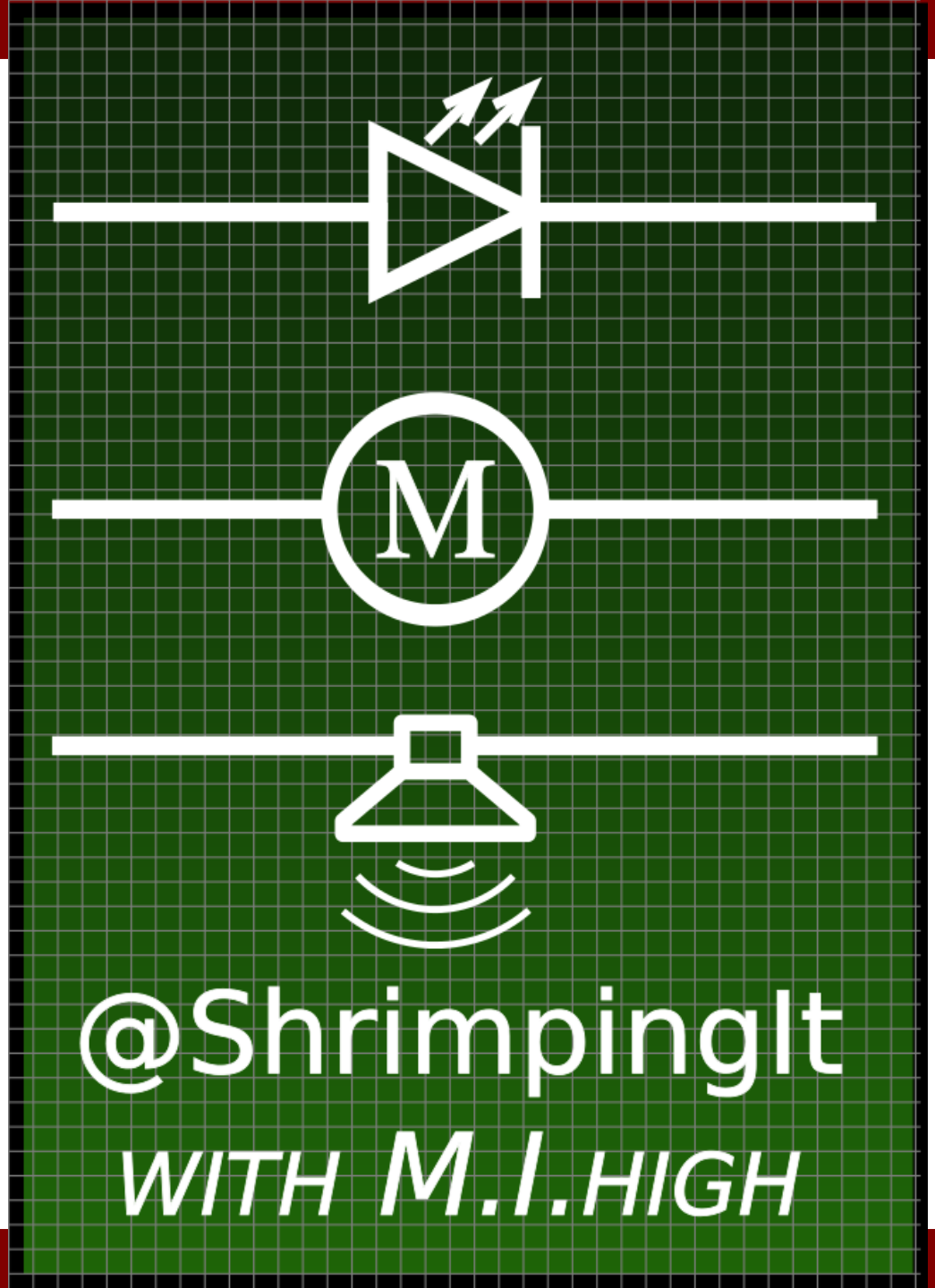
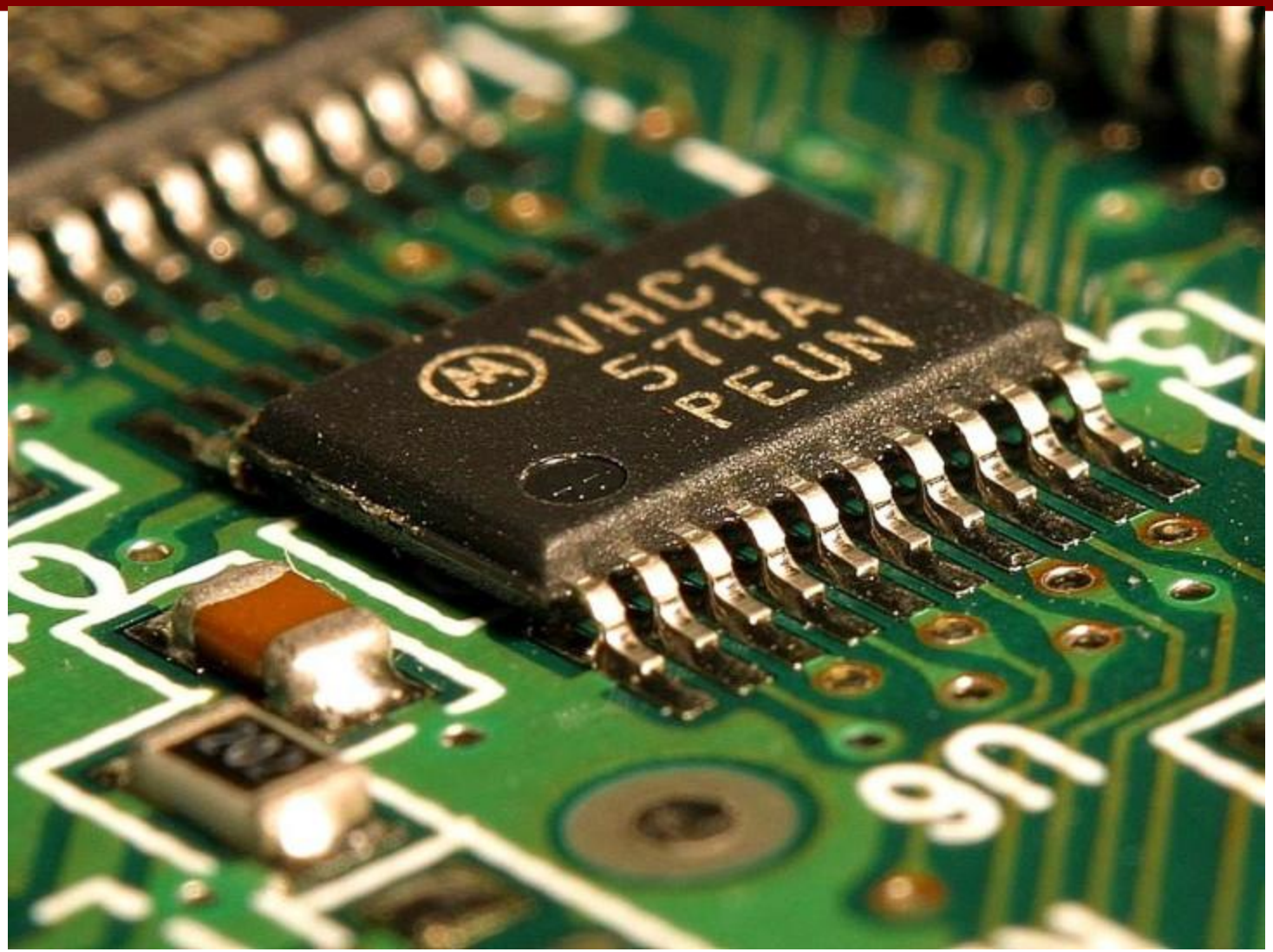
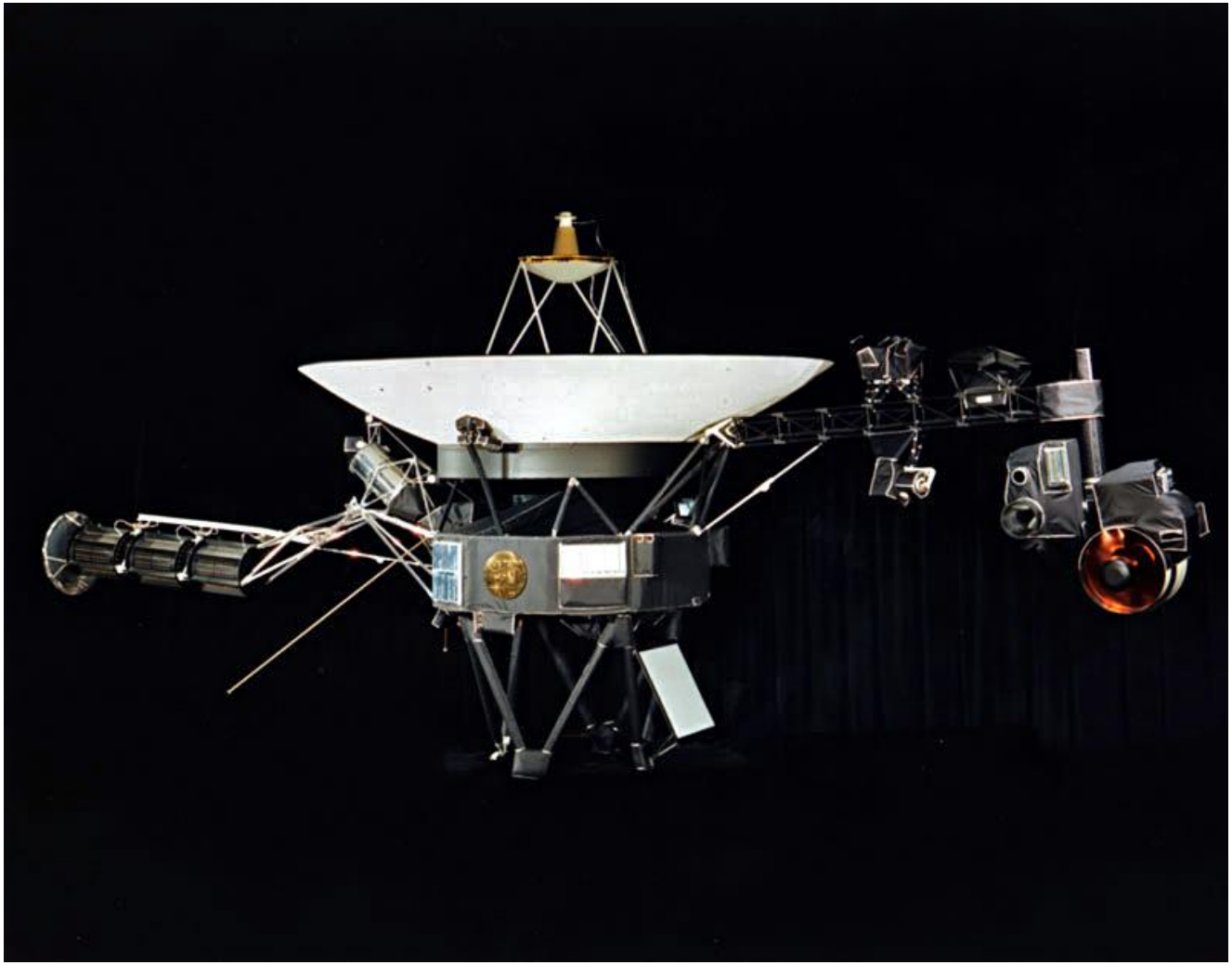

