



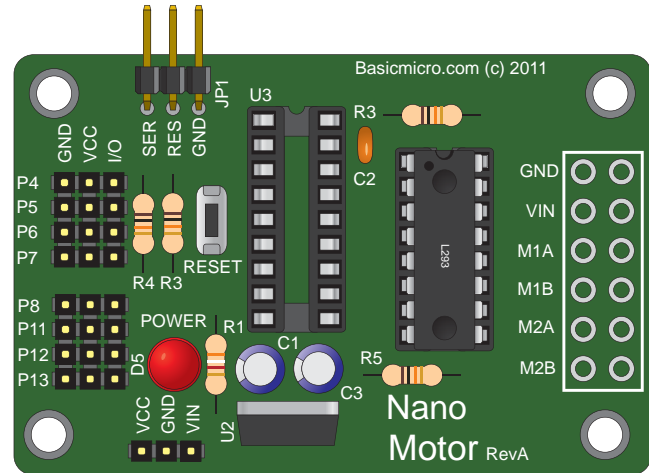
# BASIC MICRO

TECHNOLOGY AT WORK

Nano Motor Driver Board  
Data Sheet

**Feature Overview:**

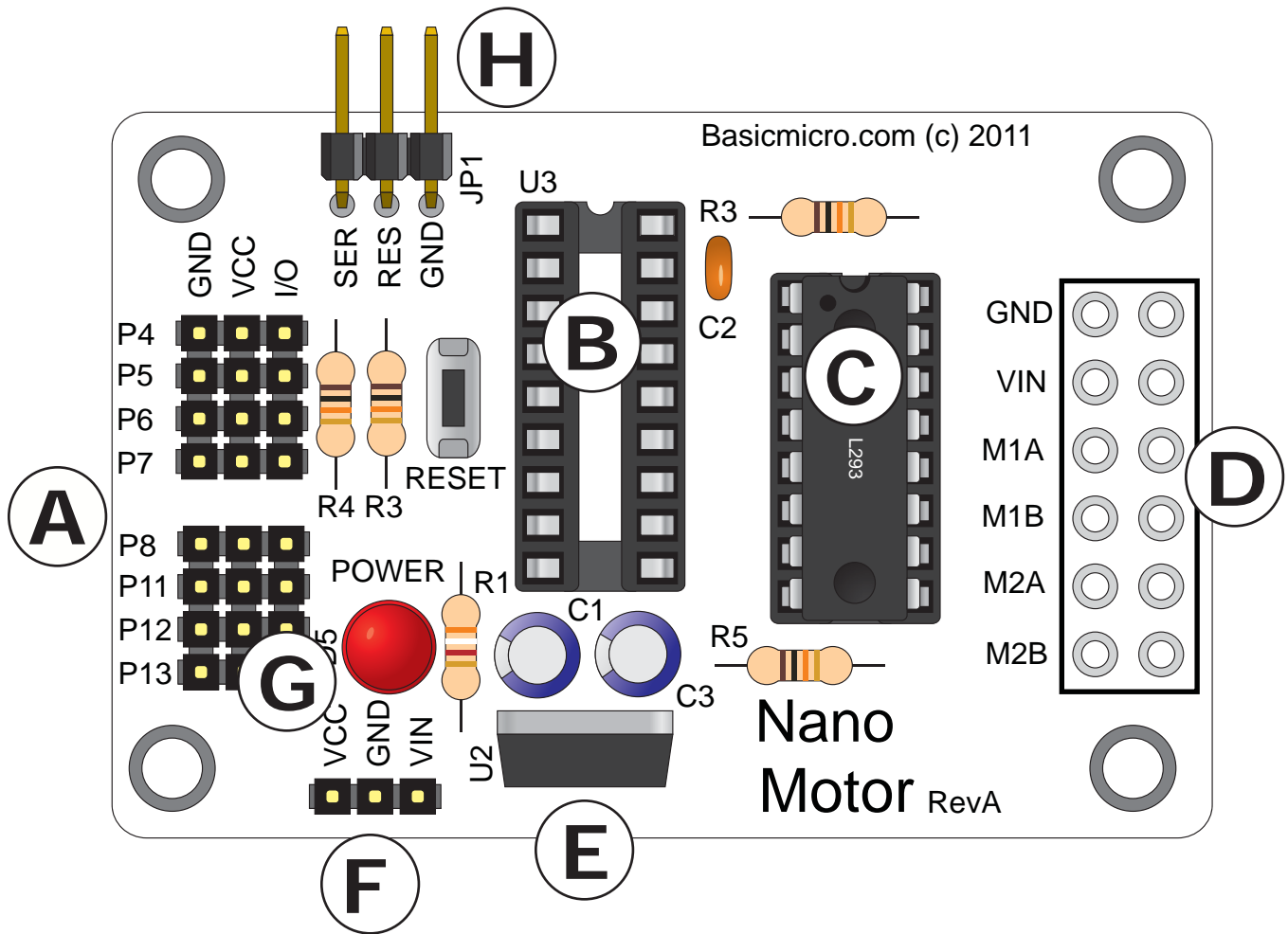
- Power LED
- 3.5mm Screw Terminal Compatible
- Battery Connector
- LDO Power Regulator
- 8 Servo or I/O Headers
- L293 Dual DC Motor Driver
- In Circuit Nano Programming

