

Lab 1

Project Introduction

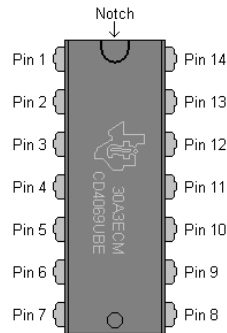
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Components

- ICs (7400 series)
- Breadboard
- Wires
- LEDs
- DIP Switch
- Capacitors
- Resistors
- Power Supply

Integrated Circuits (ICs)

- Basic components of Digital Computing
- We will use 7400 series family of ICs
- Notch always indicates the top of the chip
- Pin 1 is always to the left of the notch
- Usually operate at either 3 V or 5 V



Every 7400 series IC obeys the following convention:

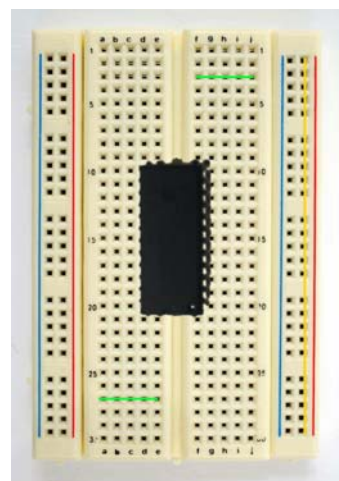
- 3 / 5 V → Logic 1 or TRUE
- 0 V → Logic 0 or FALSE

- Power is applied to the top right pin
- Ground is applied to the bottom left pin

Breadboard

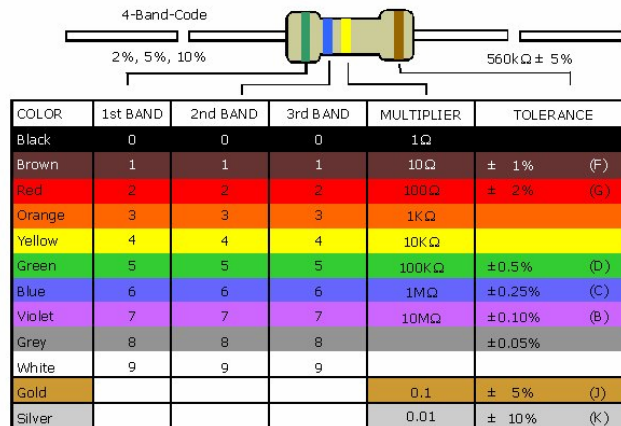
Breadboards are used for prototyping system designs.

1. All the holes in every row are connected (Green lines show two examples of rows)
2. All the holes in columns marked by a blue or red are also connected (Orange line shows an example)
3. IC chips must always be connected across a bridge as indicated



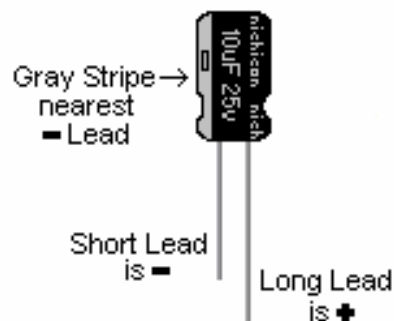
Resistors (Ohms)

- Used to reduce the amount of current going to a device



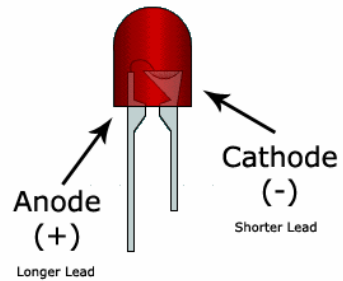
Capacitor (Farads)

- Used to store charge.
- Have a +ve and -ve lead



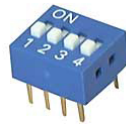
LEDs

- Produces light for variety of purposes
- Voltage must always be applied to the positive side (+ve)
- Always connect a resistor before an LED



Other Components

- Dip Switch – used for input and power control



- Wires – Used to make connections in the circuit
- Power Supply – Used to provide the required power to the board

Schematic Symbols

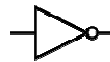
- AND Gate



- OR Gate



- NOT Gate



Schematic Symbols

Switch



Buffer

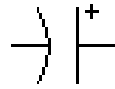


LED



Schematic Symbols

- Capacitor



- Resistor

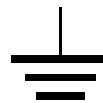


- Wire



Schematic Symbols

Ground



Power uses various symbols

Safety Considerations

- NEVER CONNECT THE POWER AND GROUND PINS OR CABLES TOGETHER, THIS WILL RESULT IN A SHORT CIRCUIT
- A short circuit may lead to electric shock and may damage the Lab Kit components
- Always check (as much as possible) to make sure that you connected the components correctly before applying power to any circuit

Safety Considerations

- Power Supply must be used carefully
- Always use shielded wires
- ICs and other components may get warm, but should never get extremely hot
- If this happens, disconnect the power supply as soon as possible
- Do not drink any beverages around in the Lab or around the Lab Kit

Experiments

- Power up an LED
- Use an NOT Gate (Inverter) to control an LED
- TA will provide all the necessary assistance