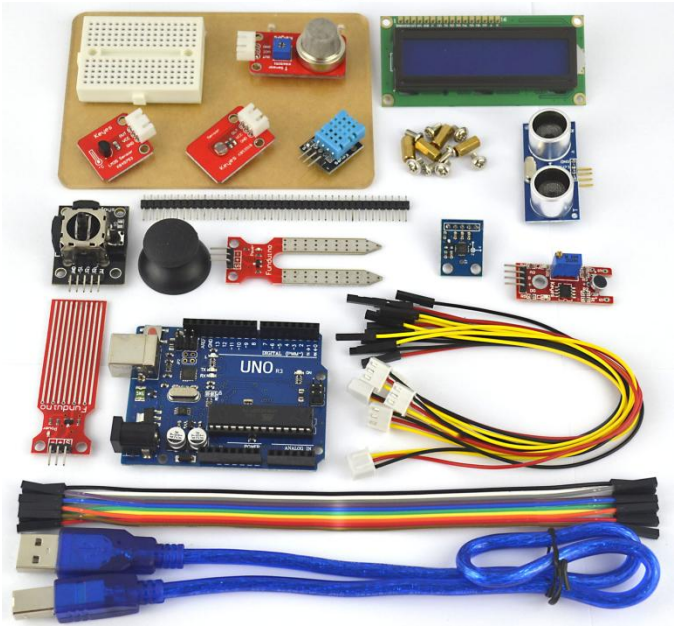
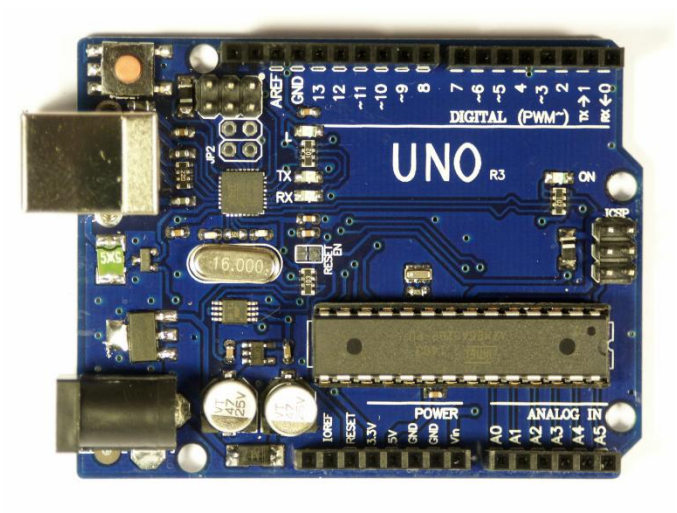


341958
Environment Sensing Kit (Contents)
170-pin Breadboard
1x 2x16 LCD display I2C1602
1x 3-axis tilt accelerometer
1x Acrylic mounting plate
1x Joystick module
1x LM35 Temp Sensor
1x Microphone sound sensor
1x Mounting hardware
1x Photo Resistor Light Sensor
1x Smoke sensor
1x Soil Moisture sensor
1x Temp & Humidity
1x Ultrasonic
1x Water Level / Rain sensor
40x Pin headers
5x Sensor header wires
Arduino Uno R3 compatible board
Dupont connector wires
1x USB cable

Inland Uno R3:



UNO R3 Summary:	
Microcontroller	ATmega328
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limits)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
Analog Input Pins	6
DC Current per I/O Pin	40 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega328) of which 0.5 KB used by bootloader
SRAM	2 KB (ATmega328)
EEPROM	1 KB (ATmega328)
Clock Speed	16 MHz
Length	68.6 mm
Width	53.4 mm
Weight	25 g

See http://arduino.cc for detailed specifications, overviews, schematics, etc. Core functions, code examples, and links to many of the device libraries can be found in the learning section; refer to the manufacturer's site if using other add-on shields or sensors.

