Introduction to Arduino Microcontrollers

...and how they can be used in Amateur Radio

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Presentation Outline

- Basics
- Terminology
- Hardware
- Amateur Radio Applications
- Getting Started

What is a Microprocessor?

- Microprocessor is an IC which has only the CPU inside. These microprocessors don't have RAM, ROM, and other peripheral on the chip.

- A system designer has to add the RAM, ROM, and other peripherals externally to make them functional.

- Application of microprocessor includes Desktop PC's, Laptops, notepads etc.

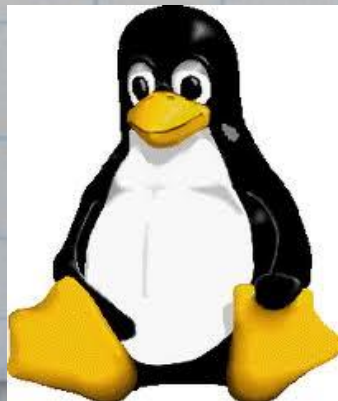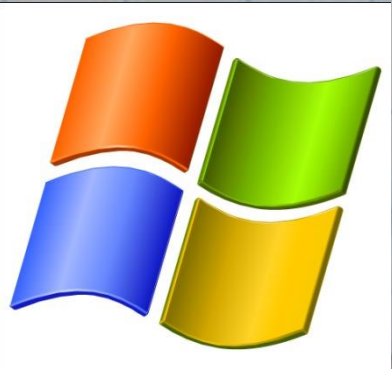# What is a Microcontroller?

- A Microcontroller has a CPU, in addition with a fixed amount of RAM, ROM and other peripherals all embedded on a single chip.

- Microcontrollers are designed to perform specific tasks where the relationship of input and output is defined

What is it?
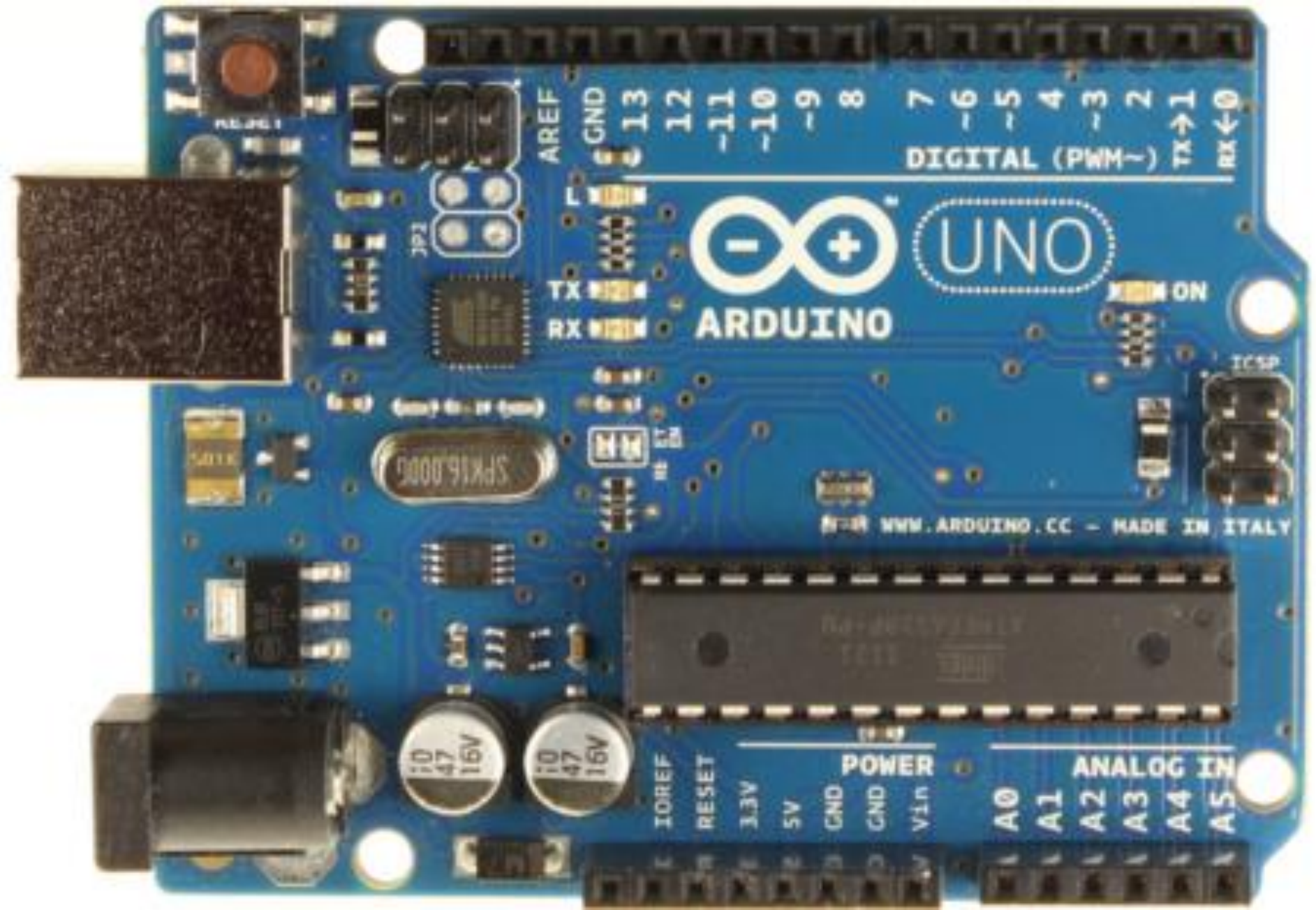
Open Source

- Open Source Hardware
- Open Source Bootloader
- Open Source Development Kit
- Community Driven Support