**Basic Description**

The Nano Motor Driver board is a great platform for controlling bidirectional 2 DC motors or 1 stepper motors. Can also be used to drive servo motors, solenoids and relays. The Nano Motor Driver board was designed with beginners or advance users in mind. Its easy setup and programming make it a great solution for your next project.

The Nano Motor Driver board is ideal for a low cost robotics controller platform. The board makes it easy to drive continuous rotation servos or DC motors for the drive train.

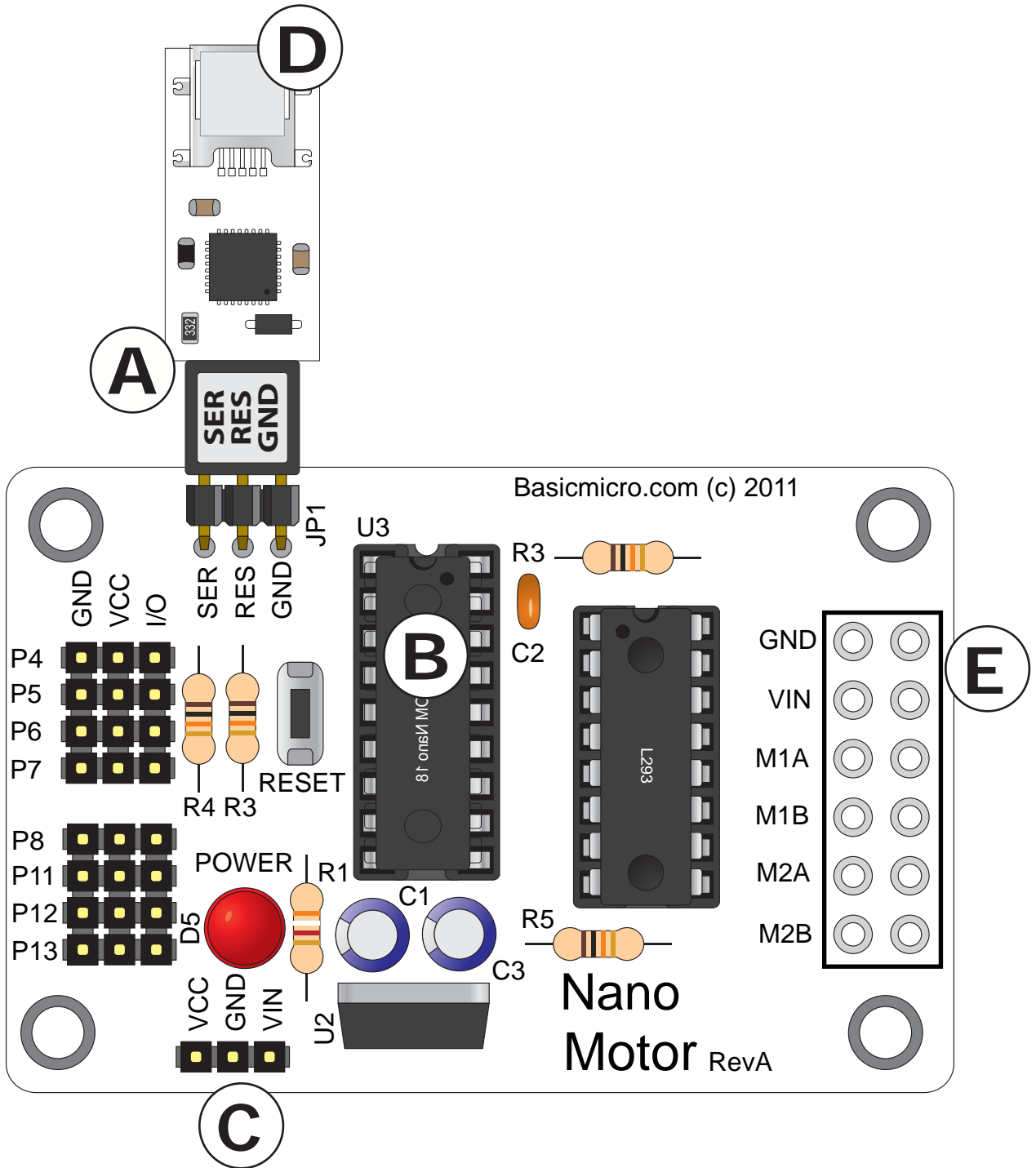
Hardware Overview:



- A: I/O or servo headers. Corresponding Nano pin is shown.
- B: Nano 18 socket.
- C: L293 Driver IC.
- D: Output header. Compatible with 3.5 screw terminals.
- E: Low drop out regulator.
- F: Battery input.
- G: Power LED.
- H: In circuit program header.

**Nano Motor Driver Board Setup**

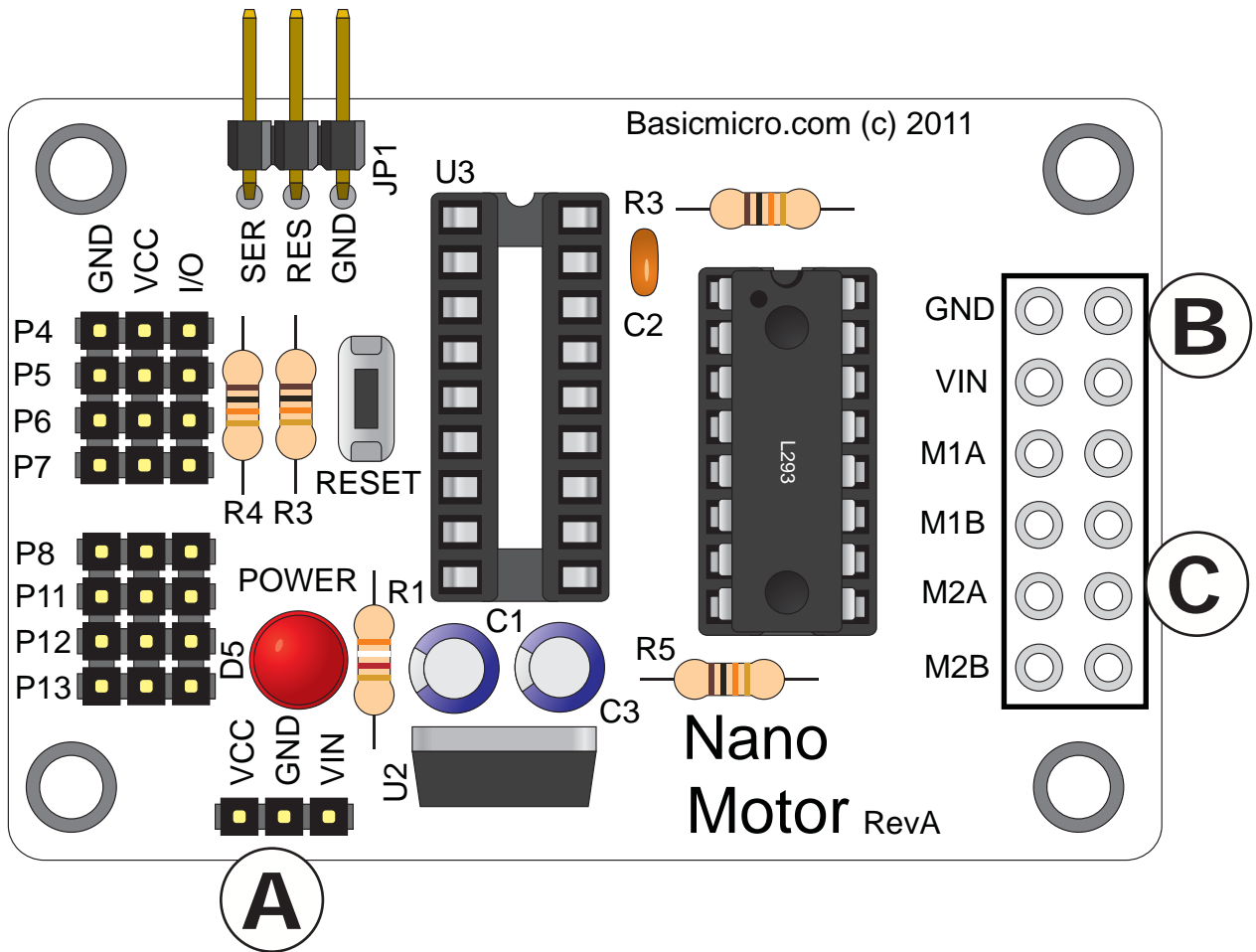
Insert a Nano 18 pin chip in the Nano Motor Driver board (B) socket labeled U3. Be careful to note Nano orientation. If the Nano is placed in the socket backwards, you will damage it. Insert the USB2Serial adapter as shown (A). Supply power (C or E). Then plug a mini B USB cable (D). Plug the other end of the USB cable into your pc. If you're using the USB2Serial adapter for the first time you will need to download the drivers from Basicmicro.com. To program the Nano you will also need to download Basic Micro Studio software from Basicmicro.com.



**Power**

The Nano Motor Driver board can be powered from as little as 4 AA batteries, RC 8.4V battery or up to a 24VDC wall adapter. The VIN input pins will supply the on board regulator. The on board regulator will stop working once the battery output voltage drops below 5.5VDC. The on board regulator can source up to 1A.

The board can be powered using the VIN connection from 2 places (A or B). The hole pattern (C) is compatible with a standard 3.5 screw terminal block. You can purchase this separately from Basicmicro.com.



### L293 Driver IC

The L293 is a dual H bridge. The L293 is typically used to bidirectionally drive 2 DC motors or one bipolar stepper motor. It can also be used to drive inductive loads like relays and lamps. The L293 has two enable pins, one for each side of the H bridge. These are controlled by P9 and P10. Setting both pins high will enable the full H bridge. Each channel is controlled by P0,P1,P2 and P3. The L293 can drive up to 600mA continuous per channel with a peak of 1.2A. With 4 channels the total continuous output for the L293 is 2.4A. Visit [basicmicro.com](http://basicmicro.com) for sample code.

