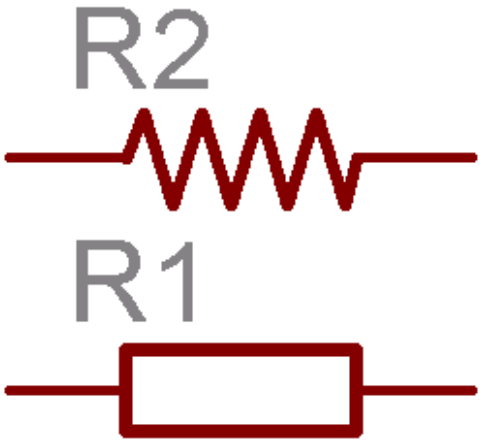
Introduction to components

Introduction to components

- Resistors
- Diodes
- Capacitors
- Transistors
- sensors
- ICs/OP amps
- Microcontrollers
- Motors

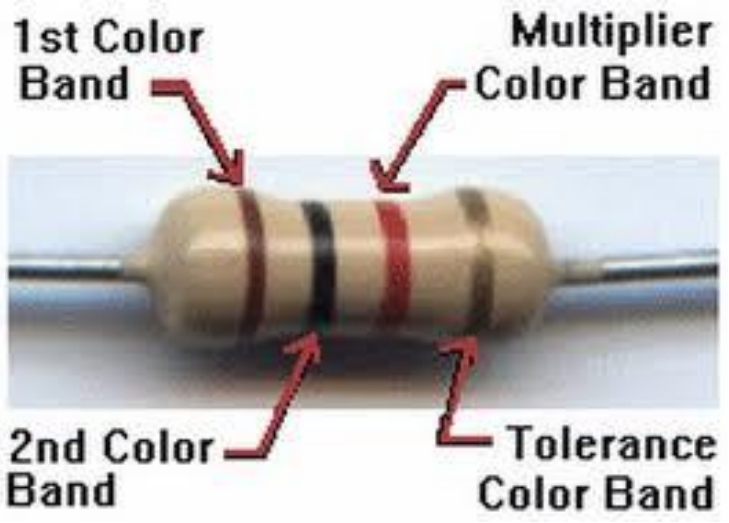
Resistors

- Basic idea
  - Symbols
  - Dropping voltage
  - Controlling current

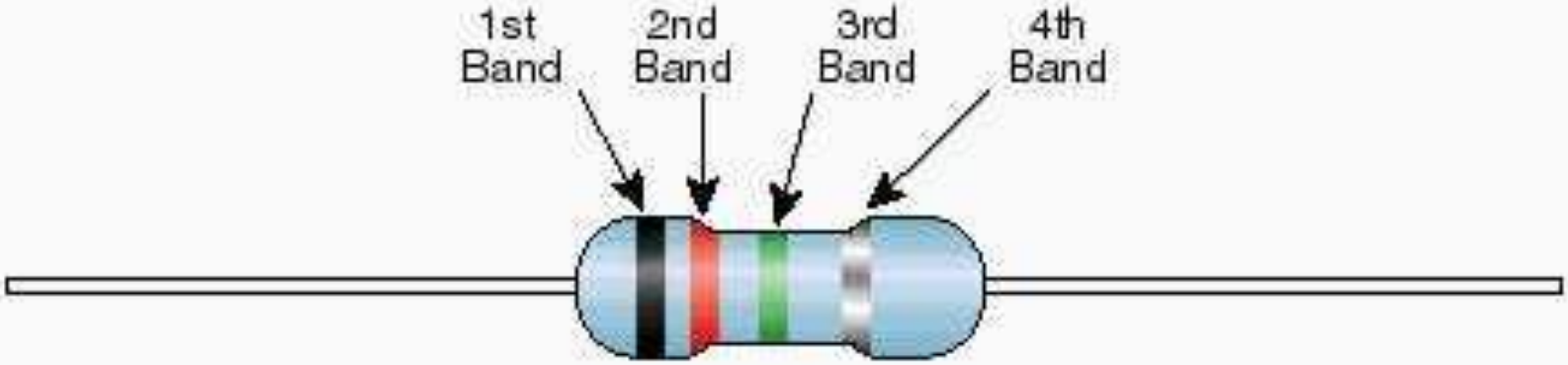


Resistors

- Reading value
  - Color bands
  - Color code
  - Wattage



Standard EIA Color Code Table 4 Band: ±2%, ±5%, and ±10%



Color	1st Band (1st figure)	2nd Band (2nd figure)	3rd Band (multiplier)	4th Band (tolerance)
Black	0	0	10^0	
Brown	1	1	10^1	
Red	2	2	10^2	±2%
Orange	3	3	10^3	
Yellow	4	4	10^4	
Green	5	5	10^5	
Blue	6	6	10^6	
Violet	7	7	10^7	
Gray	8	8	10^8	
White	9	9	10^9	
Gold			10^{-1}	±5%
Silver			10^{-2}	±10%

