes Low Profile SMT Components
- Virtual COM port drivers (Windows, Mac, and Linux)
- Software configurable data, stop, and parity bits
- Fully Compliant with USB 1.1/2.0 Specification
- USB Certified CP2102 USB to UART transceiver
- LED USB Connectivity Indicator
- Small Footprint:
 - Without Connector: 0.4" x 0.8" (10.16mm x 20.32mm)
 - With Connector: 0.4" x 1.04" (10.16mm x 26.5mm)



Applications

- Easily Update RS-232 designs to support USB
- Power Embedded Projects via USB
- Add USB I/O capabilities to existing Devices via Virtual COM port
- Access UART Serial Devices from Host PC with existing COM Port applications
- Great for Robotics and RC applications with strict weight and space limitations

Typical Application

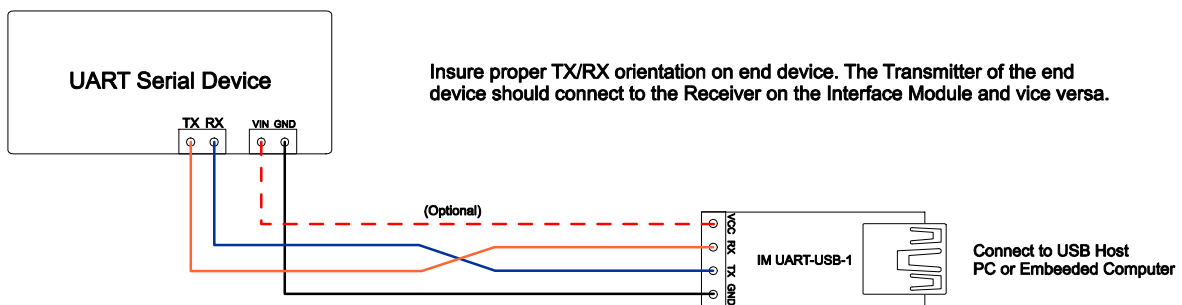


Figure 1 - Connecting IM UART-USB to a UART Serial Device

Part Description

Overview

The UART to USB Interface Module is designed to simplify interfacing serial based devices to USB host computer systems. This USB-powered module can be interfaced to micro-controllers and other serial devices running at logic levels from 2V up to 5V. The module simplifies interfacing as it removes the need for traditional RS-232 level converters.

Its small footprint is designed to fit easily in existing robotics and/or RC projects and is available with or without the USB Mini-B connector.

The VCC pin can be used to power micro-controllers and other electronics directly from the USB bus with no additional power sources. The device is built in strict accordance to the USB specification and operates safely on all USB 1.1 and 2.0 compliant host systems including PCs and embedded computers.

Design Considerations

Many UART to USB and Serial to USB adapters are bulky and take up a lot of space with many pins. There are many applications out there that only require the TX and RX pins of a UART line and can therefore be accomplished with a much simpler device with fewer pinouts.

In these simplified applications it may be desirable to power the device from a USB host system. Pulling power from the USB host system is straight forward but requires certain precautions to protect the host system from erratic device behavior. Therefore, this device was built with exacting measures to the USB specification. Proper avalanche diodes and power-down circuitry allow this device to take full advantage of USB bus power while still operating safely within the specifications. While few other USB bridge devices go to this extent, this uncompromising design insures that the Revolution Robotics Interface Modules are robust and reliable.

Part Information

Absolute Maximum Ratings

Stresses at or above those listed may cause permanent damage to the device. These ratings represent a stress rating only, and functional operation of the devices at or exceeding these conditions is not implied. Exposure to maximum rating conditions for extended periods may reduce the operating life and affect device reliability.

Absolute Maximum Input Voltage:	5.8V
Operating Temperature Range:	-55° C to 125° C
Storage Temperature Range:	-65° C to 150° C
Maximum Total Current:	500mA (USB specification)
Board Dimensions WC:	0.4" x 1.04" (10.16mm x 26.5mm)
Board Dimensions NC:	0.4" x 0.8" (10.16mm x 20.32mm)
Mounting Screws Holes:	2-56 (Fits Metric M2 & M2.2)

Global DC and I/O Electrical Characteristics

Parameter	Conditions	Min	Typ	Max	Units
VCC Supply Voltage (USB spec)		4.75	-	5.25	V
VCC Supply Current		-	20	26	mA
Operating Temperature Range		-40		+85	°C
Output Logic High Voltage	I _{OH} = -4mA	2.6	-	-	V
	I _{OH} = -10uA	3.2	-	-	
	I _{OH} = -10mA	-	2.5	-	
Output Logic Low Voltage	I _{OL} = 8.5mA	-	-	0.6	V
	I _{OL} = 10uA	-	-	0.1	
	I _{OL} = 25mA	-	1.0	-	
Input Logic High Voltage		2.0	-	-	V
Input Logic Low Voltage		-	-	0.8	V
Input Leakage Current		-	25	50	uA