Control Pins:

P10 = Enable1

P9= Enable2

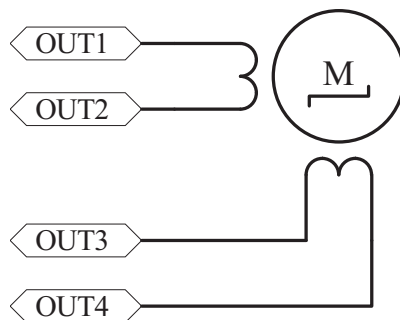
P0 = OUT1

P1 = OUT2

P2 = OUT3

P3 = OUT4

Bipolar Stepper Motor Connections:



The following code snippet will drive a bipolar stepper motor in one direction using the L293. Make sure VIN is within the operating voltage range of the stepper motor. If VIN is too high you can damage the motor. If VIN is too low the motor likely will not turn.

There is a small pause in between each step. This controls the speed. Every stepper motor varies so you may need to adjust the amount of time in between each step. If speed is too fast the motor will not turn.

```
:Start Program
```

```
DIRA = 0      ;Sets P0 -P3 as outputs
OUTA = 0      ;Sets P0-P3 low
```

```
High P9
High P10
```

```
Main
```

```
OUTA = %0101      ;OUTA access first 4 pins of port P0-P3. 0 = low, 1 = high.
Pause 10          ; Change this value in all 4 places to adjust the speed of rotation.
OUTA = %0110
Pause 10
OUTA = %1010
Pause 10
OUTA = %1001
Pause 10
```

```
Got Main
```

The DIRA and OUTA commands allow you to set the low 4 pins in one command. OUTA and DIRA access the low nib which is P0 to P3. When accessing a port, each bit in %1111 represents a pin starting from left to right P3,P2,P1,P0. Which makes first bit in %1111 is P3 and the last bit is P0. There are several ways to address each pin of the Nano. The above code only demonstrates a simple way to access a block of pins all at once.

## Headers

There are 8 headers on the Nano Driver board which are labeled P4 to P7 and P8, P11 to P13. These headers can be used for digital inputs or outputs. P8 - P11 can be used as analog inputs. The analog input pins are used to read analog voltages with an output range between 0 to 5VDC. An example would be potentiometers, accelerometers or temperature sensors to name just a few. To access the analog pins you can use the code snippet shown below.

```
;Start program

Temp Var Word           ;Setup a variable

Main
  Adin P8, Temp         ;Read analog pin P8 can change P8 to any analog pin
  Serout S_Out, i9600, [DEC TEMP,13] ;Send value to the terminal window
Goto Main               ;Loop forever
```

The headers 3-pin configuration is setup to conveniently drive servos. When driving a servo you should power the board from a 6VDC source, such as a battery pack. Typical a single servo will draw more than 1Amp which is the max output of the on board regulator. To drive a servo you can use the code snippet shown below.

```
;Start program

Main
  Servo P8,700,40       ;700 represents position, this is the max range for HiTec 5645
  Pause 17              ;Pause minimum delay between next command
  Servo P8,-700,40     ;-700 full swing in opposite direction
  Pause 17
Goto Main              ;Loop forever
```

Each servo will have a different maximum range. The HiTec 5645 digital servo, this is around 700 / -700. An analog servo like a HiTec 422 this number will be around 1400 / -1400. The 40 in the servo command is how long the command will output the pulse. This gives the servo time to travel. If you exit the command to quickly the servo may not have time to travel to the correct position.

## Electrical Characteristics

Characteristic	Value (Units)
VIN Range (min - max)	6 – 18VDC
Regulator Max Current	1A
L293 Drive IC Max Load	1.2A
Current Draw (Idle)	50 mA



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**Discussion List**

A web based discussion board is maintained at <http://www.basicmicro.com>

**Technical Support**

Technical support is made available by sending an email to [support@basicmicro.com](mailto:support@basicmicro.com). All email will be answered within 48 hours. All general syntax and programming questions, unless deemed to be a software issue, will be referred to the on-line discussion forums.