LAMPIRAN-LAMPIRAN
**Overview**

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

Revision 2 of the Uno board has a resistor pulling the 8U2 HWB line to ground, making it easier to put into DFU mode.

Revision 3 of the board has the following new features:

- 1.0 pinout: added SDA and SCL pins that are near to the AREF pin and two other new pins placed near to the RESET pin, the IOREF that allow the shields to adapt to the voltage provided from the board. In future, shields will be compatible both with the board that use the AVR, which operate with 5V and with the Arduino Due that operate with 3.3V. The second one is a not connected pin, that is reserved for future purposes.
- Stronger RESET circuit.
- Atmega 16U2 replace the 8U2.

"Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions, see the index of Arduino boards.

**Summary**

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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

Schematic & Reference Design

EAGLE files: arduino-uno-Rev3-reference-design.zip (NOTE: works with Eagle 6.0 and newer)
Schematic: arduino-uno-Rev3-schematic.pdf

Note: The Arduino reference design can use an Atmega8, 168, or 328. Current models use an Atmega328, but an Atmega8 is shown in the schematic for reference. The pin configuration is identical on all three processors.

Power

The Arduino Uno can be powered via the USB connection or with an external power supply. The power source is selected automatically. External (non-USB) power can come either from an AC-to-DC adapter (wall-watt) or battery. The adapter can be connected by plugging a 2.1mm center-positive plug into the board’s power jack. Leads from a battery can be inserted in the Gnd and Vin pin headers of the POWER connector. The board can operate on an external supply of 6 to 20 volts. If supplied with less than 7V, however, the 5V pin may supply less than five volts and the board may be unstable. If using more than 12V, the voltage regulator may overheat and damage the board. The recommended range is 7 to 12 volts.

The power pins are as follows:

- **VIN**. The input voltage to the Arduino board when it’s using an external power source (as opposed to 5 volts from the USB connection or other regulated power source). You can supply voltage through this pin, or, if supplying voltage via the power jack, access it through this pin.
- **5V**. This pin outputs a regulated 5V from the regulator on the board. The board can be supplied with power either from the DC power jack (7 - 12V), the USB connector (5V), or the VIN pin of the board (7-12V). Supplying voltage via the 5V or 3.3V pins bypasses the regulator, and can damage your board. We don’t advise it.
- **3V3**. A 3.3 volt supply generated by the on-board regulator. Maximum current draw is 50 mA.
- **GND**. Ground pins.

Memory

The ATmega328 has 32 KB (with 0.5 KB used for the bootloader). It also has 2 KB of SRAM and 1 KB of EEPROM (which can be read and written with the EEPROM library).

Input and Output

Each of the 14 digital pins on the Uno can be used as an input or output, using pinMode(), digitalWrite(), and digitalRead() functions. They operate at 5 volts. Each pin can provide or receive a maximum of 40 mA and has an internal pull-up resistor (disconnected by default) of 20-50 kOhms. In addition, some pins have specialized functions:

- **Serial: 0 (RX) and 1 (TX).** Used to receive (RX) and transmit (TX) TTL serial data. These pins are connected to the corresponding pins of the ATmega8U2 USB-to-TTL Serial chip.
- **External Interrupts: 2 and 3.** These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value. See the attachInterrupt() function for details.
- **PWM: 3, 5, 6, 9, 10, and 11.** Provide 8-bit PWM output with the analogWrite() function.
• SPI: 10 (SS), 11 (MOSI), 12 (MISO), 13 (SCK). These pins support SPI communication using the SPI library.
• LED: 13. There is a built-in LED connected to digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW, it's off.

The Uno has 6 analog inputs, labeled A0 through A5, each of which provide 10 bits of resolution (i.e. 1024 different values). By default they measure from ground to 5 volts, though it is possible to change the upper end of their range using the AREF pin and the analogReference() function. Additionally, some pins have specialized functionality:

• TWI: A4 or SDA pin and A5 or SCL pin. Support TWI communication using the Wire library.

There are a couple of other pins on the board:

• AREF. Reference voltage for the analog inputs. Used with analogReference().
• Reset. Bring this line LOW to reset the microcontroller. Typically used to add a reset button to shields which block the one on the board.

See also the mapping between Arduino pins and ATmega328 ports. The mapping for the Atmega8, 168, and 328 is identical.

Communication

The Arduino Uno has a number of facilities for communicating with a computer, another Arduino, or other microcontrollers. The ATmega328 provides UART TTL (5V) serial communication, which is available on digital pins 0 (RX) and 1 (TX). An ATmega16U2 on the board channels this serial communication over USB and appears as a virtual com port to software on the computer. The '16U2 firmware uses the standard USB COM drivers, and no external driver is needed. However, on Windows, a .inf file is required. The Arduino software includes a serial monitor which allows simple textual data to be sent to and from the Arduino board. The RX and TX LEDs on the board will flash when data is being transmitted via the USB-to-serial chip and USB connection to the computer (but not for serial communication on pins 0 and 1).