Terminology

- I/O Board - main microcontroller
- Shield - add-on boards
- Sketch - the program
- Sensor - components (thermistors, etc.)
- Modules - serial data (GPS module, etc.)
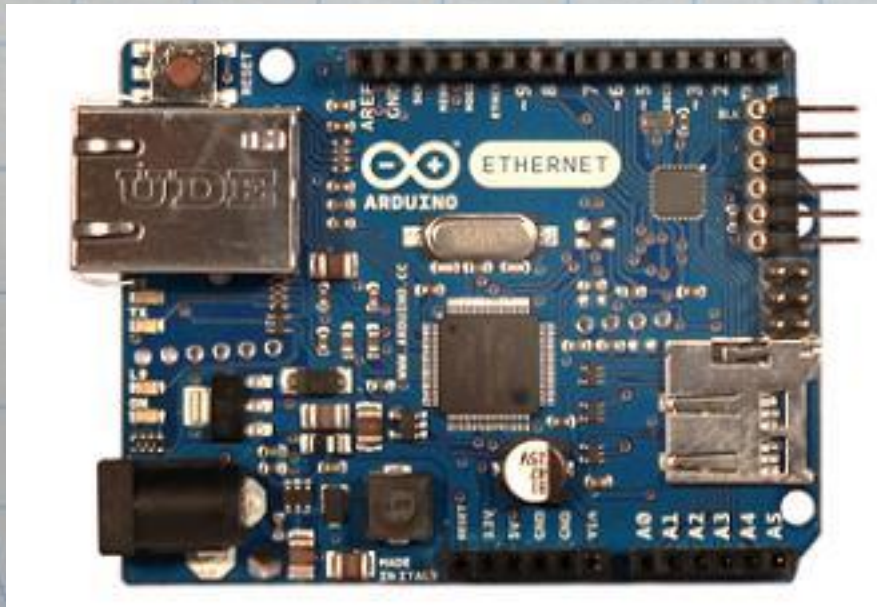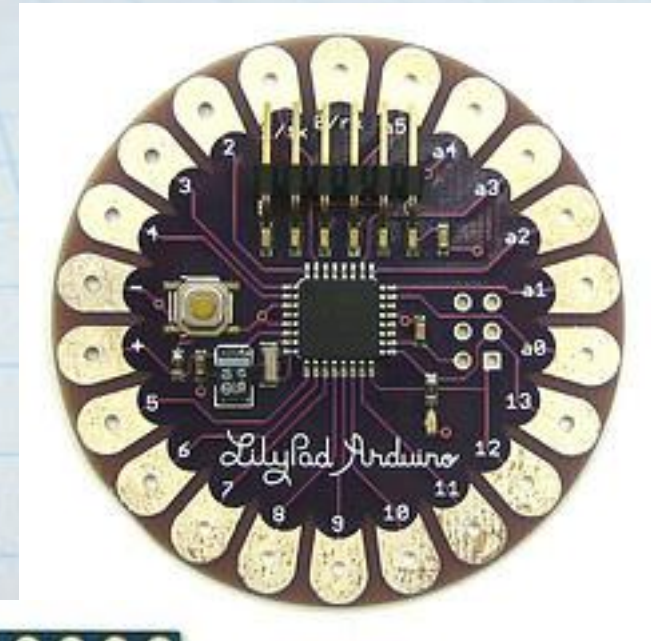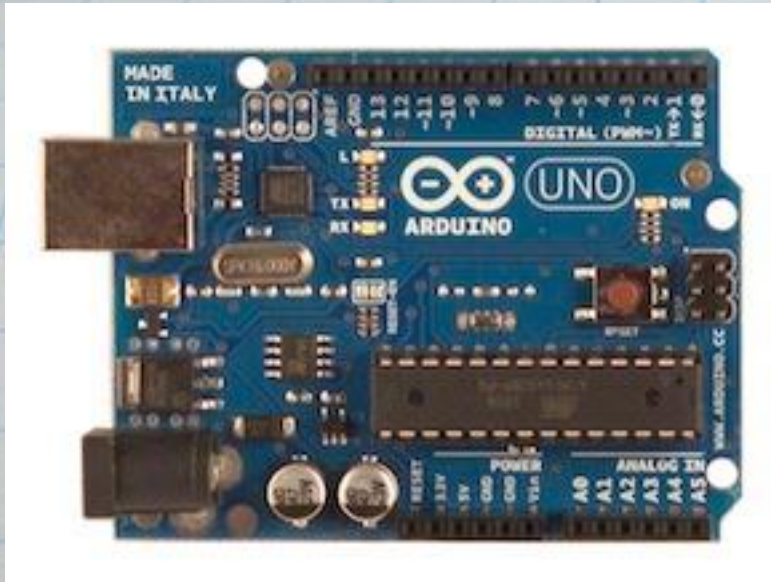
What do these do?

