

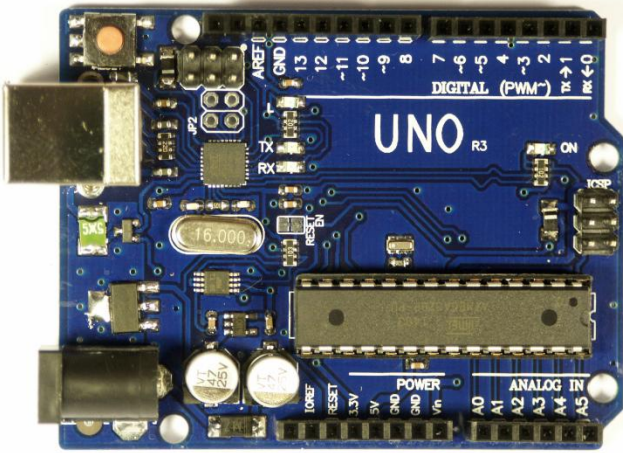


**342097**

**Uno Starter Kit (Contents)**

1x LED - RGB
5x LED - Blue
5x LED - Red
5x LED - Yellow
1x 7-seg LED 1x module
1x 7-seg LED 4x module
1x 8x8 dot LED array
1x 2x16 LCD display
4x Large button switch
1x Buzzer (active)
1x Buzzer (passive)
2x Ball tilt sensor
1x Relay 5v
1x Flame sensor
1x IR receiver
1x Temp & Humidity
1x LM35 Temp Sensor
1x RTC module
1x Servo Motor
1x Stepper module
1x Stepper Motor
1x 10K $\Omega$ Pot
5x 10K $\Omega$ resistor
5x 1K $\Omega$ resistor
8x 220 $\Omega$ resistor
3x Photo Resistor
1x IC 74HC595N 16-pin DIP
1x IR remote control
1x 6-cell AA Battery pack
1x Acrylic mounting plate
1x Mounting hardware
Arduino Uno compatible board
1x USB cable
Dupont connector wires
400,170-pin Breadboard

## 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.

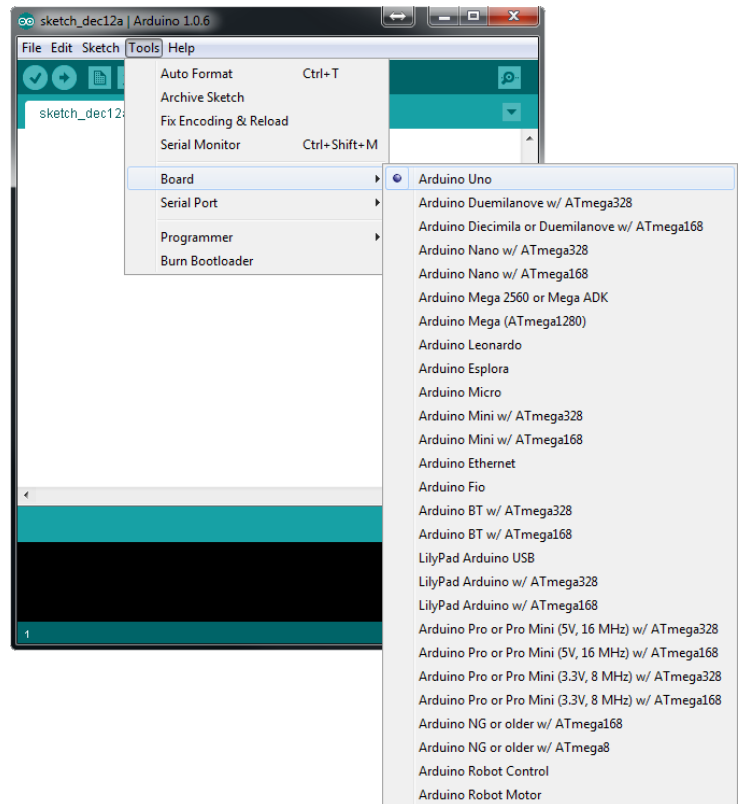
The latest Arduino Integrated Development Environment (IDE) necessary for programming your UNO R3 board can be obtained at <http://arduino.cc/en/Main/Software> (the **Download** menu choice on Arduino.cc)