M
@ShrimpingIt
WITH M.I.HIGH

Housekeeping

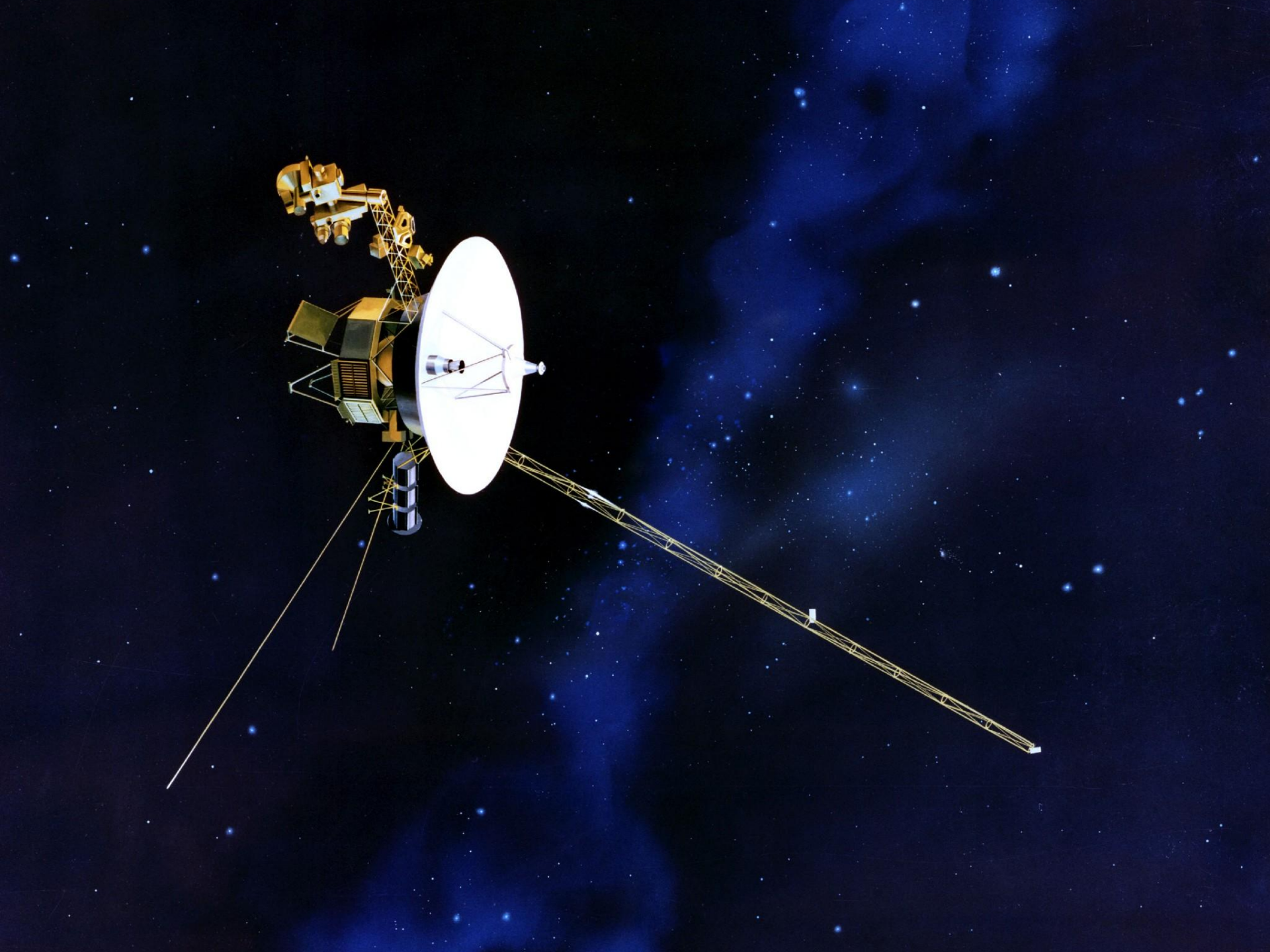
Welcome to M.I. High Training



Mind Control



The underlying tech, proven at a 122 times the distance to the Sun!



Makers

- Hackers experimenting with creating their own technology in basements and garages
- We will teach you entry-level hacking, tools, skills, practices

Build anything

Bathroom fan that switches itself on when it gets steamy or smelly - Google Chrome

15:19 Test User

Bathroom fan that switch

hackaday.com/2012/11/19/bathroom-fan-that-switches-itself-on-when-it-gets-steamy-or-smelly/

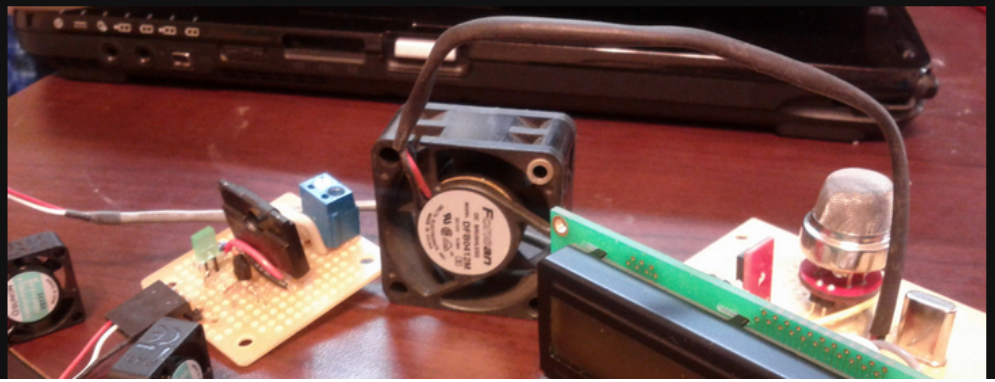
HACK A DAY

HOME | SUBMIT A TIP | FORUMS | SHOP

Search this website ... Search

Bathroom fan that switches itself on when it gets steamy or smelly

November 19, 2012 By Mike Szczys · 27 Comments



dyson airblade

Costs £40.00 per year to run.

