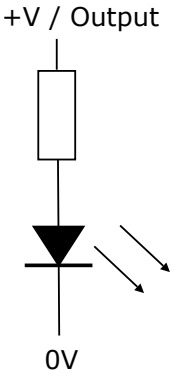
OUTPUT

LED

Diagram:



Function:

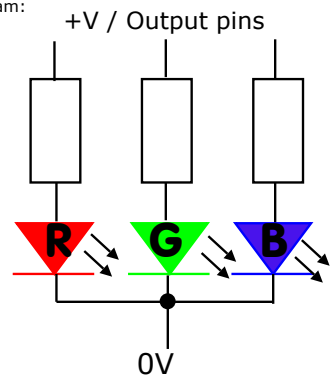
The LED is lit when connected to +V or is driven high by a microcontroller output.

The value of the resistor is found using V=IxR.

OUTPUT

RGB LED

Diagram:



Function:

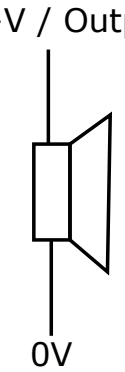
The LEDs are lit when connected to +V or is driven high by a microcontroller output. Varying brightness can be produced by using PWM from a microcontroller.

The value of the resistor is found using V=IxR.

OUTPUT

Speaker

Diagram:



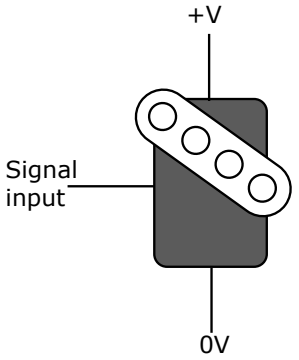
Function:

A transistor or interface drive may be required to operate some speakers.

OUTPUT

Servo motor 180° rotation

Diagram:



Function:

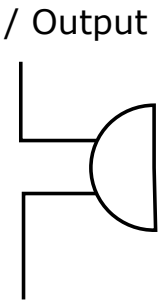
This is a standard RC servo motor, the supply voltage is 5V/6V but needs at least 250mA.

This servo can be positioned at any angle between 0° and 180°, a linkage is fastened to the axle.

OUTPUT

Buzzer

Diagram:



Function:

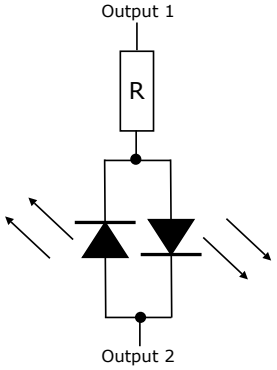
The buzzer sounds when connected to +V or driven high by a microcontroller output.

Buzzers only make a single note and aren't suitable for music, a piezo transducer is required for this.

OUTPUT

Bi-coloured LED

Diagram:



Function:

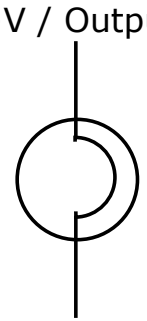
The right hand LED is lit when output 1 is +V or high and output is 0V or low. The opposite values light the left hand LED.

The value of the resistor needs to be calculated using V=IxR

OUTPUT

Bulb

Diagram:



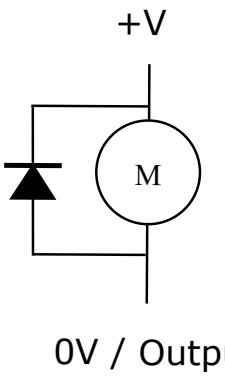
Function:

A transistor or interface driver may be required to operate some bulbs.

OUTPUT

DC Motor

Diagram:



Function:

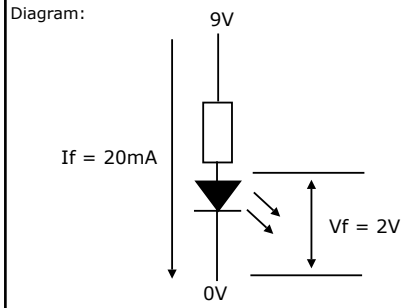
A transistor or interface driver is needed to operate motors. The 'flyback' diode is required due to the back emf produced by the motor.