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](http://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

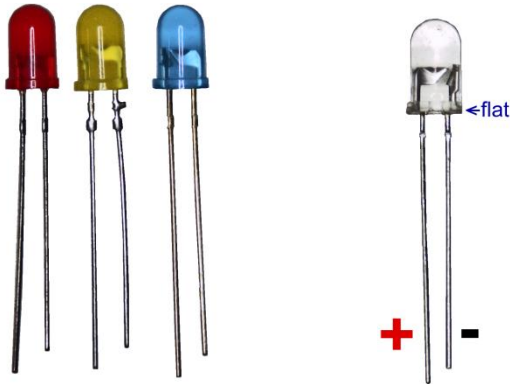


Sketch (code) Examples are included as part of the IDE. If you install device libraries for other components or shields, additional examples may be included and will show up in the list under the IDE File menu.

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

## Components:

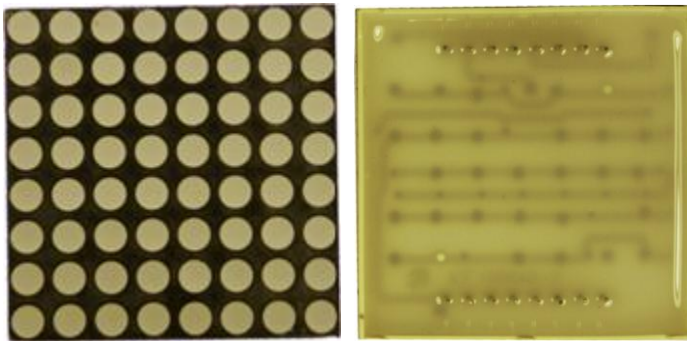
### LEDs



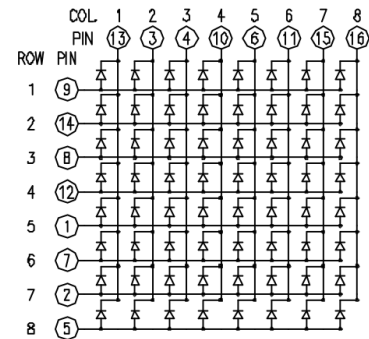
#### LED - Light Emitting Diodes

- 1) Connect a current-limiting resistor (220 ohm) between the LED's positive pin and the 5v pin. Connect the LED's negative pin directly to your Arduino output pin. -OR-
- 2) Connect a current-limiting resistor (220 ohm) between the Arduino output pin and the LED's positive pin. Connect the LED's negative pin directly to a Ground (GND) pin.

Note: LEDs may have "water clear" or color tinted lens.

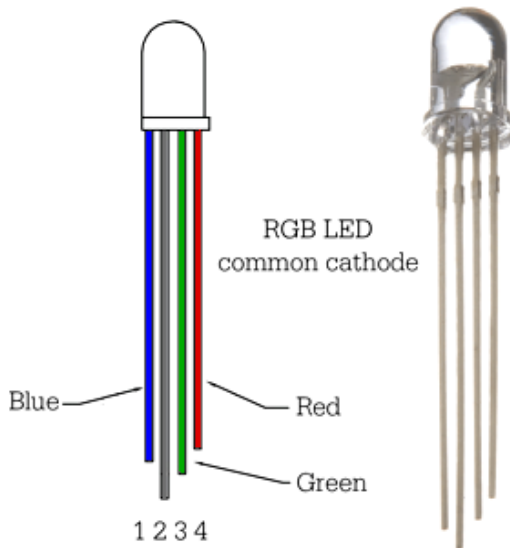


#### LED - 8x8 Matrix (1588BS or similar)



Connect Columns to Arduino Data pins that can be pulled to ground, connect columns using current limiting resistors to pins that will output positive voltage to illuminate the selected LED. See:

<http://arduino.cc/en/Tutorial/RowColumnScanning>



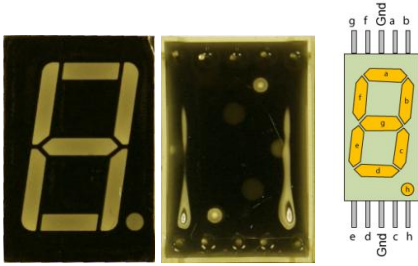
#### LED - RGB LED

Connect the common pin (2) to your ground, and the Red (4), Green (3), and Blue (1) pins to your Arduino output pins.

