A LEVEL DESIGN ENGINEERING

6.6 ELECTRONIC INPUT COMPONENTS

Learning objectives

- ❑ What are the common electronic input components?
- ❑ Which circuit symbols are used to represent the components?
- ❑ What are the common applications of these components?
- ❑ Why are they used?

Key words:

Components, active, passive, device, input, output, application, sensor

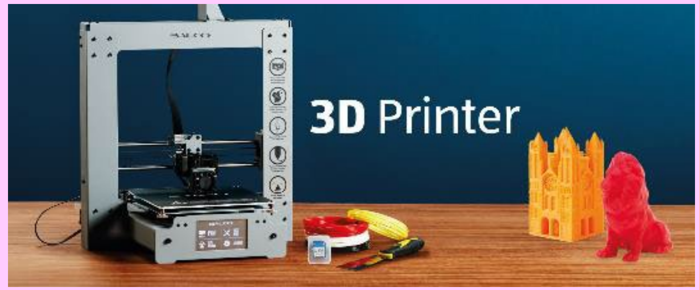
Learning objectives:

- ❑ What are the common electronic input components?
- ❑ What are their common applications?

Starter

There are many types of electronic components used in products.

What types of electronic components do you think are used in these products?

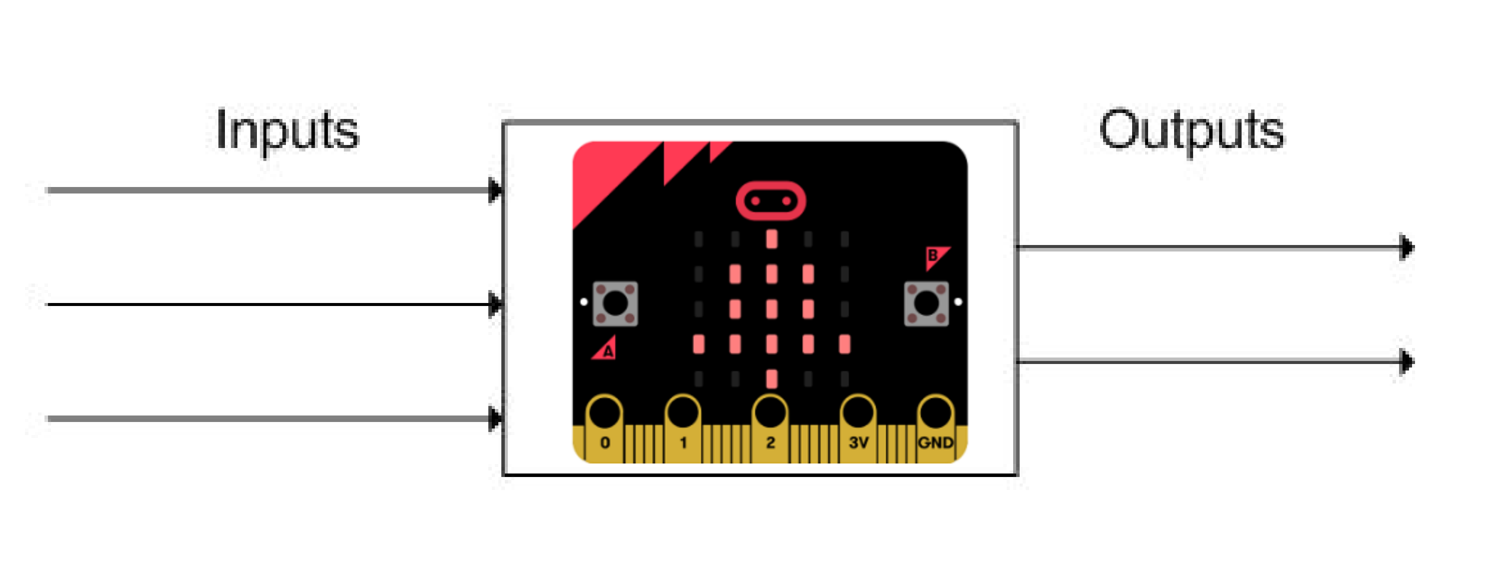


Learning objectives:

- ❑ What are the common electronic input components?
- ❑ What are their common applications?

Explanation

How are these components used in a system?



Switch

Microphone

Light sensor

LED display

Motor

Speaker

Learning objectives:

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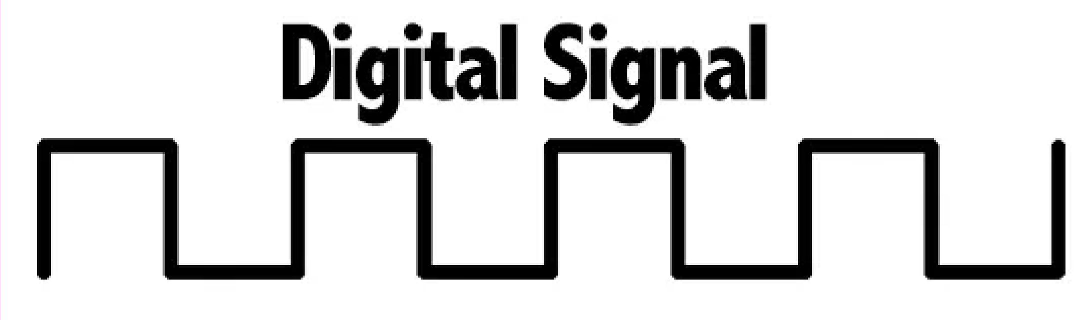
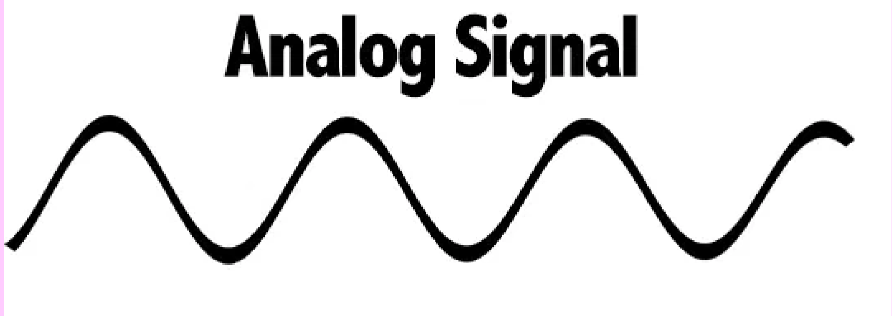
Explanation