The **ULN2803A** or **ULN2003A** don't need then as they already have them built in.

OUTPUT

LED Resistor Calculation

Diagram:



R = (Supply V - Vf) / If
R = (9V - 2V) / 20mA
R = 7V / 20mA
R = 0.35K = 350 ohms

Function:

Supply V is the power supply voltage

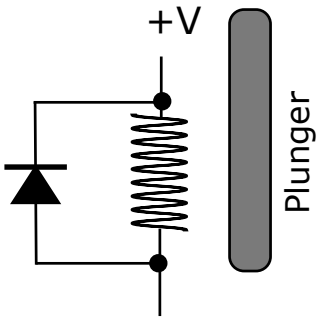
Vf is the forward voltage needed to make the LED light

If is the maximum current the LED can safely conduct

OUTPUT

Solenoid

Diagram:



Output / Transistor

Function:

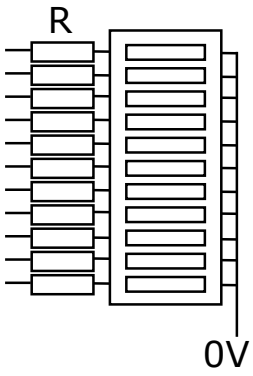
The LEDs are lit when connected to +V or is driven high by a microcontroller output. Varying brightness can be produced by using PWM from a microcontroller.

The value of the resistor is found using V=IxR.

OUTPUT

LED Bar

Diagram:



Function:

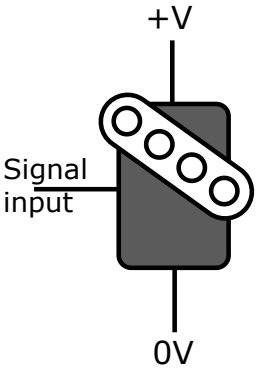
This display has 10 LEDs in it, it is connect in common cathode mode. The 10 inputs are driven from a microcontroller or a logic circuit, +V or high lights an LED. It can be wired in common anode mode if needed.

The value of the resistors are calculated using V=IxR

OUTPUT

Servo motor 360° rotation

Diagram:



Function:

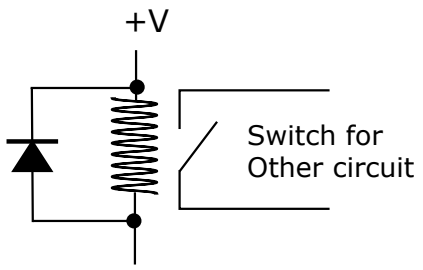
This is a special RC servo motor adapted to have continuous 360°, the supply voltage is 5V/6V but needs at least 250mA.

This servo can be used as drive motors for Robots, it needs a microcontroller to control it effectively.

OUTPUT

Relay

Diagram:



Output / Transistor

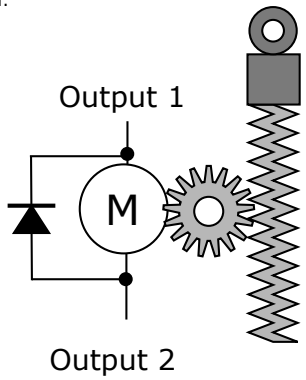
Function:

The relay coil when energised cause the switch contact to close, operating the circuit connect to the relay switch contacts. They are used to control high current / voltage circuits from a low voltage / current system.

OUTPUT

Linear Actuator

Diagram:



Function:

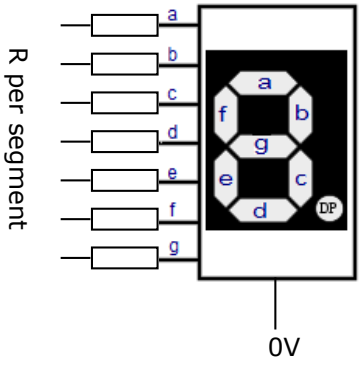
The linear actuator is operated by a DC motor, and needs to have bi-directional control, to move the arm in & out.

The standard driver is a H-Bridge driver such as the **L293D** or **SN754410**

OUTPUT

7 Segment display

Diagram:



Function:

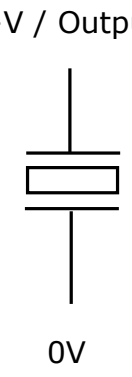
This display is a common cathode type, connected to 0V. The 7 inputs are driven from a microcontroller or a logic circuit.

