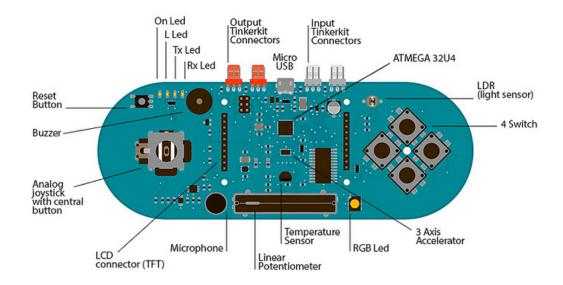# The Arduino Esplora

Esplora Introduction - https://youtu.be/6GRxQ3lwoHw

Esplora sample projects - https://youtu.be/U28XofR738o

Arduino getting started - https://youtu.be/5F054MNB1QI

Arduino factory - https://youtu.be/21hPmFNYUNo

Arduino Clones - https://youtu.be/M_u7OWr5DN8

Make an easy & cheap Arduino robot - https://youtu.be/Ibg7M7Qoqag

Overview

The Arduino Esplora is a microcontroller board derived from the Arduino Leonardo. The Esplora differs from all preceding Arduino boards in that it provides a number of built-in, ready-to-use set of onboard sensors for interaction.

It's designed for people who want to get up and running with Arduino without having to learn about the electronics first.

The Esplora has onboard sound and light outputs, and several input sensors, including a joystick, a slider, a temperature sensor, an accelerometer, a microphone, and a light sensor. It also has the potential to expand its capabilities with two Tinkerkit input and output connectors, and a socket for a color TFT LCD screen.

The design of the Esplora board is in the form of a traditional gamepad design with an analog joystick on the left and four pushbuttons on the right.

The Esplora has the following on-board inputs and outputs :

- Analog joystick with central push-button two axis (X and Y) and a center pushbutton.
- 4 push-buttons laid out in a diamond pattern.
- Linear potentiometer slider near the bottom of the board.
- Microphone for getting the loudness (amplitude) of the surrounding environment.
- Light sensor for getting the brightness.
- Temperature sensor reads the ambient temperature
- Three-axis accelerometer measures the board's relation to gravity on three axes (X, Y, and Z)
- Buzzer can produce square-waves.
- RGB led bright LED with Red Green and Blue elements for color mixing.
- 2 TinkerKit Inputs to connect the TinkerKit sensor modules with the 3-pin connectors.
- 2 TinkerKit Outputs to connect the TinkerKit actuator modules with the 3-pin connectors.
- TFT display connector connector for an optional color LCD screen, SD card, or other devices that use the SPI protocol.

In order to utilize the total number of available sensors, the board uses an analog multiplexer. This means a single analog input of the microcontroller is

shared among all the input channels (except the 3-axis accelerometer). Four additional microcontroller pins choose which channel to read.

Like the Leonardo board, the Esplora uses an Atmega32U4 AVR microcontroller with 16 MHz crystal oscillator and a micro USB connection capable of acting as a USB client device, like a mouse or a keyboard.

The ATmega32u4 has 32 KB (with 4 KB used for the bootloader). It also has 2.5 KB of SRAM and 1 KB of EEPROM (which can be read and written with the EEPROM library).

In the upper left corner of the board there is a reset push button, that you can use to restart the board. There are four status LEDS :

ON [green] indicates whether the board is receiving power supply

L [yellow] connected directly to the microcontroller, accessible through pin 13

RX and TX [yellow] indicates the data being transmitted or received over the USB communication

The board contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable to get started.

The Esplora has built-in USB communication; it can appear to a connected computer as a mouse or keyboard, in addition to a virtual (CDC) serial / COM port.

Activity

There are a whole bunch of different things on the board, but in general they can be put into the two following categories:

Inputs - collect information about something occurring in its vicinity and send it to the Arduino Esplora. They are also called sensors.

Outputs - receive information from the Arduino Esplora and transform it into some action.

Check your understanding

In the table below, identify the various input and output features on the Esplora board:

INPUT	OUTPUT