Digital IO (LEDs, switches)
Analog IO (resistive sensor data)
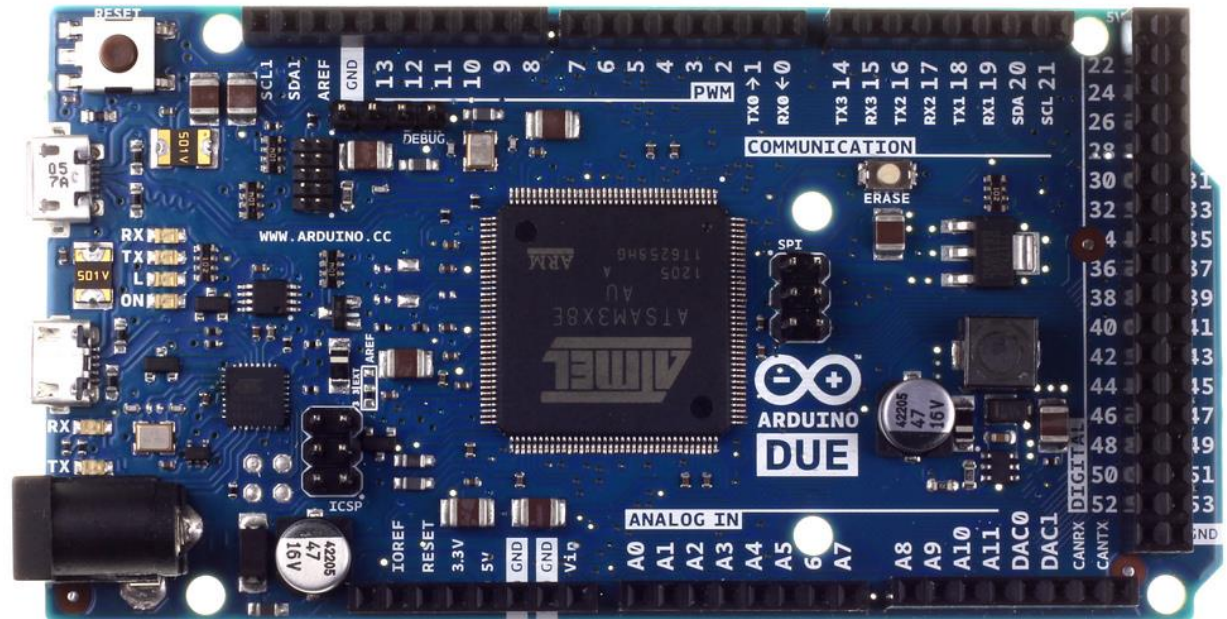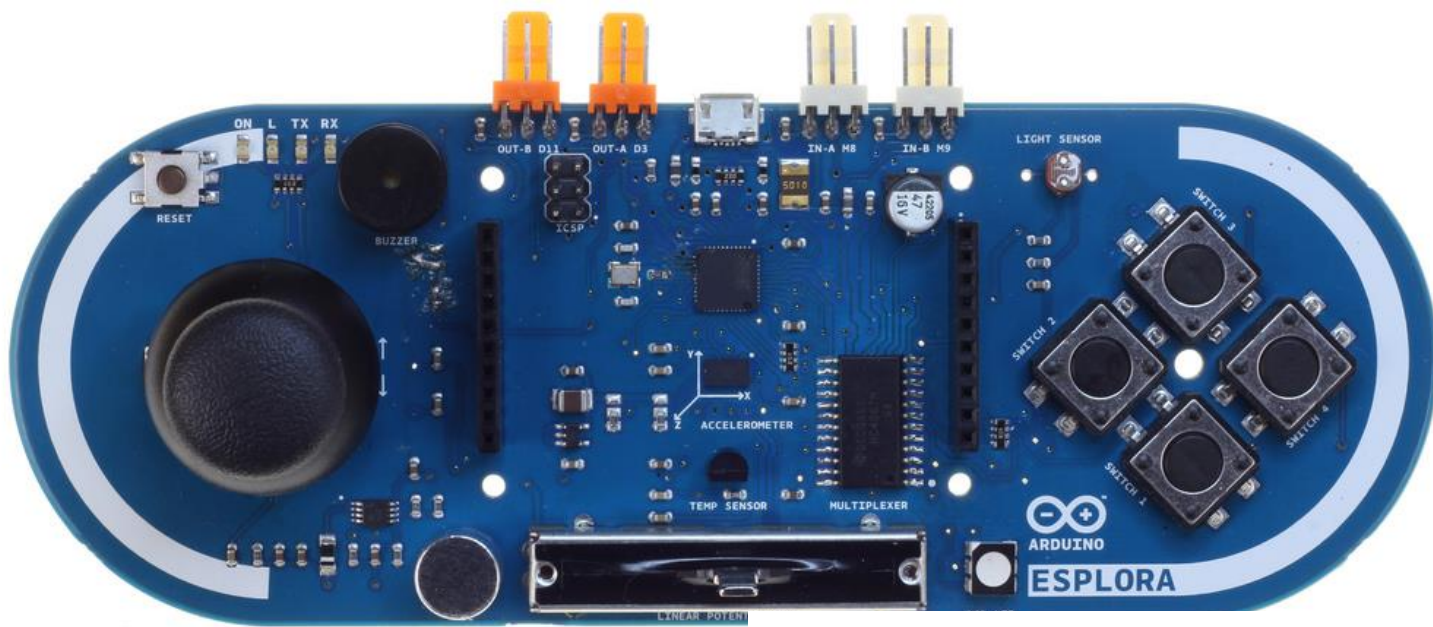Serial Connection (Sensors, GPS, etc)