What is the difference between an analogue and digital input?





Learning objectives:

- ❑ What are the common electronic input components?
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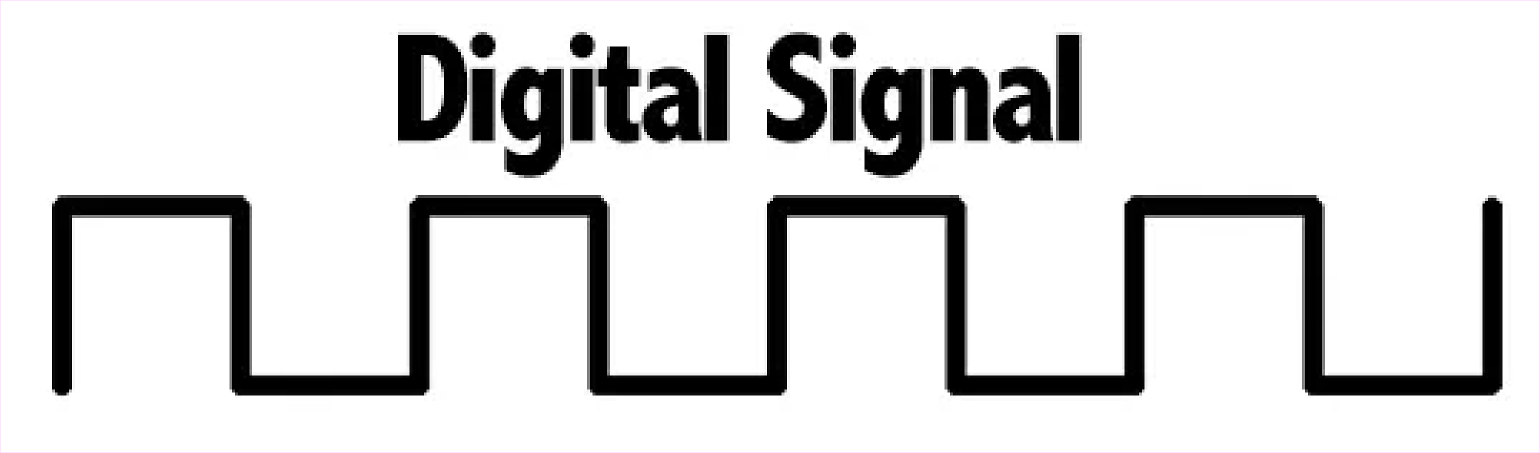
Explanation

What are the different types of digital input?

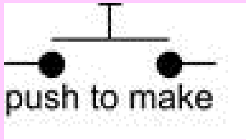


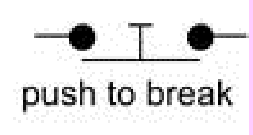
Learning objectives:

- ❑ What are the common electronic input components?
- ❑ What are their common applications?

Explanation

Switches – Momentary or non-momentary



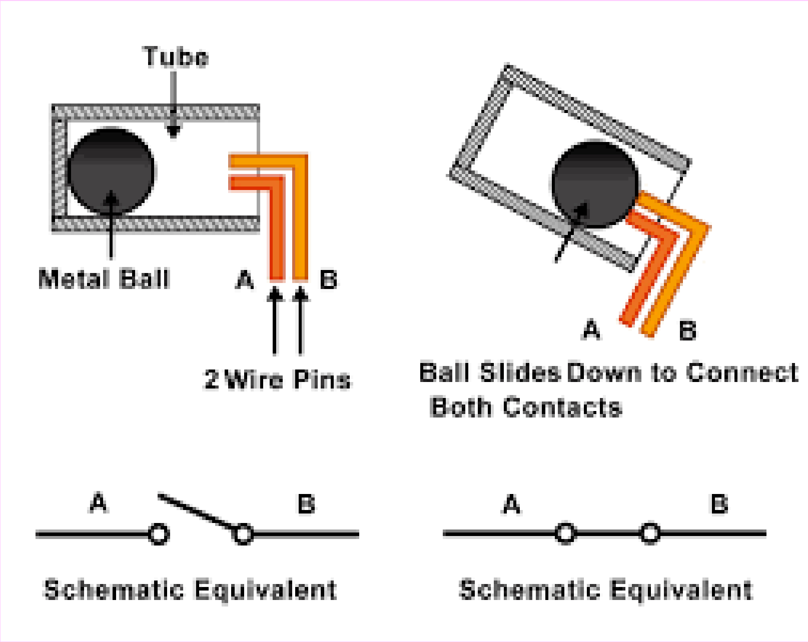


Learning objectives:

- ❑ What are the common electronic input components?
- ❑ What are their common applications?

