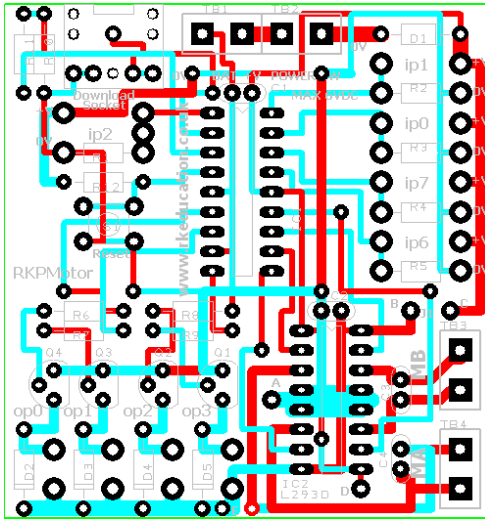
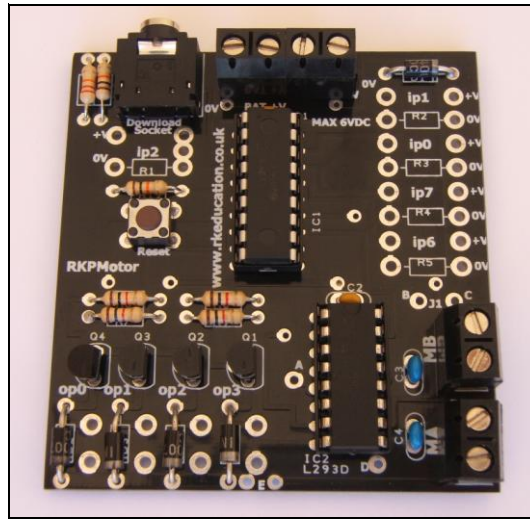


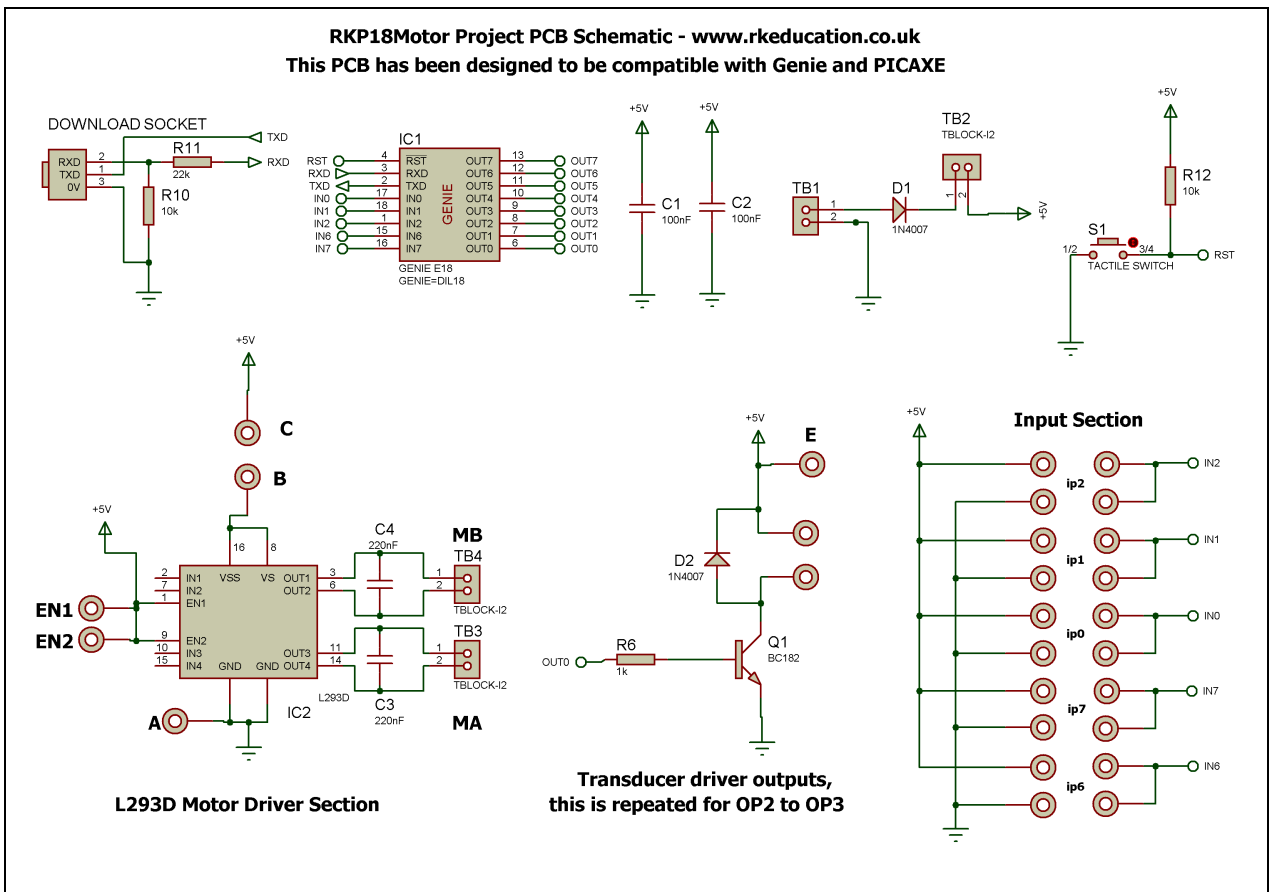
RKP18Motor Component List and Instructions



PCB layout



Constructed PCB



Schematic Diagram

Description

The RKP18Motor project PCB has been designed to use PIC microcontrollers such as the Genie and PICAXE, the microcontroller shown here is a Genie.