The value of the resistors are calculated using V=IxR

OUTPUT

Piezo Transducer

Diagram:



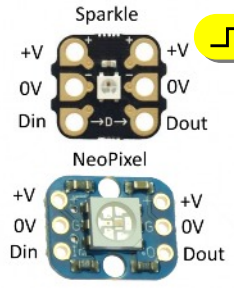
Function:

The Piezo transducer can be used to produce any musical note or sounds, best driven by a microcontroller.

OUTPUT

NeoPixels / Sparkles

Diagram:



Note:

You need to ensure you have a power supply with sufficient current capacity ~ 62mA per unit when fully lit

Function:

NeoPixels or Sparkles , a Red, Green and Blue LEDs alongside a driver chip into a tiny surface-mount package controlled through a single wire. They can be used individually, chained into longer strings. They need a fast microcontroller to operate them, such as Arduino. Sparkles are version that can be driven by the Crumble board.

OUTPUT

Graphical LCD Display

Diagram:

Note: There are a wide range of displays available with different resolutions (X x Y) and colours.

Function:

This LCD display is a large matrix of dots, which are organised in 128 x 64 dot based display. It will produce monochrome graphic and alphanumeric displays and needs to be controlled via a microcontroller and uses up to 8 outputs.

They also have a backlighting for night usage.

OUTPUT

Alphanumeric LCD Display

Diagram:

Note: There are a wide range of displays available with different numbers of lines , characters per line and colours

Function:

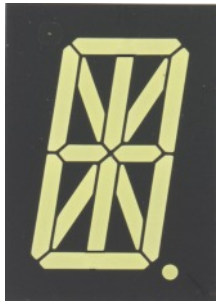
This LCD display is a large matrix of dots, which are organised in 5x7 blocks to give an alphanumeric character based display. It needs to be controlled via a microcontroller and uses up to 8 outputs.

They also have a backlighting for night usage.

OUTPUT

Starburst LED Display

Diagram:



Function:

This is an **ALPHANUMERIC** display, which can display letter as well as numbers and some symbols. The display needs to be driven from a microcontroller.

The value of the LED series resistors are calculated using V=IxR

OUTPUT

IR LED 950nm

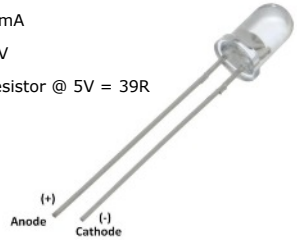
Diagram:

Typical values

If = 100mA

Vf = 1.5V

Series resistor @ 5V = 39R



Just like a normal LED a series resistor will be needed.

The value of the resistor is found using V=IxR

Function:

This LED produces Infra Red light of 950nm wavelength, which is used in remote control applications, operating at 38KHz. It will be driven by a microcontroller to send a command via sequence of pulses. A special detector such as a TSOP38238 is needed.

OUTPUT

Graphical OLED Display

Diagram:

Note: A wide range of displays are available with many different resolutions (X x Y) and touch screens.

Function:

This type of graphical display is similar to the LCD version but offers a full colour display. It needs to be controlled using a microcontroller.

They have to capacity to display full colour still and moving images, some also have touch sensitive screens for inputs etc.

OUTPUT

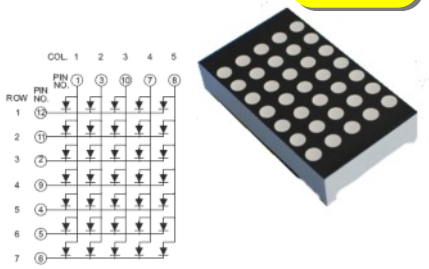
Diagram:

Function:

OUTPUT

5x7 LED Dot matrix

Diagram:



Note: This is a Common Cathode version, Common Anode versions are available.

Function:

This display uses a matrix of 7 rows of 5 columns of LEDs. Using a microcontroller to control the rows and columns a wide range of alphanumeric characters and symbols can be displayed.

The columns will need LED series resistors.