Explanation

Switches – Tilt

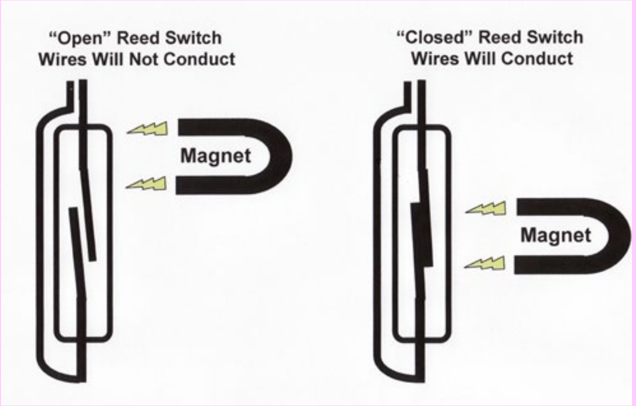


Learning objectives:

- ❑ What are the common electronic input components?
- ❑ What are their common applications?

Explanation

Switches – Reed and magnet

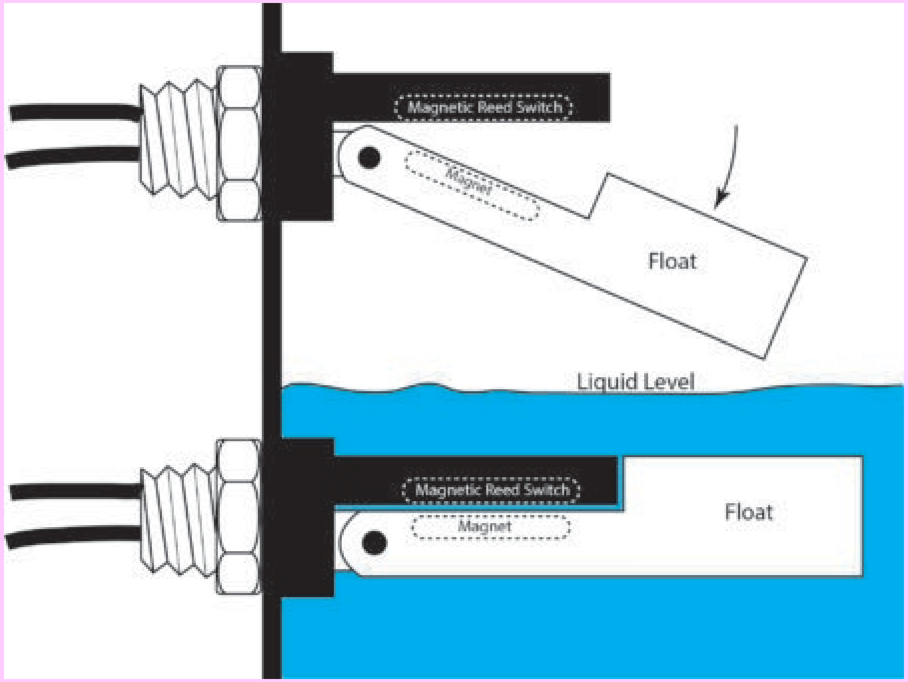


Learning objectives:

- ❑ What are the common electronic input components?
- ❑ What are their common applications?

Explanation

Switches – Float / level

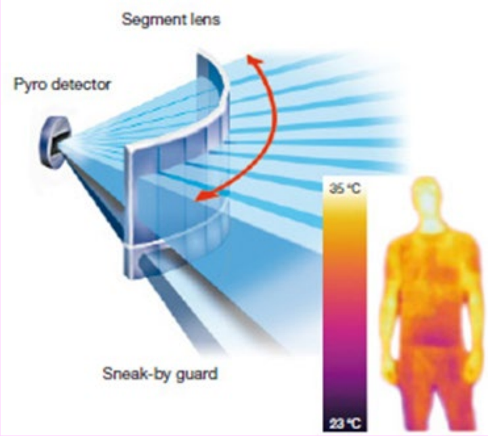


Learning objectives:

- ❑ What are the common electronic input components?
- ❑ What are their common applications?

Explanation

Input devices: Passive Infrared Sensor (PIR)



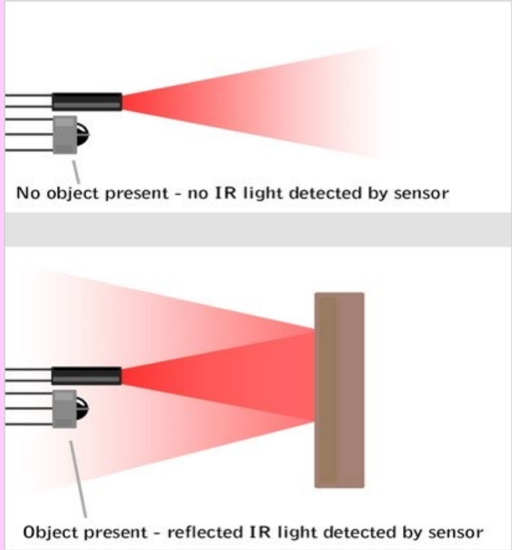
Detects the infrared light emitted by warm objects

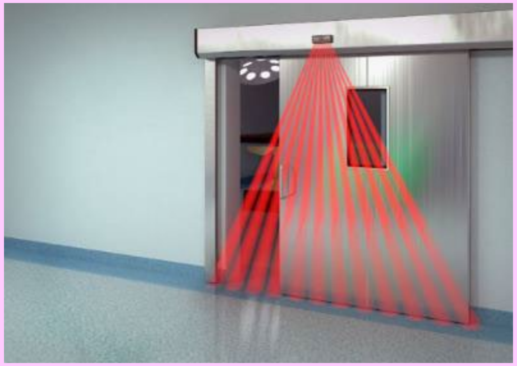
Learning objectives:

- ❑ What are the common electronic input components?
- ❑ What are their common applications?

