

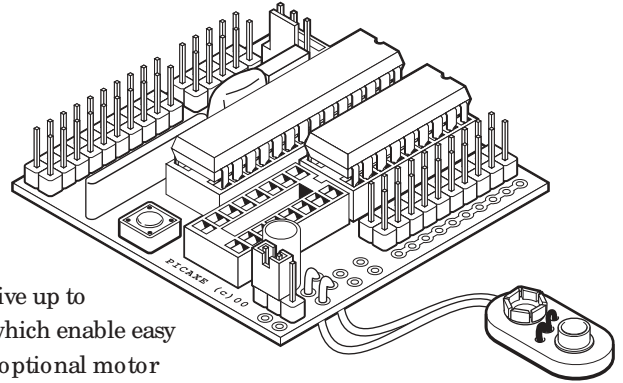
# 28-PIN PROJECT BOARD

## Contents:

AXE020 28-pin Project Board with input/output cables

## Introduction

The 28-pin project board is designed to allow rapid prototyping with 28-pin PICAXE microcontrollers. The board provides connections for eight digital inputs (inputs portC 0-7), four analogue inputs (inputs portA 0-3) and eight digital outputs (outputs portB 0-7). Each of the outputs is driven through a ULN2803A darlington driver, which will drive up to 800mA per output. Ribbon cables with connectors are also included, which enable easy interfacing to the board. Space is provided on the board for adding an optional motor driver IC, through which DC motors can be controlled with forward/reverse directional control.

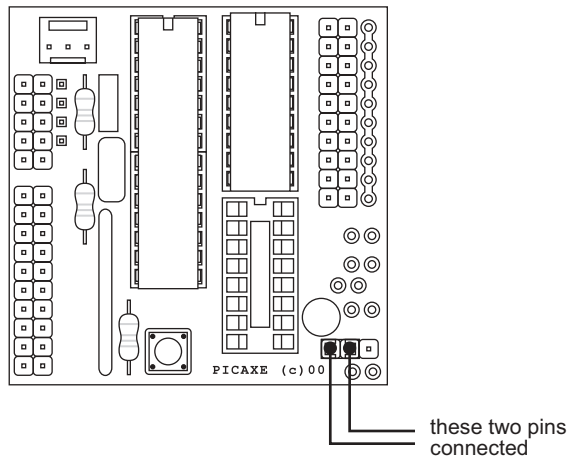


## Power

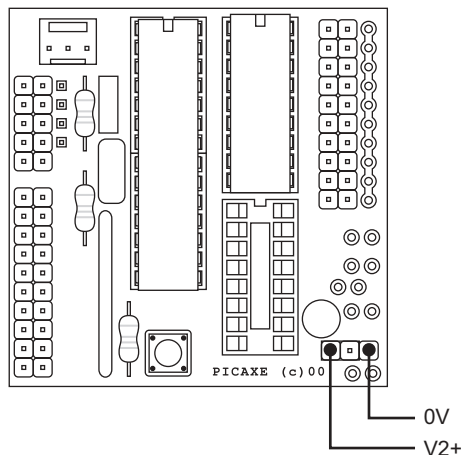
The board can be powered by a single, or two separate, power supplies. When two power supplies are used the second separate supply (V2+) is used to power the output devices. This is useful when a higher voltage is required (e.g. when driving a 12V stepper motor) or when it is necessary to isolate the outputs to avoid noise problems (e.g. when using radio-control servos).

The primary power supply (V1+) for the interface is a 5V or 4.5V DC. This is connected via the battery clip connector. DO NOT use a 9V PP3 battery, as the interface does not include a voltage regulator.

