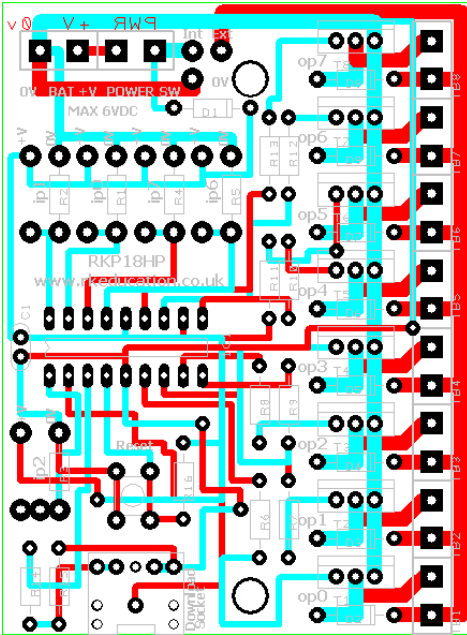
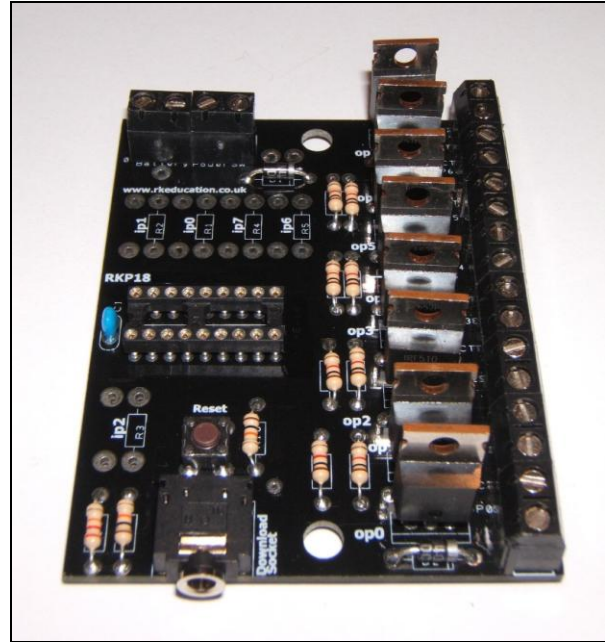


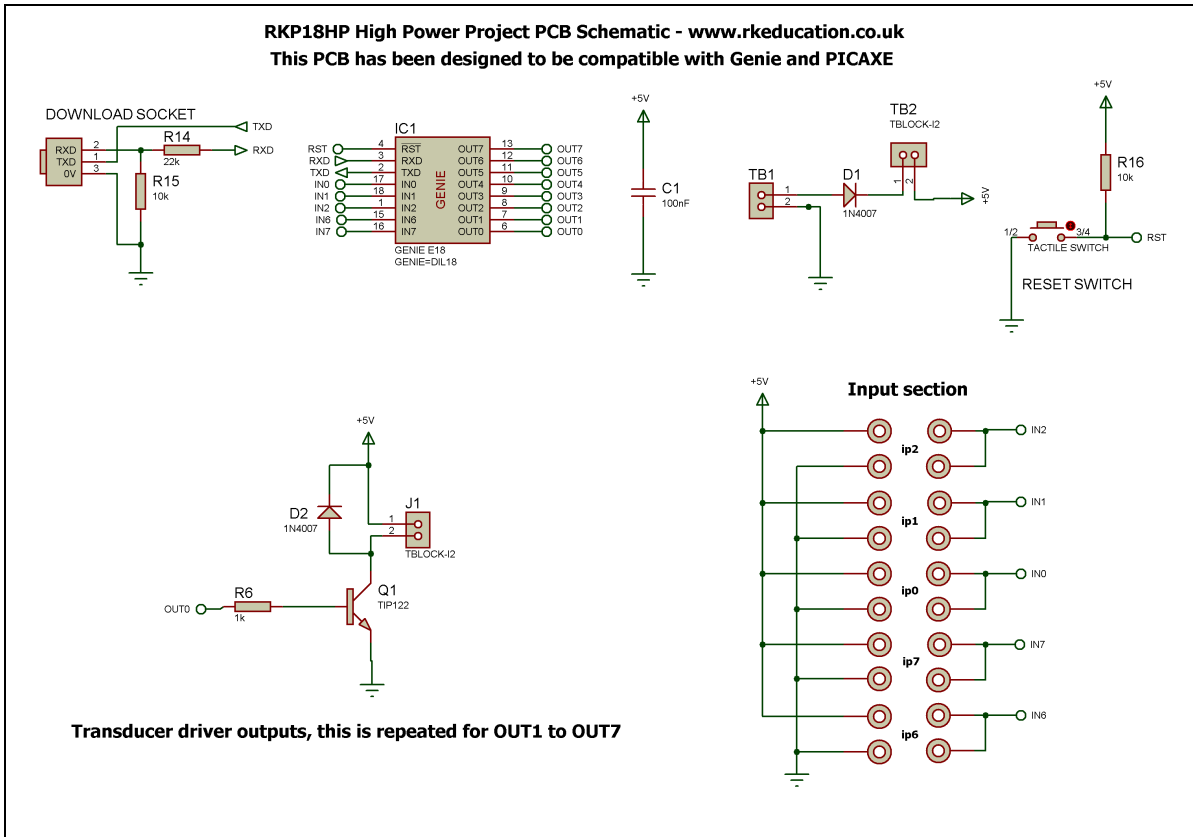
RKP18hp Component List and Instructions



PCB layout



Constructed PCB



Schematic

Description

The RKP18hp 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 high power TO220 outputs e.g. TIP122
- Power to the TO220s can either be from the main power supply or from an external source
- 5 potential divider inputs, 3 can be used as analogue
- 1 input can have a PCB mount potentiometer directly mounted