Program from your computer

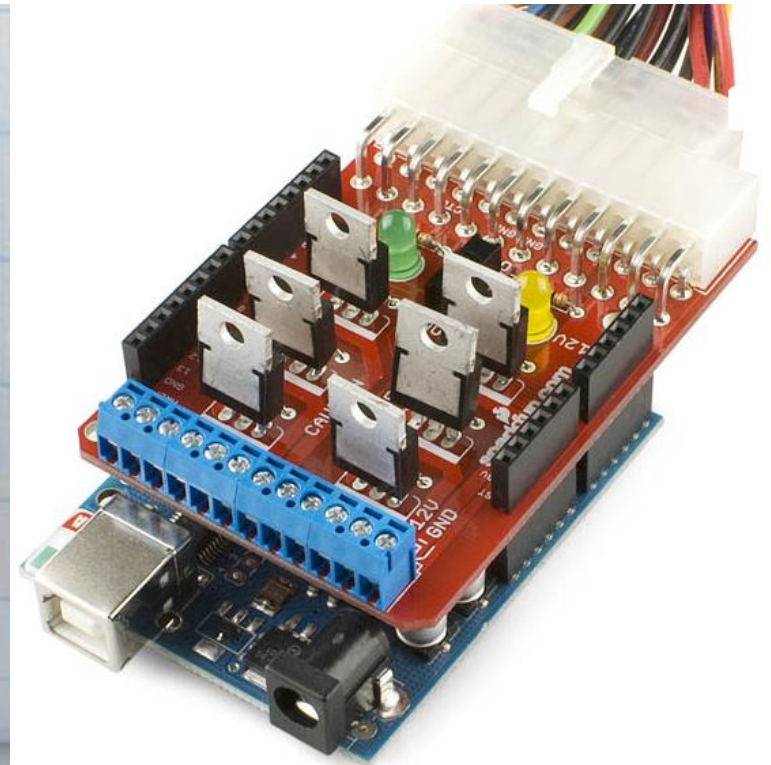Your limit is only your creativity!

