Ks0342 Keyestudio MEGA 2560 Compatible Board Advanced

Introduction:

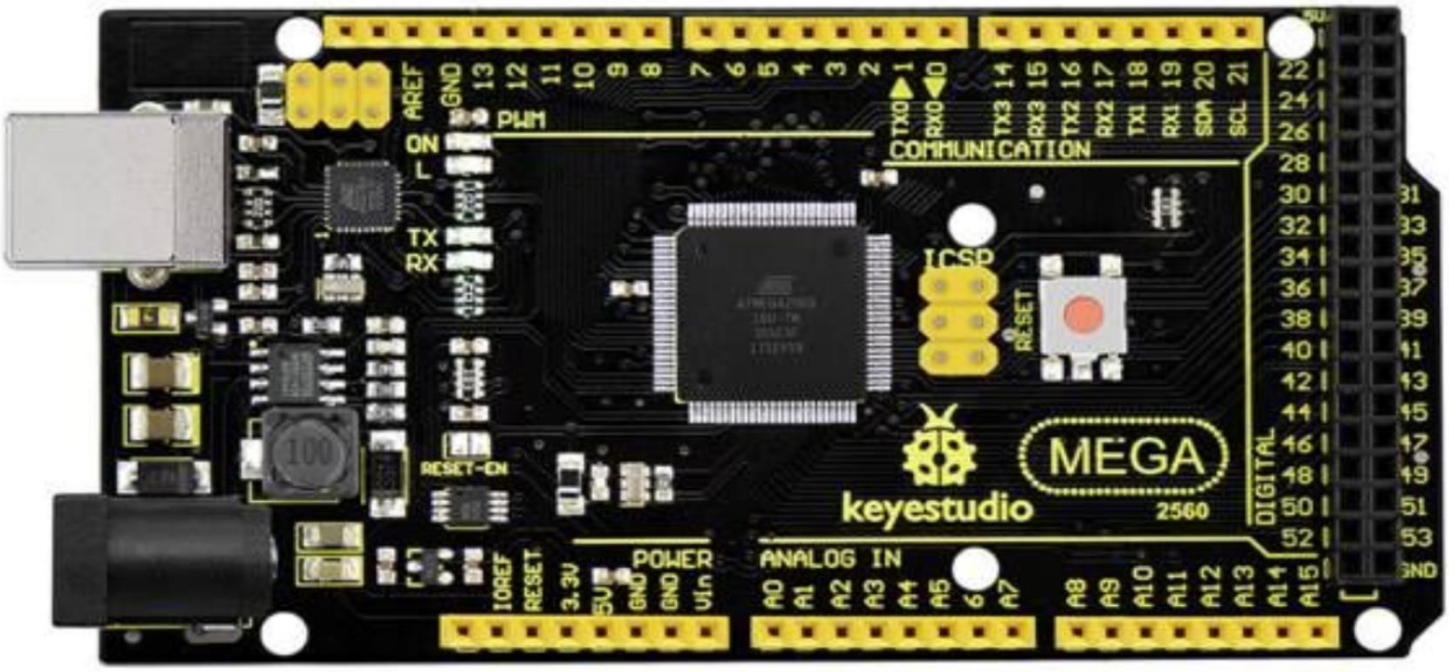
Keyestudio Mega 2560 compatible Advanced is a microcontroller board based on the ATMEGA2560-16AU , fully compatible with Keyestudio Mega 2560 R3 board and ARDUINO MEGA 2560 REV3.
It has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, 2 ICSP headers, and a reset button.
It contains everything needed to support the microcontroller. With its bootloader, program can be downloaded directly with USB and you don't need to use other external programmer.
Just simply connect it to a computer with a USB cable or power it via an external DC power jack (DC 7-12V) or via female headers Vin /GND (DC 7-12V) to get started.

Note: the most important difference between keyestudio MEGA 2560 compatible board Advanced and keyestudio MEGA 2560 R3 board is the voltage regulator chip used in the board.