- 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
- 4 outputs are connected to a L293D h-bridge driver chip
- Motors attached via terminal blocks
- 4 outputs are connected to BC182 transistors
- Transistor outputs have back EMF diodes
- 5 potential divider inputs, 3 can be used as analogue
- ip2 can have a PCB mount potentiometer directly mounted
- Designed to be compatible with Genie and PICAXE
- Compatible with your existing software, e.g. Genie Design Studio
- Low cost
- High quality, professional, double sided, black PCB
- Perfect for electronic projects
- Ideal for robotic projects

Component List

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

C1, C2 – 100nF multilayer ceramic capacitor

C3, C4 – 220nF multilayer ceramic capacitor

TB3, TB4 – 3 way 5mm terminal block

D1 ~ D5 – 1N4007

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

IC2 – 16 way DIP socket with L293D

R6 ~ R9 – 1k brown black red

R11 – 22k red red orange

R10, R12 – 10k brown black orange

S1 – RESET – PCB mounting tactile switch

Software download socket – PCB mount 3.5mm stereo connector

Q1 ~ Q4 – BC182 transistors

Add a wire link between pads **B** and **C**

When constructing always start with the components that have the lowest profile and work high, for example start with the resistors and end on the terminal blocks.

Please only attempt to construct this unit if you are confident you are able to do this, if you are not confident please purchase a constructed unit. We will not accept responsibility for damaged and faulty units due to poor soldering.

Instructions

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

Connecting Power

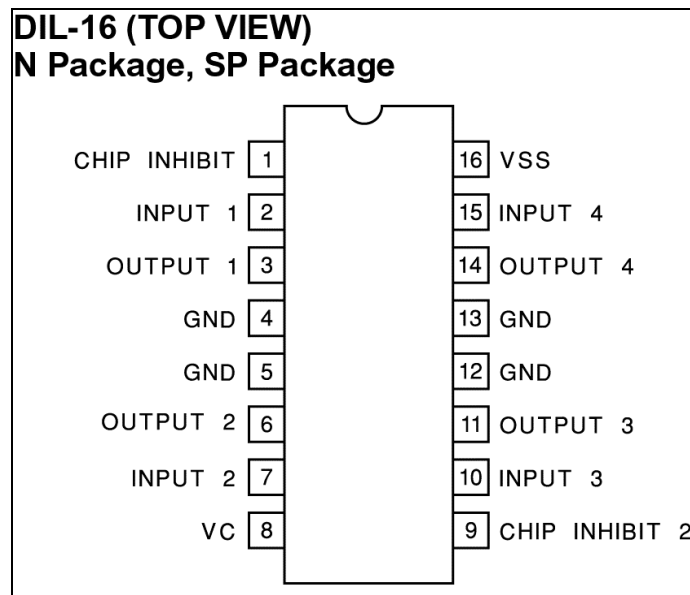
The power is connecting the terminal block marked Battery, the 0V input, usually black is put in the left hand terminal and the +VE, usually red, is put in the right hand terminal, a regulated 6VDC power supply should be used.

A power switch can be used and should be inserted into the terminal next to the battery terminal block, if a power switch is not required short the terminals together.

Downloading software into the RKP18Motor

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 L293D



The L293D is an h-bridge drive chip, for more information on this chip please refer to a datasheet for this device, please visit www.rapidonline.com for a datasheet.

The L293D powers two motors at up to 600mA each or 1 motor up to 1.2A, motors are reversible, the outputs to the motors are clearly marked **MA** and **MB**. The motors are controlled by sending appropriate output signals from the microcontroller to the L293D, the L293D is already enabled. Use the following as a guide,

Microcontroller L293D

Pin 10	to	pin 7	MA
Pin 11	to	pin 2	MA
Pin 12	to	pin 15	MB
Pin 13	to	pin 10	MB

Both inputs low	- motor stop
First output high, second output low	- motor forward
First output low, second output high	- motor reverse
Both inputs high	- motor stop

To attach a motor simply screw the flying leads from the motor into the appropriate terminal block.

The L293D is enabled by default but there are 2 pads near each of the enable pins to allow the user to access the enable pins and control them from the PIC. If the enable pins are required then a track will need to be cut, this is not recommended for beginners.

Please note that if you use the L293D near to its maximum limits then a heat sink will need to be used. A number of pads have been added to allow users to change the power supply to the L293D, this involves cutting tracks and this is not recommended for beginners.

Transistor Outputs

The BC182 transistors 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 BC182 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 PCB pads, please note a capacitor will need to be used on the motor terminals.

They are connected to the microcontroller as follows,

- B0 – op0 – pin6
- B1 – op1 – pin7
- B2 – op2 – pin8
- B3 – op3 – pin9

To use an output simply attach flying leads to the appropriate PCB pads.

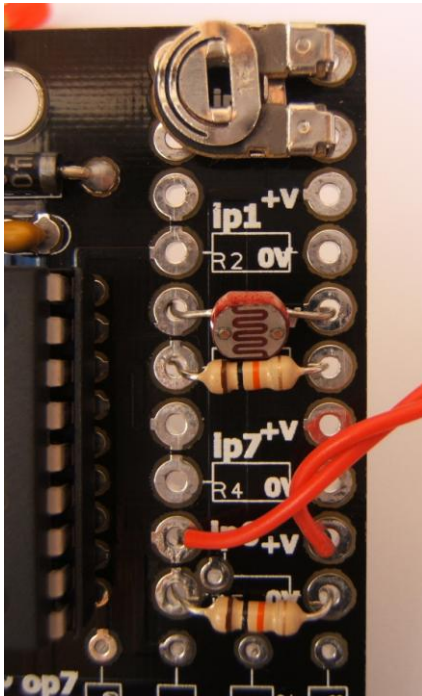
Inputs Ip0 ~ Ip7

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 left 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