Explanation

Input devices: Infrared emitter and detector





Emits then detects reflected infrared light…
used to detect presence of an object

Learning objectives:

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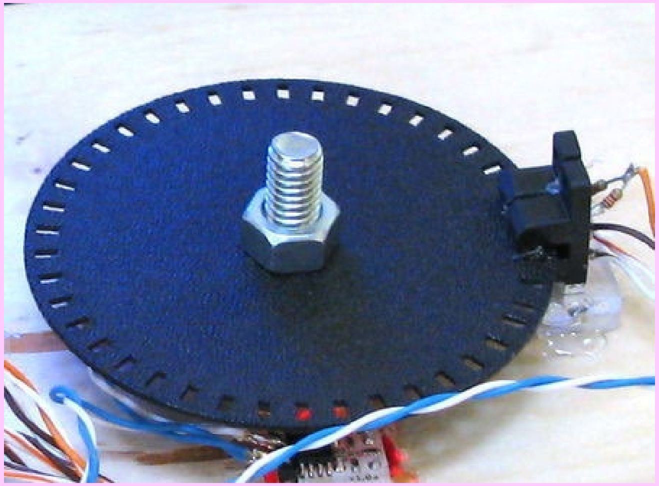
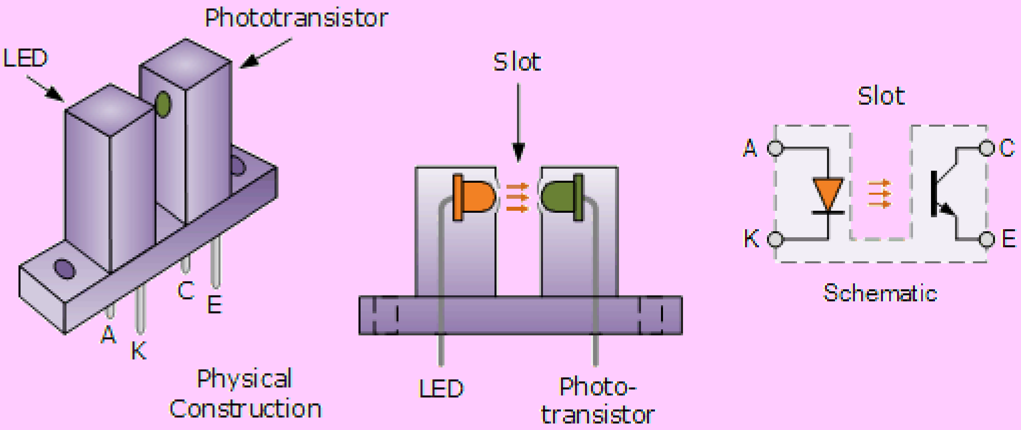
- ❑ What are their common applications?

Explanation

Slotted opto-switch



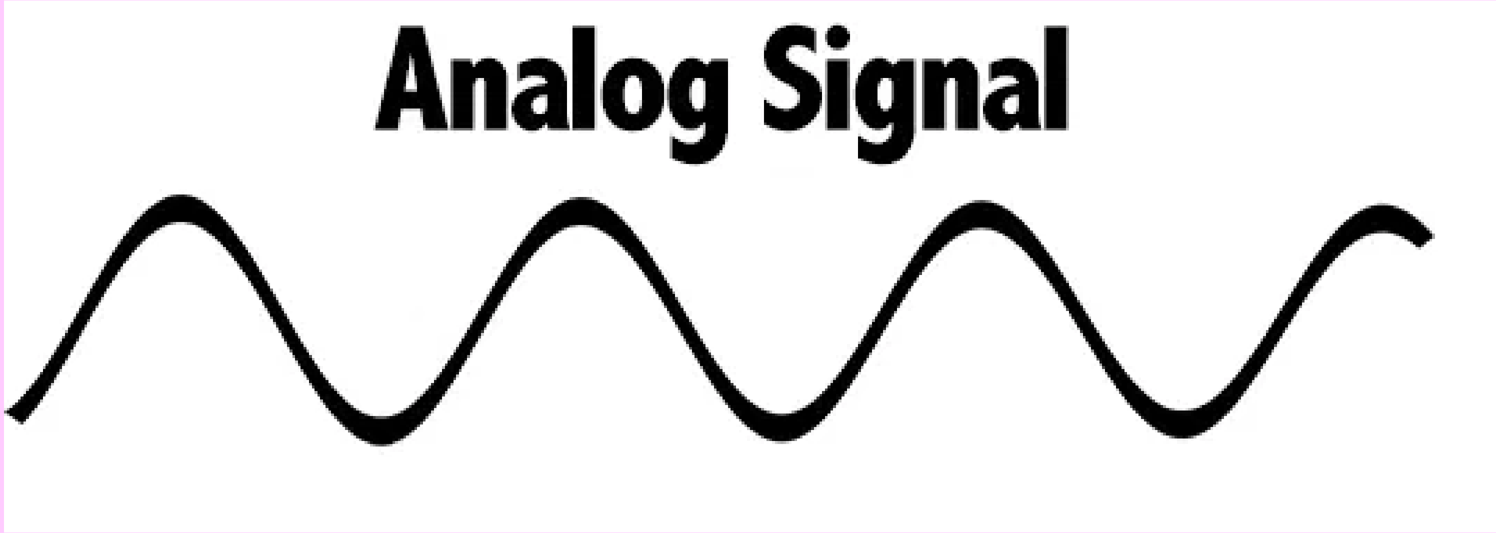


Learning objectives:

- ❑ What are the common electronic input components?
- ❑ What are their common applications?