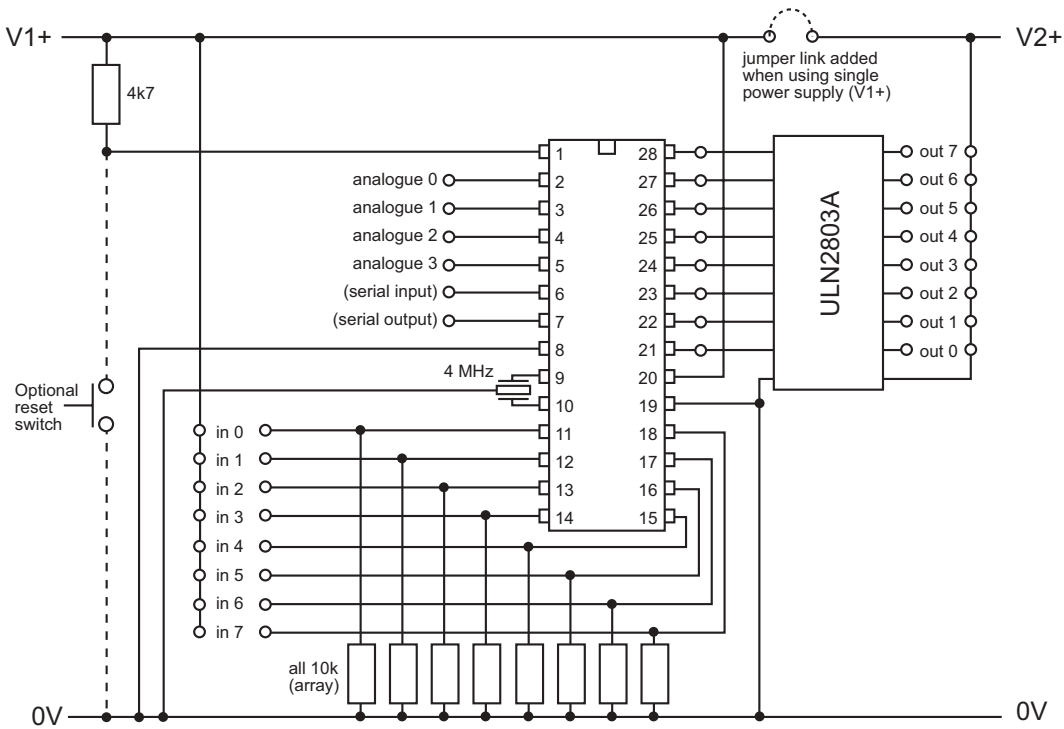
When a single power supply is used a jumper link is required on the external power jumper link 'E' as shown right.



When two power supplies are required the second supply is connected to jumper E as shown right.

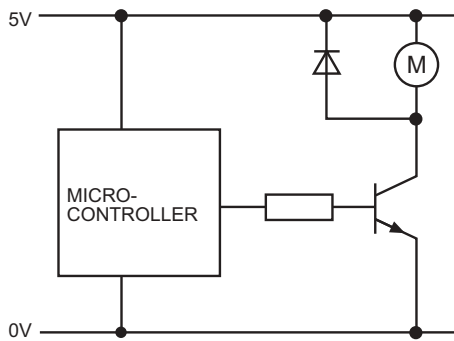


### 28-Pin Project Board Circuit

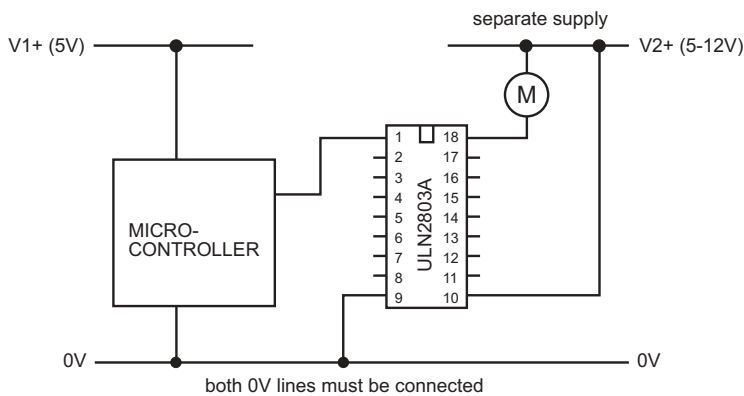


### Digital Outputs

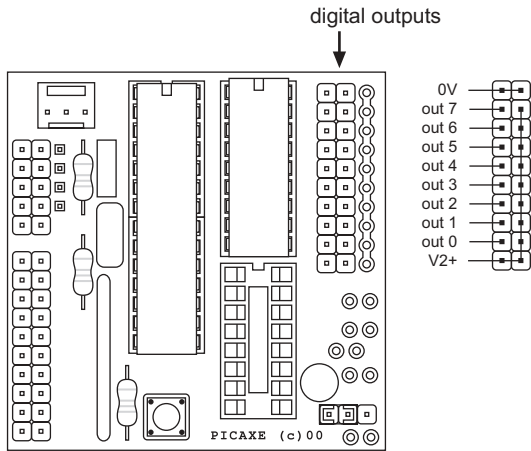
Each digital output is connected to a darlington transistor as shown below.