Capacitors

- Introduction
  - Storing charge
  - Release it when needed

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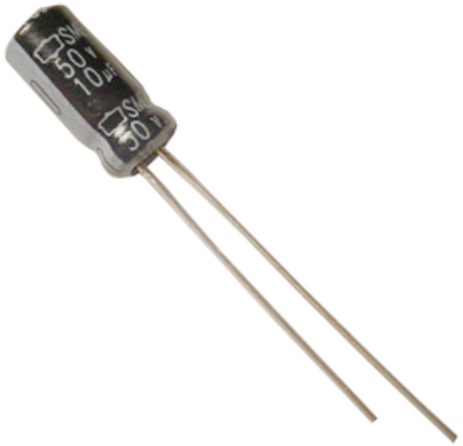
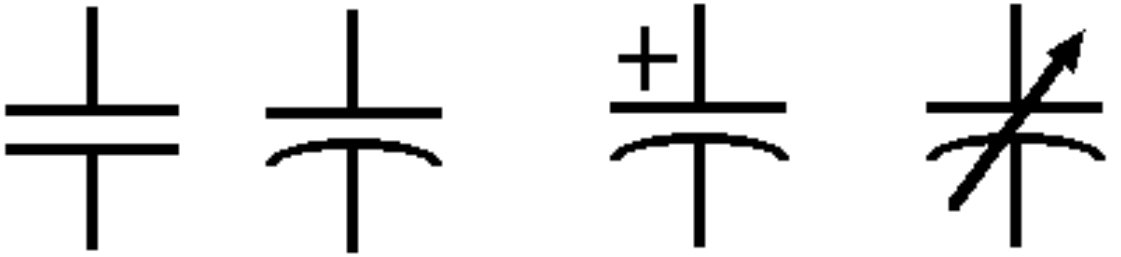
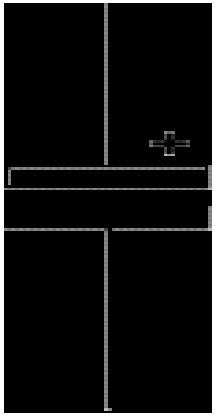


Capacitor - symbols



Normal Normal Electrolytic Variable



Reading values

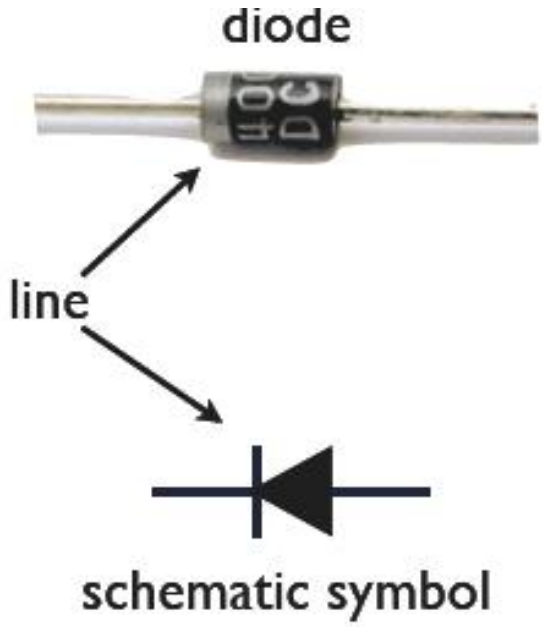
Capacitor Value Codes

Fig. 2

3rd Digit	Multiplier	Letter	Tolerance
0	1	D	0.5 pF
1	10	F	1 %
2	100	G	2 %
3	1,000	H	3 %
4	10,000	J	5 %
5	100,000	K	10 %
6,7	Not Used	M	20 %
8	.01	P	+100, -0 %
9	.1	Z	+80, -20 %

