

The LabRecon Breadboard Experimenter provides the convenience of a 5V regulated power supply, a USB, Bluetooth, or RS-232 interface and a

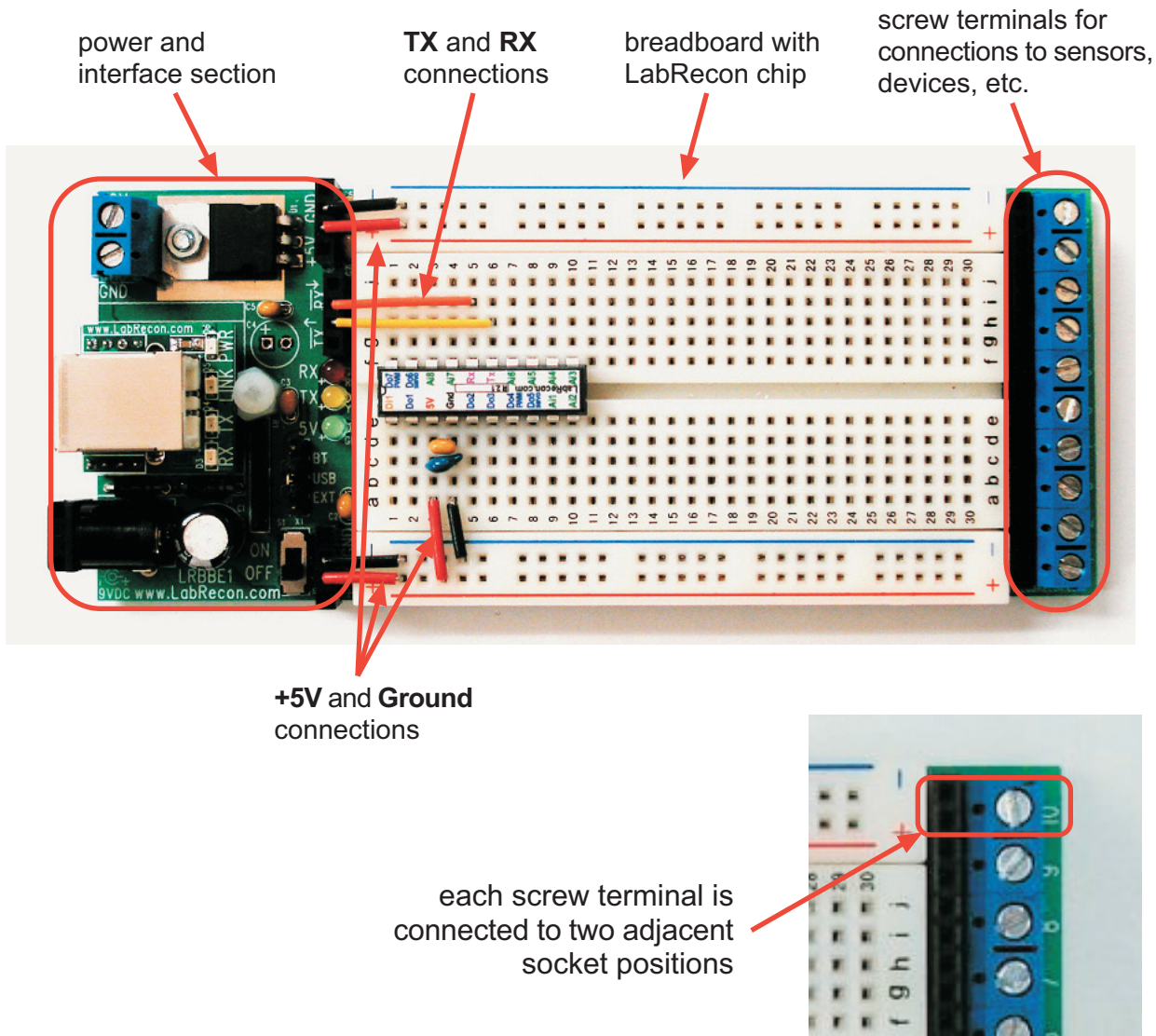
solderless breadboard.