On the board the transistors are contained in a single ULN2803A darlington driver IC. The equivalent output circuit is shown below.

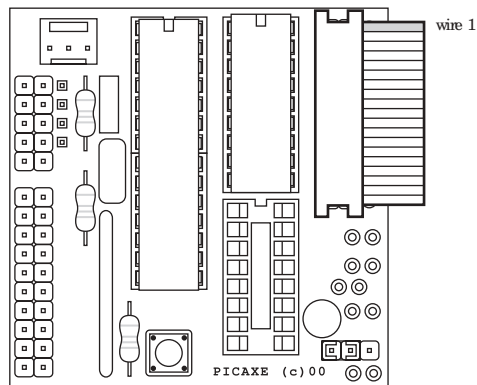


The digital output pins on the board are identified as follows:



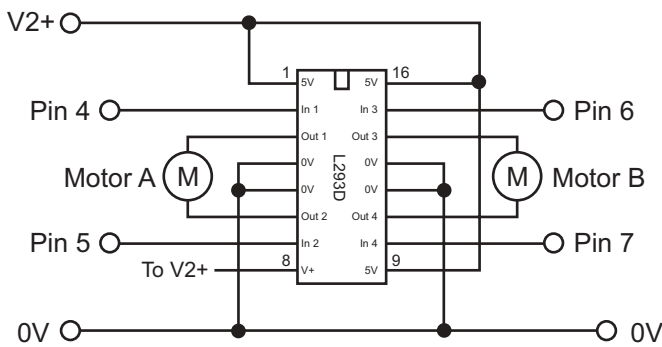
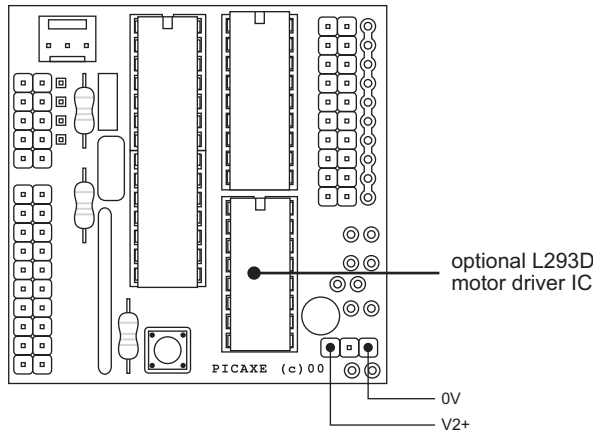
The output ribbon cable connector has the following pin arrangement (wire 1 is marked with red ink).

1	0V
2	0V
3	7
4	V2+
5	6
6	V2+
7	5
8	V2+
9	4
10	V2+
11	3
12	V2+
13	2
14	V2+
15	1
16	V2+
17	0
18	V2+
19	V2+
20	V2+



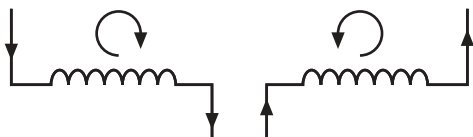
### Motor Driver

An optional L293D motor driver IC (not supplied) may be added to the basic interface. This provides forward-backward control of two DC motors, controlled by outputs 4 to 7. Naturally, if only one motor is to be controlled then only two output lines are used.



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

Changing the states of the input pins has the effect of altering the direction of current flow through the motor, as shown below.



