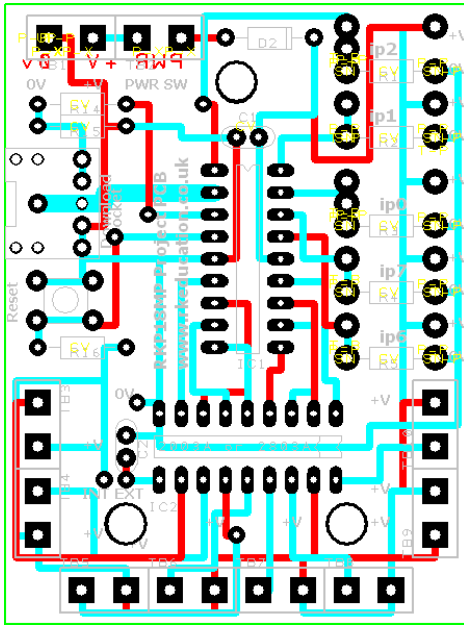
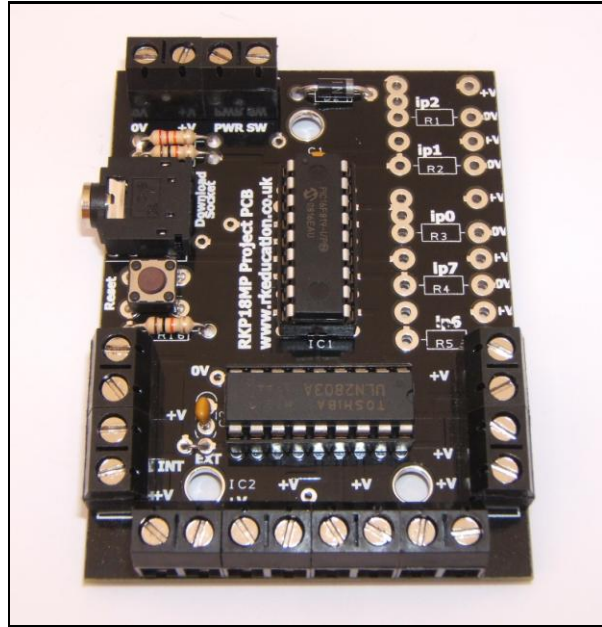