Component List

BAT & POWER SW - 2 way 5mm pitch terminal blocks

TB1 ~ TB8 - 3 way 5mm terminal block

C1 - 100nF multilayer ceramic capacitor

D1 ~ D9 - 1N4007

IC1 - 18 way DIP socket with microcontroller e.g. Genie

R6 ~ R13 - 1k brown black red

R14 - 22k red red orange

R15 & R16 - 10k brown black orange

RESET - PCB mounting tactile switch

Software download socket - PCB mount 3.5mm stereo connector

T1 ~ T8 - TO220 transistor or FET e.g. TIP122 or IRF510

Instructions

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

Connecting Power

The power is connecting the terminal block marked BAT, the 0V input, usually black is put in the left hand terminal and the +V, usually red, is put in the right hand terminal, a regulated 6VDC power supply should be used.

A power switch can be used and should be inserted into the terminal block marked POWER SW, if a power switch is not required short the terminals together

Power to the TO220 outputs can either be internal or external, if you want to use the internal supply, that is the +6VDC on the BAT terminal block, then short the pads marked Int and Ext together. If you want to use an external power supply connect the 0VDC to the 0V pad and the +VDC to the Ext pad, alternatively the 0VDC from the external power supply could be inserted into the 0V of the BAT terminal block.

Downloading software

Once the software has been written using the Genie Programming Editor (or equivalent) it can be downloaded into the Genie (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 high power TO220 outputs

The TO220s can be turned on by sending a +VE output from the microcontroller, by sending a logic 1 from the software to the appropriate output pin.

Each of the outputs has a back EMF protection diode and as such a DC motor can easily be added, simply insert the cables from the motor into the appropriate terminal blocks, please note a capacitor will need to be used on the motor terminals.

They are connected to the microcontroller as follows,

T1 – pin6 – output 0
T2 – pin7 – output 1
T3 – pin8 – output 2
T4 – pin9 – output 3
T5 – pin10 – output 4
T6 – pin11 – output 5
T7 – pin12 – output 6
T8 – pin13 – output 7

To use an output simply attach flying leads to the appropriate output terminal block.

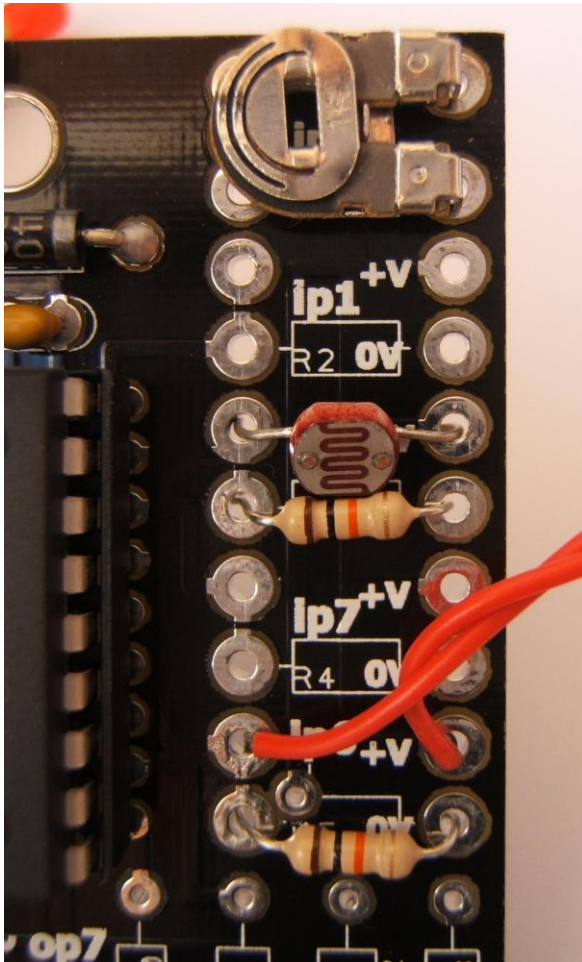
Inputs Ip0 ~ Ip7

These are used as digital inputs and Ip0, Ip1 and Ip2 can also be used as analogue inputs. They are arranged as potential dividers with the +V and 0V parts clearly marked, the centre of the potential divider or output are the 2 pads to the right hand side of the potential divider. Ip2 has been designed to allow a PCB mounting potentiometer to be soldered directly to the PCB.

They are connected to the microcontroller as follows,

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

Please see below for an example of using inputs



Here the input section can be seen close up. It can be seen from ip1 that the inputs are set up as potential dividers and the +V and 0V are clearly labelled.

For the preset resistor 1k has been used, it is not recommended to use a high value as it will affect the a2d conversion. The analogue value from the preset can be read using the appropriate function in your software. Ip2 has been used.

The LDR and resistor can be used to detect when it is light or dark. This can be done with an a2d conversion but as the LDR has a very wide resistance range it can also be read like a digital switch. Ip0 has been used.

The PTM switch and 10k pull down resistor would be read as a digital signal, either on or off. The state of the switch would be read in software as high or 1 for pressed and low or 0 for not pressed. It is important to use a pull up or pull down resistor and if the switch and resistor were reversed then a press would give a 0 or low signal.

Please visit our website

www.rkeducation.co.uk

If you have any comments or queries please email us at

technical@rkeducation.co.uk

