



## Ks0001 keyestudio UNO R3 BOARD

### Introduction:

keyestudio Uno R3 is a microcontroller board based on the ATmega328 (datasheet), fully compatible with ARDUINO UNO REV3.

It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, 2 ICSP headers 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.

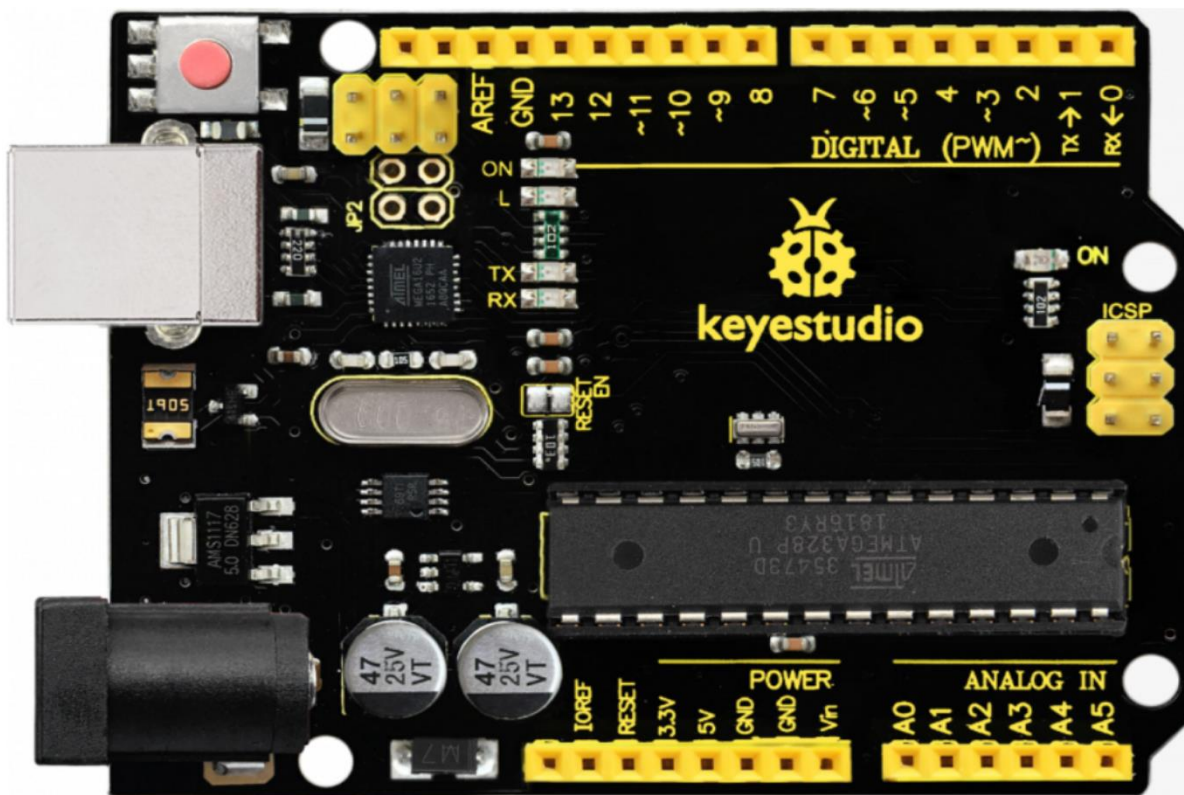
Note that the two ICSP headers are separately used to program the firmware to ATMEGA16U2-MU and ATMEGA328P-PU, but generally the two chips have been programmed well.

The Uno R3 differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 programmed as a USB-to-serial converter.

The UNO is the best board to get started with electronics and coding. If this is your first experience tinkering with the platform, the UNO is the most robust board you can start playing with.