If using PWM (Pulse Width Modulation) capable outputs, you can effectively mix the RGB primary colors to produce thousands or different output colors in the single LED. (See Examples, 01.Basic, **Fade** sketch example in the IDE)

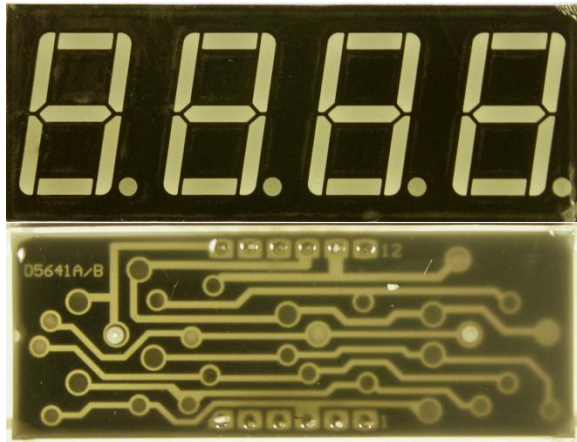
Using the IDE command "digitalWrite(led, HIGH)" and digitalWrite(led, LOW) you can turn the individual color LEDs on and off. (See Examples, 01.Basic, Blink in the IDE) Combine Red+Green = Yellow, Green+Blue=Cyan, Red+Blue=Purple, and Red+Blue+Green=White.



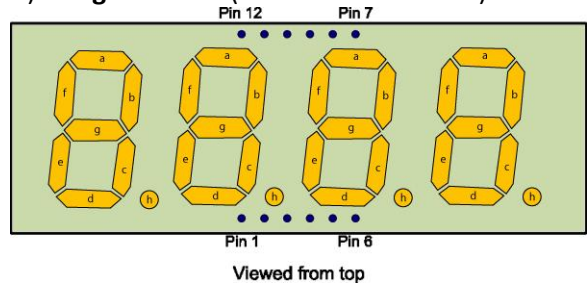


**(1-bit) 7-segment LED (TOS5121AS or similar)**

Pin 1 is bottom left. Pins 3 and 8 are a common ground. Connect other pins to your Arduino with a current limiting resistor.



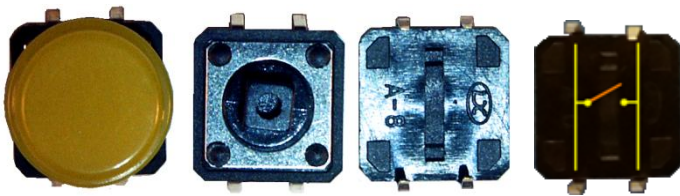
**(4-bit) 7-segment LED (SH5461AS or similar)**



Pins 12, 9, 8, 6 are grounds for each segment; LED segments share pins 11(a), 7(b), 4(c), 2(d), 1(e), 10(f), 5(g), 3(h). Transistors are recommended to handle current that could exceed the maximum output of the Arduino pins. See:

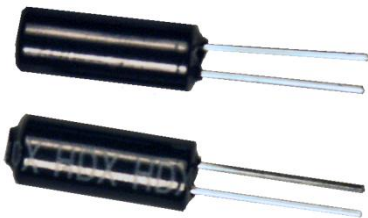
<http://learn.parallax.com/4-digit-7-segment-led-display-arduino-demo>