This document covers the connection options, features, and usage.

Many additional documents and tutorial videos are available at the below two links.

[www.LabRecon.com/Documents.html](http://www.LabRecon.com/Documents.html)

[www.LabRecon.com/Videos.html](http://www.LabRecon.com/Videos.html)



### USB Connection Option

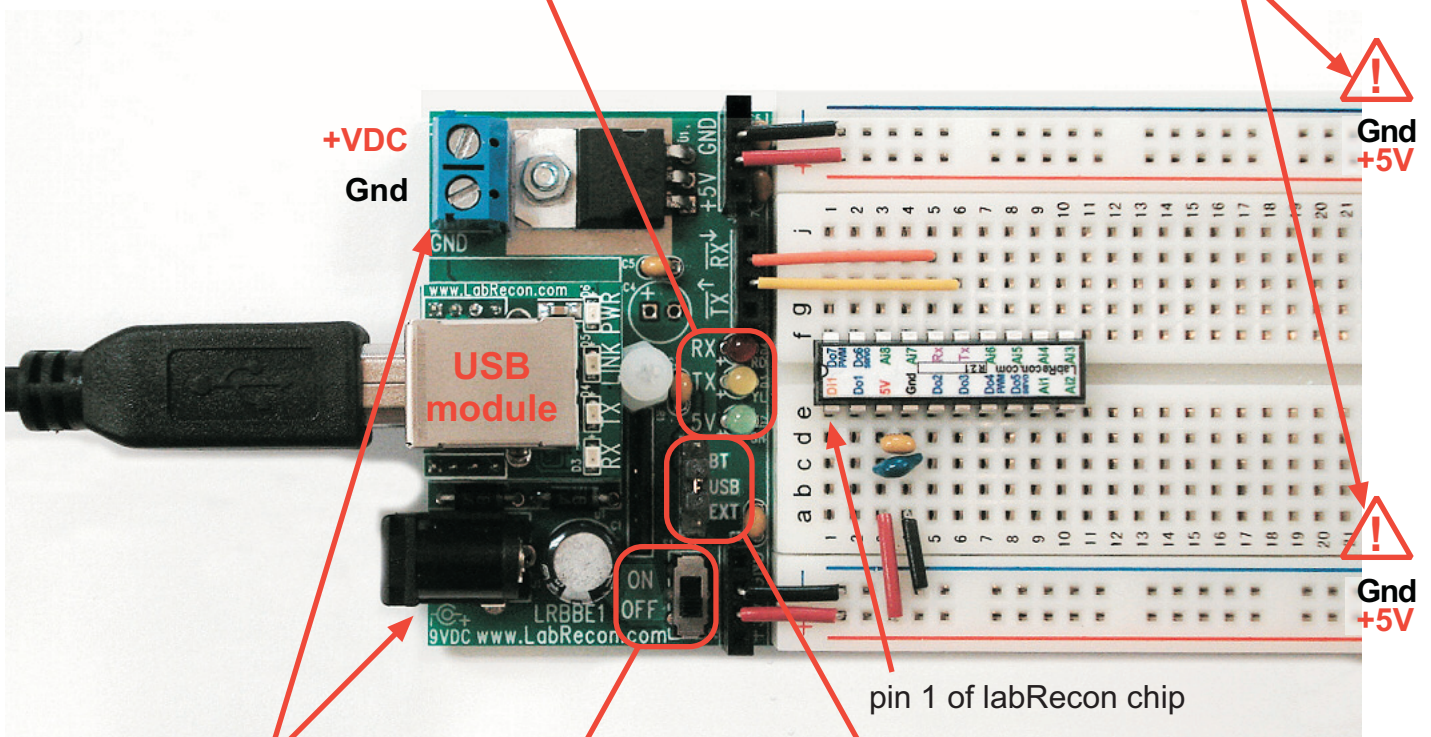
With the USB module installed, a USB connection between the LabRecon chip and the computer can be established. The board can be powered from the USB bus (<500mA) or from a 9-12VDC source.