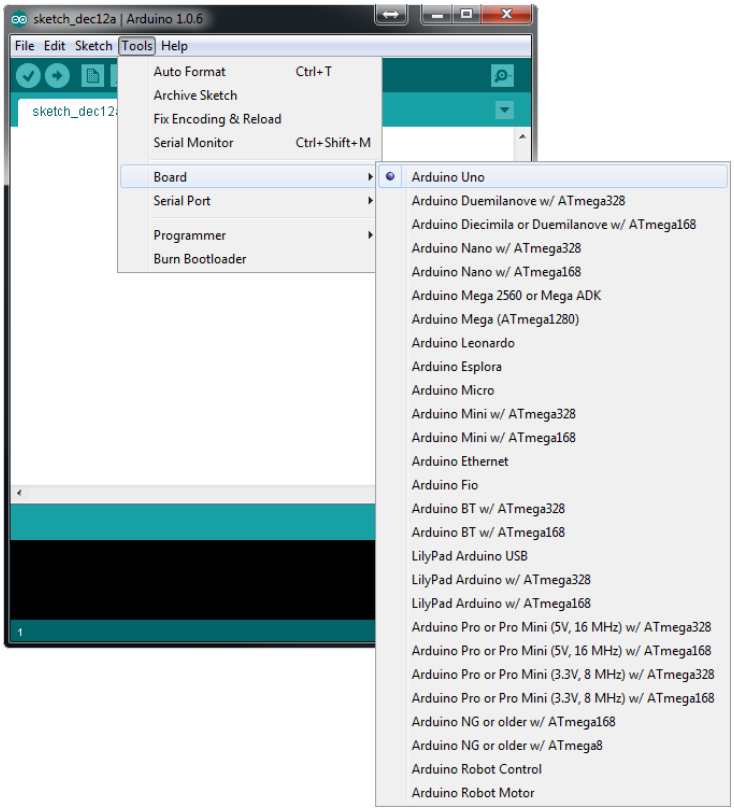
The latest Arduino Integrated Development Environment (IDE) necessary for programming your UNO R3 board can be obtained at http://arduino.cc/en/Main/Software (the **Download** menu choice on Arduino.cc)

Examples for many basic components can be found under the Examples menu. As you install libraries for additional shields, new examples may be available.

Follow the getting started guide found on the arduino.cc web site. Click **Learning**, and select **Getting started**. Click on the link for Windows, Mac OS X, or Linux for more specific directions.

Getting Started:

1. Download the Arduino Environment (IDE) and install or unzip/extract the application directory.
2. Connect the UNO board to one of your computer's USB port.
3. Install the drivers (If the computer does not automatically download and install the necessary USB drivers, point the hardware setup to the "**drivers**" directory of the Arduino IDE application.)
4. Launch the Arduino IDE application
5. Open a sketch example such as "Blink"
6. Select your **Board** from the Tools menu.
7. Select the **Serial Port** used by the board
8. Upload the sketch to the board

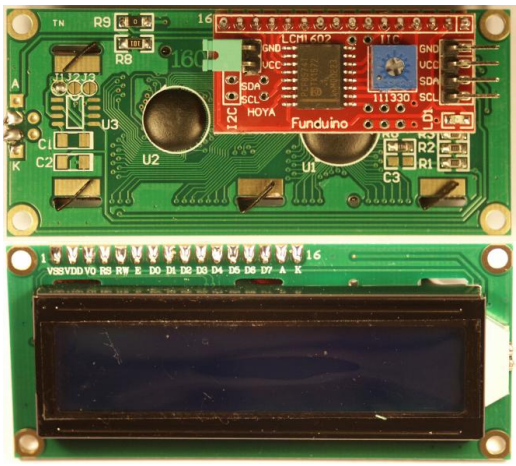


Sketch (code) Examples are included as part of the IDE. If you install device libraries for other components or shields, additional examples may be included and will show up in the list under the IDE File menu.

(See: http://arduino.cc/en/Tutorial/HomePage for an overview of the core functions and libraries.)