Explanation

What are the different types of analogue input?

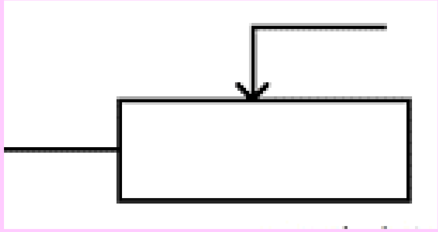


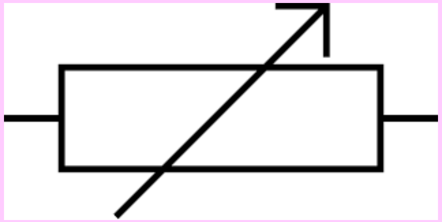
Learning objectives:

- ❑ What are the common electronic input components?
- ❑ What are their common applications?

Explanation

Resistors – Variable





Changes resistance when moved/adjusted

Learning objectives:

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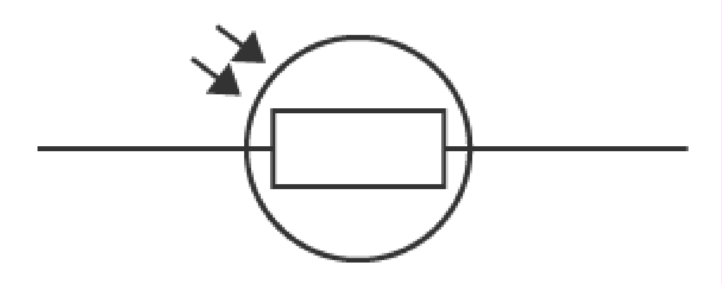
- ❑ What are their common applications?

Explanation

Resistors – LDR Light Dependent Resistor



Changes resistance when light levels change

Learning objectives:

- ❑ What are the common electronic input components?
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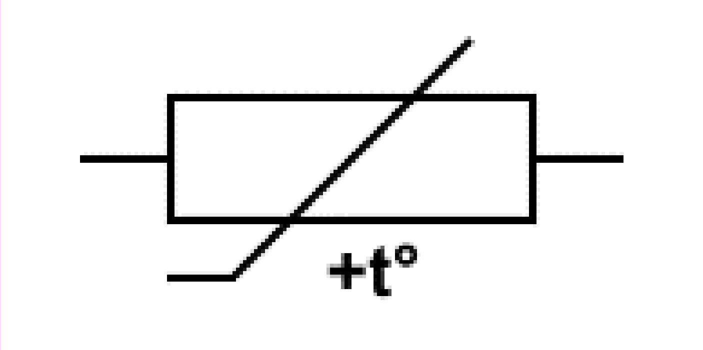
Explanation

Resistors – Thermistor



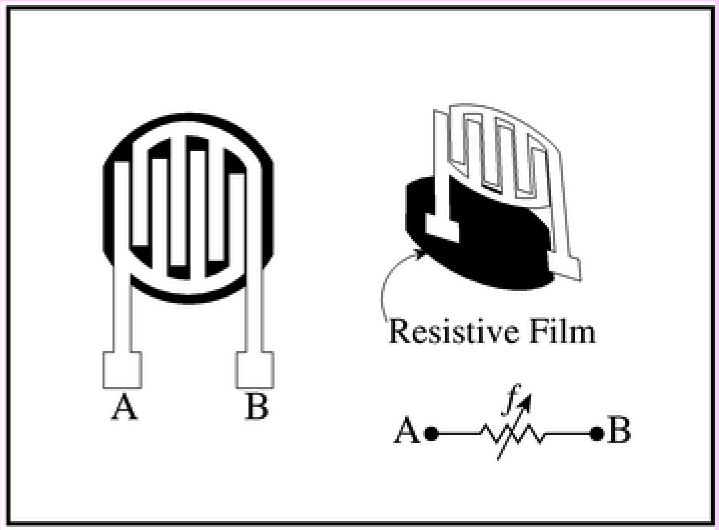
Changes resistance when temperature changes

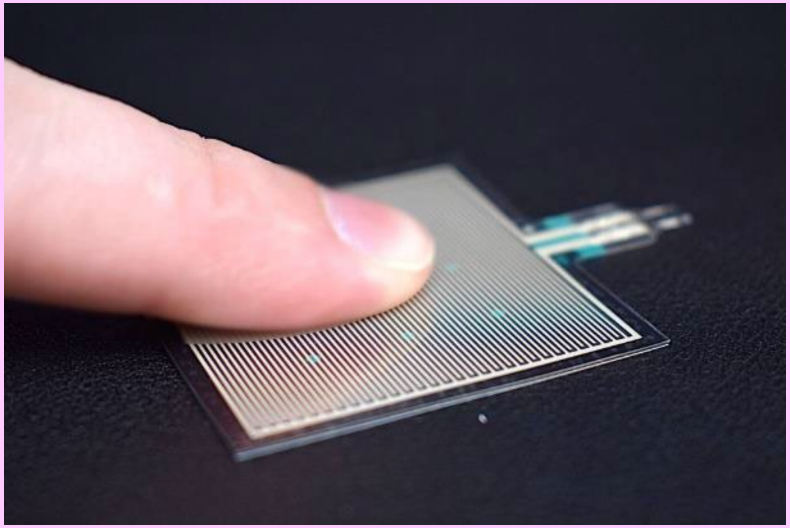
Learning objectives:

- ❑ What are the common electronic input components?
- ❑ What are their common applications?

