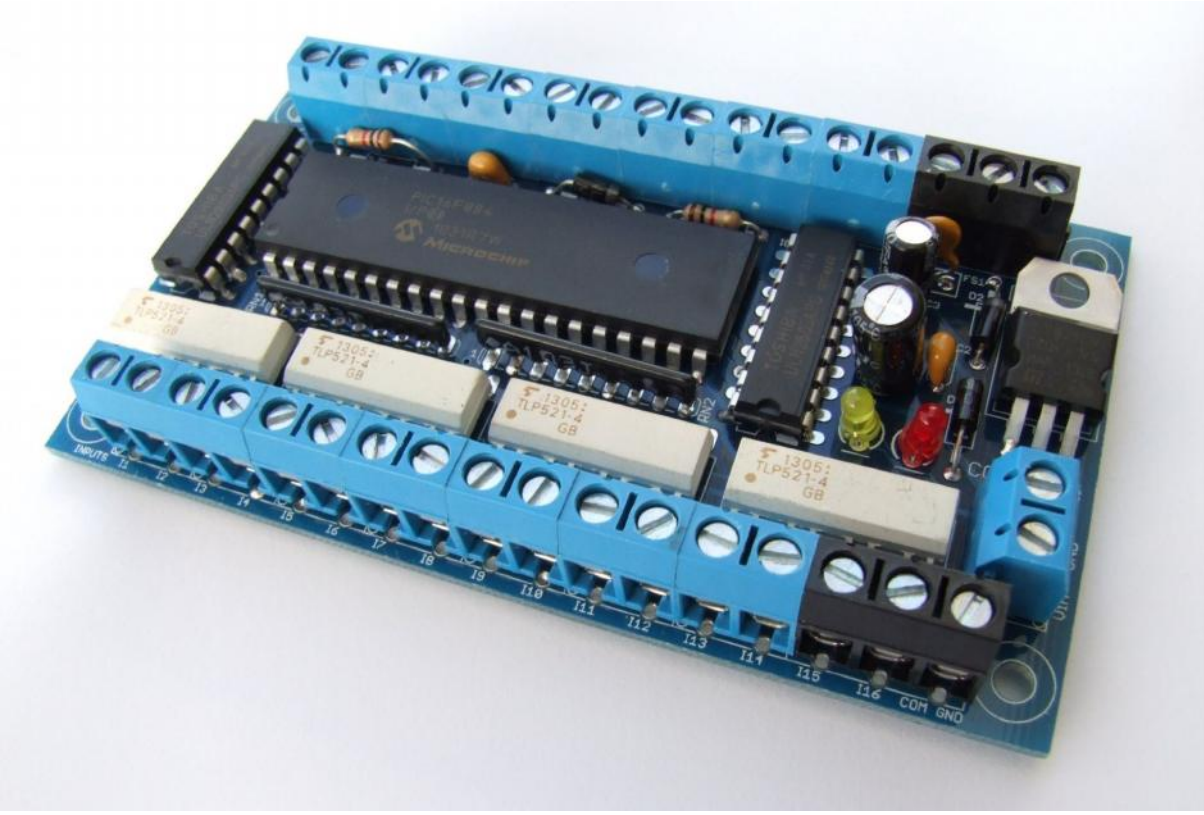
BLOCKsignalling

www.blocksignalling.co.uk

Points Position Indicator (PPI1) for Points Motors with Common Ground



Monitors Points Action and Operates Leds on a Control Panel

- Monitors the brief positive operating voltage across points motors when they are switched
- Lights a corresponding led on a control panel to show the last operation of each set of points
- Saves all settings automatically to memory when the power is switched off
- Monitors up to 8 sets of points
- Opto-isolated inputs accept voltages from +5V to +60V

The Points Position Indicator (PPI) monitors the brief switching voltage to either of the two coils of the points motor, and displays the last operation using coloured leds which can be mounted on a route mimic.

Manual methods use simple spring-loaded switches, push buttons, probe and stud, etc and the points coils have a common connection to the ground of the supply.

When they are driven from DCC Accessory decoders, the decoders most often provide a +12V supply to the common of the points coil, and then switch the other connections to the coils to ground to switch the points.

This PPI is designed for operation on systems where the coil common is GROUND.

Operation

The PPI has 8 channels, each channel with two inputs and two outputs.