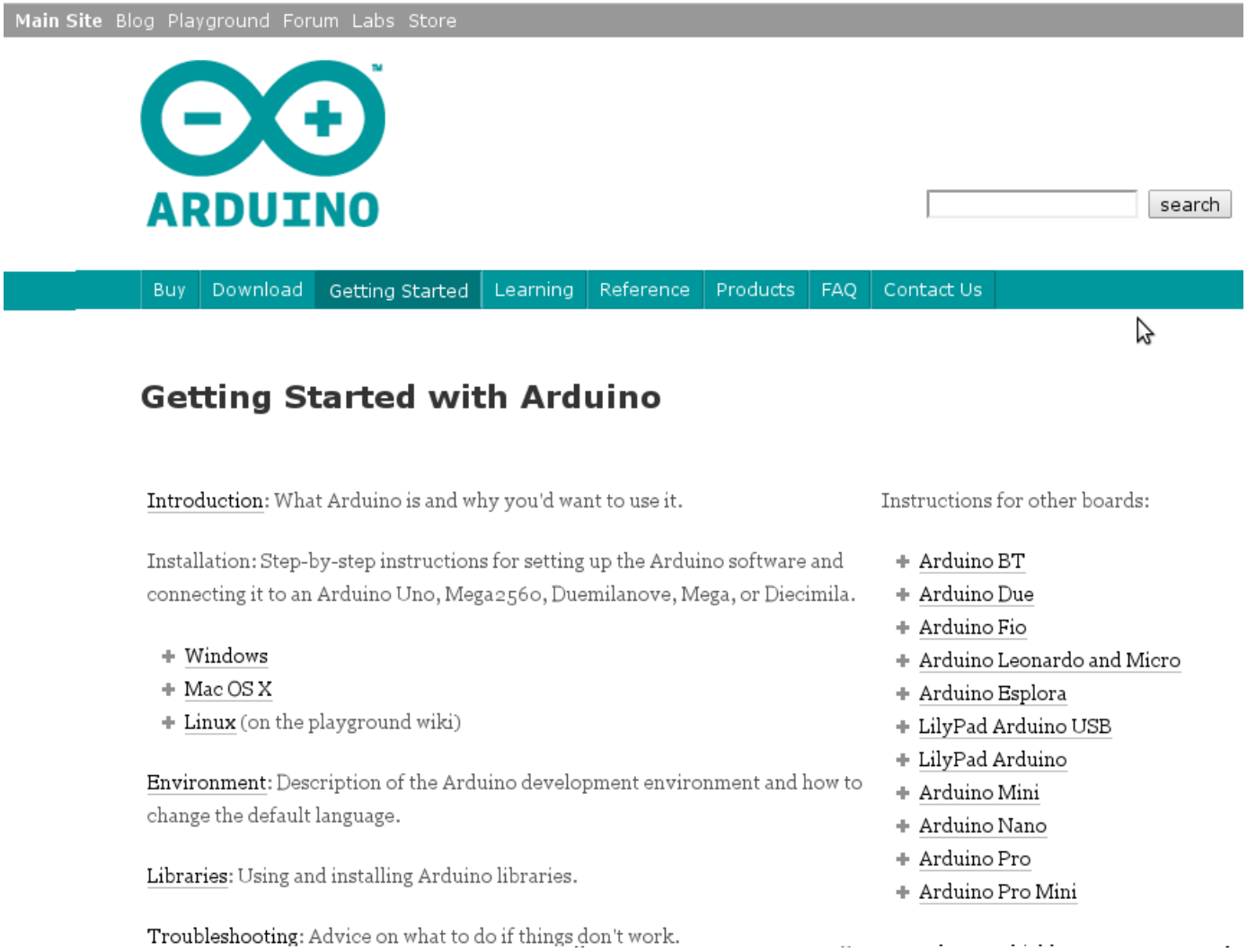
97% less than paper towels.