Explanation

Resistors – Force sensitive resistor





Changes resistance under load.

Learning objectives:

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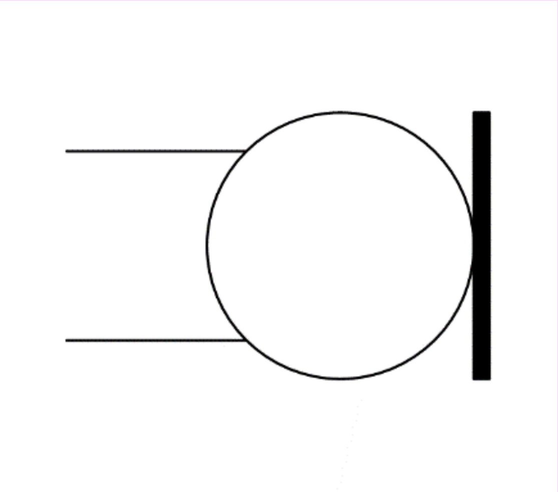
Explanation

Input devices: Microphone



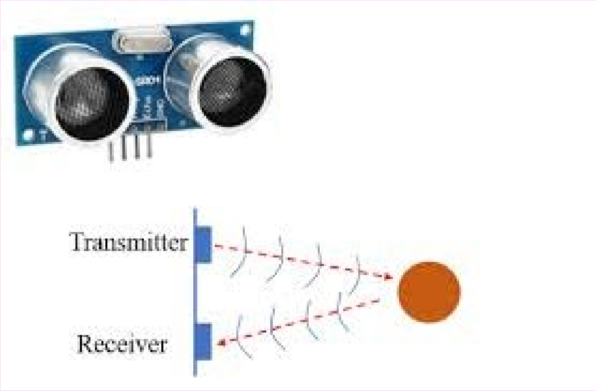
Detects sound waves

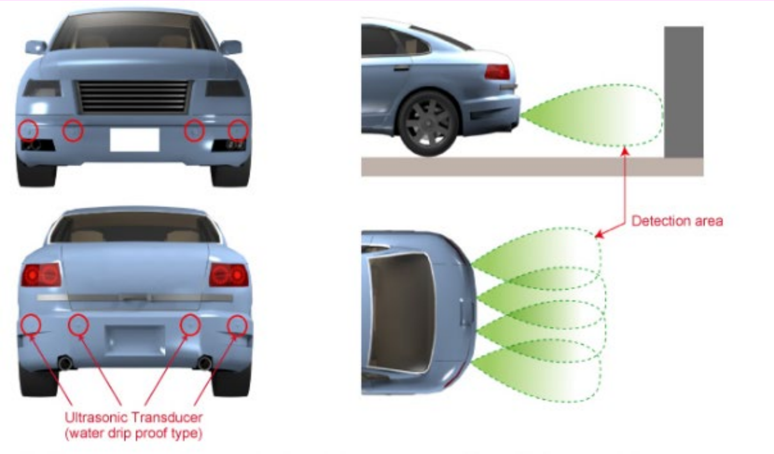
Learning objectives:

- ❑ What are the common electronic input components?
- ❑ What are their common applications?

Explanation

Input devices: Ultrasonic





Emits then detects ultrasonic sound waves which can be used to measure distance to an object.

Learning objectives:

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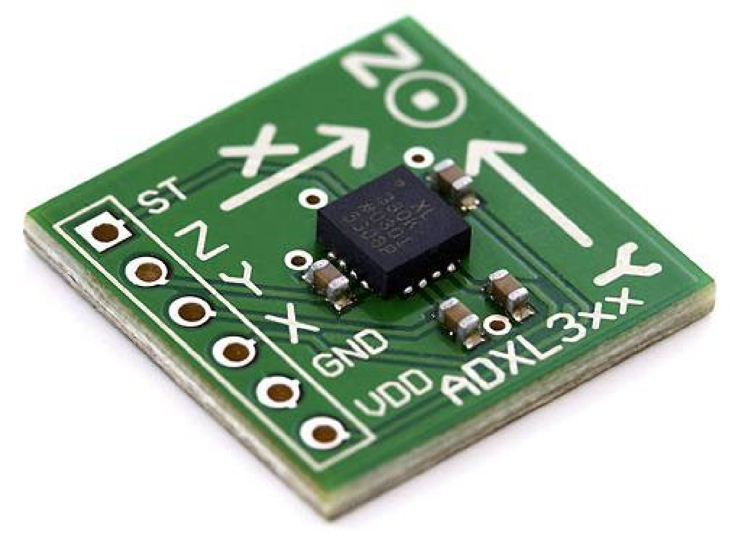
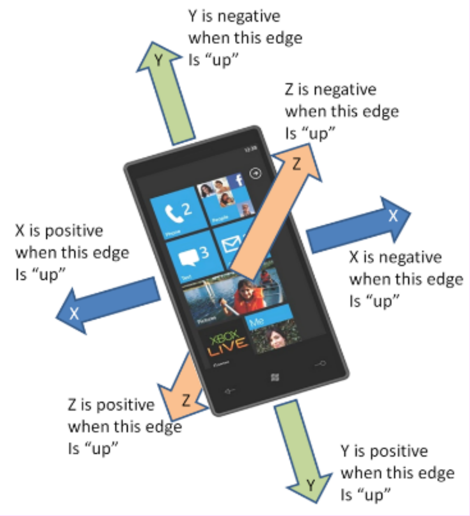
Explanation