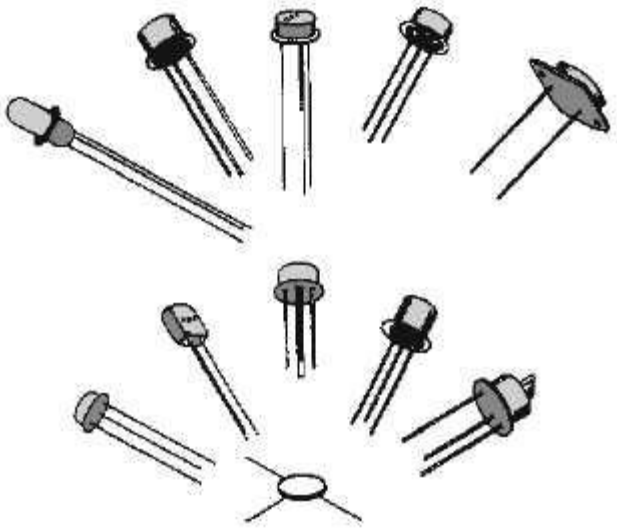
Diodes

- Electronic valve
- symbols



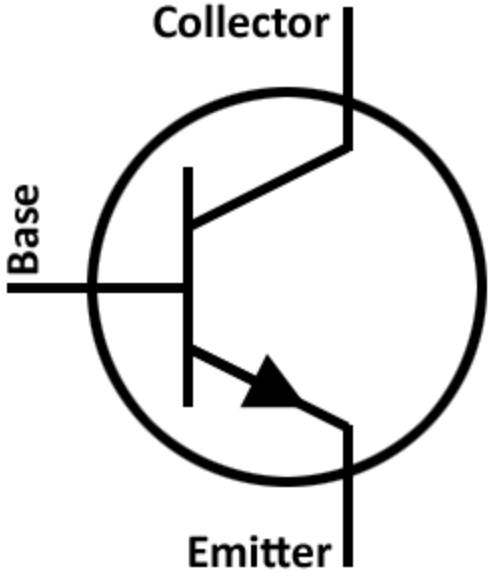
Transistors

- Amplifier/ switch
- Identification

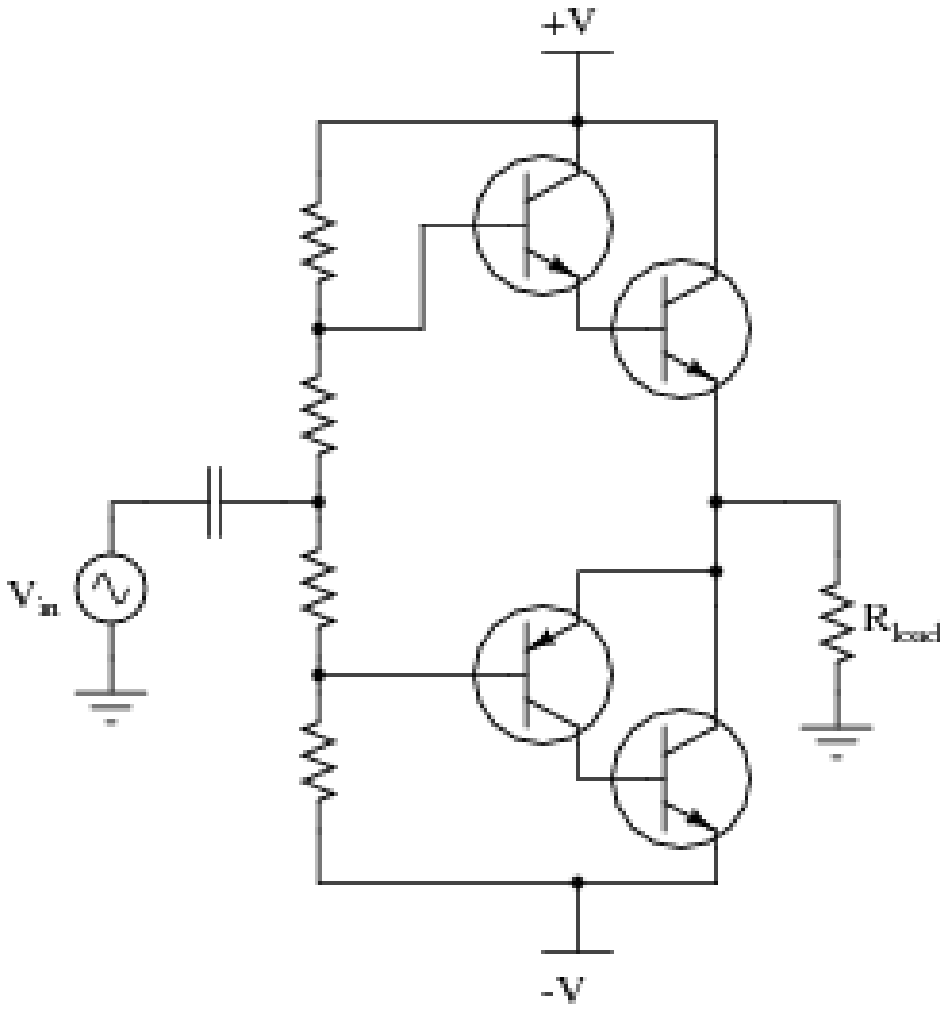


Symbols

- npn – pnp