The outputs each consist of a transistor which conducts to ground. These operate in a similar way to a switch contact, with one side connected to ground. Normally, these outputs will be used to light one or more leds, with the other side of the led connected to a positive voltage via a current limiting resistor.

Each channel also has two inputs. These inputs cause the associated output transistor to conduct when the input voltage rises above around 3V. Also, at this moment the other output is switched off.

In this way, only one of the output transistors conducts at any one time, that being the one with the most recent positive input voltage pulse. This means that only one of the route leds for each channel will be lit at any one time.

Each time an input change occurs, it is stored in memory, so that when the power is switched off and on again, the led outputs are set automatically to their last recorded condition.

Connecting the Unit

Simply connect one of the PPI input terminals to the end of one points motor coil, the other input to the end of the other coil, and the common of the coils to the COM GND input to the PPI.

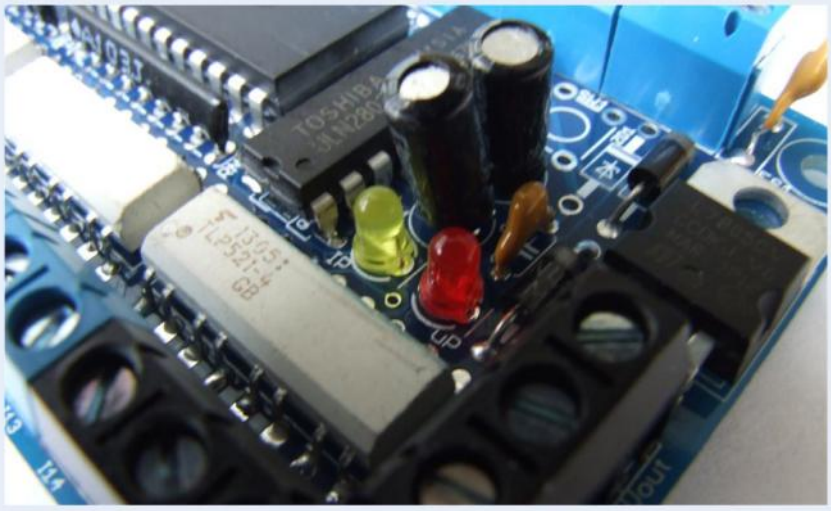
Only one connection from a coil common to the COM GND input of the PPI is required. This allows the coil voltages to be recognised by the PPI correctly against the ground reference.

The supply to the PPI can be AC or DC, and must be in the range of 9V to 16V for correct operation. If using a dc supply, take care to connect the positive and negative leads correctly. No harm will be done to the PPI if they are connected in reverse, but the PPI will not function.

If using a single led for each output, a 1k resistor is required connected between the Vout terminal and the long leg of the leds.

Only one resistor is required per channel, as both leds are never on at the same time during normal operation.

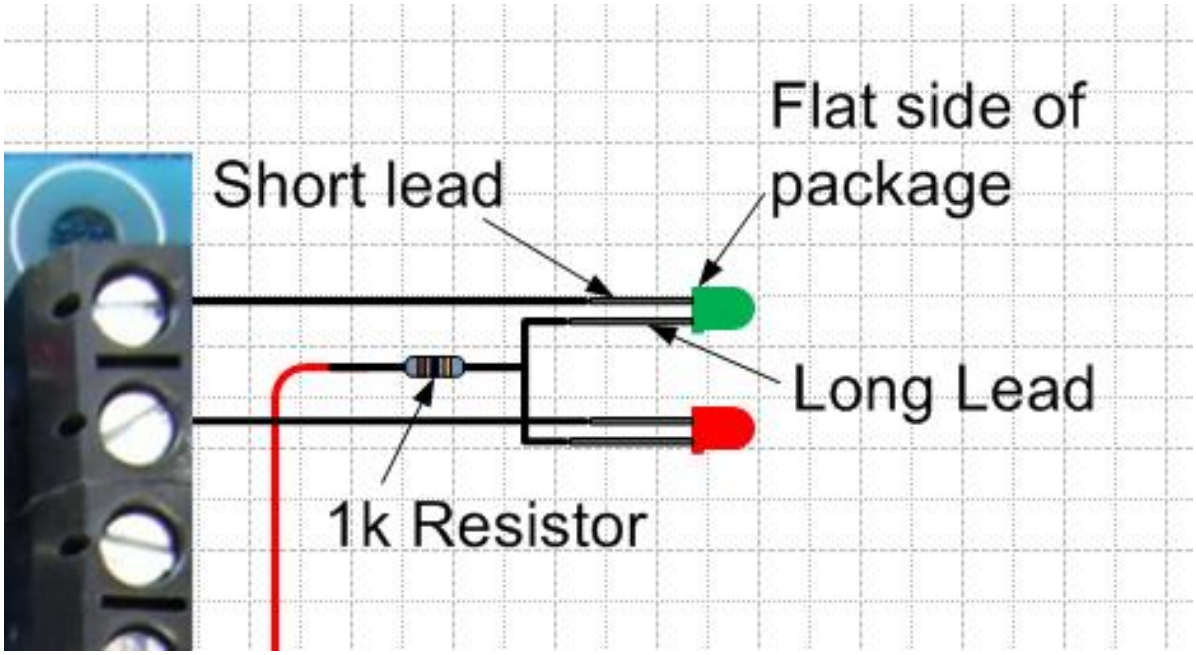
When powering up, the uP (red) led on the pcb will light for a quarter of a second, go off and then come back on steady. Each time a point is operated, the IP (yellow) led flashes to confirm the input signal. If the points position has changed, the (red) uP led on the flashes to indicate that the updated status has been stored in memory.