Arduino I/O Boards

More Boards

15 current boards

Compatible Boards

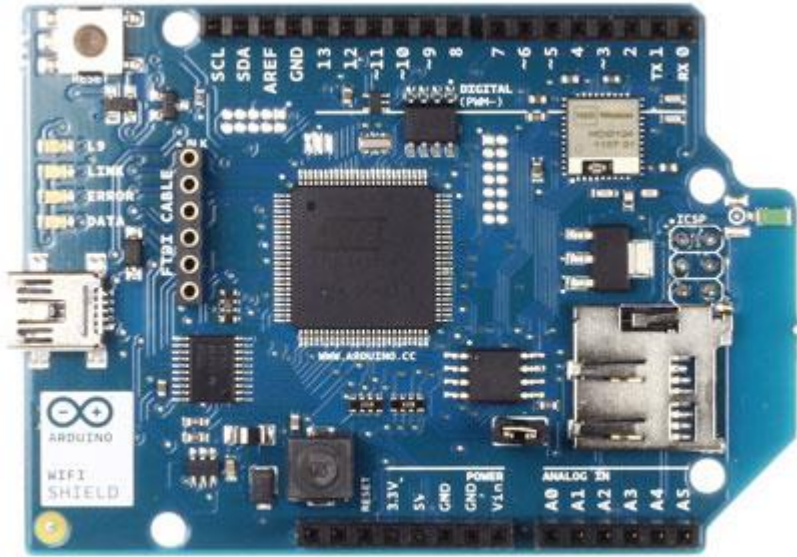**These are two of MANY!**

Compatible Boards

Shields
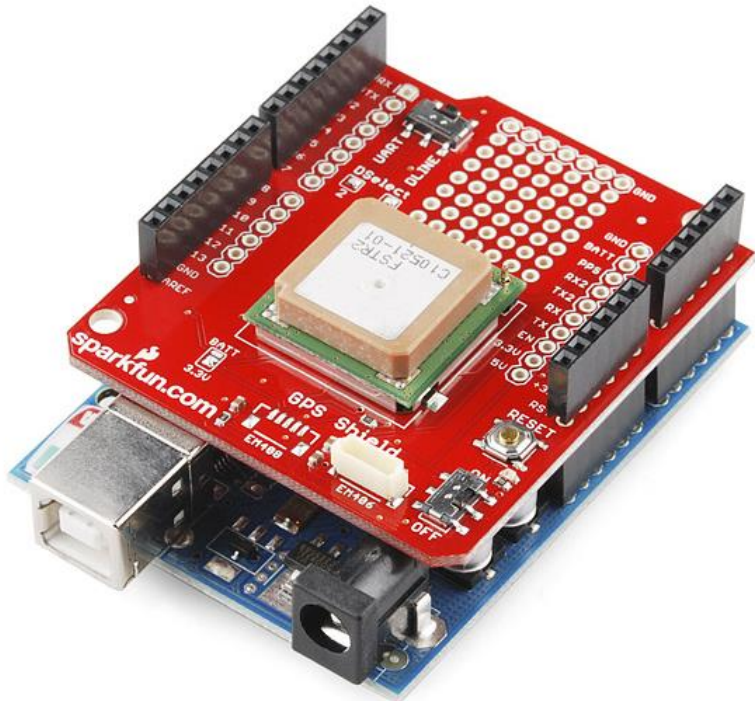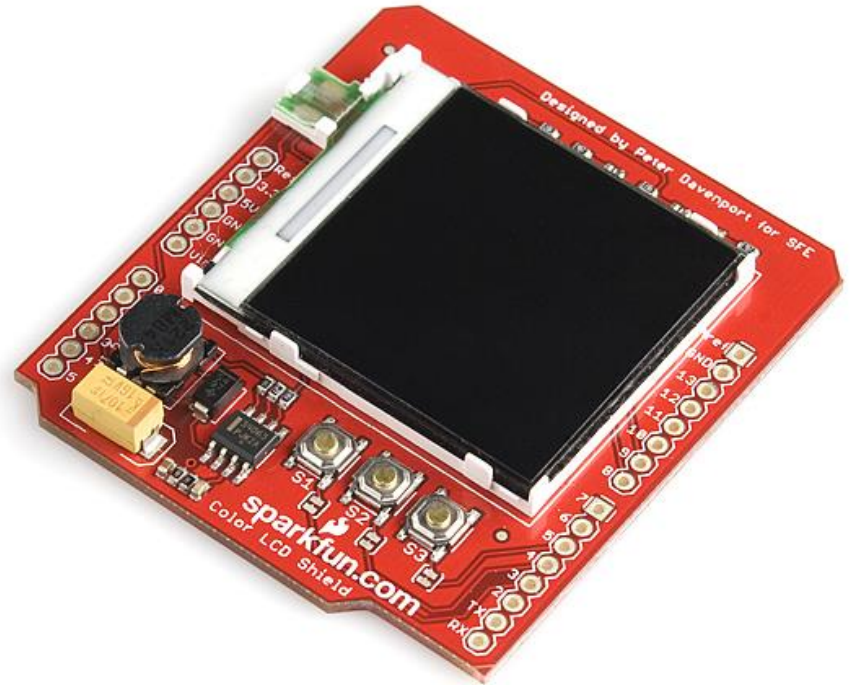
Shields