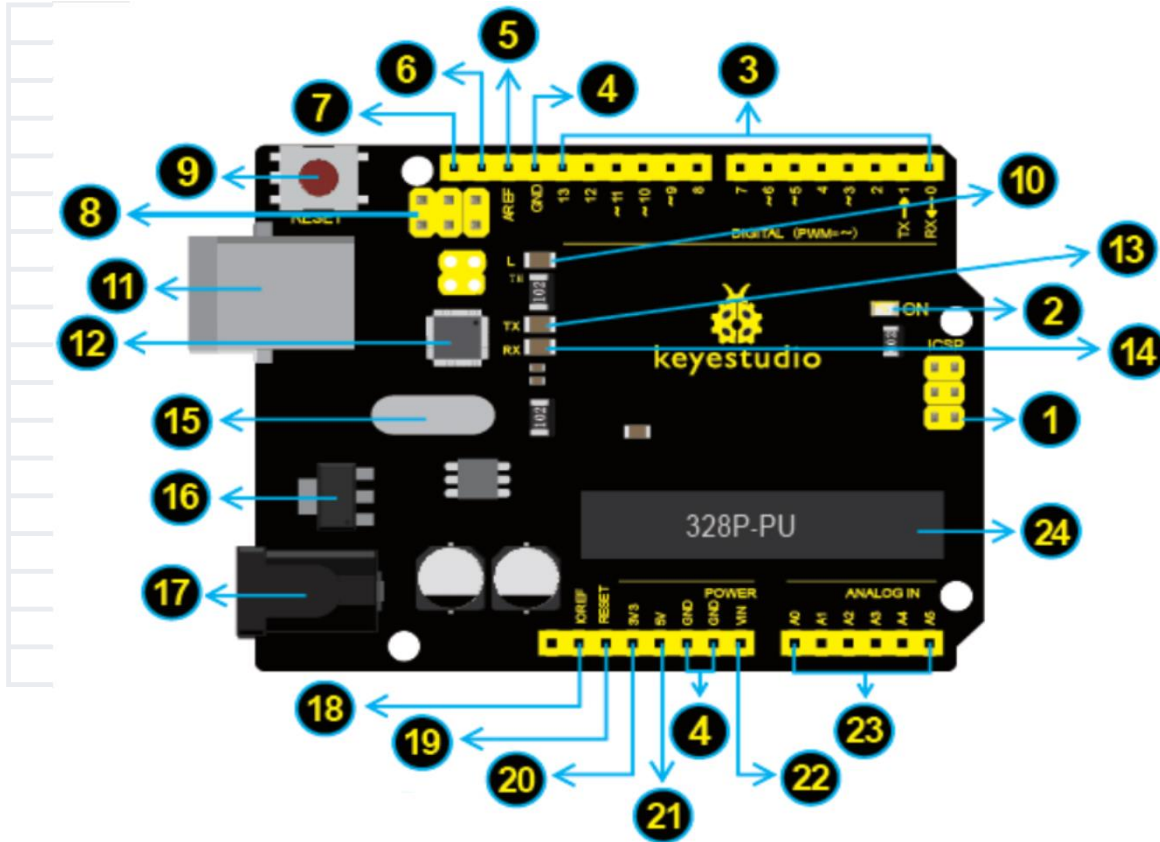
### Specification:

Microcontroller	ATmega328P-PU
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Digital I/O Pins	14 (of which 6 provide PWM output)
PWM Digital I/O Pins	6 (D3, D5, D6, D9, D10, D11)
Analog Input Pins	6 (A0-A5)
DC Current per I/O Pin	20 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 (ATmega328P-PU)
EEPROM	1 KB (ATmega328P-PU)
Clock Speed	16 MHz
LED_BUILTIN	D13





## Element and Pin Interfaces



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**ICSP (In-Circuit Serial Programming) Header** In most case, ICSP is the AVR, an Arduino micro-program header consisting of MOSI, MISO, SCK, RESET, VCC, and GND. It is often called the SPI (serial peripheral interface) and can be considered an "extension" of the output. In fact, slave the output devices under the SPI bus host. When connecting to PC, program the firmware to ATMEGA328P-PU.