YELLOW LED (IP)– flashes when points change appears on any input terminal

RED LED (uP) – flashes when microprocessor records change in any points position from that held in memory

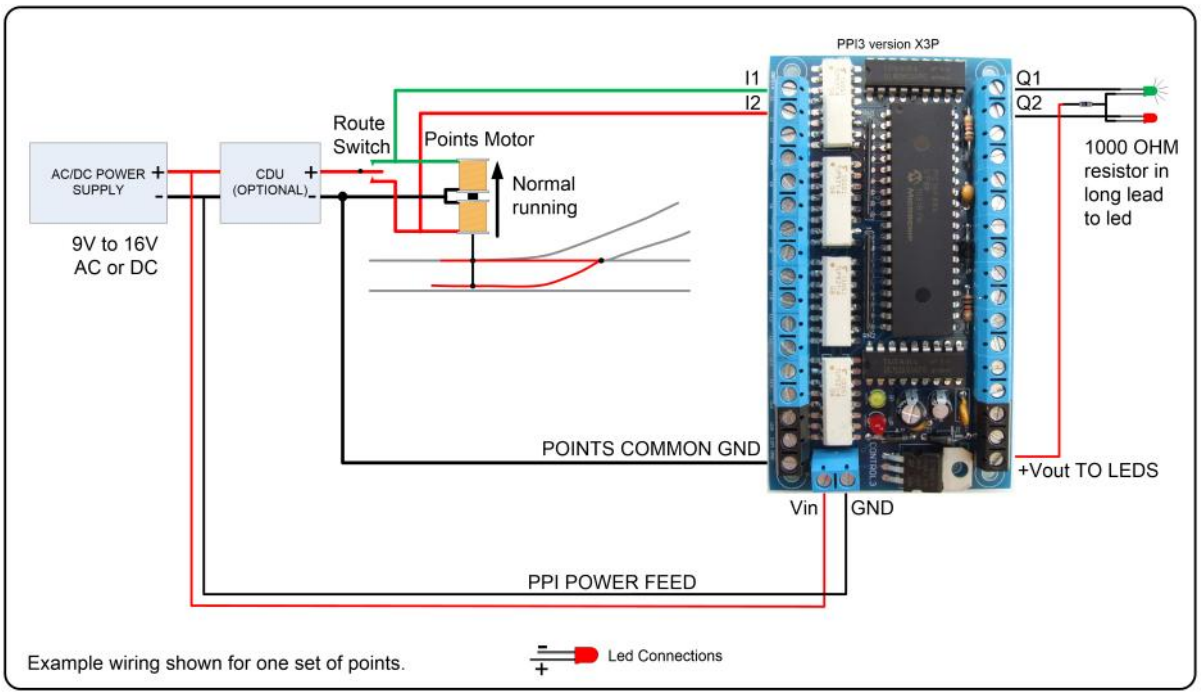
If using a single led for each output, a 1k resistor is required, connected between the PPI positive output, and the long leg of the leds.