Datalogging Shield

Wave Shield

Touchscreen Shield
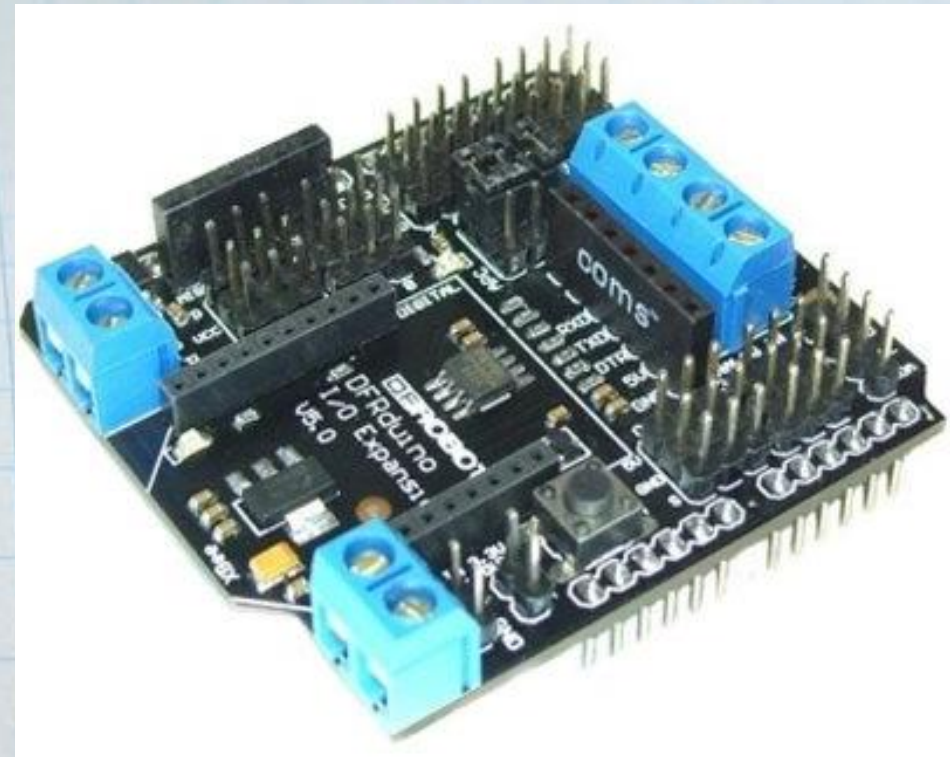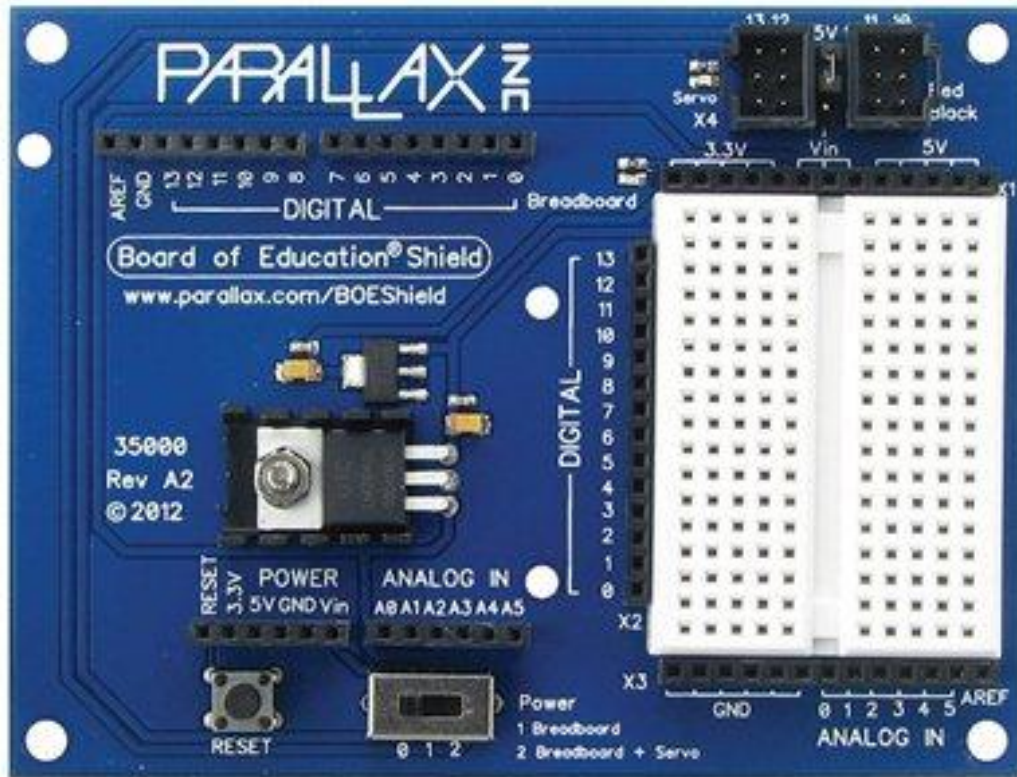
More Shields…