Input devices: Gyroscopic / accelerometer





Detect motion…
Accelerometer-Linear movement
Gyro-Angular/rotation

Learning objectives:

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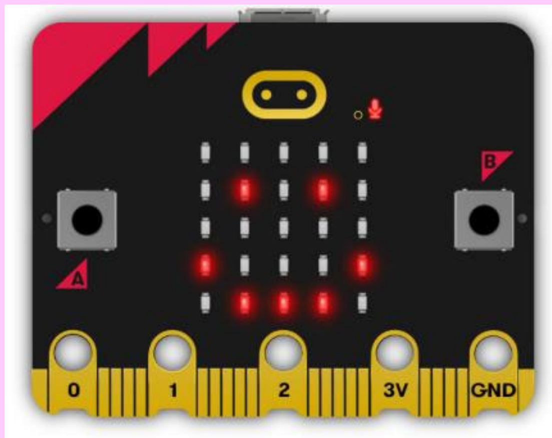
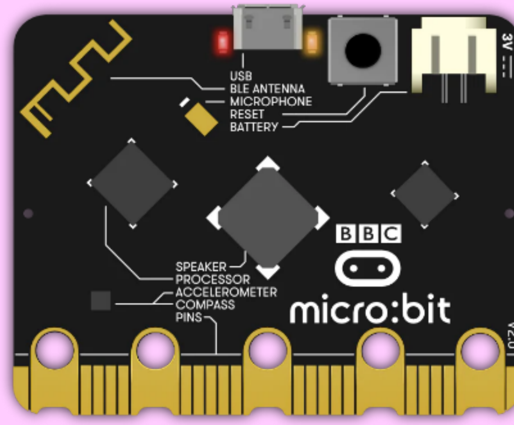
Explanation

What are the <u>inputs</u> and <u>outputs</u> on a BBC Microbit?

Inputs → **Process** → **Outputs**

Inputs
- **-Microphone**
- **-Switch**
- **-Accelerometer**
- **-Tilt (Gyro)**
- **-Touch**
- **-Light**





Outputs
- **-LED Display**
- **-Speaker**

How do we connect <u>external inputs and outputs</u> devices?

Inputs
- **-Thermistor**
- **-Slotted opto switch etc..**

Outputs
- **-Motor**
- **-Solenoid etc.**

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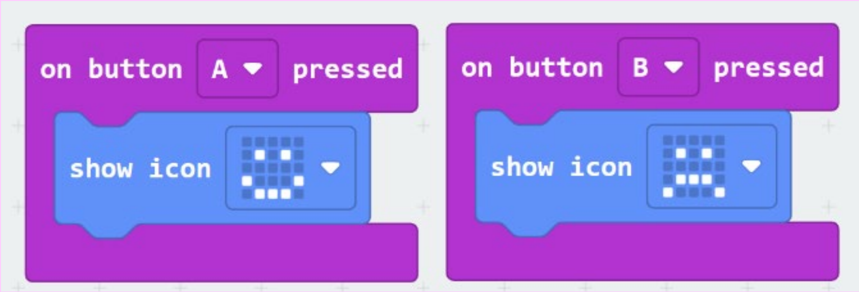
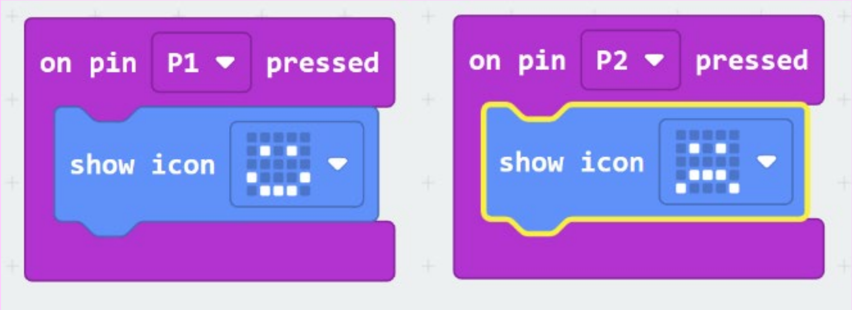
Explanation

How do we code a BBC Microbit?





Learning objectives:

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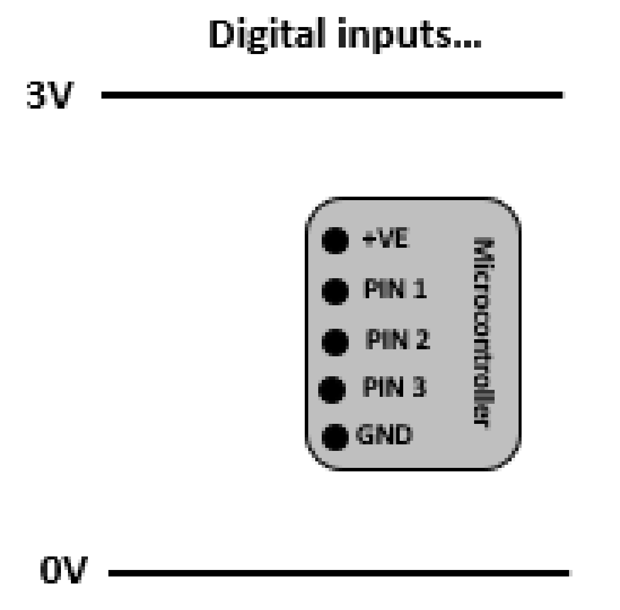
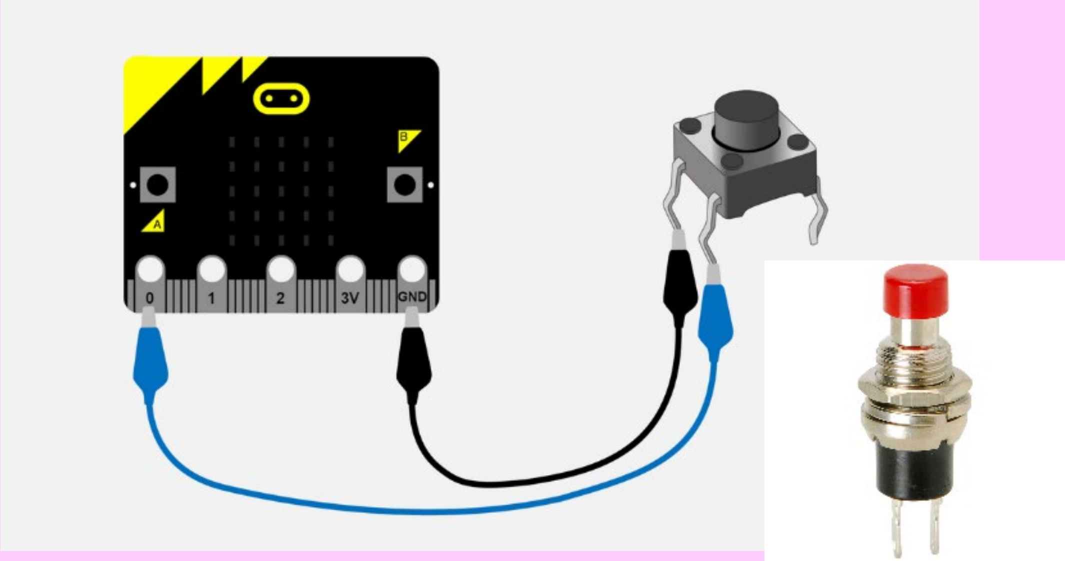
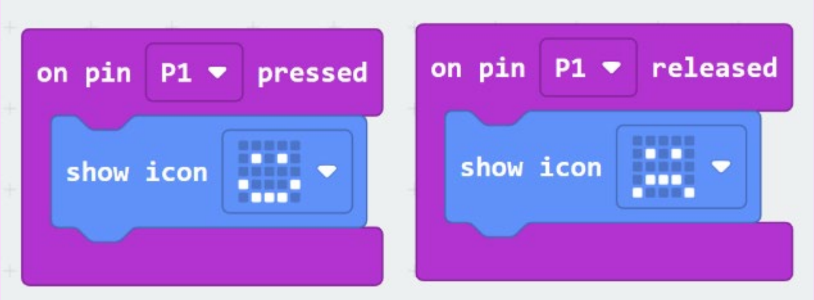
Explanation

How can we connect digital input devices to a microcontroller?







Learning objectives:

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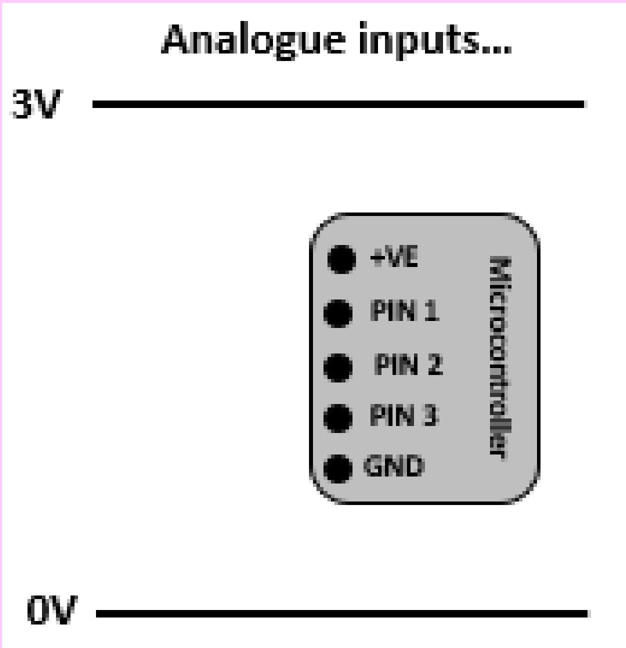
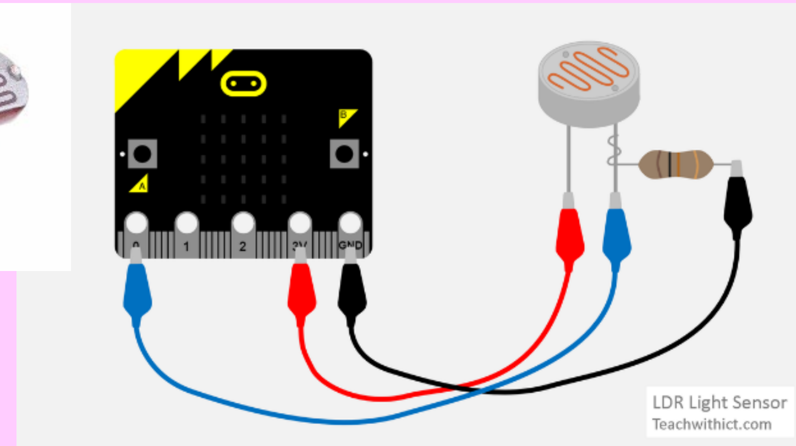
Explanation

How can we connect <u>analogue input</u> devices to a microcontroller?





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