Start saving now

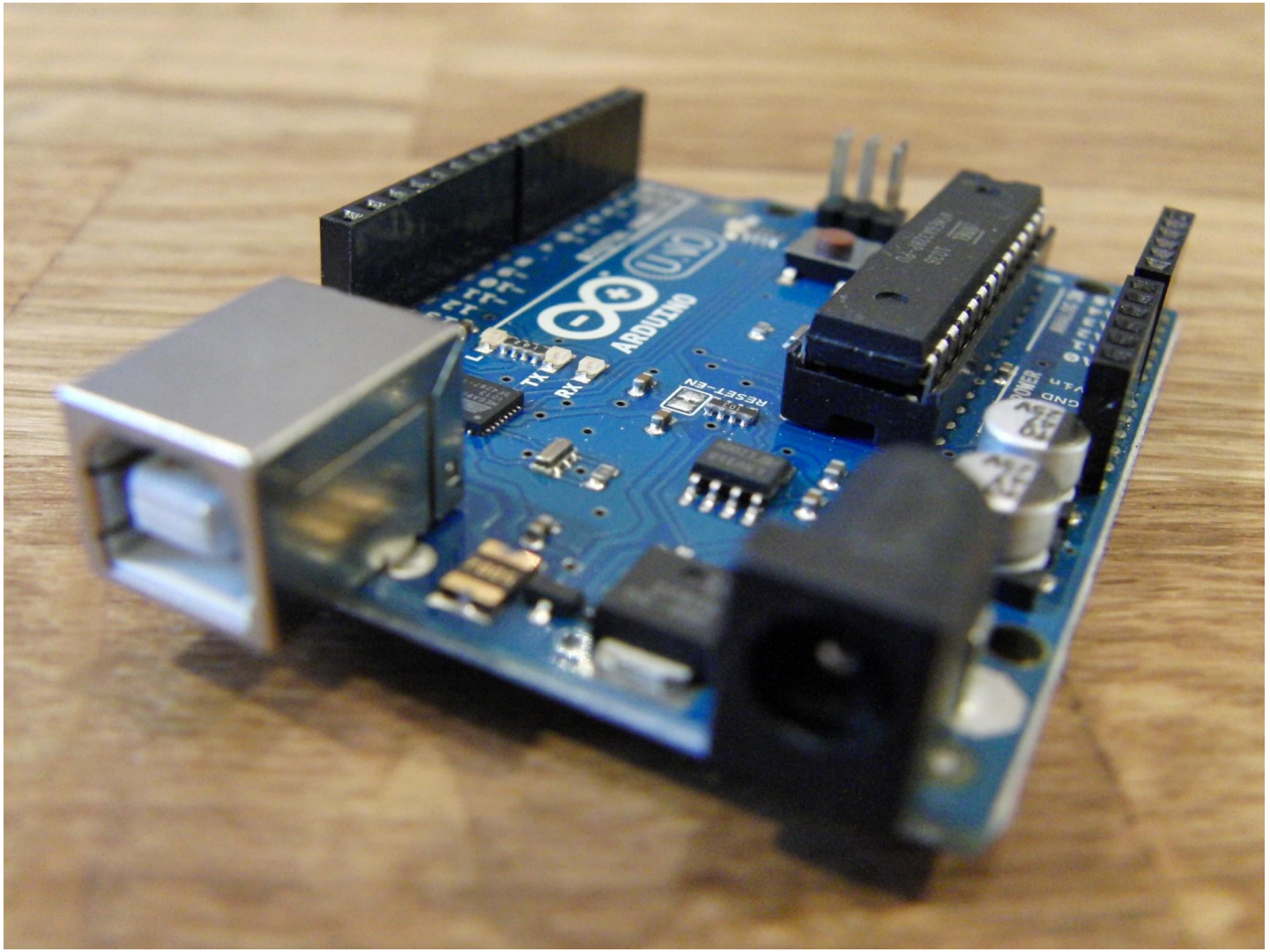
NEVER MISS A HACK

HACKADAY on g+ Follow

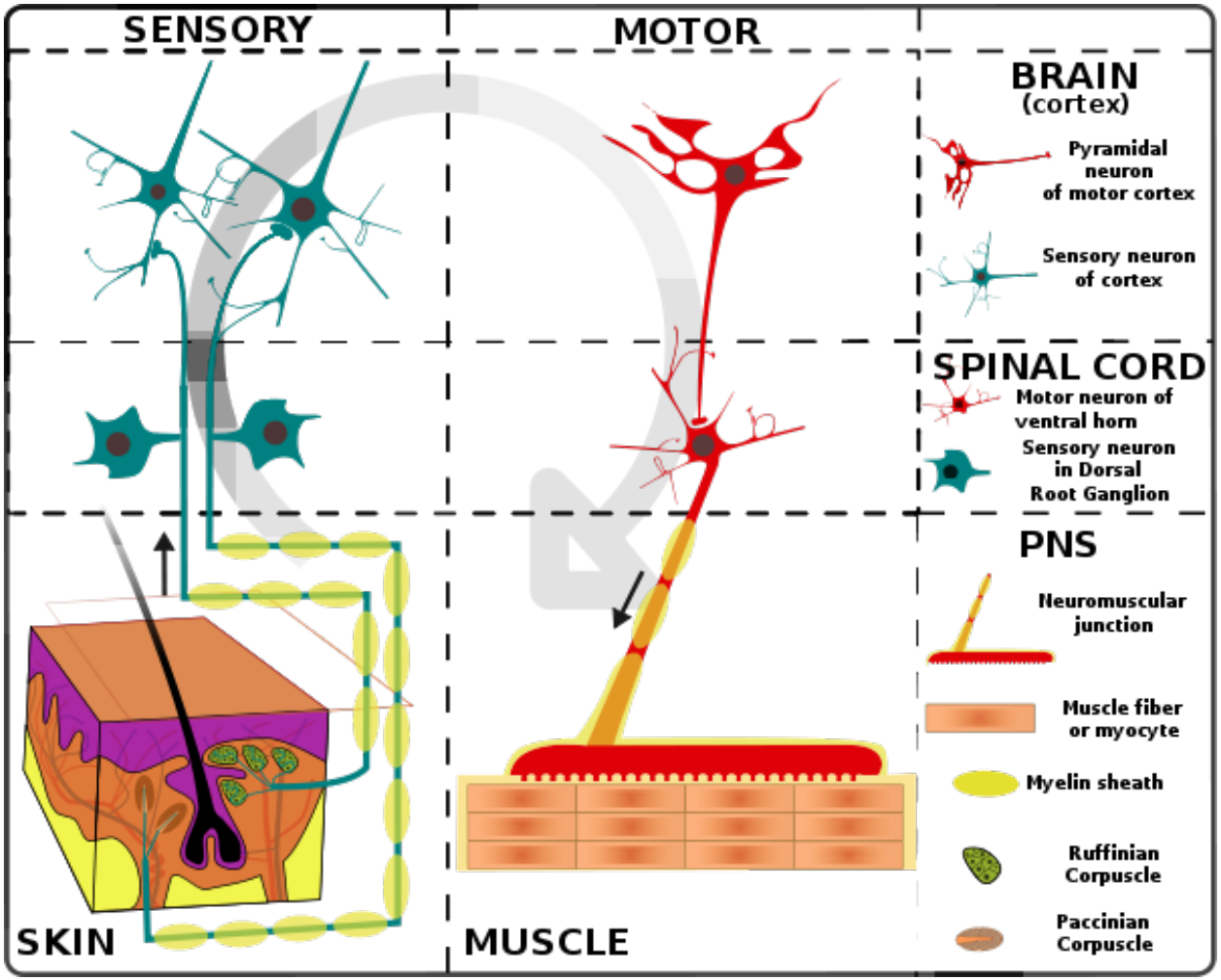
Arduino Community



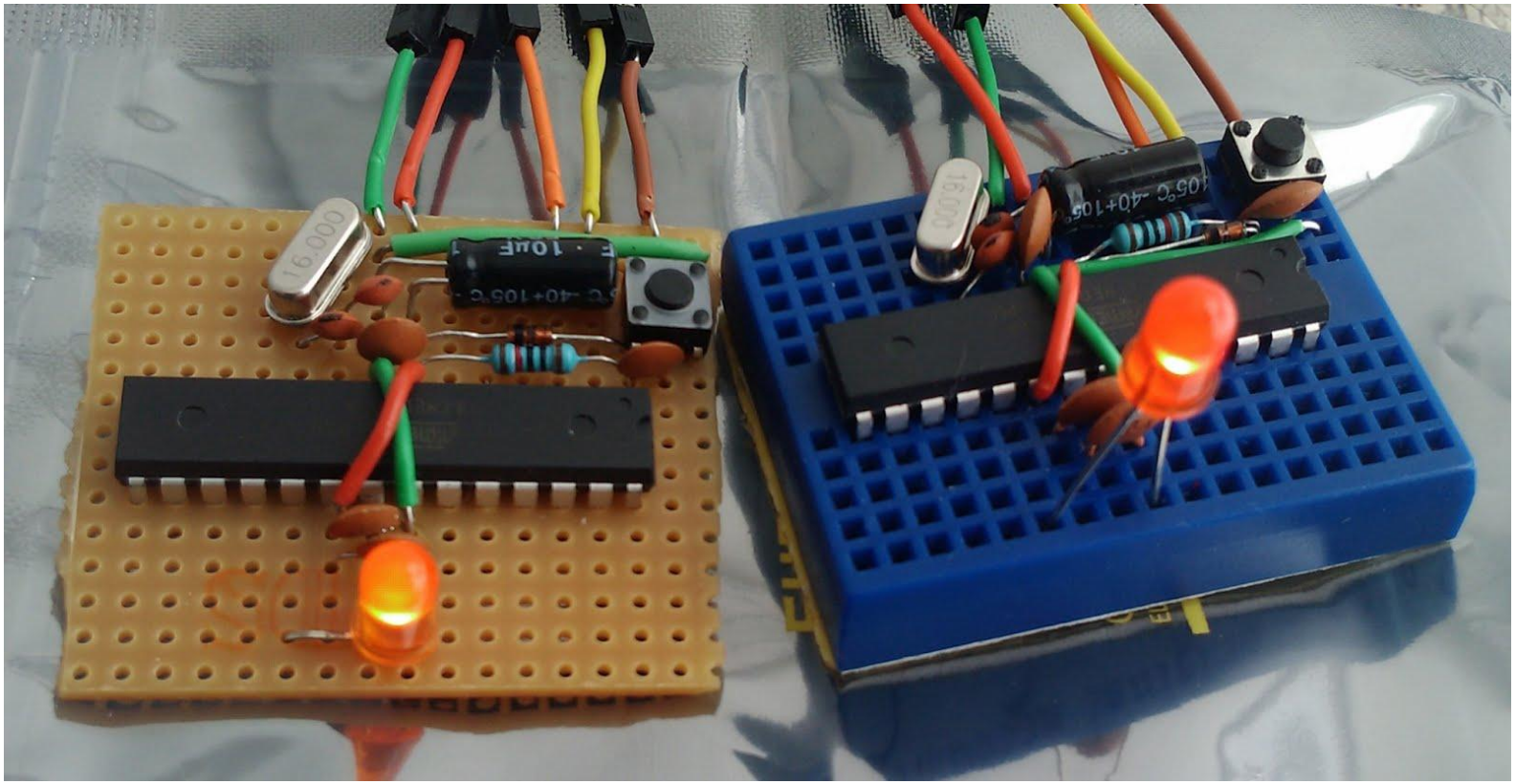
Arduino Ecosystem



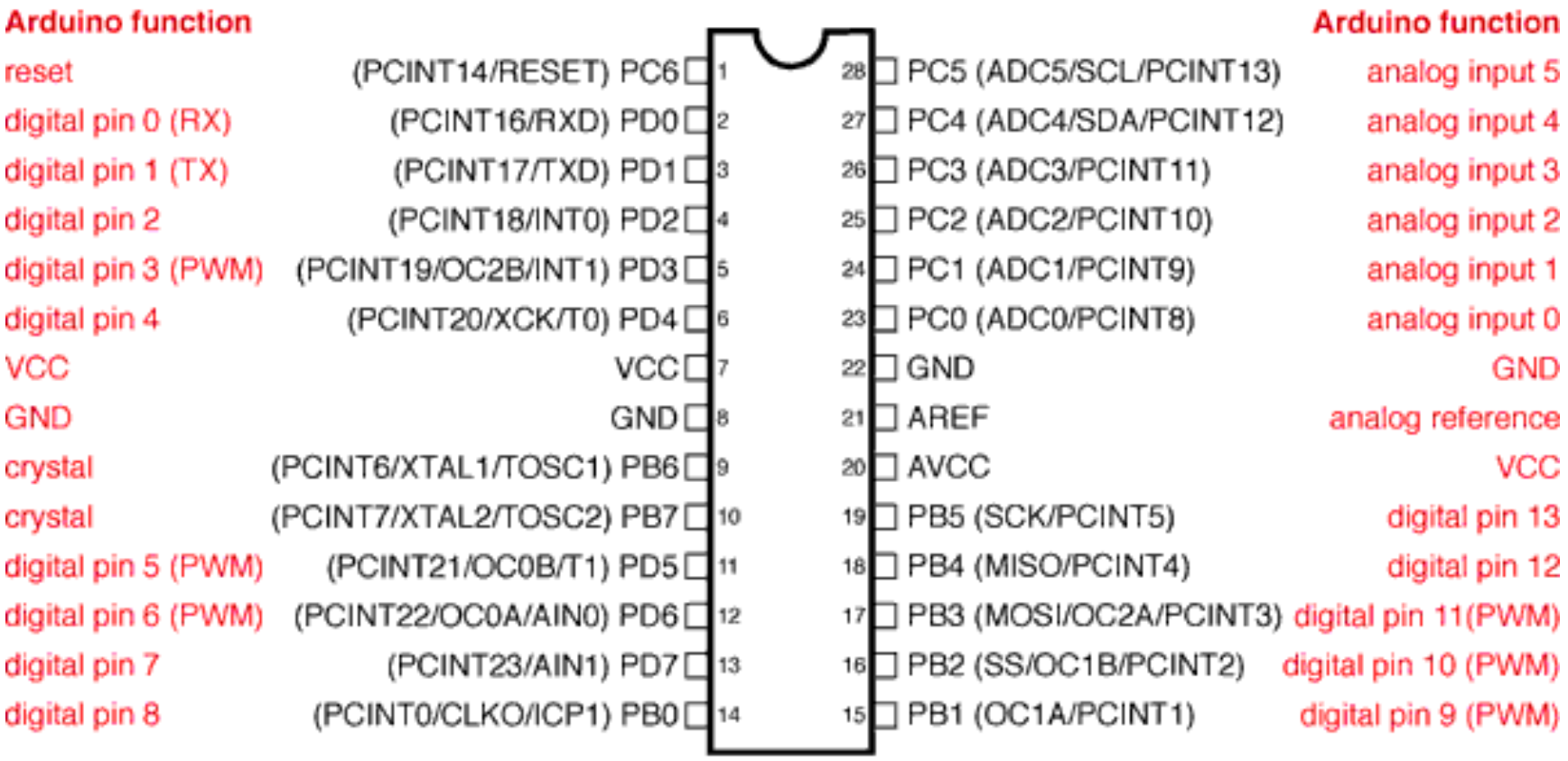
Inputs and Outputs



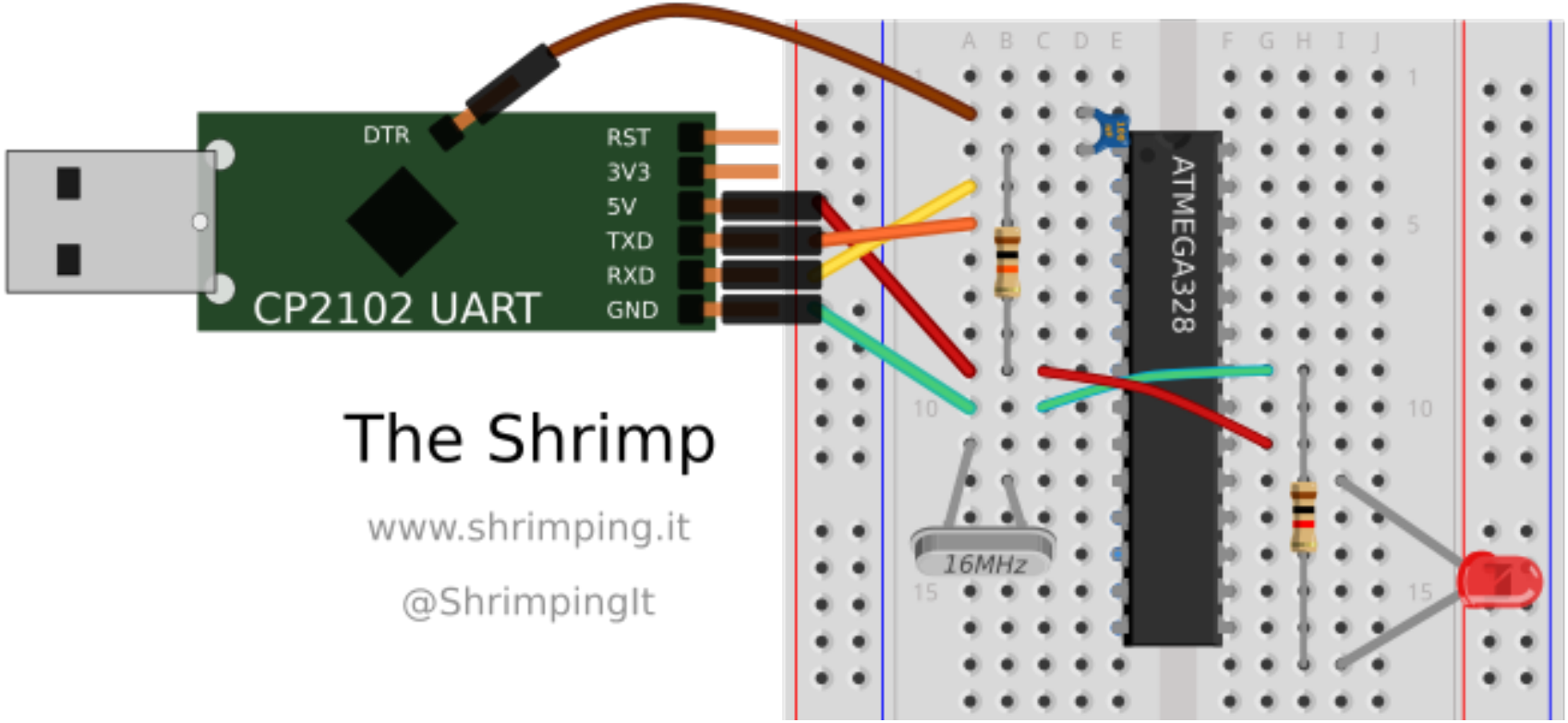