The USB module uses a FT232R chip from FTDI. The VCP (Virtual Com Port) driver from FTDI will create a COM port on the PC, when the board is connected to the PC.

Dagnostic LEDs:

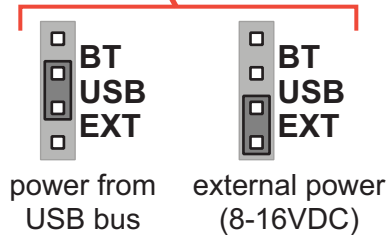
- Red (RX) = Data Received from PC
- Yellow (TX) = Data Transmitted to PC
- Green (5V) = Power

The **Gnd** and **+5V** rows can be used for connections or breadboard components. Insure using the proper row when doing so.



Power (8 to 16 VDC) can be supplied either with the 2.1mm jack (center pin is +) or the screw terminals.

Power switch (for 8-16VDC power)



Install jumpers for desired power source. See **Power Source Notes** below.

#### Power Source Notes:

Power from a USB port has a **500mA limit** and its 5V voltage can drop due to wire resistance and unpowered USB hubs. For higher current or a better regulated 5V, external (8 to 16VDC) power should be used. When using external power, it is best to use **9VDC** to limit power dissipation of the regulator when drawing currents greater than **300mA**. The LM7805 linear regulator has a **1A limit** and a high temperature cutoff. Each DC power input is reverse polarity protected with its own diode. When powering the board with the DC power jack, the DC power connector cannot be used for power out due to its diode.

### Bluetooth Connection Option

With the Bluetooth module installed, a wireless connection between the LabRecon chip and the computer can be implemented.

The module is always in the “discoverable mode” to allow it to be found when a search for Bluetooth devices is done from the PC. It implements a SPP (Serial Port Protocol) service and will show as a serial port (COM port) on the PC.

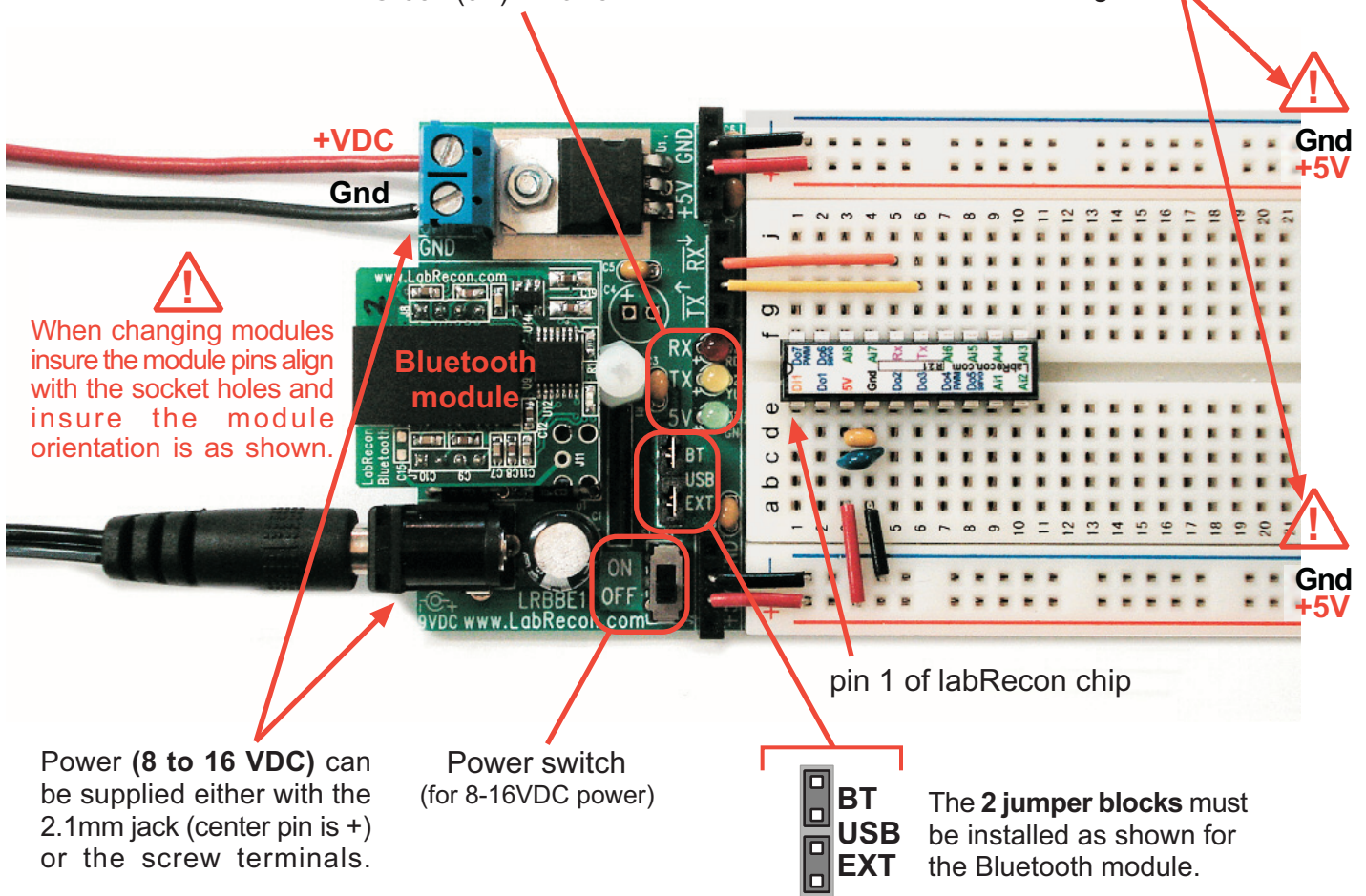
The module must be "paired" with the PC's Bluetooth adapter using the Bluetooth software (stack) provided by the manufacturer of the Bluetooth adapter or the PC. A default password of 0000 may be requested.

