

# WEATHER ARDUINO APPARAT WITH INFRARED COMMUNICATION

Arduino Uno / LCD / 5 sensors kit

AlbaElektronica

## Summary

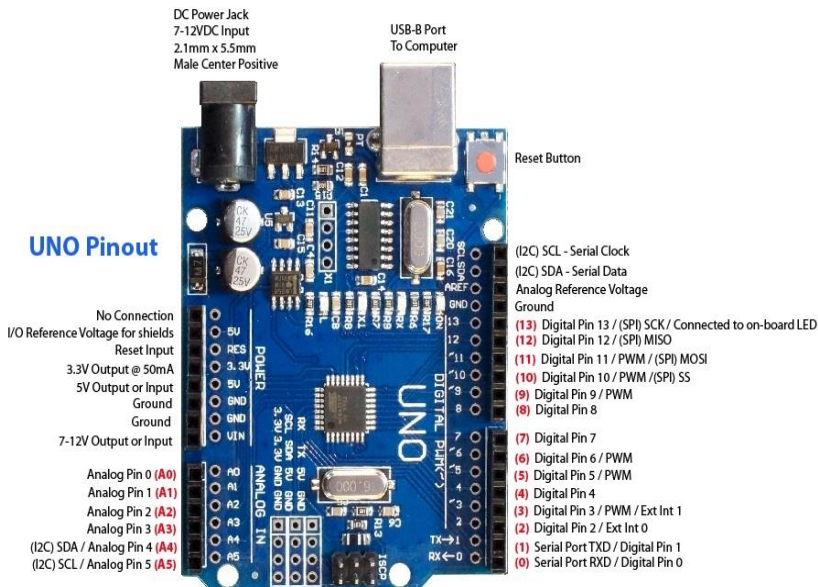
The sensors are spited in two sets. The weather is assessed with four sensors. Two infrared sensors and a remote control allow the activation of the readings at a certain time, and the broadcasting of the results. An LCD display shows the output of the readings. A number of configurations and corresponding programs are available on our github site. Experiments include one / two / three sensors.

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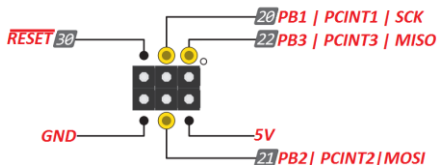
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## Inside the box

### Arduino Uno pinout



Red numbers in paranthesis are the name to use when referencing that pin.  
Analog pins are references as A0 thru A5 even when using as digital I/O



In Circuit Serial Programming Pinout (ICSP)

[www.CircuitsToday.com](http://www.CircuitsToday.com)

## List of components

Components	Description	No
Arduino Uno R3	Arduino board	1
Charger Arduino	USB A / USB B	1
Liquid Crystal Display	LCD 1602 / IIC I2C module	1
Connectors	male-female / male-male	8
Weather sensors	1. Temperature & Humidity sensor (DHT11)	
	2. MH Rain sensor	

<https://github.com/Alba-Elektronika/Arduino-Uno-LCD-5-sensors/>

Communication sensors + remote control	3. Photosensitive module	6
	4. Remote control	
	5. Infrared sensor KT-005 (transmitter)	
	6. Infrared sensor KY-022 (receiver)	
Manual	Description / Tips / Experiments	1

## List of Sensors + remote

 KY005	 KY022	 Remote
 KY015	 MH-RD	 KY018

## Additional components



## Required hardware & software

Connect Arduino UNO with computer / Raspberry Pi by wired cable

The Arduino app / software / IoT from Arduino.cc

An alternative for advanced users is the atmel studio.