Reverse engineered... the @ShrimpingIt Circuit



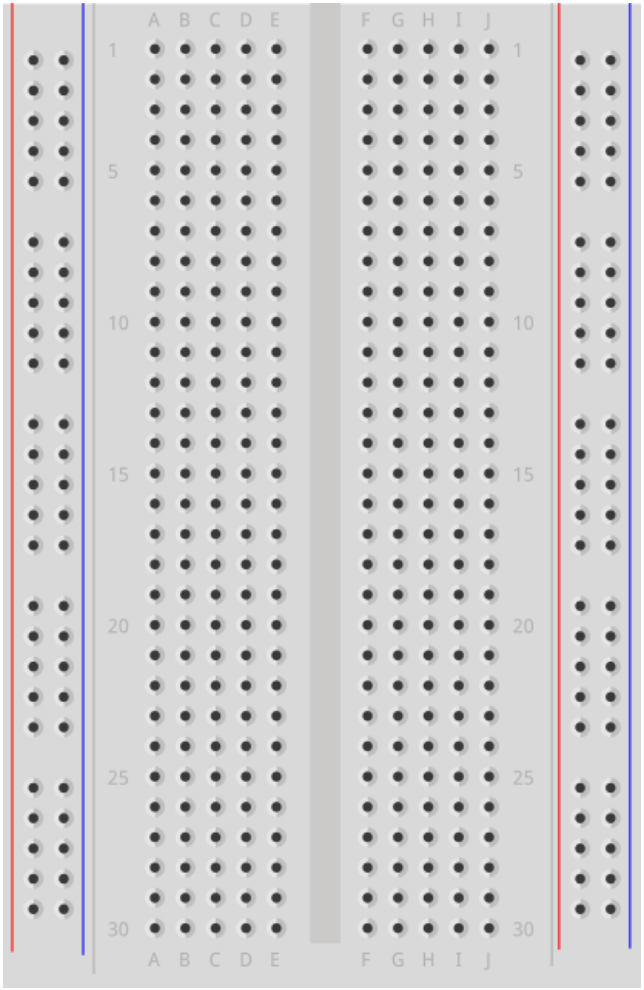
328 Pinmapping



@ShrimpingIt Blink



Breadboard



Values

- ***Examples*** : 9, 10, 'c', "Alan", True, False
- ***Types***: Whole Number, Text, Bits
- ***Operations***: 9+10, 'c' in "Alan", test=!test