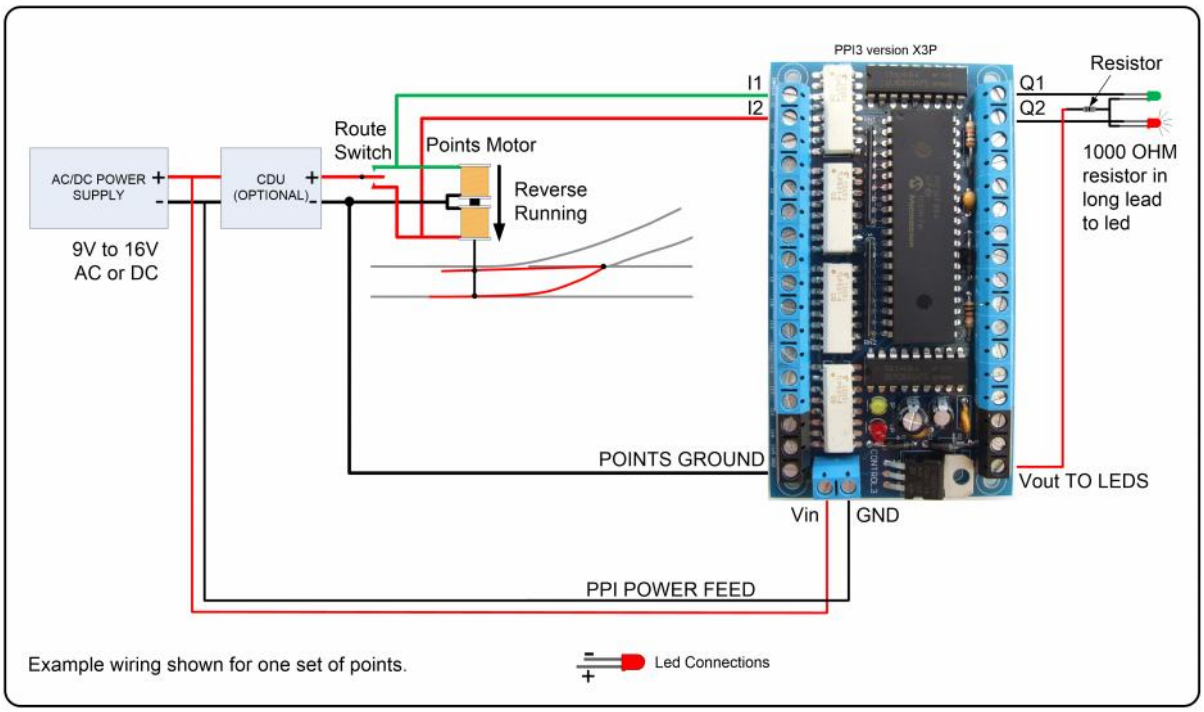
Following factory testing, sometimes more than one led will be lit. This will clear as soon as each set of points are first operated.

If your points operate from a supply above 16V, the PPI can be powered from a separate supply (12V DC recommended).