Components:

LCD

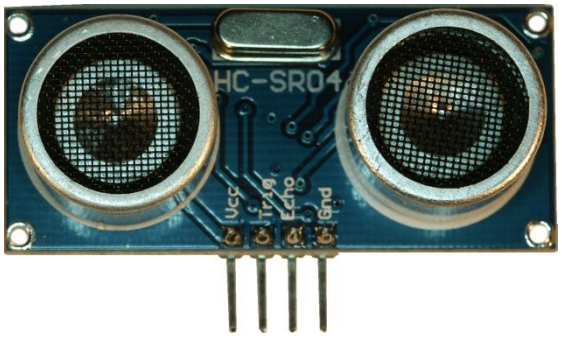


I2C 1602 LCD - 2-line, 16-character LCD display (I2C) with backlight.

4 pin connections are required: 5V (Vcc), Ground, and two Analog lines (i.e. SDA-A4, SCL-A5). For Arduino, you will need several libraries installed: Wire.h, LCD.h, LiquidCrystal_I2C.h

See:
http://www.hessmer.org/blog/2014/01/11/arduino-compatible-iic-i2c-serial-2-5-lcd-1602-display-module/

Sensors and modules

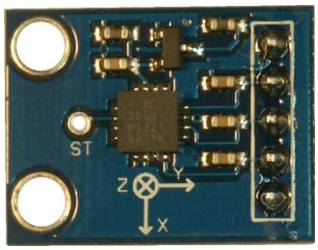


Ultrasonic Sensor

Four connections: Vcc - +5V, Trig - Trigger (sends ultrasonic ping), Echo - receives ultrasonic echo, Gnd - Ground (-).
See:
http://arduinobasics.blogspot.com/2012/11/arduinobasics-hc-sr04-ultrasonic-sensor.html

http://playground.arduino.cc/Code/NewPing

http://www.buildcircuit.com/obstacle-sensor-using-arduino-and-hcsr04/

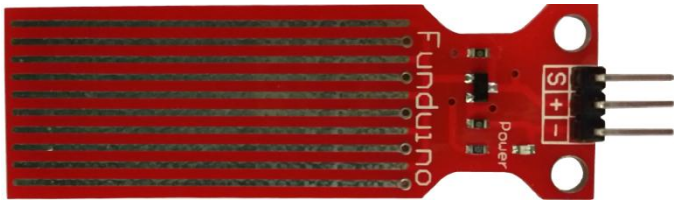


3-axis tilt accelerometer (ADXL335)
NOTE: ADXL335 requires **3.3v** (or less) **VCC**!

Five connections (on rear): VCC - **+3.3v**, X_OUT - side-to-side rotation, Y_OUT - front-to-rear rotation, Z_OUT - horizontal rotation, GND - Ground (-).

X, Y, and Z outputs are analog voltage levels.
See:
http://www.unrobotica.com/aurduino/arduino-a%20quick-start%20guide.pdf (pg 132-140+)

http://www.elecfreaks.com/wiki/index.php?title=Triple_Axis_Accelerometer_-_ADXL335



Water Level or Rain Sensor

Three connections - = Ground, + = 5V, S = analog signal that will vary based on how much of the contacts are in contact with water.
See:
http://www.instructables.com/id/Water-Level-Sensor-Module-for-Arduino-AVR-ARM-STM3/

http://www.seeedstudio.com/wiki/Grove_-_Water_Sensor

(Video): http://www.wearerobots.co.uk/funduino-water-level-sensor-tutorial-and-application/

Soil Moisture Sensor

Three connections - = Ground, + = 5V, S = analog signal that will vary based on how much of the contacts are under water or in contact to moist soil.