Steps

- Store a value

```
int led = 13;
```

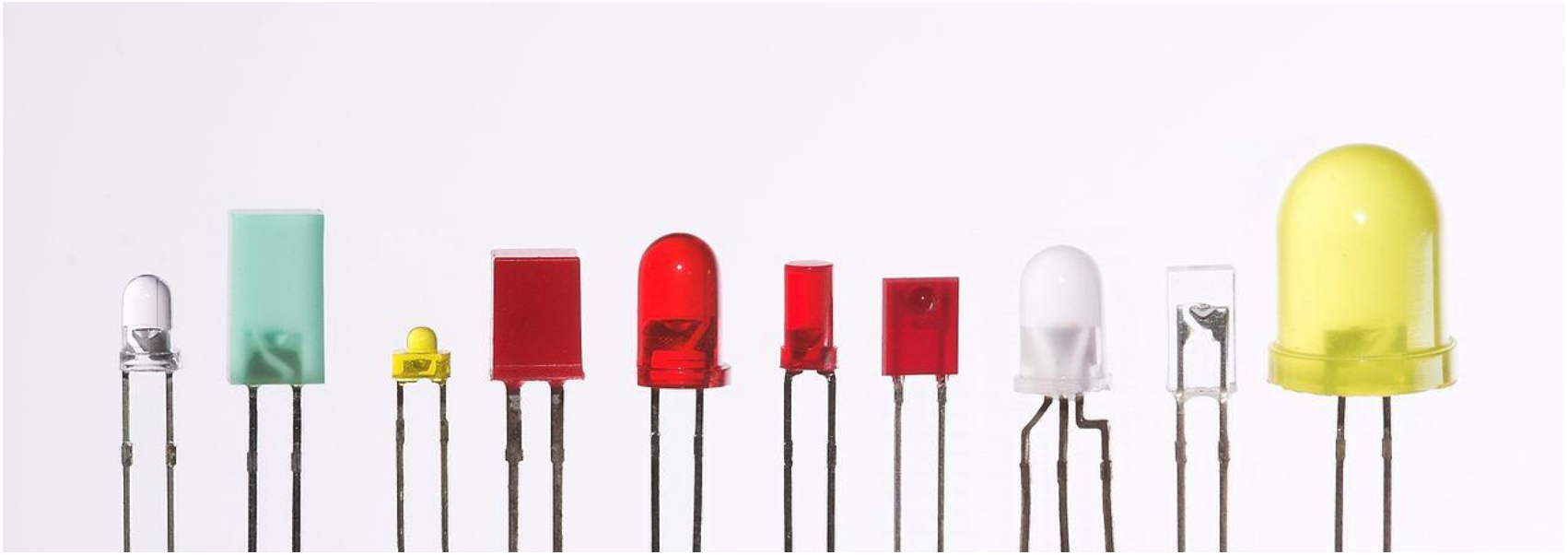
- Turn on an LED

```
digitalWrite(led, HIGH);
```

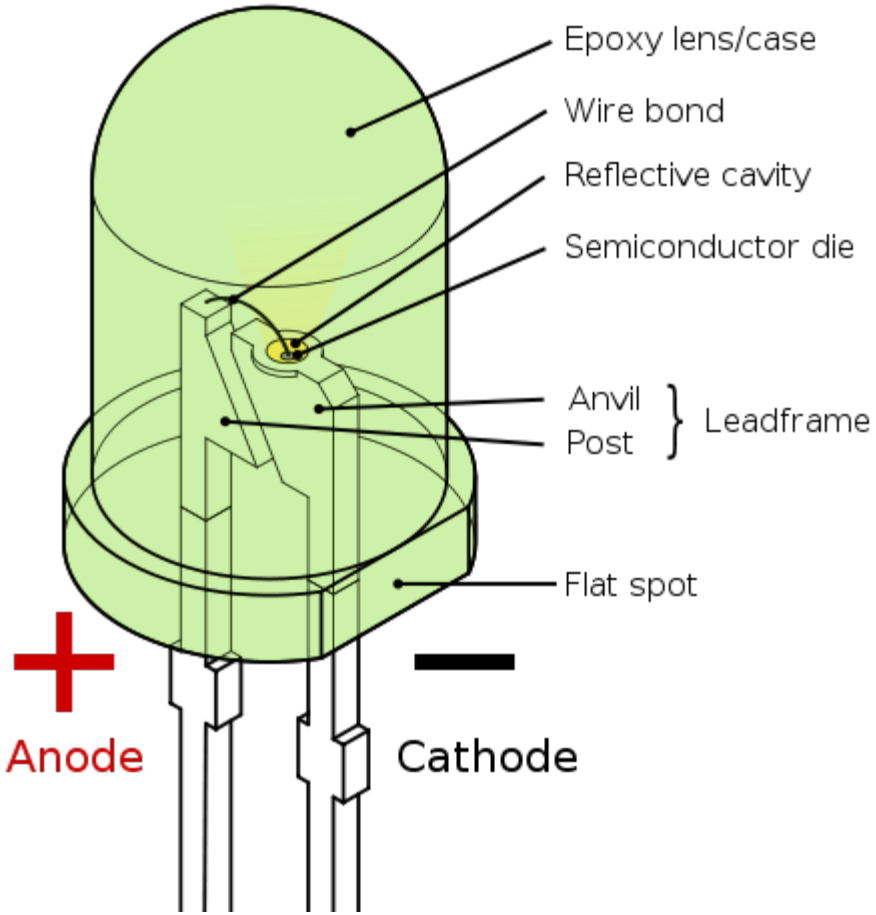
- Wait for 1000 milliseconds

```
delay(1000);
```

LEDs - Light Emitting Diodes



Simple LED


Epoxy lens/case
Wire bond
Reflective cavity
Semiconductor die
Anvil
Post
Leadframe
Flat spot
Anode
Cathode

MIHIGH > BlinkSimple

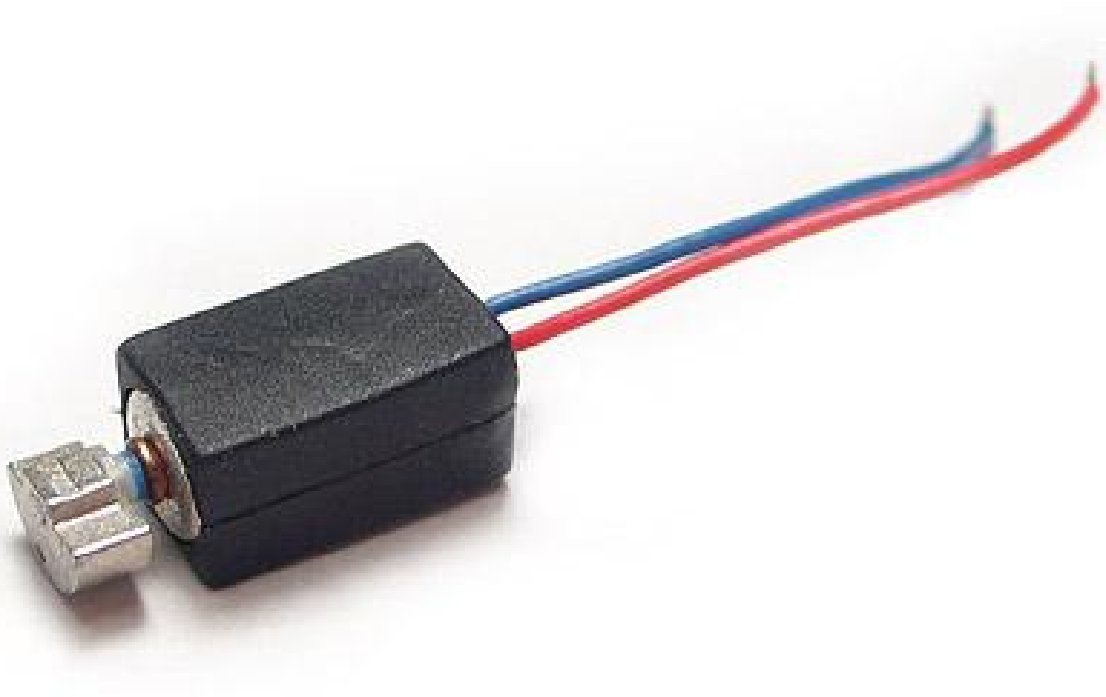
Get your LED to blink either Red, Green or Blue