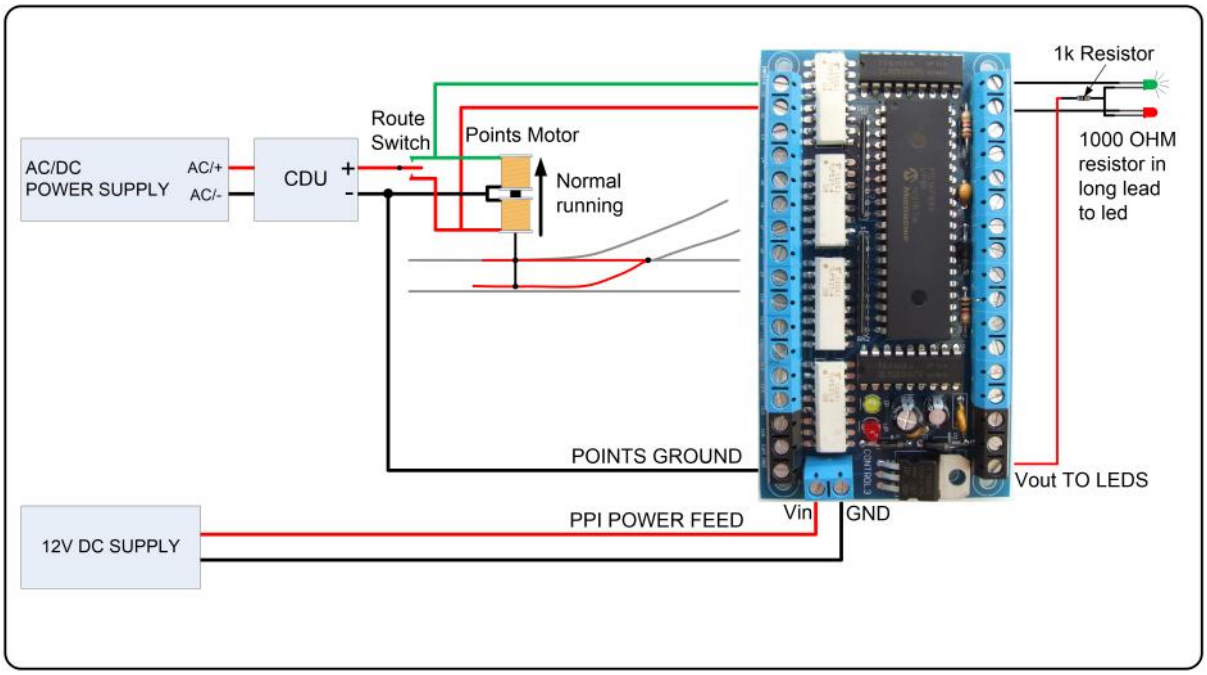
System Operation – Normal Running



System Operation – Reverse Running

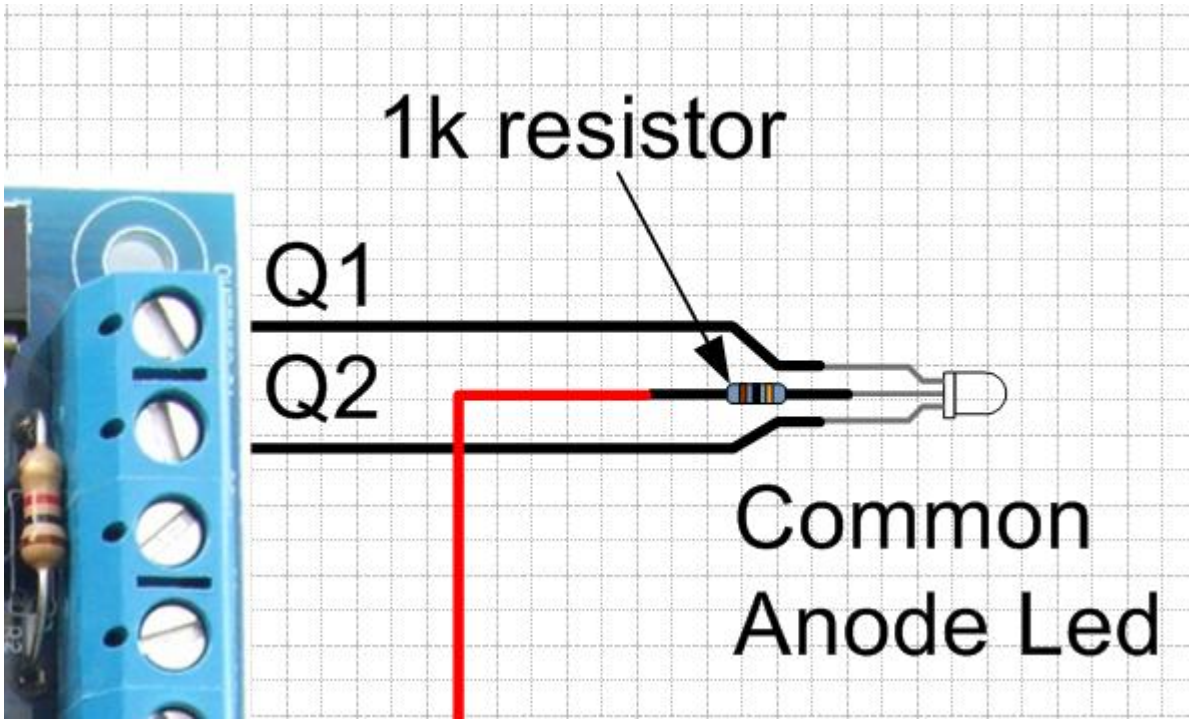


System Operation – with separate power supplies for points and PPI.



