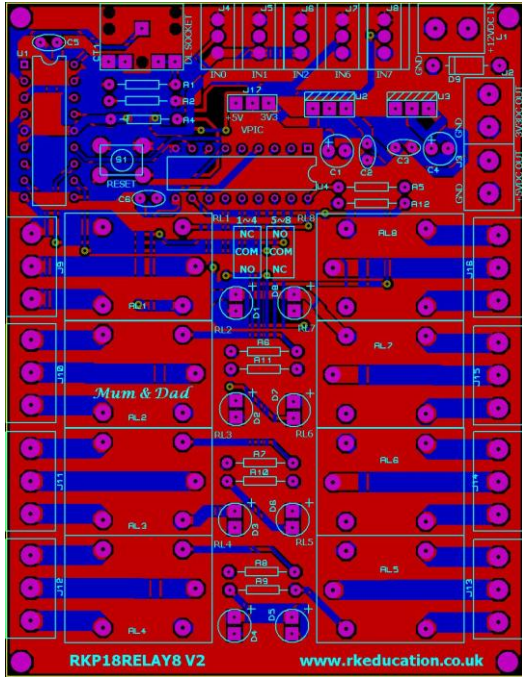
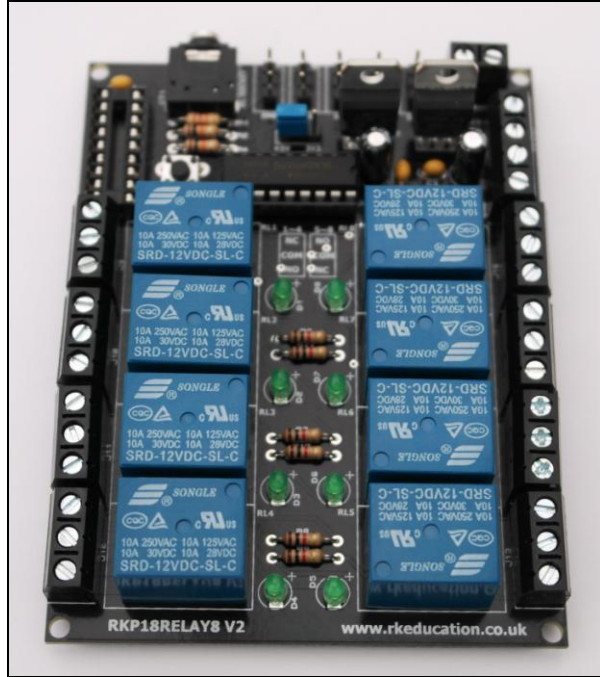