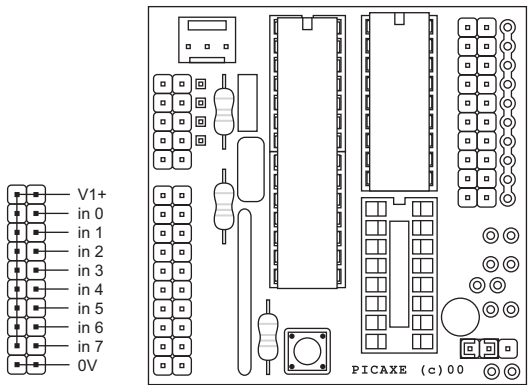
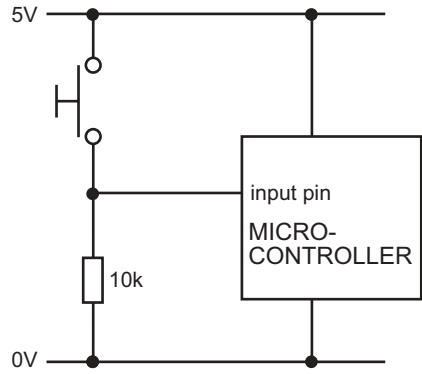
Note that the L293D will become warm with continuous use. The end user may choose to bond a heatsink onto the top of the chip (to help keep it cool) if required.

Motor A and B are connected to the interface via the pads provided beside the L293D chip position. It is necessary to solder connectors or wires into these pads.

### Digital Inputs

The digital inputs have a 10k pull down resistor on each input pin.

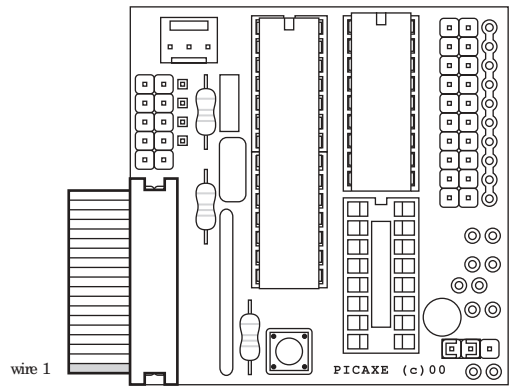
The equivalent input circuit is shown right.



↑  
digital inputs

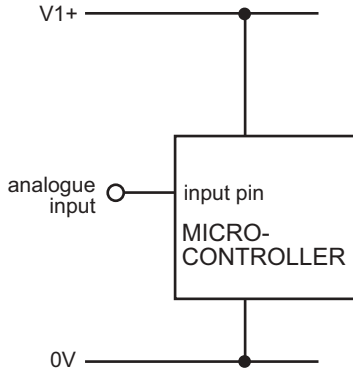
The input ribbon cable connector has the following pin arrangement (wire 1 is marked with red ink).

20	V1+
19	V1+
18	V1+
17	0
16	V1+
15	1
14	V1+
13	2
12	V1+
11	3
10	V1+
9	4
8	V1+
7	5
6	V1+
5	6
4	V1+
3	7
2	0V
1	0V



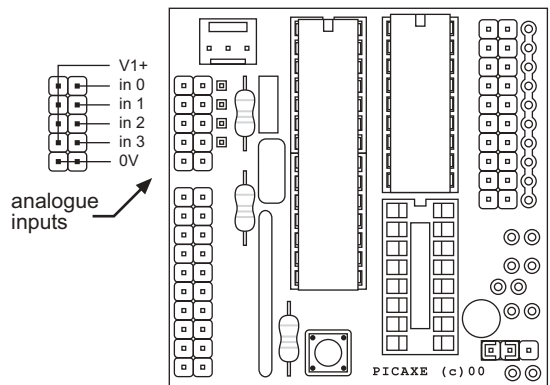
### Analogue Input Channels

The analogue input channels are left floating (no connection).  
 The equivalent input circuit is shown below.



The analogue input ribbon cable connector has the following pin arrangement (wire 1 is marked with red ink).

10	V1+
9	ADC0
8	V1+
7	ADC1
6	V1+
5	ADC2
4	V1+
3	ADC3
2	0V
1	0V



### Order Codes:

- AXE020      28-pin Project Board
- AXE040      Infra-red Upgrade Pack
- AXE027      USB Programming Cable
- IC030        L293D 16-pin Motor Driver IC (optional)