Attach your circuit and upload the program

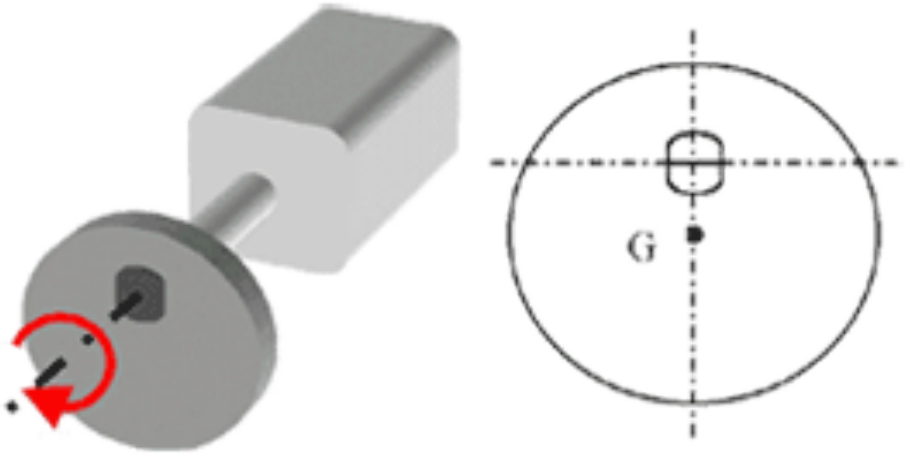
Pinmapping shows which row is Digital Pin 13, plug the Red, Green or Blue wire there

Plug the yellow wire into ground

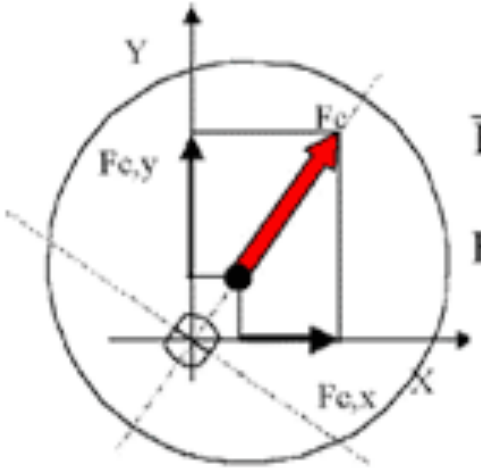
Vibration Motor



Structure of motor



Example of eccentric mass adopted on moto vibrator



$$\overline{F}_c = m\,\overline{e}\,\omega_a^2$$

$$F_c = \begin{cases} F_{c,X} = m\,\omega_a^2\,e\,\mathrm{Cos}(\omega_a) \\ F_{c,Y} = m\,\omega_a^2\,e\,\mathrm{Sin}(\omega_a) \end{cases}$$

Names

Named, stored values are called ***Variables***

MIHIGH > BlinkNamed

Upload to board

Connect a different output between Digital Pin 13 and Ground

RGB LED

RGB Color control

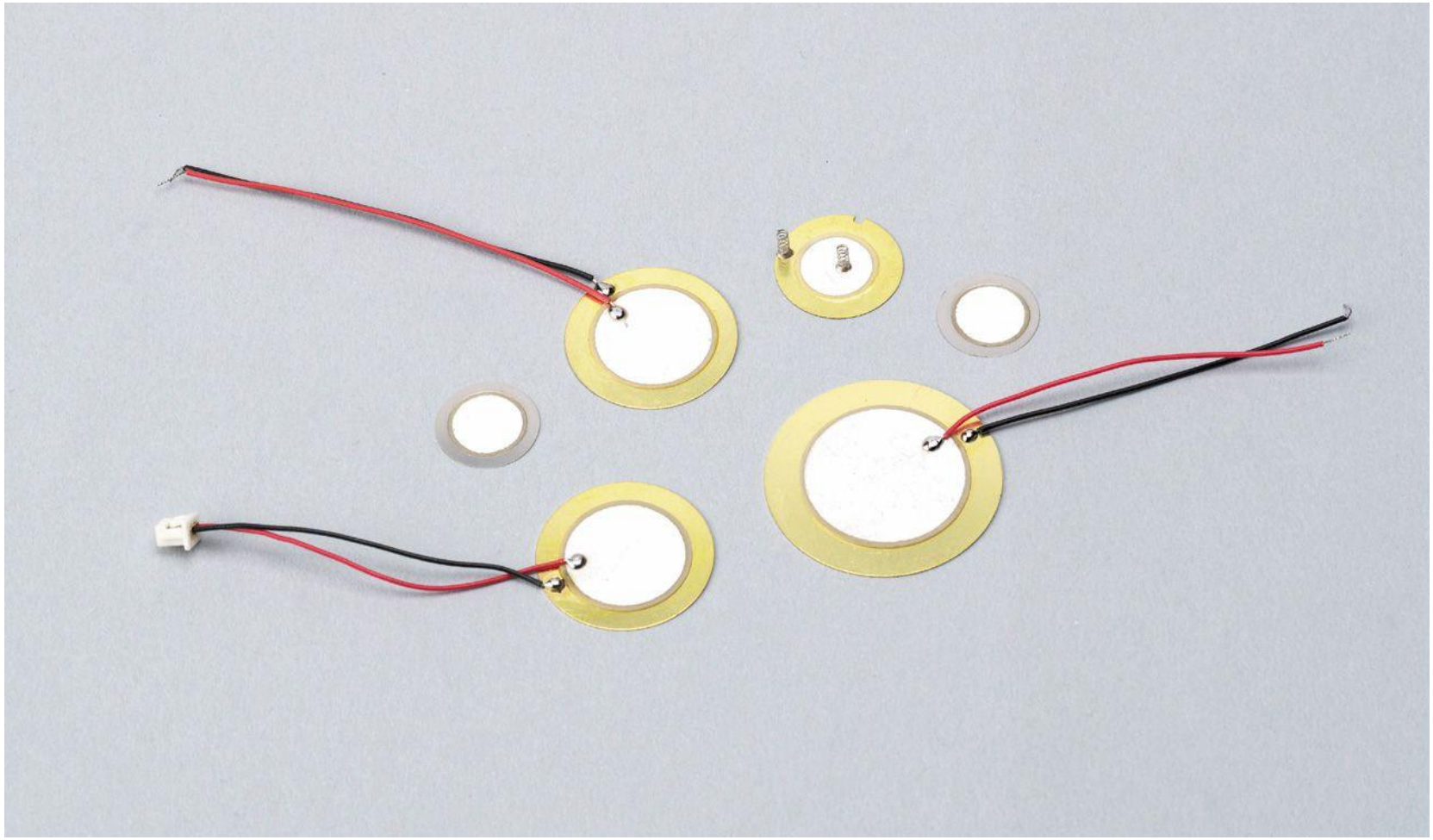
Figure out the wiring using the Pinmapping and reading the code