<https://github.com/Alba-Elektronika/Arduino-Uno-LCD-5-sensors/>

## Arduino Uno

- ➔ Download software from Arduino.cc; Install
- ➔ Select Tools / Manage libraries / Arduino Uno board
- ➔ Select Tools / Port / the port of the connection (COM1 or COM6 in Windows)
- ➔ Check Tools / Get board info (if the board is correctly connected)

## A basic Liquid Crystal Display (LCD)

Connect the LDC 1602 IIC I2C display

- ➔ Turn on the LCD
- ➔ Connect the pins Arduino  $\leftrightarrow$  IIC I2C module with male / female connectors (see tips)
- ➔ Run File / Examples / Wire / i2c\_scanner to find the address of the display
- ➔ Open Tools / Serial monitor; observe the output (see tips for troubleshooting)
- ➔ Install from Arduino libraries Tools / Manage libraries / LiquidCrystal I2C
- ➔ Compile and upload the HelloWorld application
- ➔ For more examples : search LCD I2C tutorial on Arduino.cc
- ➔ Pinout Arduino / LCD: A5  $\rightarrow$  SCL, A4  $\rightarrow$  SDA, 5V  $\rightarrow$  VCC, GND  $\rightarrow$  GND
- ➔ If initialised correctly you will see at first a black line
- ➔ If the screen is too bright or too dark, then tune with screw the blue potentiometer of the MH module on the backside of LCD
- ➔ Often the serial output for LCD is 0x27; if you cannot find the example i2c\_scanner just use this address
- ➔ Include in the program LiquidCrystal I2C.ino the following line
  - LiquidCrystal\_I2C lcd(0x27,16,2);

## Experiments with the weather sensors

### Temperature and humidity in one sensor

Connect the Arduino with the sensor KY-015 type DHT11 with three male / female connectors

- ➔ Select Tools / Manage libraries / Install DHT library of Adafruit and also the required additional libraries (like Adafruit Unified Sensor)
- ➔ Open Tools / Examples / DHT sensor library / DHT\_Unified\_Sensor.ino
- ➔ Open Tools / Serial monitor / Compile and upload the application
- ➔ Pinout S → 2, + → 3.3V, - → GND
- ➔ Select from the program DHT\_Unified\_Sensor
  - #define DHTTYPE DHT11
- ➔ For connecting the LCD and DHT11 you find the combined code on [github.com/alba-elektronica/Arduino-Uno-LCD-3-sensors](https://github.com/alba-elektronica/Arduino-Uno-LCD-3-sensors)
- ➔ The DHT11 sensor may get very hot; the reading of temperature is disturbed

### Rain sensor

Connect MH-RD sensor to Arduino

- ➔ Connect the module to the MH sensor series with 4 x female, male connectors
- ➔ MH-RD sensor has two parts which need to be connected with 2 x male, male connectors
- ➔ Put some drops of water on the sensor
- ➔ Pinout: Vcc → 7, GND → 14 (GND), D0 → 8, A0 → A0
- ➔ Combine the LCD and humidity and rain sensors
- ➔ Code available from [github.com/alba-elektronica/Arduino-Uno-LCD-3-sensors](https://github.com/alba-elektronica/Arduino-Uno-LCD-3-sensors)

### Photosensitive module

The KY-018 sensor module has a photosensitive resistor to detect light and intensity

<https://github.com/Alba-Elektronica/Arduino-Uno-LCD-5-sensors/>

- ➔ Connect the sensor to the Arduino board using the signal on an analog pin, for example A2
  - ➔ Use the extra 5V and GND slots from Arduino to connect the other two pins S → A2, + → +5V, - → GND
  - ➔ Test with a simple program reading the analog input A2
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- ➔ It is possible to combine all the sensors at once
  - ➔ Amplify the analog number with a large number; Open Serial Plotter

## Experiments with the infrared sensors

There are two infrared sensors.: the receiver KY 022, and the transmitter KY 005.

The most popular library is IRremote library. For our experiments, we have used IRLib2.

### Infrared sensor Receiver & remote

Connect KY-022 to Arduino. We have used pin 3 for signal.

- ➔ We provide a remote control, although a general purpose remote control may be used in experiments
- ➔ You may need extra GND and power pins when using both receiver / transmitter and an sensor. We have used the ICSP pinout with male-male connectors

### Infrared transmitter sensor

Connect KY-005. We have used pin 2 for signal and ICSP pins for extra power and GND.