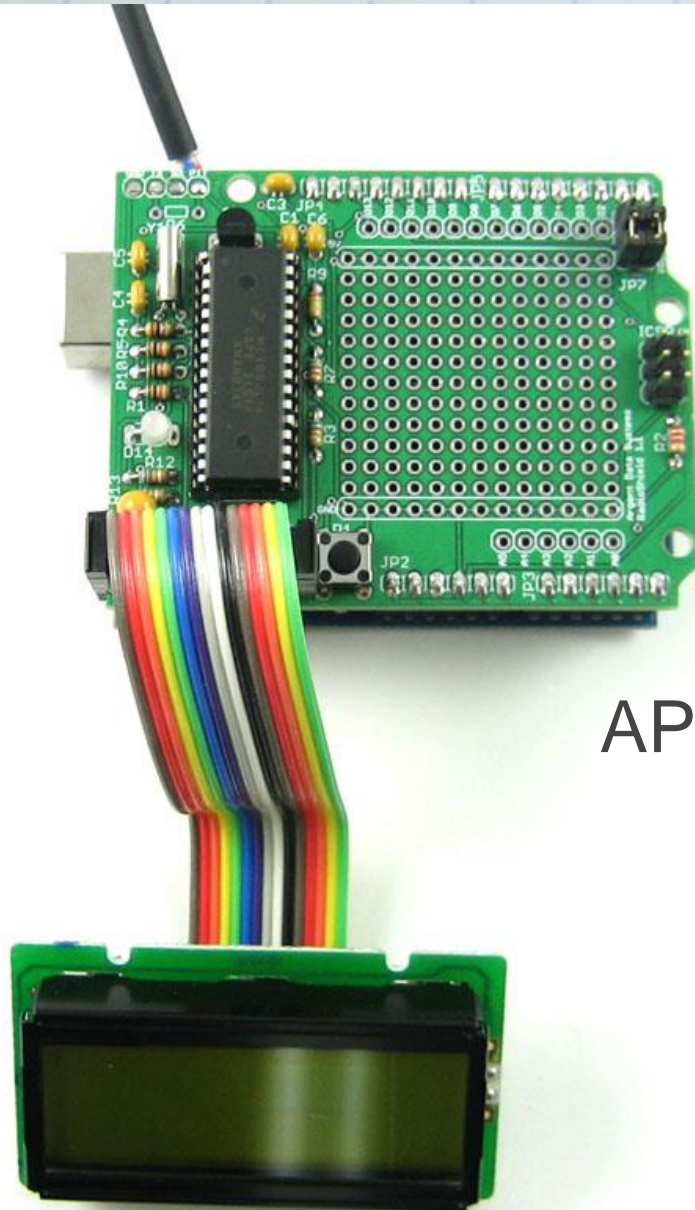XBee Shield

Ethernet Shield

Wifi Shield

And more shields…
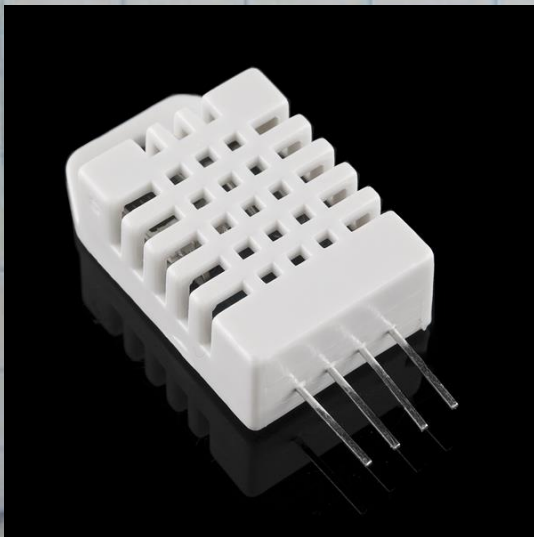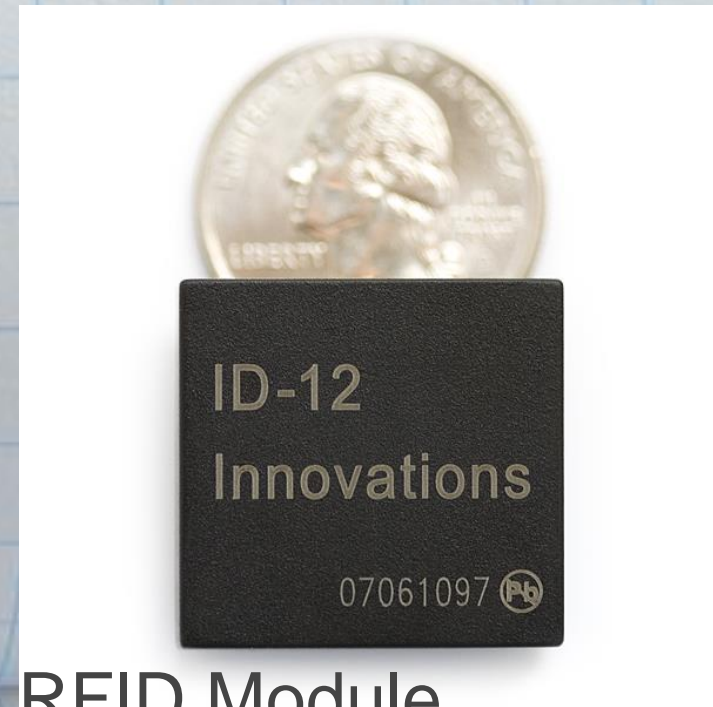
Even more shields!