Other Ideas

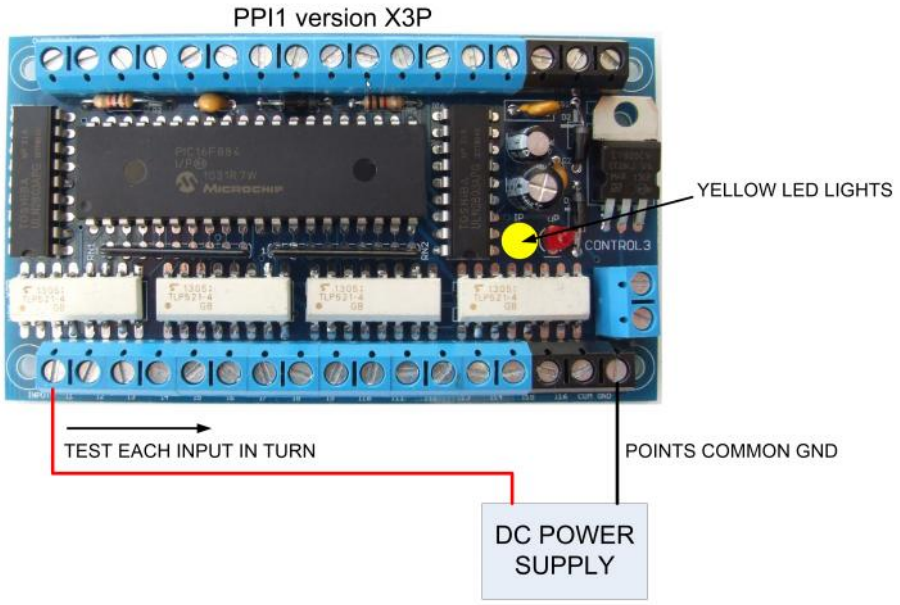
System Operation – with Dual colour Leds



Troubleshooting

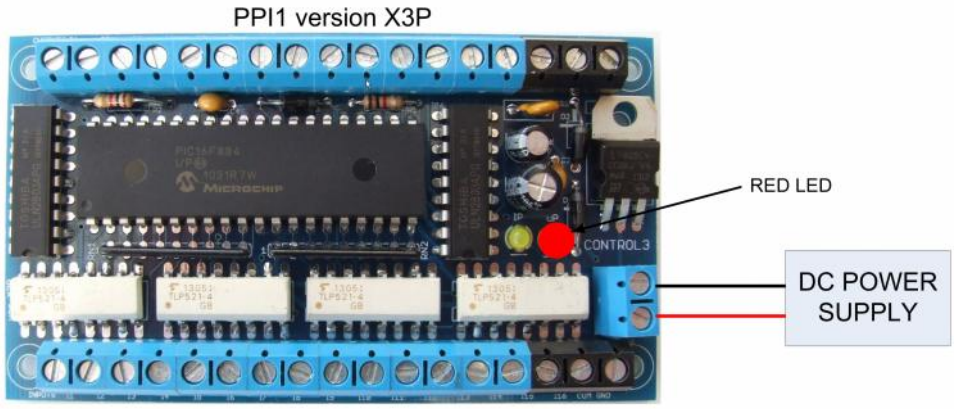
The following diagrams show four tests which can be conducted to determine if the PPI is operating correctly.

TEST 1 – INPUT TEST



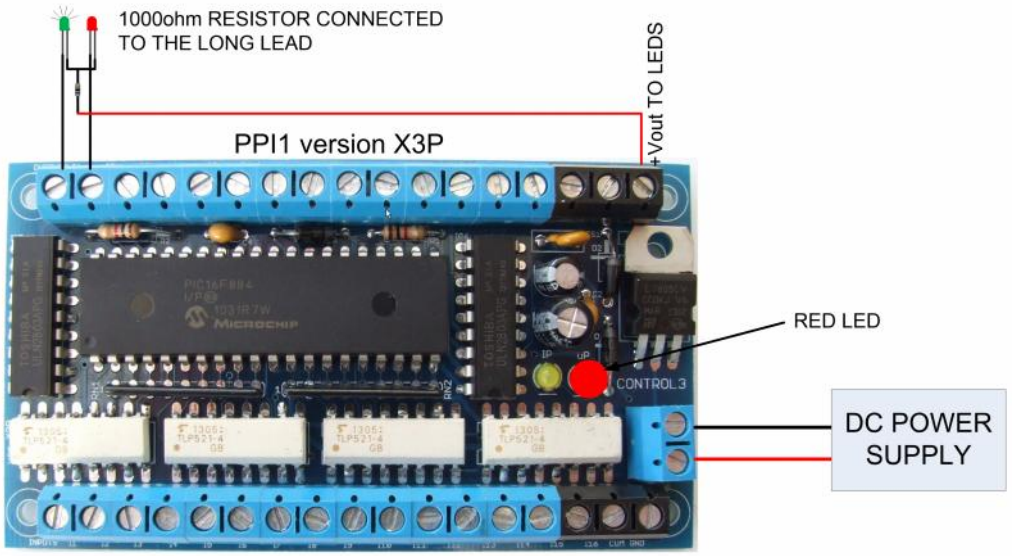
1. CONNECT DC POWER SUPPLY (RECOMMENDED AROUND 12V)
2. GROUND (NEGATIVE) SIDE MUST BE CONNECTED TO COMMON GROUND
3. WHENEVER POSITIVE IS CONNECTED TO AN INPUT (I1, I2, I3.. ETC) THE YELLOW LED ON THE PCB LIGHTS