A SoftwareSerial library allows for serial communication on any of the Uno's digital pins. The ATmega328 also supports I2C (TWI) and SPI communication. The Arduino software includes a Wire library to simplify use of the I2C bus; see the documentation for details. For SPI communication, use the SPI library.

Programming

The Arduino Uno can be programmed with the Arduino software (download). Select *Arduino Uno from the Tools > Board menu (according to the microcontroller on your board). For details, see the reference and tutorials.

The ATmega328 on the Arduino Uno comes preburned with a bootloader that allows you to upload new code to it without the use of an external hardware programmer. It communicates using the original STK500 protocol (reference, C header files).

You can also bypass the bootloader and program the microcontroller through the ICSP (In-Circuit Serial Programming) header; see these instructions for details.

The ATmega16U2 (or BU2 in the rev1 and rev2 boards) firmware source code is available. The ATmega16U2/BU2 is loaded with a DFU bootloader, which can be activated by:

• On Rev1 boards: connecting the soder jumper on the back of the board (near the map of Italy) and then resetting the BU2.
• On Rev2 or later boards: there is a resistor that pulling the BU2/16U2 HWB line to ground, making it easier to put into DFU mode.

You can then use Atmel's FLIP software (Windows) or the DFU programmer (Mac OS X and Linux) to load a new firmware. Or you can use the ISP header with an external programmer (overwriting the DFU bootloader). See this user-contributed tutorial for more information.

Automatic (Software) Reset
Rather than requiring a physical press of the reset button before an upload, the Arduino Uno is
designed in a way that allows it to be reset by software running on a connected computer. One of the
hardware flow control lines (DTR) of the ATmega8U2/16U2 is connected to the reset line of the
ATmega328 via a 100 nanofarad capacitor. When this line is asserted (taken low), the reset line drops
long enough to reset the chip. The Arduino software uses this capability to allow you to upload code by
simply pressing the upload button in the Arduino environment. This means that the bootloader can
have a shorter timeout, as the lowering of DTR can be well-coordinated with the start of the upload.
This setup has other implications. When the Uno is connected to either a computer running Mac OS X
or Linux, it resets each time a connection is made to it from software (via USB). For the following half-
second or so, the bootloader is running on the Uno. While it is programmed to ignore malformed data
(i.e. anything besides an upload of new code), it will intercept the first few bytes of data sent to the
board after a connection is opened. If a sketch running on the board receives one-time configuration or
other data when it first starts, make sure that the software with which it communicates waits a second
after opening the connection and before sending this data.
The Uno contains a trace that can be cut to disable the auto-reset. The pads on either side of the trace
can be soldered together to re-enable it. It’s labeled ”RESET-EN”. You may also be able to disable the
auto-reset by connecting a 110 ohm resistor from 5V to the reset line; see this forum thread for
details.

USB Overcurrent Protection

The Arduino Uno has a resettable polyfuse that protects your computer’s USB ports from shorts and
overcurrent. Although most computers provide their own internal protection, the fuse provides an extra
layer of protection. If more than 500 mA is applied to the USB port, the fuse will automatically break
the connection until the short or overload is removed.

Physical Characteristics

The maximum length and width of the Uno PCB are 2.7 and 2.1 inches respectively, with the USB
connector and power jack extending beyond the former dimension. Four screw holes allow the board to
be attached to a surface or case. Note that the distance between digital pins 7 and 8 is 160 mil
(0.16”), not an even multiple of the 100 mil spacing of the other pins.
**DATASHEET SENSOR ULTRASONIK**

**Ultrasonic Sensor Module**

An ultrasonic transmitter and receiver sensor all in one.

- Operating Voltage: 5V
- Working Current: 15 mA
- Distance Range: 2cm to 400cm
- 100% Arduino Compatible

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**DATASHEET MOTOR SERVO**

**SERVO MOTOR SG90 DATA SHEET**

Tiny and lightweight with high output power, Servo can rotate approximately 180 degrees (90 in each direction), and works just like the standard kinds but smaller. You can use any servo code, hardware or library to control these servos. Good for beginners who want to make stuff move without building a motor controller with feedback & gears, especially since it will fit in small places. It comes with a 3mm brass ball end Installed.
**DATASHEET SIM 800L**

Berikut datasheet SIM800L mini Module:

Description:

**Chip:** SIM800L  
**Voltage:** 3.7-4.2V (datasheet = 3.4-4.4V)  
Freq: QuadBand 850/900/1800/1900Mhz  
Module size: 2.5cmx2.3cm  
Transmitting power  
Class 4 (2W) at GSM 850 and EGSM 900  
Class 1 (1W) at DCS 1800 and PCS 1900GPRS connectivity  
GPRS multi-slot class 12 default  
GPRS multi-slot class 1-12 (option)  
Temperature range Normal operation: 40°C ~ +85°C  
TTL serial port for serial port, you can link directly to the microcontroller. No need MAX232  
Power module automatically boot, homing network  
Onboard signal lights all the way. It flashes slowly when there is a signal, it flashes quickly when there is no signal