APRS Shield

Modules

GPS Module

Bluetooth Module

Temperature & Humidity Sensor

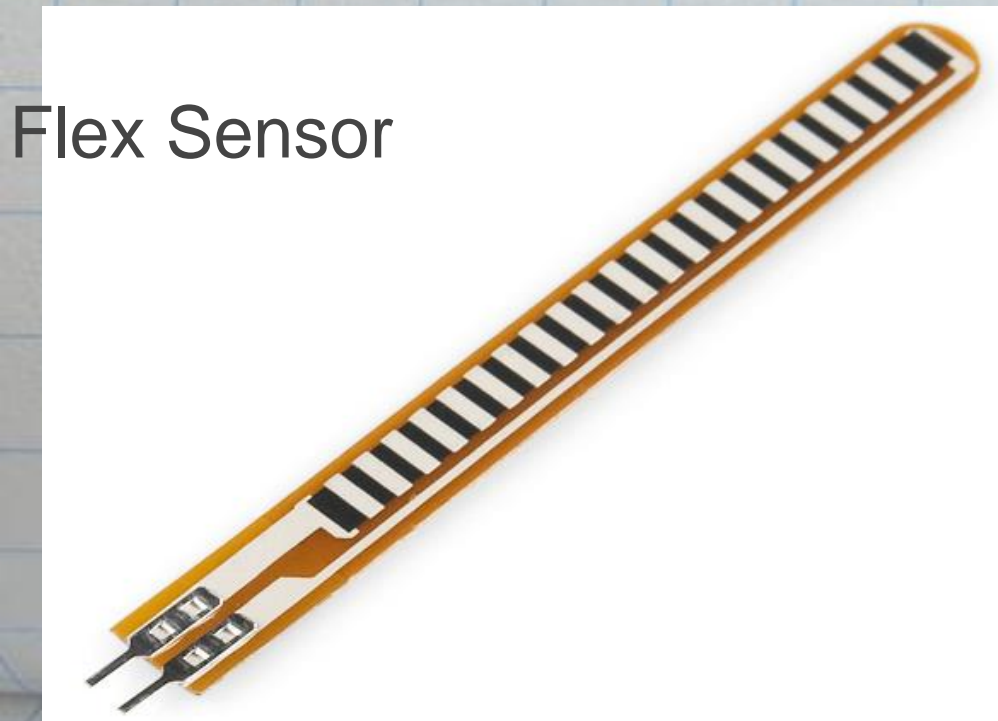RFID Module

Sensors and Modules
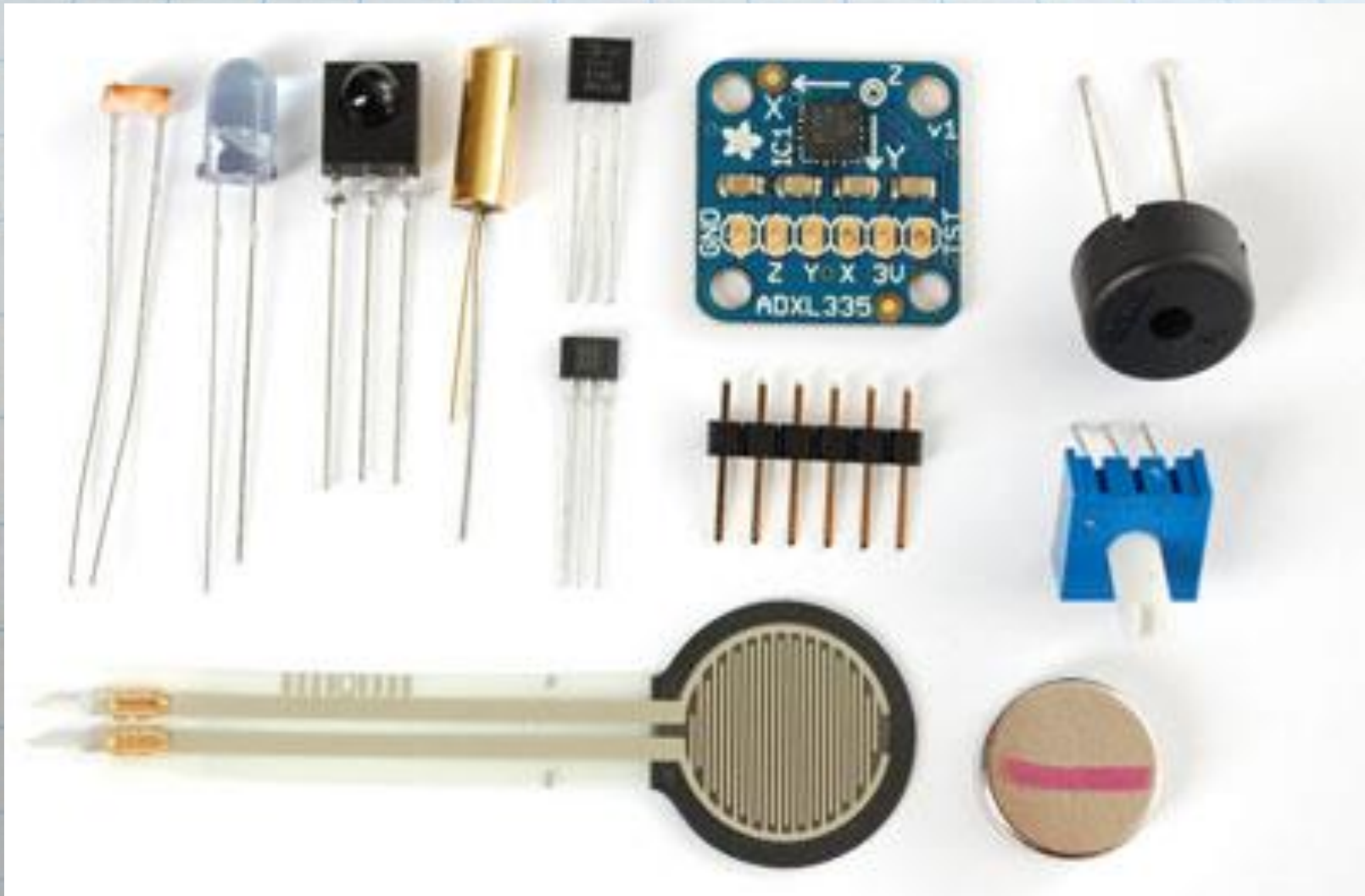
Gas Sensor

Temp & Humidity

Fingerprint Scanner

Flex Sensor

Geiger Counter

Sensors

Photoresistor, infared, force sensitive resistor, Hall effect, Piezo, tilt sensor..

Sketches

Amateur Radio Applications

Applications - APRS

Argent Data

Trackduino

Morse Code Keyboard

Arduino Controlled Tuner

Arduino SimpleSat Rotor Controller

http://amsat-uk.org/info/simplesat-rotor-controller/

Other Examples

- Weather Stations
- Remote Antenna Switches

Getting Started

Sparkfun Getting Started in Arduino Kit ($95)
Sparkfun Starter Kit for Arduino ($60)
Adafruit Experimentation Kit ($85)
Adafruit Starter Pack ($65)

OR

Arduino Board (Uno $20 or Mega $35) +
Breadboard, wires, components, etc.

With Starter Sets

Book is open source!