See:
http://arduinosensors.com/index.php/soil-moisture-sensor-interface-with-arduino-uno/

http://www.electroschematics.com/6519/simple-soil-moisture-sensor-arduino-project/

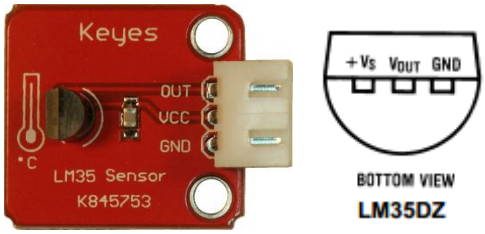
http://www.dfrobot.com/wiki/index.php?title=Moisture_Sensor_(SKU:SEN0114)

Smoke Sensor (MQ2)
The MQ-2 sensor will produce an analog voltage-out in response to the smoke or flammable gas concentration level (with adjustable sensitivity using the on-board potentiometer).
Three connections: OUT - signal (adjustable), VCC - +5v, GND - Ground (-).

For a list of MQ-2 and similar sensors, see:
http://playground.arduino.cc/Main/MQGasSensors

For sample code, see:
http://arduinotronics.blogspot.com/2012/03/gas-sensor-tutorial.html

http://vanceance.blogspot.com/2013/04/gas-sensor-with-arduino.html



LM35 data sheet:
http://www.ece.usu.edu/ece_store/spec/lm35dt-3p.pdf

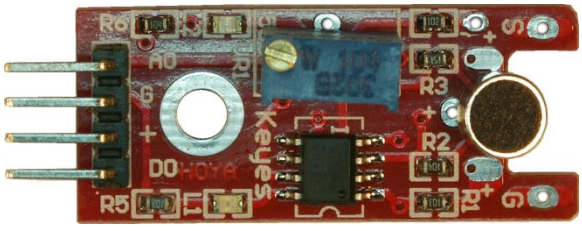
LM35 Temperature Sensor
The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature.
Basic Temperature Sensor (+2° to +150°C):
+Vs=5V in, Ground, Vout = 0mV + 10.0mV/°C

For code examples, see:
http://playground.arduino.cc/Main/LM35HigherResolution

http://www.learningaboutelectronics.com/Articles/LM35-temperature-sensor-circuit.php

http://pscmpf.blogspot.com/2008/12/arduino-lm35-sensor.html

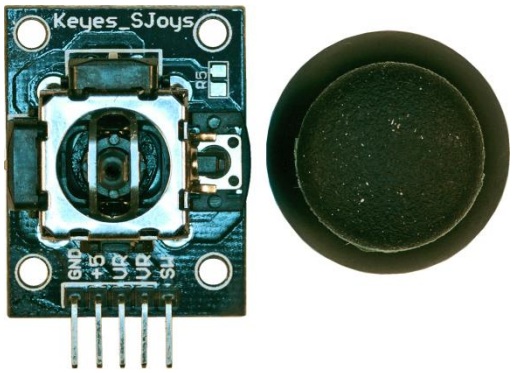
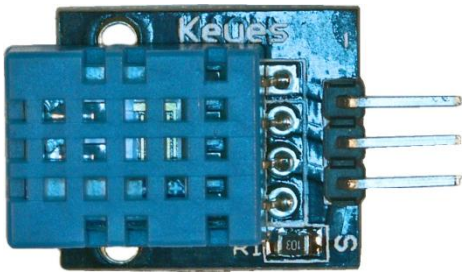
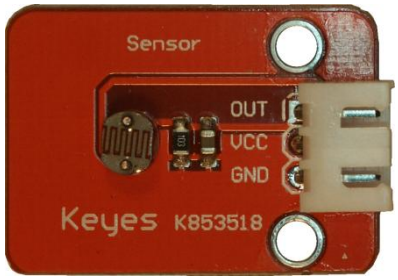
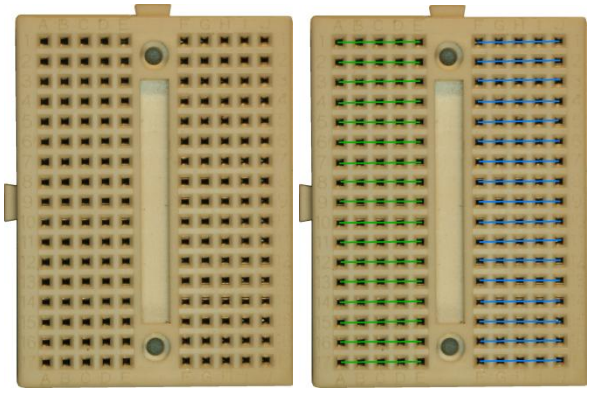
https://tkkrlab.nl/wiki/Arduino_KY-001_Temperature_sensor_module



Microphone Sound Sensor
Four connections:
G - connect to Ground
+ - connect to 5V
AO - Analog Out - connect to Arduino for analog input
DO - Digital Out - Connect to Arduino as digital trigger input; adjust sensitivity via screw on potentiometer.