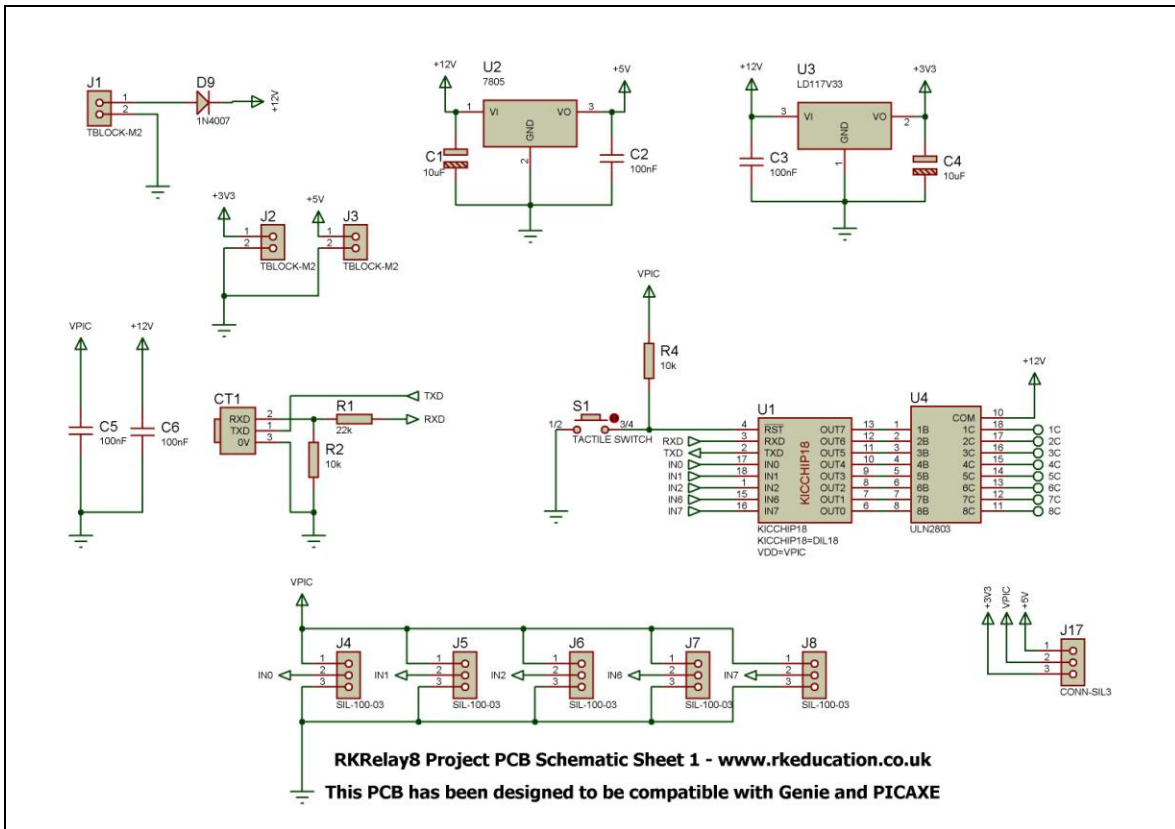
RKP18Relay8 V2 Component List and Instructions