MIHIGH > BlinkRGBSequenceDigital

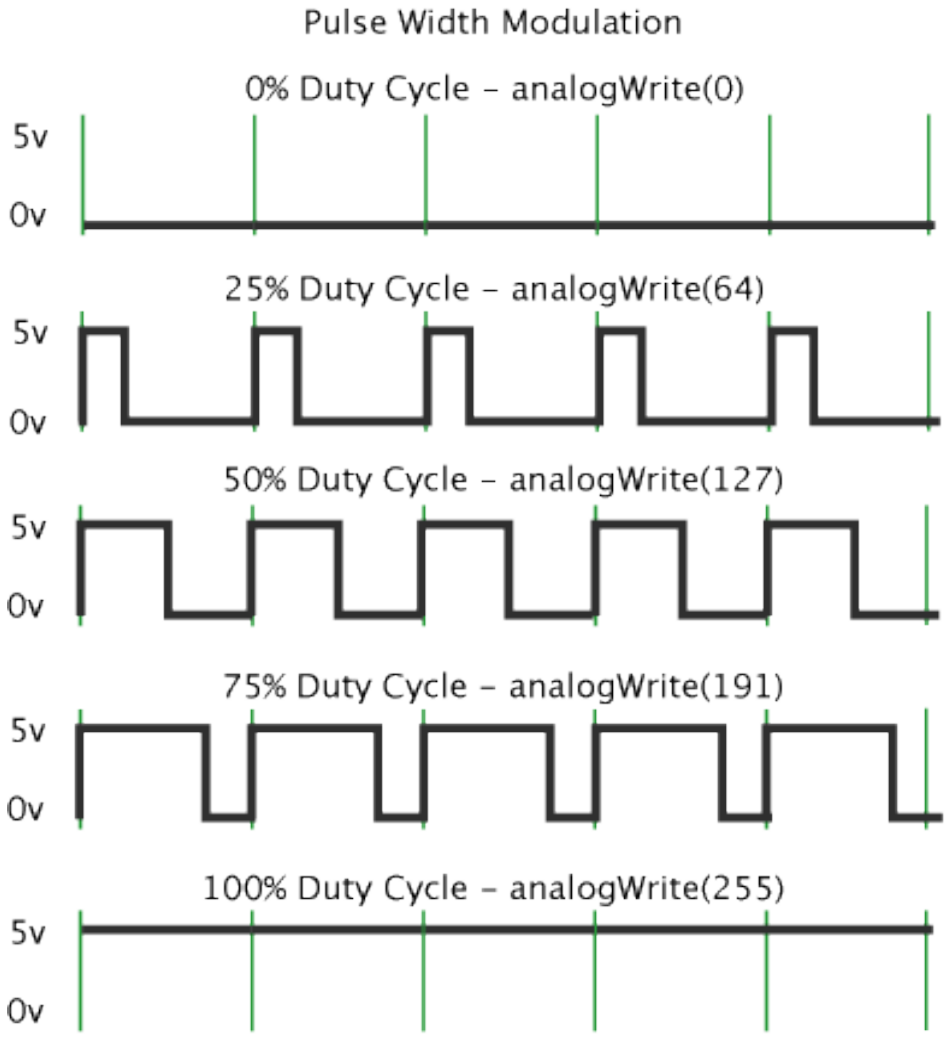
MIHIGH > BlinkRGBRandomCombinations

Piezo Transducer

Piezo Elements



Pulse Width Modulation



Block the Corps Attack

Incoming communication...

Collections

- Collections of values are **Arrays**
- Collections of steps are **Functions**

Tune

TuneArray

See how much simpler it is to work with Arrays

Ringtone

Find an RTTTL file online, or use one of the ones in the sketch to personalise your devices

Increase the Encryption

Incoming communication...

Programming is for people

- **Values**
  - ***Examples*** : 9, 10, 'c', "Alan", True, False
  - ***Types***: Whole Number, Text, Bits
  - ***Operations***: 9+10, 'c' in "Alan", test=!test
- **Steps**
  - ***Examples***: Store value, turn on LED
- **Names**
  - Named, stored values are ***Variables***
- **Collections**
  - Collections of values are ***Arrays***
  - Collections of steps are ***Functions***

BlinkRGBSequenceAnalog

Find your own colors online, using Colorjack colour wheel

Build your own personalised sequence

Signoff

Incoming communication...

Reference Material

Light Emitting Diode
(LED for short)

LEDs are diodes, so they only allow current to pass in one direction. The longer leg should be positive, the shorter one negative. Round LEDs are also flat near the negative leg. They generate lots of different frequencies or colors of light. Only some of them are visible. Many components contain three LEDs; Red, Green and Blue (RGB for short) blending them to create the impression of any colour since the human eye can only sense these three colors.

Resistors limit the movement of charge

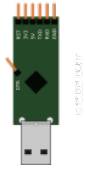
Resistors connect different parts of circuits like a wire. They allow charge to move as part of a circuit's behaviour. However, they have different *resistances* to the movement of charge, measured in Ohms (using the symbol Ω). Circuit designer can therefore control how fast charge moves. If you imagine charge is like water, a resistor is like a narrow pipe. Pressure (voltage) can still build up, but not much water can get through.

Capacitors store a little bit of charge

Capacitors have the ability to store a small amount of charge. Storage is measured in Farads (using the symbol F). In many circuits they help to smooth out unwanted variations in energised charge by releasing it when there's a dip, and absorbing it when there's a peak.
.

Microcontroller combines a computer with inputs and outputs

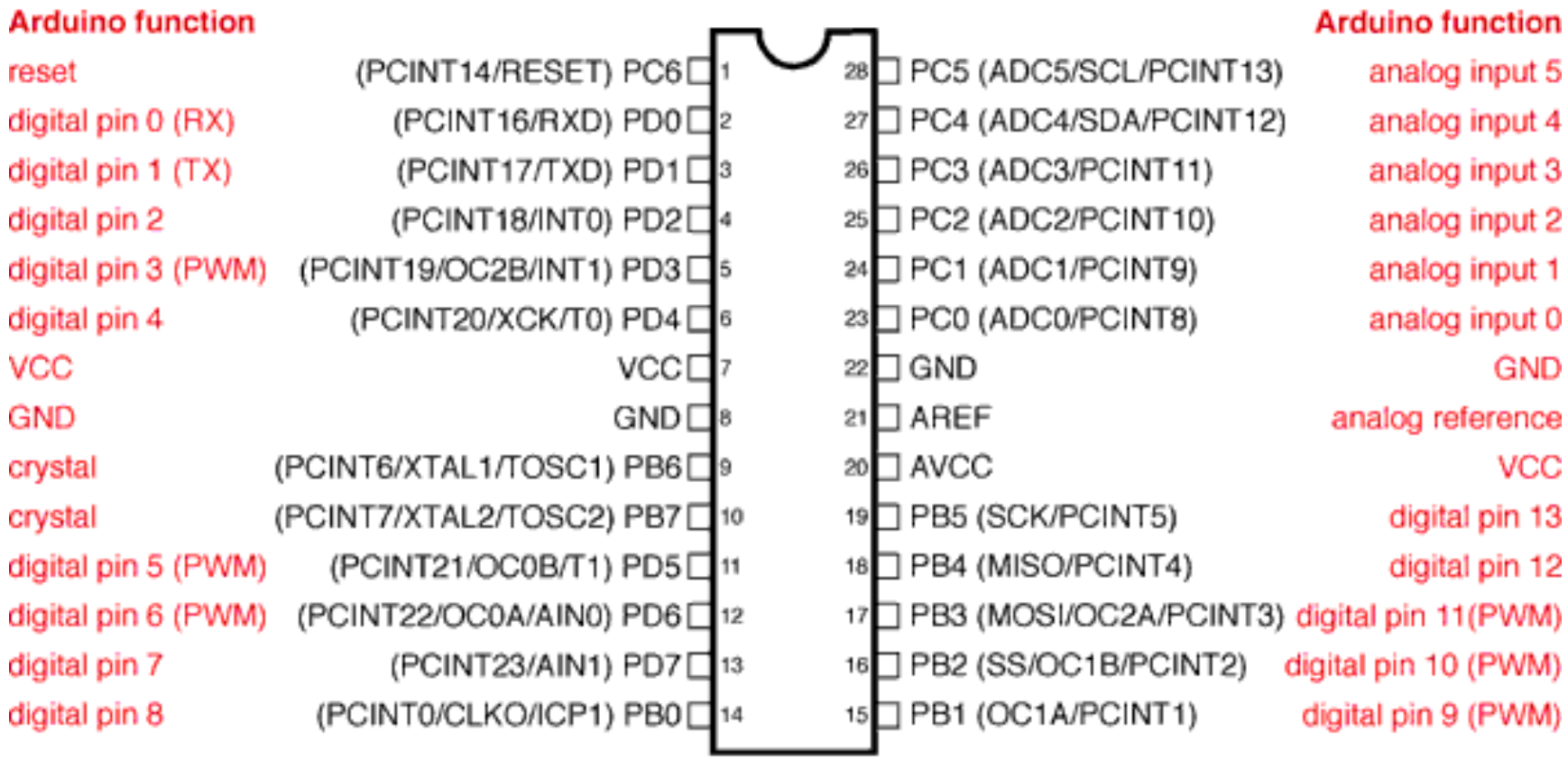
The Arduino Uno and @ShrimpingIt boards both use the ATMEGA328 family of microcontrollers. They can be programmed again and again by sending new digital behaviours over the serial pins (yellow and orange) using the USB device below.. Programs can easily sense or act on the physical world by controlling or measuring the voltage.of different pins.



USB Serial Receiver and Transmitter

Our example circuit uses a CP2102 USB to UART adaptor, which a laptop or desktop can use send and receive information to the Microcontroller. When programming, the digital behaviour, or program, is sent using this device. For some applications, you may also use this to communicate with to a desktop or laptop whilst the project circuit is running.

Shrimp to Arduino Pinmapping



Monitoring Developments

- Instructables' Arduino Channel
  - real world projects, with user-submitted instructions
  - http://www.instructables.com/tag/type-id/category-technology/channel-arduino/
- Hackaday Arduino Hacks
  - inspiring stuff, not always easy to copy without help
  - http://hackaday.com/category/arduino-hacks/
- Make Arduino Projects
  - Makezine is a great source of hacks of all kinds, including electronics
  - http://makeprojects.com/c/Arduino