

# Electronics 101

## Components

### Resistors

“resist current flow”

specify ohmic value and tolerance, wattage ( $P=I^2R$ )

colour code



### Potentiometer or “Pot” or Rheostat

“variable resistor”

specify same as resistor



### Capacitor or “Cap”

“store charge” - opposes change in voltage

electrostatic

specify capacitance, voltage, polar/non-polar

$\mu$  or u – micro, n – nano, p – pico or “puff”



### Inductor or “Choke”

“store current” - opposes change in current

magnetic

specify inductance, maximum voltage, maximum current, air/iron core



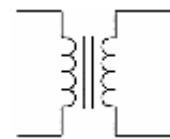
### Transformer

“transform (alternating) current and voltage levels”

specify turns ratio, efficiency, air/iron core

- close relatives are motors, solenoids, relays

“action or work from magnetic field”



### Batteries

“power”

specify voltage, amp-hours



### Diodes

“one way wire” (with the arrow, positive to negative)

specify current, reverse voltage limit, speed



**LED** – “light emitting diode” (forward current lights it up), specify colour



**Zener** – “voltage limiter” ('breaks down' at a reverse bias), specify voltage



## **Transistors**

“valve”



specify maximum voltages, beta or gain, maximum power dissipation

close relatives are silicon controlled rectifier (SCR), triac, field effect transistor (FET)

## **Integrated Circuits or “chips”**

“active components”

specify packaging, temperature range, number of devices in a package

e.g. op-amp – “amplifier”, regulator – “voltage adapter”, inverter – “minus battery”,  
opto-coupler – “transmit/receive light pair” etc. etc.

## **Wiring**

### ***Supplies***

- breadboard or proto board
- enclosure
- switches
- plugs and sockets
- terminal strips or header
- wire & solder
- heat shrink tubing
- tie-wraps or cable ties
- stand-offs
- grommet or strain relief
- nuts, bolts, screws, washers (hardware)
- chip sockets
- epoxy

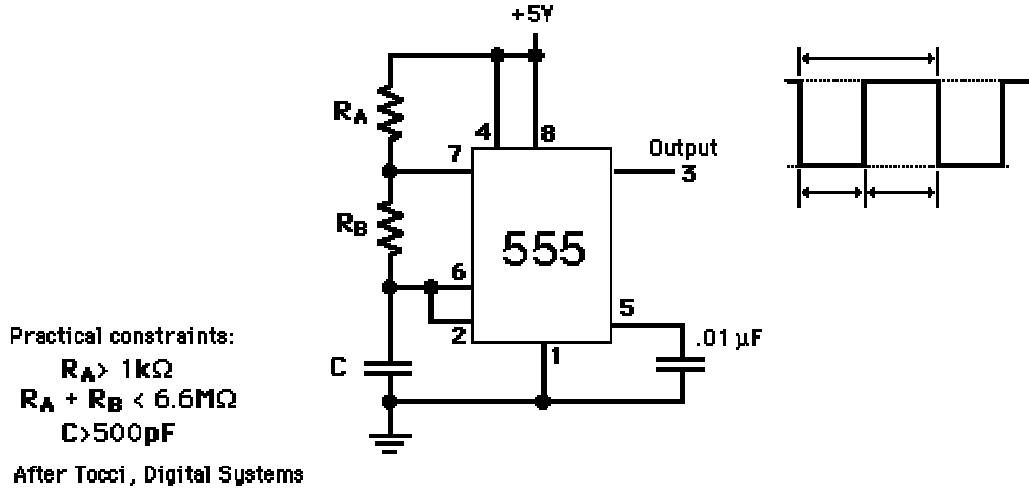
### ***Tools***

- clippers (diagonal cutter)
- wire stripper
- soldering iron
- pliers
- alligator clip leads
- screw drivers
- adjustable wrench

# Circuits

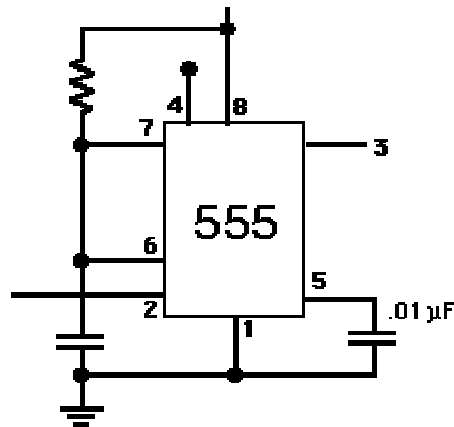
## ***Astable Multivibrator***

Generates a pulse train with configurable duty cycle and period.



## ***Monostable Mutivibrator***

Puts out a single configurable width pulse when triggered.



## Sample and Hold

Remembers a voltage.