**Switches**



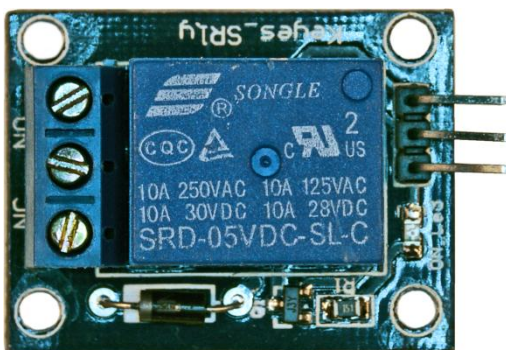
**Large button switch - momentary contact, NO**

For the switch, you can use either pair located on one side. The connection is Normally Open (off) until the button is pushed.



**Ball Tilt Sensor**

This is a very simple switch with a ball inside of the tube. When the sensor is tipped upward past the horizontal, the ball will short the contacts, closing the switch. With the top (away from the pins) is tilted down relative to the horizontal, the switch opens.



**5 Volt Relay module**

Three input pins: +, -, S ...connect - to ground, connect + to 5V, Connect S to your Arduino "signal" pin to trip the relay.

Three output (screw) pins: Center is common, NC indicates Normally Closed (ON), NO indicates Normally Open (OFF). When relay engages, the NC contact will open, the NO contact will close.

## LCD



**2x16 LCD Display** - 2-line, 16-character LCD display with backlight.

The LiquidCrystal library allows you to control LCD displays that are compatible with the Hitachi HD44780 driver. There are many of them out there and you can usually tell them by the 16-pin interface.

See:

<http://www.arduino.cc/en/Reference/LiquidCrystal>

<http://www.arduino.cc/en/Tutorial/LiquidCrystal>

<http://www.arduino.cc/en/Tutorial/LiquidCrystalDisplay>

Hitachi HD44780 LCD controller information:

[https://en.wikipedia.org/wiki/Hitachi\\_HD44780\\_LCD\\_controller](https://en.wikipedia.org/wiki/Hitachi_HD44780_LCD_controller)

## Sensors and modules



**Flame Sensor** (YG1006 or similar)

The Flame sensor is a high-speed and highly sensitive NPN Silicon photo transistor based on the YG1006. It can be used to detect fire or other wavelength at 760nm ~ 1100nm light. Response time is 15us, supply voltage is 3.3-5V; output is analog.

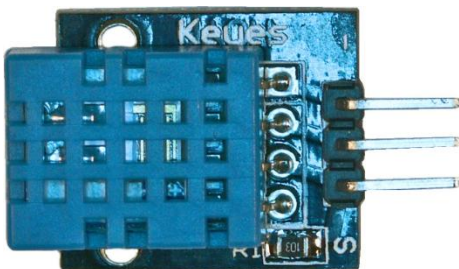


**IR Receiver** (VS1838B or similar)

Connect the Vcc pin to your 5V pin and the Gnd to a Ground pin. The Signal pin connects to an Arduino input pin and will change when the sensor detects an Infrared signal.

An IR remote control will send coded pulses based on which button you press, or an IR LED will produce a continuous illumination.

The surface-mount LED connects to the signal pin of the receiver. It will illuminate when the sensor detects an active infrared source.



**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>

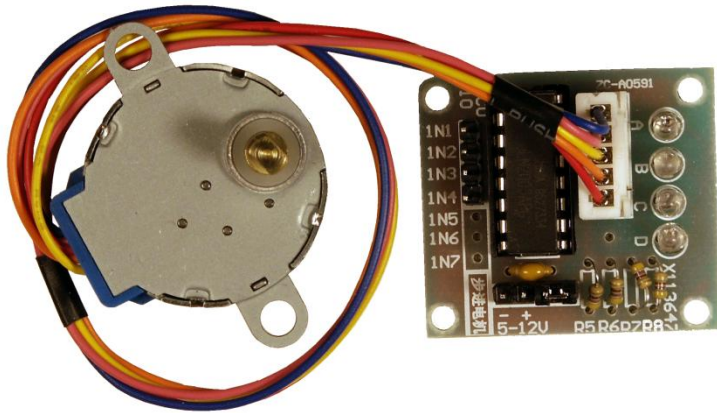
<http://www.johnboucha.com/arduino-dht11-temperature-humidity/>