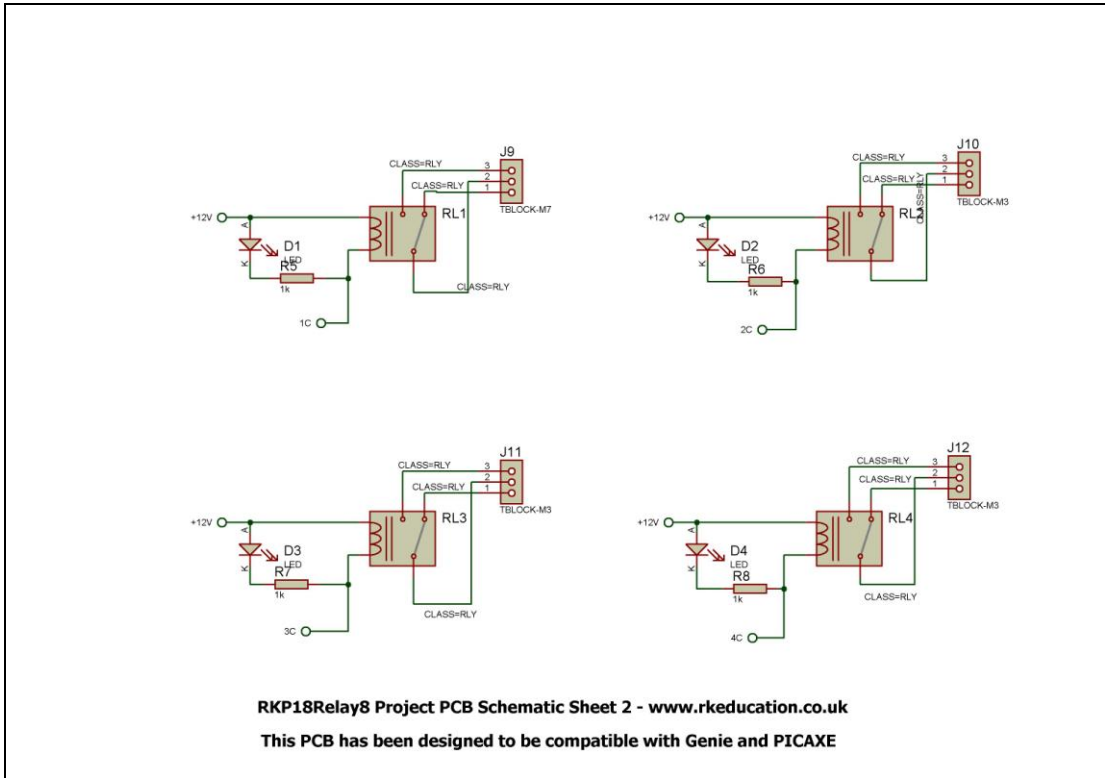
PCB layout



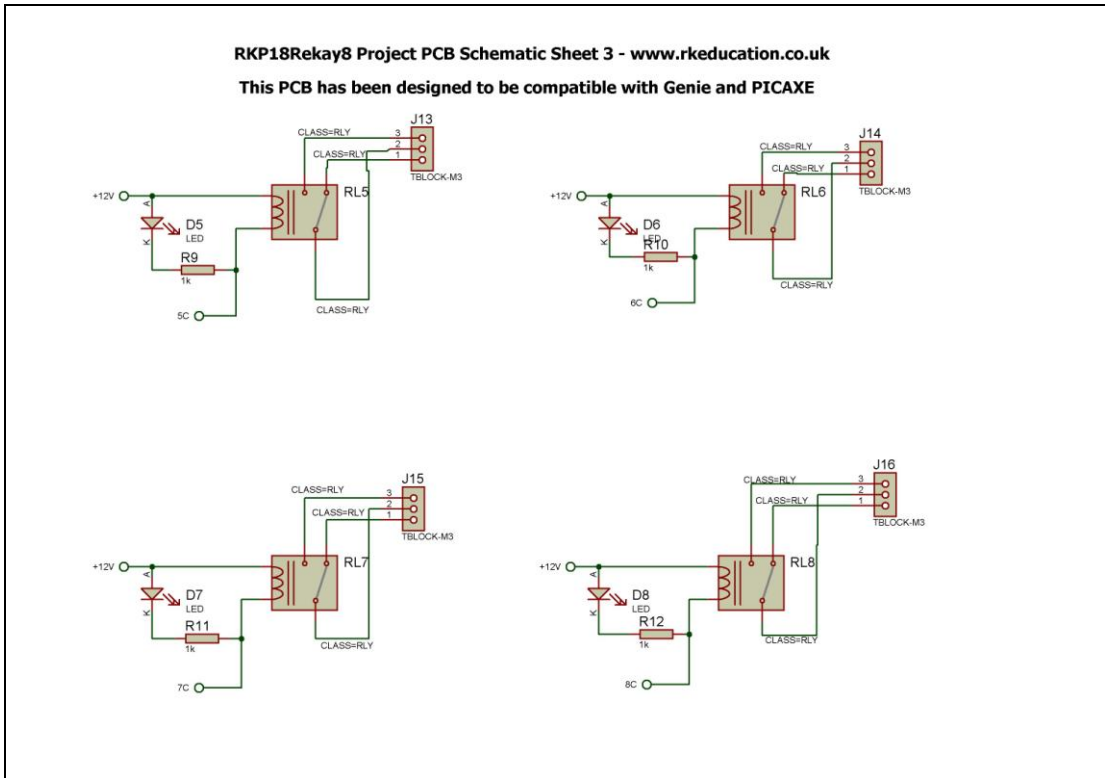
Constructed PCB



Schematic Sheet 1



Schematic Sheet 2



Schematic Sheet 3

Description

The RKP18Relay8 V2 project PCB has been designed to use PIC microcontrollers such as the Genie or PICAXE

- Software is downloaded from a PC into the microcontroller via a 3.5mm stereo socket
- The clock reference is from a the microcontrollers internal resonator
- 8 outputs are connected to PCB SPDT relays
- Each relay has an LED to show when it is energised
- 5 potential divider inputs
- Power is via a 2 way terminal block
- 5VDC input and 3V3DC regulated output
- The PCB has 4 mounting holes for sturdiness
- Thick tracks are used and extra thick where needed