There may be multiple COM ports. The Bluetooth software should indicate the COM Port used for the present connection.

Dagnostic LEDs:

- Red (RX) = Data Received from PC
- Yellow (TX) = Data Transmitted to PC
- Green (5V) = Power

The **Gnd** and **+5V** rows can be used for connections or breadboard components. Insure using the proper row when doing so.



When changing modules insure the module pins align with the socket holes and insure the module orientation is as shown.

Power (8 to 16 VDC) can be supplied either with the 2.1mm jack (center pin is +) or the screw terminals.

Power switch (for 8-16VDC power)

pin 1 of labRecon chip



The 2 jumper blocks must be installed as shown for the Bluetooth module.

#### Power Source Notes:

It is best to use 9VDC to limit power dissipation of the regulator when drawing currents greater than 300mA. The LM7805 linear regulator has a 1A limit and a high temperature cutoff.

Each DC power input is reverse polarity protected with its own diode. When powering the board with the DC power jack, the DC power connector cannot be used for power out due to its diode.

## Troubleshooting for **USB connections:**

### **Power:**

The **green “5V” LED** should be on when the board is properly powered. If not:

Was the USB driver (FTDI VCP) installed correctly?

Is 5V being shorted to Gnd on the breadboard?

If using 8-16VDC power:

Is the power polarity (+ and -) correct as marked on the board?

Is the power switch on?

### **USB connection:**

The **red “RX” LED** should be blinking when receiving data from the computer. If not:

Is the LabRecon software running and is the proper COM port selected?

### **Chip Communications:**

The **yellow “TX” LED** should be blinking quickly when transmitting data to the computer. If not:

Is 5V and Gnd connected to the chip as shown in the photo?

Is 5V and Gnd connected to the breadboard rails as shown in the photo?

Is RX and TX connected to the chip as shown in the photo?

Is pin 2 (Do1) connected to Gnd through a resistor or transistor? The pin cannot have a current path to ground when power is applied to the chip.

## Troubleshooting for **Bluetooth connections:**

### **Power:**

The **green “5V” LED** should be on when the board is properly powered. If not:

Is the power polarity (+ and -) correct as marked on the board?

Is the power switch on?

Is 5V being shorted to Gnd on the breadboard?