[https://tkkrlab.nl/wiki/Arduino\\_KY-](https://tkkrlab.nl/wiki/Arduino_KY-)

[015\\_Temperature\\_and\\_humidity\\_sensor\\_module](https://tkkrlab.nl/wiki/Arduino_KY-015_Temperature_and_humidity_sensor_module)







### Stepper motor and controller

Stepper IC = ULN2003AN (or similar)

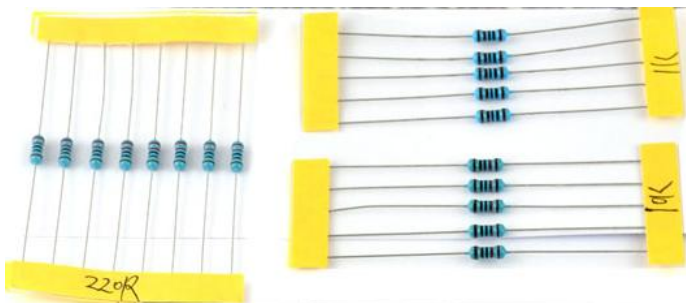
The stepper motor included in the kit connects to the controller through a white connector socket. Four inputs connect to your Arduino IN1, IN2, IN3, and IN4. Power for the motor and controller is provided through the ground (-) and 5-to-12V (+) pins.

Use an external power supply for the motor to avoid damaging the Arduino. Connect the ground of your external supply to the ground of the Arduino and the signal IN# pins to digital outputs.

For sketch examples, see:

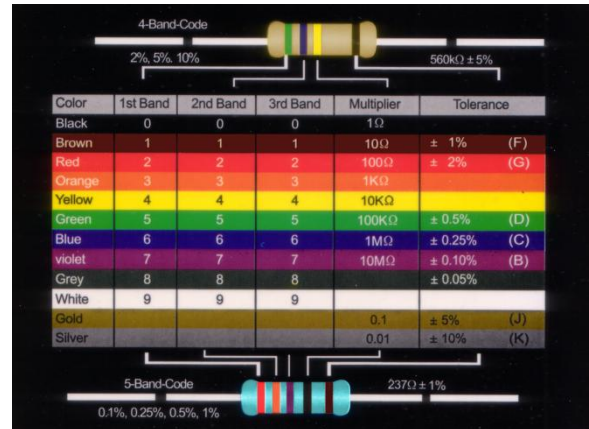
<http://arduino.cc/en/Tutorial/MotorKnob>

## Resistors

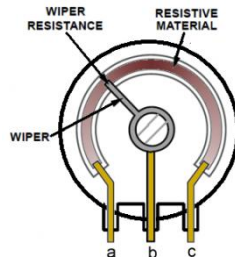
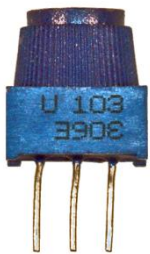


8pcs 220 ohm  
5pcs 1K ohm  
5pcs 10K ohm

### 1/4 Watt Resistors



Resistors may come with 4 or 5 identifying color bands. (When in doubt, use a multimeter to verify the value.)



### 10K Potentiometer

Resistance between outer pins is 10K ohms. Resistance between one outer pin and the center (wiper) pin is 0-10K ohms based on position.



### Photo Resistor

Resistance across the pins will be 1 meg ohm or higher in darkness, dropping to 60 ohms or less in bright light.





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](http://linksprite.com/wiki/index.php5?title=Advanced_Sensors_Kit_for_Arduino)

TkkrLab.nl (Tukkerlab)Wiki: [https://tkkrlab.nl/wiki/Arduino\\_37\\_sensors](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\\_ruMOtRDDgNXI3OTFGZXhI2c/edit?usp=sharing](https://docs.google.com/file/d/0Bw_ruMOtRDDgNXI3OTFGZXhI2c/edit?usp=sharing)

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