**DATASHEET STEPDOWN**

Stepdown Lm2596

**Input voltage:** 4-35V  
**Output Voltage:** 1.5-35V (adjustable)  
**Output current:** rated current 2A, maximum 3A (heat sink required)
Conversion efficiency: Up to 92% (the higher the voltage, the higher the efficiency)

Switching Frequency: 150KHz

Rectifier: Non-Synchronous Rectification

Module Properties: Non-isolated step-down module (buck)

Short circuit protection: current limiting

Operating temperature: Industrial grade (-40 °C to +85 °C) (output power 10W or less)

Full load temperature rise: 40 °C

Load regulation: ± 0.5%

Voltage regulation: ± 0.5%

Dynamic response speed: 5% 200uS

Output ripple:

Input 12V Output 5V 3A 60mV (MAX)

Input 24V Output 12V 3A 120mV (MAX)
#define pingTrig 6
#define pingEcho 7
#define pingTrig2 9
#define pingEcho2 10
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
#include <Servo.h>
#include <SoftwareSerial.h>

SoftwareSerial mySerial(0, 1);
int sms_count=0;

LiquidCrystal_I2C lcd(0x27,16,2);
Servo servo;

void setup()
{
  lcd.begin(16,2);
pinMode(pingTrig2, OUTPUT);
pinMode(pingEcho2, INPUT);
pinMode(pingTrig, OUTPUT);
pinMode(pingEcho, INPUT);
lcd.init();
}
lcd.backlight();
lcd.setCursor(3,0);
lcd.print("LOADING. . .");
delay(3000);
lcd.setCursor(1,1);
lcd.print("Tunggu ya Bro");
delay(3000);
servo.attach(5);
mySerial.begin(9600);
Serial.begin(9600);
delay(5000);

}

void loop()
{
long duration2, distance2;

digitalWrite(pingTrig2, HIGH);
delayMicroseconds(10);
digitalWrite(pingTrig2, LOW);

duration2 = pulseIn(pingEcho2, HIGH);

distance2 = duration2*0.034/2;
if(distance2 >= 10)
{
    openclose();
}
else
{
    servo.write(0);
    lcd.clear();
    lcd.setCursor(5, 0); //baris pertama
    lcd.print("TEMPAT");
    lcd.setCursor(2, 1); //baris kedua
    lcd.print("SAMPAH PENUH");
    delay(200);

    while(sms_count<1)
    {
        SendMessage();
    }
}

void openclose()
{ 
long duration, inches, distance;

digitalWrite(pingTrig, HIGH);
delayMicroseconds(10);
digitalWrite(pingTrig, LOW);

duration = pulseIn(pingEcho, HIGH);

distance = duration*0.034/2;

if(distance <= 30 )
{
    servo.write(90);
    lcd.setCursor(4, 0); //baris pertama
    lcd.print("SILAHKAN");
    lcd.setCursor(2, 1); //baris kedua
    lcd.print("BUANG SAMPALAH");
    delay(200);
    servo.write(0);
    lcd.clear();
    lcd.setCursor(0, 1); //baris pertama
    lcd.print("MENUTUP DALAM");
    delay(1000);
    lcd.clear();
}
lcd.setCursor(5, 1);  //baris KEDUA
lcd.print("5");
lcd.clear();

lcd.setCursor(0, 1);  //baris pertama
lcd.print("MENUTUP DALAM");
delay(1000);
lcd.clear();

lcd.setCursor(5, 1);  //baris KEDUA
lcd.print("4");
lcd.clear();

lcd.setCursor(0, 1);  //baris pertama
lcd.print("MENUTUP DALAM");
delay(1000);
lcd.clear();

lcd.setCursor(5, 1);  //baris KEDUA
lcd.print("3");
lcd.clear();

lcd.setCursor(0, 1);  //baris pertama
lcd.print("MENUTUP DALAM");
delay(1000);
lcd.clear();

lcd.setCursor(5, 1);  //baris KEDUA
lcd.print("2");
lcd.clear();  
lcd.setCursor(0, 1); //baris pertama  
lcd.print("MENUTUP DALAM");  
delay(1000);  
lcd.clear();  
lcd.setCursor(5, 1); //baris KEDUA  
lcd.print("1");  
lcd.clear();  
sms_count=0;

}
else
{
    servo.write(0);  
    ss sms_count=0;
    lcd.clear();  
lcd.setCursor(1, 0);  
lcd.print("SMART TRASH BIN");  
lcd.setCursor(2, 1);  
lcd.print("Galih & Wahyu");  
delay(2000);  
lcd.clear();
}
void SendMessage()
{

    mySerial.print("AT+CMGF=1\r\n");  //GSM modul set text mode
    delay(1000);  // Delay of 1000 milli seconds or 1 second

    mySerial.print("AT+CMGS="\"087773826193\"\r"); // Ganti X dengan nomor
tujuan
    delay(1000);

    mySerial.print("TEMPAT SAMPAH PENUH!\nSILAHKAN KOSONGKAN TEMPAT SAMPAH!\n"); // Test sms yg akan dikirim
    delay(100);

    mySerial.print((char)26); // ASCII code
    delay(1000);
    sms_count++;
}

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FOTO ALAT