**2 Power LED Indicator** Powering the Arduino, LED on means that your circuit board is correctly powered on. If LED is off, connection is wrong.

**3 Digital I/O** Arduino UNO has 14 digital input/output pins (of which 6 can be used as PWM outputs). These pins can be configured as digital input pin to read the logic value (0 or 1). Or used as digital output pin to drive different modules like LED, relay, etc. The pin labeled "~" can be used to generate PWM.

**4 GND** Ground pins

**5 AREF** Reference voltage (0-5V) for analog inputs. Used with analog Reference(). Configures the reference voltage used for analog input (i.e. the value used as the top of the input range).

**6 SDA** IIC communication pin

**7 SCL** IIC communication pin

**8 ICSP (In-Circuit Serial Programming) Header** The AVR, an Arduino micro-program header consisting of MOSI, MISO, SCK, RESET, VCC, and GND. Connected to the ATMEGA16U2-MU. When connecting to PC, program the firmware to ATMEGA16U2-MU.

**9 RESET Button** You can reset your Arduino board, for example, start the program from the initial status. You can use the RESET button.

**10 D13 LED** There is a built-in LED driven by digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW, it's off.

**11 USB Connection** Arduino board can be powered via USB connector. All you needed to do is connecting the USB port to PC using a USB cable.

**12 ATMEGA 16U2-MU** USB to serial chip, can convert the USB signal into serial port signal.

**13 TX LED** On board you can find the label: TX (transmit) When Arduino board communicates via serial port, send the message, TX led flashes.



- 14 RX LED** On board you can find the label: RX(receive )  
When Arduino board communicates via serial port, receive the message, RX led flashes.
- 15 Crystal Oscillator** How does Arduino calculate time? by using a crystal oscillator.  
The number printed on the top of the Arduino crystal is 16.000H9H. It tells us that the frequency is 16,000,000 Hertz or 16MHz.
- 16 Voltage Regulator** Convert an external input DC7-12V voltage into DC 5V, then switch DC 5V to the processor and other components.
- 17 DC Power Jack** Arduino board can be supplied with an external power DC7-12V from the DC power jack 2.1mm.
- 18 IOREF** This pin on the board provides the voltage reference with which the microcontroller operates. A properly configured shield can read the IOREF pin voltage and select the appropriate power source or enable voltage translators on the outputs for working with the 5V or 3.3V.
- 19 RESET Header** Connect an external button to reset the board. The function is the same as reset button.
- 20 Power Pin 3V3** Provides 3.3V voltage output
- 21 Power Pin 5V** Provides 5V voltage output.
- 22 Vin** You can supply an external power input DC7-12V through this pin to Arduino board.
- 23 Analog Pins** On board has 16 analog inputs, labelled A0 to A15.
- 24 Microcontroller** Each Arduino board has its own microcontroller. You can regard it as the brain of your board.  
The main IC (integrated circuit) on the Arduino is slightly different from the panel pair. Microcontrollers are usually from ATMEL. Before you load a new program on the Arduino IDE, you must know what IC is on your board. This information can be checked at the top of IC.

## Specialized Functions of Some Pins

**Serial communication:** Digital pins 0 (RX) and 1 (TX).

**PWM Interfaces (Pulse-Width Modulation):** D3, D5, D6, D9, D10, D11

**External Interrupts:** D2 (interrupt 0) and D3 (interrupt 1). These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value.

**SPI communication:** D10 (SS), D11 (MOSI), D12 (MISO), D13 (SCK). These pins support SPI communication using the SPI library.

**IIC communication:** A4 (SDA); A5(SCL)

## Notice:

1. The Arduino Uno has a resettable polyfuse that protects your computer's USB ports from shorts and overcurrent. 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.
2. Automatic (Software) Reset:
3. The Uno board 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.

## Resources:

[https://wiki.keyestudio.com/Ks0001\\_keyestudio\\_UNO\\_R3\\_BOARD](https://wiki.keyestudio.com/Ks0001_keyestudio_UNO_R3_BOARD)