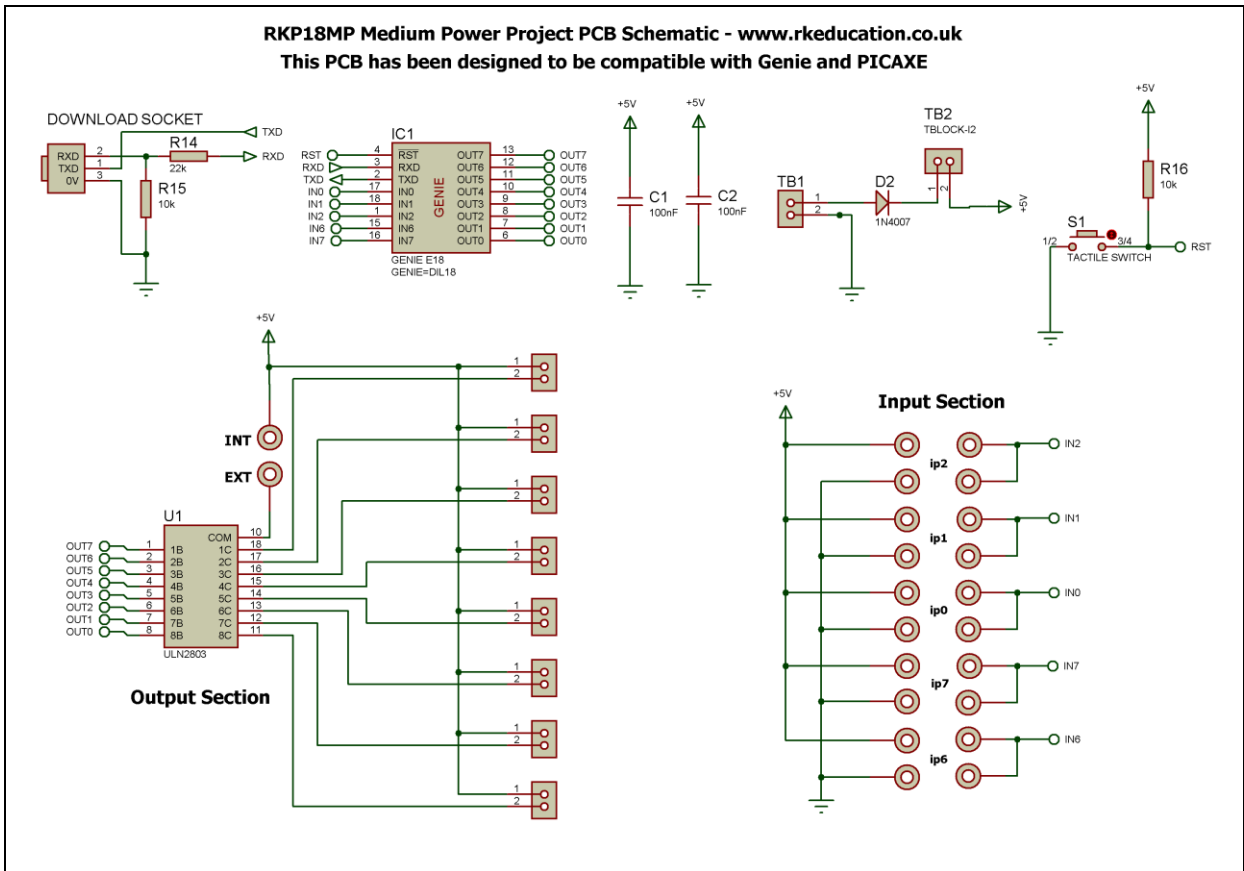
## RKP18mp Component List and Instructions



PCB layout



Constructed PCB



Schematic Diagram

## Description

The RKP18lp project PCB has been designed to use PIC microcontrollers such as the the Genie – [www.genieonline.com](http://www.genieonline.com) – the microcontroller used in the picture 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
- 8 outputs are connected to a ULN2803 transistor driver
- Power to the ULN2803 can either be from the main power supply or from an external source
- 5 potential divider inputs, 3 can be used as analogue
- 2 inputs can have a PCB mount potentiometer directly mounted
- Designed for use with PIC microcontrollers such as Genie and PICAXE
- Compatible with your existing software, for example Genie Design Studio
- Great for educational projects
- Perfect for electronic projects
- Ideal for robotic projects
- Low cost
- Professional, double sided, black PCB
- Available as a kit or as a blank PCB

## Component List

TB1 ~ TB10 - 2 way 5mm pitch terminal blocks

C1 & C2 – 100nF multilayer ceramic capacitor

D2 – 1N4007

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

IC2 - 18 way DIP socket with ULN2803A

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

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](http://www.genieonline.com)

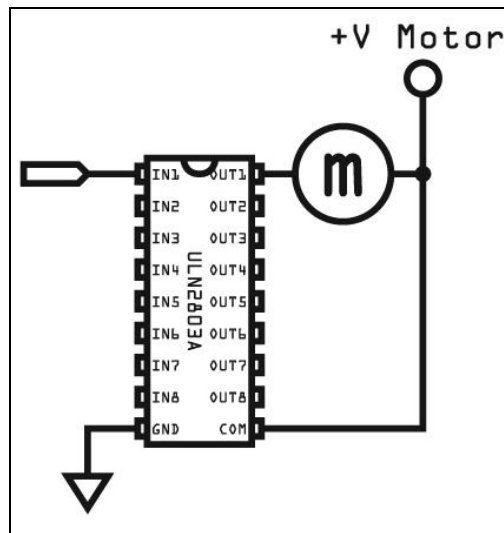
### Connecting Power

The power is connecting the terminal block marked TB1, 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 PWR SW, if a power switch is not required short the terminals together

Power to the ULN2803A 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 located near pin 10 of the ULN2803A. 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. It will also be necessary to make further modifications when using an external power supply for the ULN2803A, it is not recommended that this should be attempted by inexperienced users, for guidance please contact us.

