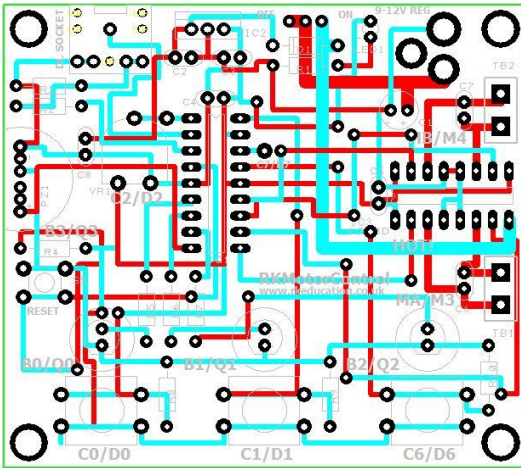
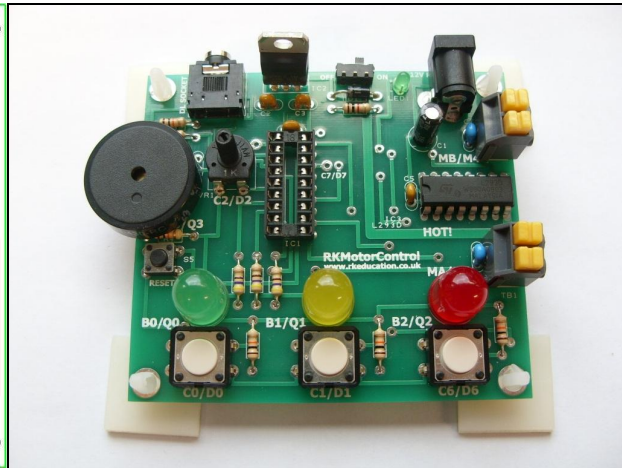


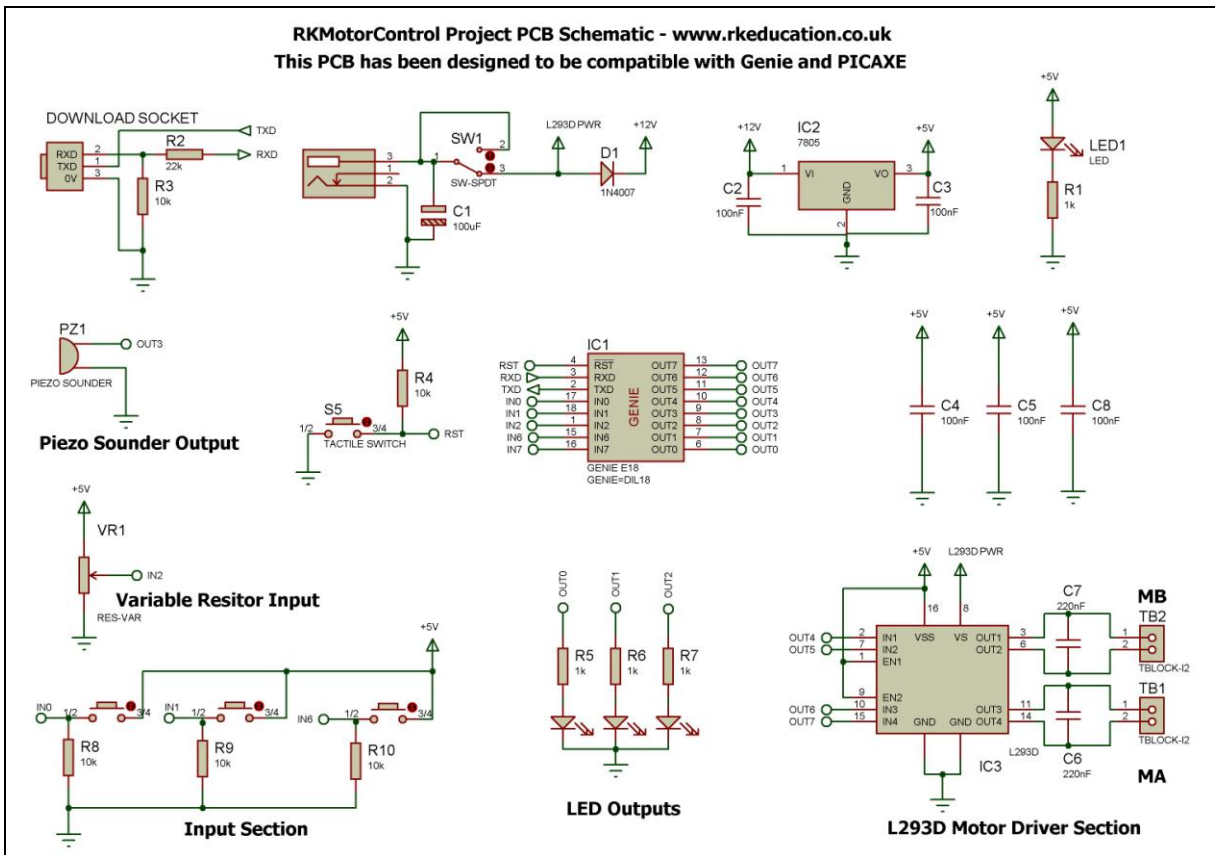
RKMotorControl Component List and Instructions