Pinout Definitions

Name	Type	Description
VCC	Power Out	Connected to VBUS via FET to disconnect power during USB suspend state.
RX	Digital IN	Asynchronous Data Input (UART Receiver).
TX	Digital OUT	Asynchronous Data Output (UART Transmitter)
GND		Ground
VBUS ¹	Power IN	USB Bus Voltage Input from HOST
D- ¹	Digital I/O	USB D-
D+ ¹	Digital I/O	USB D+

¹ Pinouts only on No Connector versions (SI UART-USB-NC-#).

Application & Usage Information

Usage

The Interface Module can be connected to any UART serial device with TTL compatible logic levels using 3 wires. Refer to Figure 1 for a wiring diagram.

Connect the TX pin of the serial device to the RX pin of the Interface Module, and the RX pin of the serial device to the TX pin on the Interface Module. It is necessary to cross these cables because the signals are directional and relative to each device. Think about it as the Transmitter (TX) of one device being received by the Receiver (RX) on the other end and vice versa.

To achieve proper signal levels, the device must have a common ground. Connect the GND pin on the Interface Module to the ground pin of the serial device. Typically this would be the same GND pin used by the power supply input as indicated in Figure 1.

Some applications may inadvertently label their TX/RX backwards to show how to connect it to an end device. Interpret the directionality of these I/O pins and connect the device according to the guidelines above.

To power the remove device using USB power, simply use the VCC pin to connect the VIN of the end device. In applications requiring 5V with a +/- 5% supply, the VCC pin can directly power the target, otherwise DC regulation may be necessary. Most USB compliant devices will easily handle loads up to 100mA. The USB bus specification allows up to 500mA of power to be drawn per USB device. Check with the HOST device to make sure it is capable of supplying the full load. If an external hub is used, it may be necessary to power it with an external power adapter.

The device can be tested easily by jumpering the TX and RX lines and opening up a serial terminal to the device. Any data sent will be echo back to the terminal.

PC Interface and Drivers

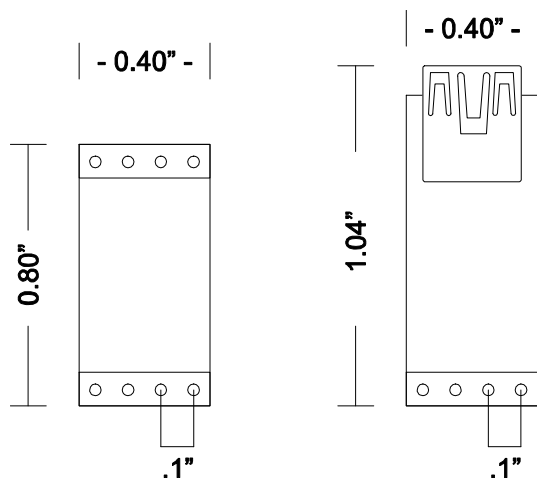
Most operating systems will see this device as a generic virtual com port and will work without additional drives. Simply plug-in the device's USB to the host system and wait for the USB indicator LED to turn green.

If the system is unable to find drivers, they can be downloaded from the Silicon Labs website. The link to the drives can be found here: http://www.revolution-robotics.com/im_uart-usb-1

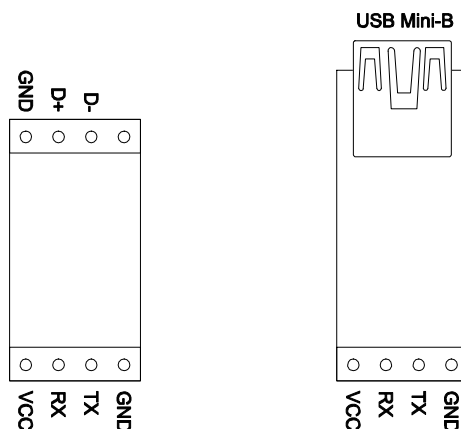
For additional usage information or application specific concerns, please contact our support staff, post a question on the support forums, or see the Silicon Labs website.

Package Description

Board Dimensions



Board Pinout



Ordering Information

Part No.	Ordering Code	Part Description	Price (Single)
IM UART-USB-WC-1	IMUARTUSBWC1	Interface Module UART to USB Bridge with USB Mini-B Connector	14.95
IM UART-USB-NC-1	IMUARTUSBNC1	Interface Module UART to USB Bridge without Connector	14.95

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