In circuit identification

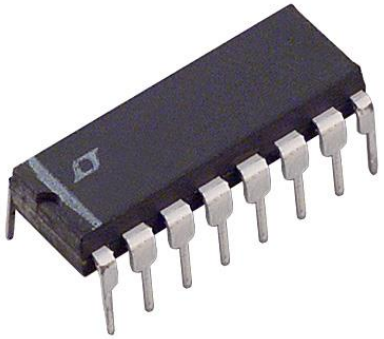


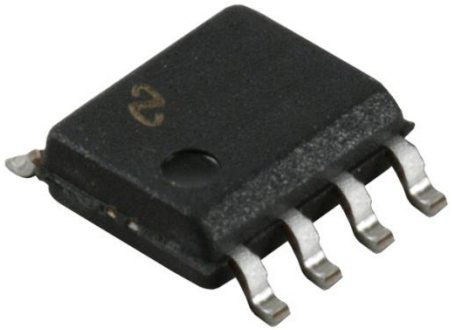
Sensors

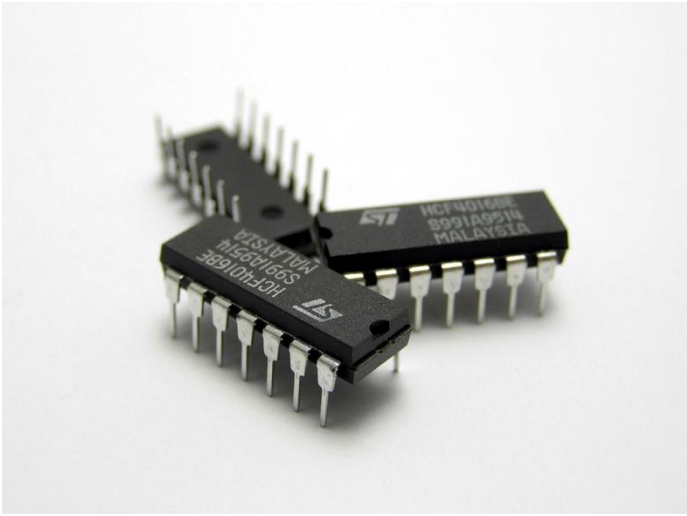
- Sense a particular frequency
- IR / Light
- Varies resistance according to sense