### Using the ULN2803A



The ULN2803A is a high-voltage, high-current Darlington transistor array. The device consists of eight NPN Darlington pairs that feature high-voltage outputs with common-cathode clamp diodes for switching inductive loads. The collector-current rating of each Darlington pair is 500mA. The Darlington pairs may be connected in parallel for higher current capability.

For more information on the ULN2808A please view the datasheet, please visit [www.rkeducation.co.uk](http://www.rkeducation.co.uk) for a datasheet.

Each of the outputs of the ULN2803A 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.

They are connected to the microcontroller as follows,

<b>Microcontroller</b>		<b>ULN2803A</b>
pin6 – output 0	to	pin8 – output 0
pin7 – output 1	to	pin7 – output 1
pin8 – output 2	to	pin6 – output 2
pin9 – output 3	to	pin5 – output 3
pin10 – output 4	to	pin4 – output 4
pin11 – output 5	to	pin3 – output 5
pin12 – output 6	to	pin2 – output 6
pin13 – output 7	to	pin1 – 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 left hand side of the potential divider. Ip2 and ip0 have been designed to allow a PCB mounting potentiometer to be soldered directly to the PCB.

They are connected to the microcontroller as follows,

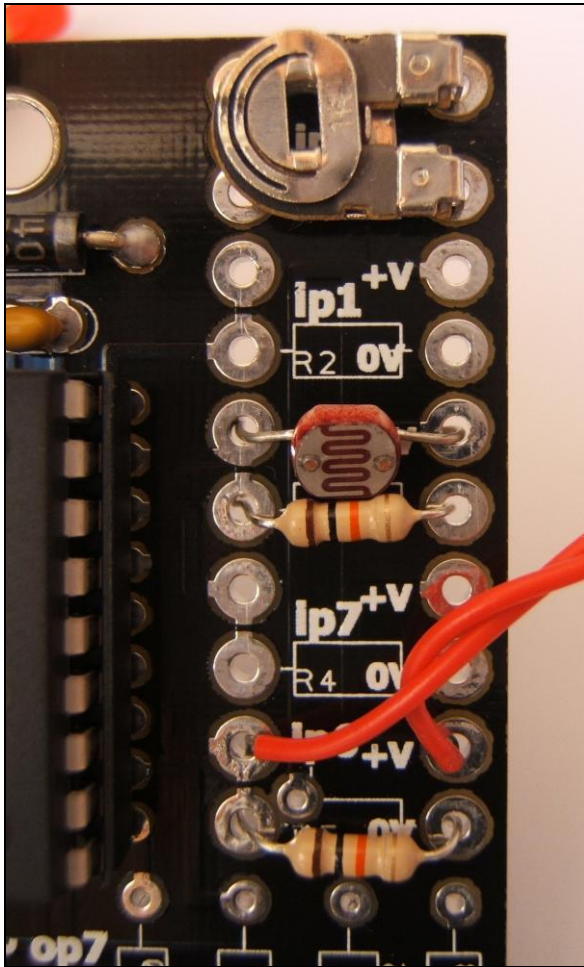
ip0 – pin17  
ip1 – pin18  
ip2 – pin1  
ip6 – pin15  
ip7 – pin16

### **Downloading software into the RKP18mp**

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.

**Please see below to see how to use the inputs**

### Example of how to use the 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](http://www.rkeducation.co.uk)

If you have any comments or queries please email us at

[technical@rkeducation.co.uk](mailto:technical@rkeducation.co.uk)