TEST 2 – MICROPROCESSOR BASIC FUNCTION



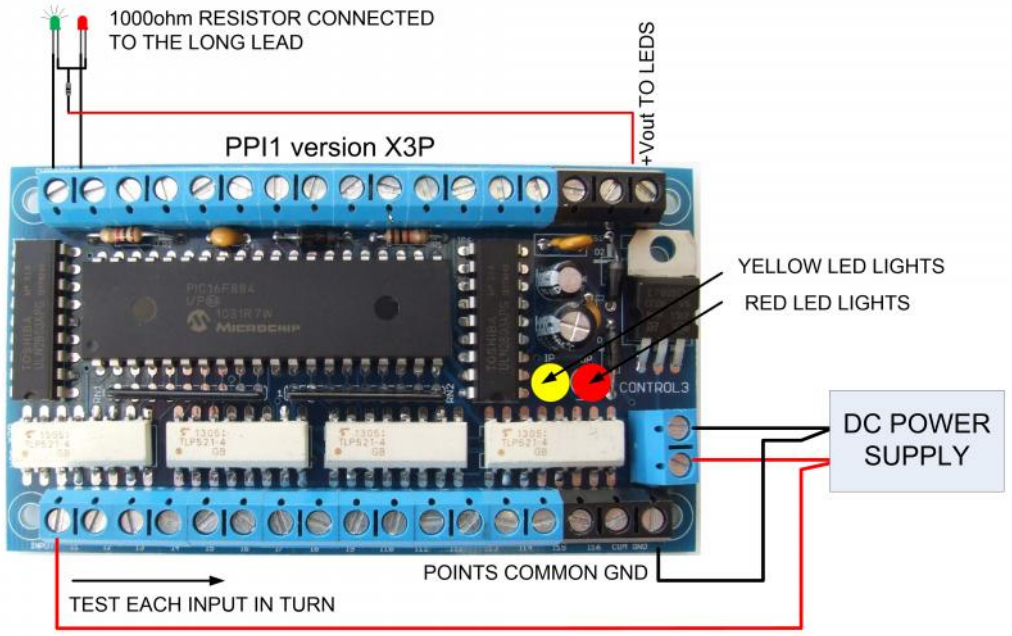
1. CONNECT DC POWER SUPPLY (BETWEEN 8V AND 16V)
2 RED LED ON THE PCB LIGHTS AFTER 1 SECOND

TEST 3 – OUTPUT TEST



1. CONNECT DC POWER SUPPLY (BETWEEN 8V AND 16V)
2. RED LED ON THE PCB LIGHTS AFTER 1 SECOND
3. ONE OR BOTH OF THE CONNECTED LEDS LIGHTS

TEST 4 – FULL TEST



1. CONNECT UP POWER SUPPLY AND LEDS ON THE OUTPUT AS IN TEST 3
2. CONNECT DC 0V (GROUND) TO POINTS COMMON GROUND
3. ONE OR BOTH OUTPUT LEDS WILL BE ON
4. MOVE INPUT FROM I1 TO I2
5. RED LED WILL BRIEFLY GO OUT
6. Q2 LED WILL LIGHT. Q1 LED WILL EXTINGUISH
7. MOVE INPUT FROM I2 TO I1
5. RED LED WILL BRIEFLY GO OUT
6. Q1 LED WILL LIGHT. Q2 LED WILL EXTINGUISH
7. REPEAT FOR OTHER PAIRS OF LEDS (ONLY ON PAIR SHOWN IN THE DIAGRAM ABOVE FOR CLARITY)