Integrated Circuits

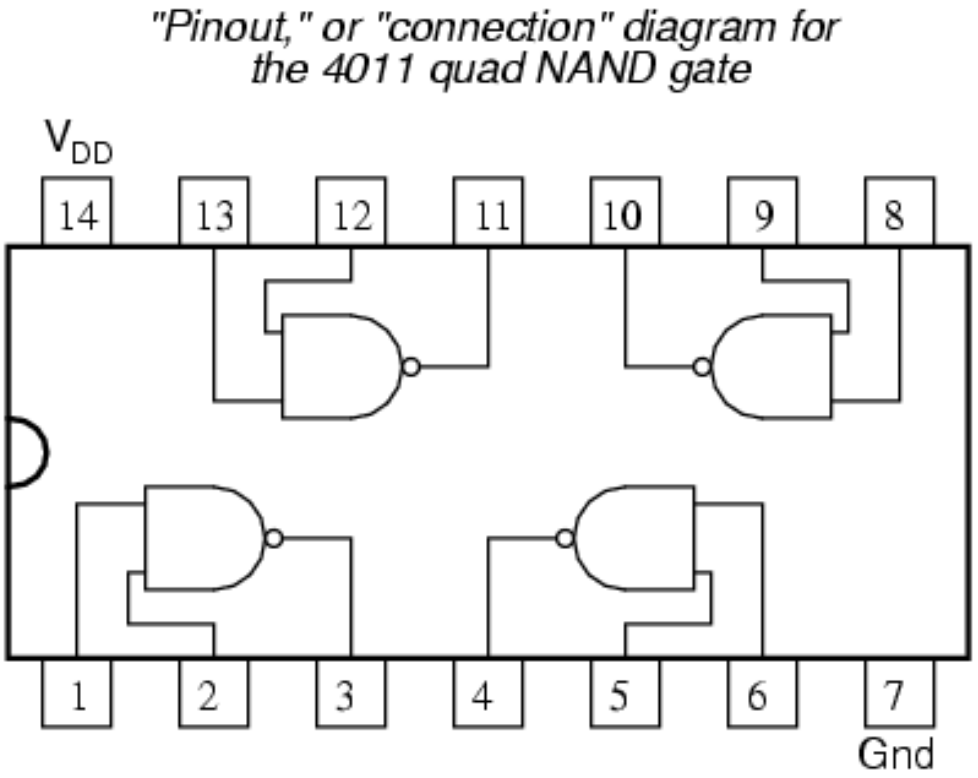
- Millions of transistors together



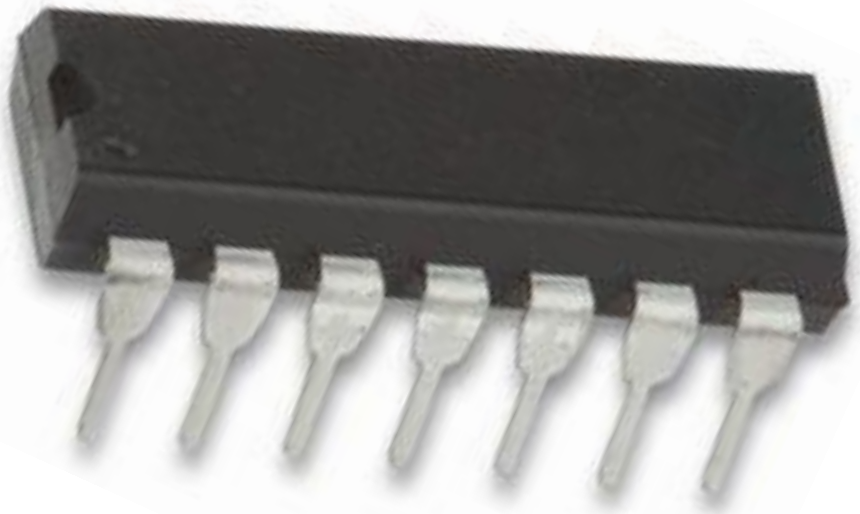




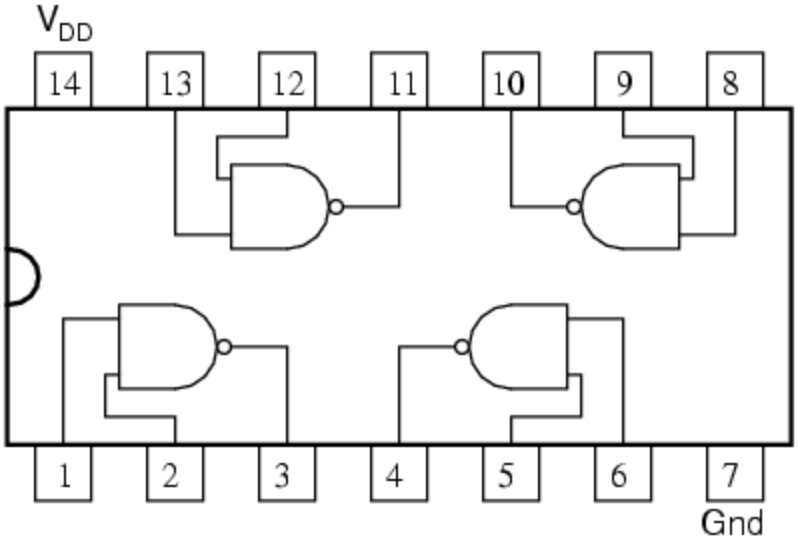
Internal structure



Pin identification



"Pinout," or "connection" diagram for the 4011 quad NAND gate



Microcontrollers

- Programmable IC
- Can be programmed
- Pins to input data
- Pins to out put data
- Commonly used types

Geared Motors

- Used to drive the robot
- 3 inputs
- Direction/Ground
- Operated by DC voltage