PCB layout



Constructed PCB



Schematic Diagram

Description

The RKMotorControl project PCB has been designed to use PIC microcontrollers such as the Genie-E18 and PICAXE-18M2

- Powered via a 2.1mm DC socket, 9-12VDC
- The circuit uses a 7805 regulator to provide 5VDC
- Software is downloaded from a PC into the microcontroller via a 3.5mm stereo socket
- The clock reference is from the microcontrollers internal resonator
- 4 outputs are connected to a L293D h-bridge driver chip
- Motors attached via terminal blocks
- 3 outputs are connected to 10mm LEDs
- 1 output is connected to a piezo sounder
- 3 tactile switch inputs
- 1 variable resistor input
- Pin 16 of the MCU is spare and accessible via a plated through hole
- 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 motor projects

Component List

2.1mm DC socket

PWR SW - ultra miniature slide switch

C1 - 100uF electrolytic capacitor

C2, C3, C4, C5, C8 - 100nF multilayer ceramic capacitor

C6, C7 - 220nF multilayer ceramic capacitor

TB1, TB2 - 2 way 5mm screwless terminal blocks

D1 - 1N4007

LED1 - 3mm green LED

10mm LEDs

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

IC2 - 7805 TO220 voltage regulator

IC3 - L293D

R1, R5, R6, R7 - 1k brown black red

R3, R4, R8, R9, R10 - 10k brown black orange

VR1 - variable resistor

R11 - 22k red red orange

12x12mm tactile switches

S5 - RESET - PCB mounting tactile switch

Software download socket - PCB mount 3.5mm stereo connector

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

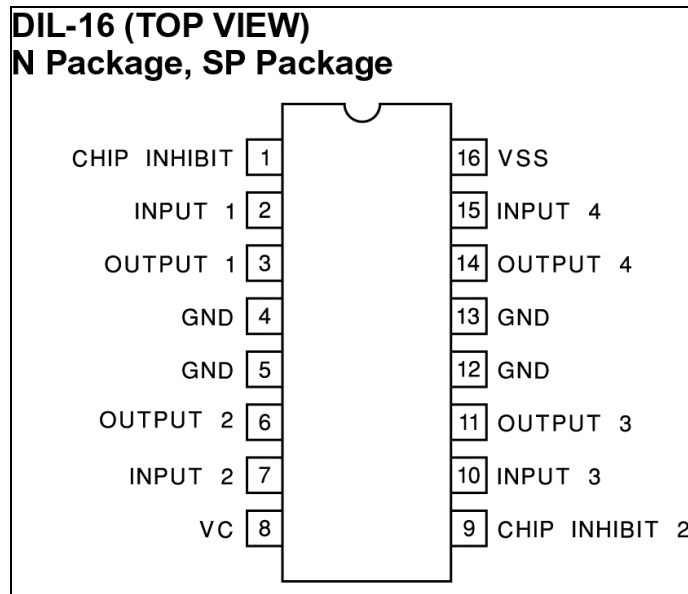
The power is connected to the circuit via the 2.1mm DC socket, a regulated 9-12VDC power supply should be used.

A power switch has been used and when the circuit is powered LED1 will light.

Downloading software into the RKMotorControl

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 push the flying leads from the motor into the appropriate terminal block.

The L293D is enabled by default but if the enable pins are required then tracks 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.

LED Outputs

3x 10mm LEDs have been included and how they are used will depend on how the circuit is being used. For example the green LED may be lit when the motor is being powered, the red when it is stopped. To operate an LED send a logic 1 from the appropriate output pin of the MCU.

Piezo Output

A piezo has been included to allow the user to play a tune. Please refer to the datasheet for your chosen MCU for more information on playing tunes from your MCU.

Switch Inputs

3x 12x12mm tactile switches have been included and how these are used will depend on how the circuit is being used. For example you a switch may be used to start the motor, a second to stop and a third for an emergency. When the switch is not being pressed 0V will be at the appropriate input pin on the MCU, when a switch is pressed 5VDC will be at the appropriate input pin. Each of the switches has a 10k pull down resistor for reliable operation.

Variable Resistor Input

A variable resistor has been included to allow the user to gain greater control over the motor. For example this may be used to control the speed of the motor. Please refer to the datasheet for your chosen MCU for information on achieving this.

Please visit our website

www.rkeducation.co.uk

If you have any comments or queries please email us at

technical@rkeducation.co.uk