Component List

J1 ~ J3 – 2 way 5mm pitch terminal block
J9 ~ J16 – 3 way 5mm pitch terminal block
J4 ~ J8, J17 – 3 way PCB header plugs
C1, C4 – 10uF electrolytic capacitor 16VDC
C2, C3, C5, C6 – 100nF multilayer ceramic capacitor
CT1 – PCB mount 3.5mm stereo connector (software download)
D1 ~ D8 – 3mm LEDs green (indicators)
D9 – 1N4007
R1 – 22k ¼ watt resistor (red red orange)
R2, R4 – 10k ¼ watt resistor (brown black orange)
R5 ~ R12 – 1k ¼ watt resistor (brown black red)
RL1 ~ RL8 – SPDT miniature PCB power relays
U1 – 18 way DIP socket with microcontroller e.g. Genie/PICAXE
U2 – 7805 voltage regulator TO220 package
U3 - LD1117V33 3V3 voltage regulator TO220 package
U4 – 18 way DIP socket with ULN2803
S1 - tactile switch

When constructing always start with the components that have the lowest profile and work higher, for example start with the resistors and end on the 7805 voltage regulator.

Instructions

For instructions on using your chosen microcontroller, e.g. Genie/PICAXE please see the appropriate website.

Please only attempt to use this product if you are qualified to do so, if in doubt please seek professional advice.

Connecting Power

The power is connected to the terminal block marked +12VDC IN, the 0V input, usually black is put in the left hand side terminal and the +VE, usually red, is put in the right hand side terminal, a regulated 12VDC 1Amp power supply or 12VDC battery should be used. The circuit incorporates 7805 and LD1117V33 voltage regulators and 5VDC and 3V3 is available at the terminal blocks +5VDC OUT and 3V3VDC OUT, a heat sink will need to be added to the regulators if a high current is required to prevent damage to the circuit.

There is a jumper on the PCB that allows the supply voltage to the MCU to be set at either 3V3 or 5V. The recommended default voltage is 5V.

Downloading software

Once the software has been written using the Genie/PICAXE Programming Editor (or equivalent) it can be downloaded into the Genie/PICAXE (or equivalent). This is downloaded using a download cable that connects either to your PC's serial port or USB port. Insert the download plug into the download socket and activate the program function in your Programming Editor. If all goes well it will tell you the program download was successful.

Using the relays

The relays are energised by powering the appropriate pin of the ULN2803 this is done by turning on the output pins outputs 1 ~8 on the microcontroller. When a relay is energised a click can be heard and when it returns to its non energised state a further click can be heard. The green LEDs near the relays provide a visual indication of when the relay is energised.

The relays are connected to the microcontroller in the following way,

PIN 6	OP0	RL8
PIN 7	OP1	RL7
PIN 8	OP2	RL6
PIN 9	OP3	RL5
PIN 10	OP4	RL4
PIN 11	OP5	RL3
PIN 12	OP6	RL2
PIN 13	OP7	RL1

Sending logic 1 or high to the transistor will turn on the relay.

Each relay has 3 connections that are located on the 3 way terminal block, they are called COM – common – pin 1, NC – normally connected – pin 2 and NO – normally open – pin 3. When the relay is not energised there is a circuit between COM and NC and when the relay is energised there is a circuit between COM and NO. To power a DC motor connect one lead to COM and one to NC, the motor will be powered until the relay is energised and the circuit changes to between COM and NO, if the motor leads were between COM and NO then this would be reversed.

Inputs Ip0 ~ Ip7

These are used as digital inputs and Ip0, they can also be used as analogue inputs, please see the information for your chosen MCU for more information. They are arranged as potential dividers with the +5VDC the lower pin and 0V the upper pin, the centre of the potential divider or output is the central pin. These inputs have been designed to accept a 3296 type potentiometer. No pull up or pull down resistors have been included and they will have to be added if needed.

They are connected to the microcontroller as follows,

ip0 – pin17
ip1 – pin18
ip2 – pin1
ip6 – pin15
ip7 – pin16

Please visit our website

www.rkeducation.co.uk

If you have any comments or queries please email us at

technical@rkeducation.co.uk