### **Bluetooth connection:**

The **red “RX” LED** should be blinking when receiving data from the computer. If not:

Is the Bluetooth connected and paired using the Bluetooth software on the computer?

Is the LabRecon software running and the proper COM port selected?

Is the board too far from the computer? The Bluetooth module is a Class 2 device with a maximum distance of 30 feet.

### **Chip Communications:**

The **yellow TX” LED** should be blinking quickly when transmitting data to the computer. If not:

Is 5V and Gnd connected to the chip as shown in the photo?

Is 5V and Gnd connected to the breadboard rails as shown in the photo?

Is RX and TX connected to the chip as shown in the photo?

Is pin 2 (Do1) connected to Gnd through a resistor or transistor? The pin cannot have a current path to ground when power is applied to the chip.

**Additional Documents ( [www.LabRecon.com/Documents.html](http://www.LabRecon.com/Documents.html) ):**

LabRecon - Getting Started with Measurements (rev1).pdf  
LabRecon - Getting Started with Robotics.pdf  
LabRecon - Measurement Configuration.pdf  
LabRecon - Photovoltaics.pdf  
LabRecon - Reflow Oven PID Control.pdf

**Instructional Videos:**

[www.LabRecon.com/Videos.html](http://www.LabRecon.com/Videos.html)

**Revisions to this Document**

Rev 0	Initial release

**Support**

[www.LabRecon.com/Support.html](http://www.LabRecon.com/Support.html)  
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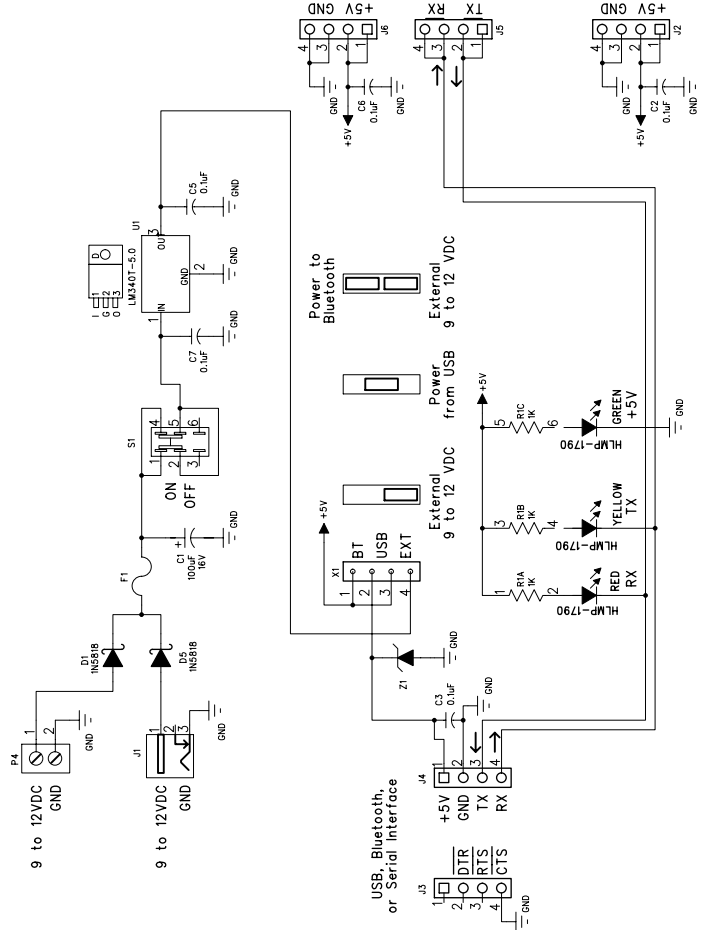
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**Breadboard Experimentor**

DRAWING	DATE	TITLE
J. BARBETTA	00/00/00	Breadboard Experimentor
ENG.	DATE	
J. BARBETTA	00/00/00	
QUALITY CONTROL	DATE	
J. BARBETTA	00/00/00	
LAST REV.	DATE	
J. BARBETTA	00/00/00	
CODE	SIZE	DRAWING NO.
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