For code examples, see:
http://www.princetronics.com/sound-sensitive-lights-w-sound-sensor-arduino/

https://tkkrlab.nl/wiki/Arduino_KY-038_Microphone_sound_sensor_module

	**Joystick with push button module** Joystick module has five connections: GND (Ground), +5V, VRx = x-axis analog output, VRy = y-axis analog output, SW = Normally Open switch (push down on joystick to activate). For code examples, see: http://arduino.cc/en/Tutorial/JoystickMouseControl https://tkkrlab.nl/wiki/Arduino_KY-023_XY-axis_joystick_module https://teamprincipia.wordpress.com/2007/12/27/joystick-control-of-a-servo/
	**Temperature and Humidity sensor** Three connections: (-) = ground (-) Note the square solder pad. (center pin) = +5V (S)= Signal (digital, serial output) For the DHT11 library and information, see: http://playground.arduino.cc/main/DHT11Lib http://www.johnboucha.com/arduino-dht11-temperature-humidity/ https://tkkrlab.nl/wiki/Arduino_KY-015_Temperature_and_humidity_sensor_module
	**Photo Resistor Light Sensor** Three connections: Out - Analog voltage signal, VCC - +5v, GND - Ground (-). Analog signal level will be higher in bright light, lower in darkness. See: http://playground.arduino.cc/Learning/PhotoResistor https://tkkrlab.nl/wiki/Arduino_KY-018_Photo_resistor_module http://www.cutedigi.com/articles/sensor-ky018-arduino-sample-code.html
other	
	**170-pin Breadboard** Rows of 5 pins each are connected together, but not to each other, and separated by a channel down the center of the breadboard.

Additional Resources:

Several sites have hook-up and information and code examples on a variety of sensors, similar to, and including the ones found in this kit. Some sensors may be loose components or integrated into different board designs. If the documented sensor uses the same electronic component, then any code sketch documented may work with the sensors found in your kit. However, depending on the circuit design, the adjustments or sensitivity range may need to be modified slightly to achieve the desired result. Sites documenting these and other sensors include:

Arduino Playground Examples and additional libraries (code sketches available from the IDE *File, Examples* menu): http://www.arduino.cc/en/Tutorial/HomePage

Arduino Playground Tutorials: http://playground.arduino.cc/Learning/Tutorials

Forum.HobbyComponents.com: http://forum.hobbycomponents.com/viewtopic.php?f=73&t=1320

LinkSprite Wiki - Advanced Sensors Kit for Arduino: http://linksprite.com/wiki/index.php5?title=Advanced_Sensors_Kit_for_Arduino

TkkrLab.nl (Tukkerlab)Wiki: https://tkkrlab.nl/wiki/Arduino_37_sensors

University of Rhode Island (PDF coursework): http://www.ele.uri.edu/courses/ele205/Arduino%20-%20Learning.pdf

Freeduino.org: http://www.freeduino.org/

Arduino for Projects (PDF with 1193 projects): http://duino4projects.com/arduino-projects-pdf/

Lady Ada - Introduction to Arduino- step-by-step lessons: http://www.ladyada.net/learn/arduino/index.html

Tronixstuf Arduino Tutorials: http://tronixstuff.com/tutorials/

Earthshine Electronics Beginners Guide to Arduino: https://docs.google.com/file/d/0Bw_ruMOtRDDgNXI3OTFGZXhlZ2c/edit?usp=sharing

Sheepdog's Guide to Arduino Programming: http://sheepdogguides.com/arduino/FA1main.htm