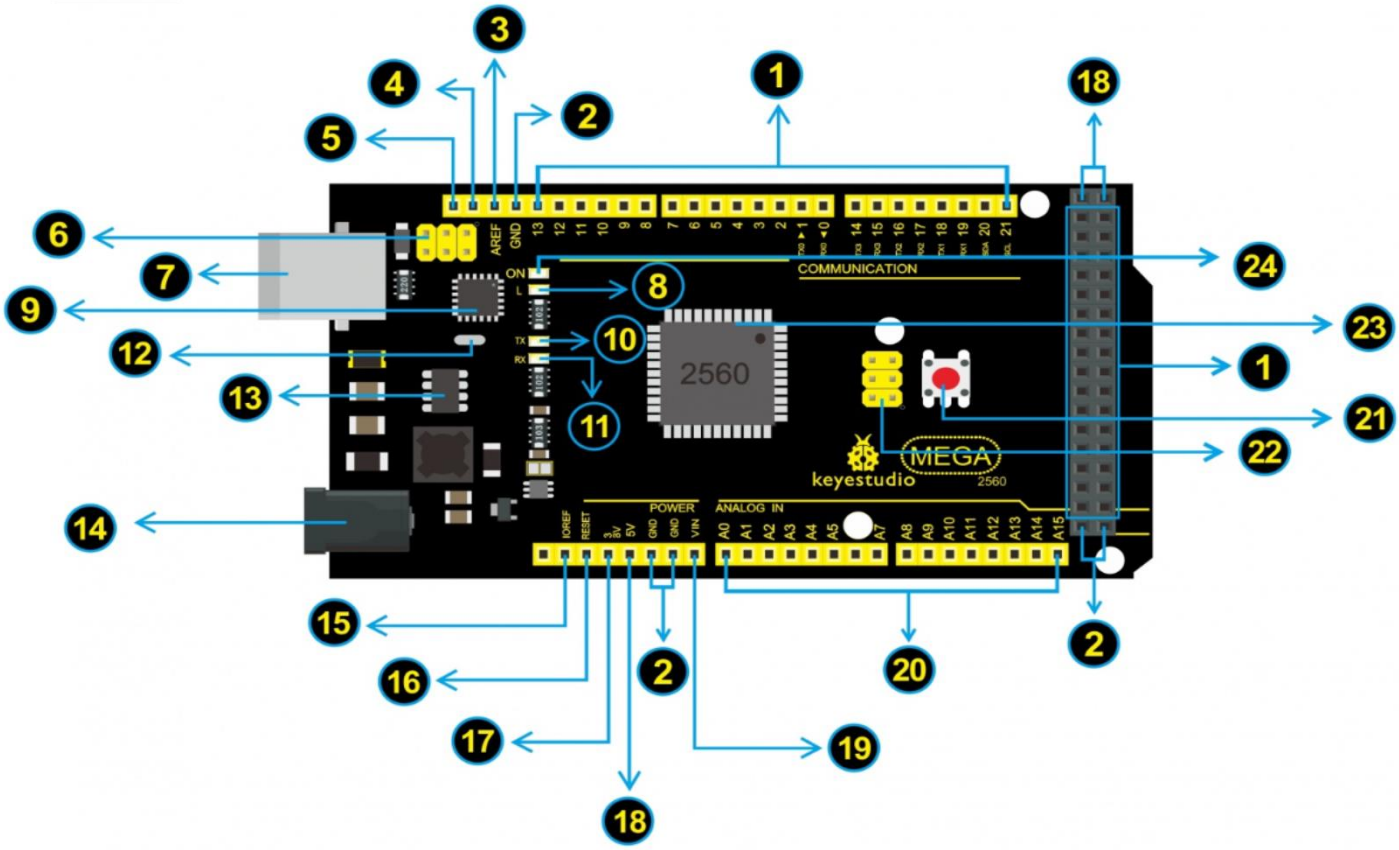
The voltage regulator chip used in keyestudio MEGA 2560 R3 board is NSP1117. When connect the external power, output 5V, the drive current is 1A. However, keyestudio MEGA 2560 compatible board Advanced features the voltage-regulator chip MP2307DN. When connect the external power, output 5V, the drive current can be 2A.

Specification:

Input Voltage: DC 7-12V
Operating Voltage: DC 5V
Advanced: 2A Output power on board, regulator MP2307DN
Digital I/O Pins 54 (D0-D53)
PWM Digital I/O Pins 15 (D2-D13; D44-D46)
Analog Input Pins 16 (A0-A15)
DC Current per I/O Pin 20 mA
DC Current for 3.3V Pin 50 mA
Flash Memory 256 KB of which 8 KB used by bootloader
SRAM 8 KB
EEPROM 4 KB
Clock Speed 16 MHz
Dimensions: 108*53.5mm, H-15mm
Environmental properties: ROHS



Element and Pin Interfaces



1 **Digital I/O** Arduino MEGA has 54 digital input/output pins (of which 15 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.
Using pinMode(), digitalWrite(), and digitalRead() functions.

2 **GND** Ground pins

3 **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).

4 **SDA** IIC communication pin

5 **SLC** IIC communication pin

6 **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.

7 **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.

8 **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.

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

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

11 **RX LED** On board you can find the label: RX(receive)
When Arduino board communicates via serial port, receive the message, RX led flashes.

12 **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.

13 **Voltage Regulator** Convert an external input DC7-12V voltage into DC 5V, then switch DC 5V to the processor and other components. Output DC 5V, the drive current is 2A.

14 **DC Power Jack** Arduino board can be supplied with an external power DC7-12V from the DC power jack 2.1mm.

15 **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.

16 **RESET Header** Connect an external button to reset the board. The function is the same as reset button.

17 **Power Pin 3V3** Provides 3.3V voltage output

18 **Power Pin 5V** Provides 5V voltage output at 2A.

19 **Vin** You can supply an external power input DC7-12V through this pin to Arduino board.

20 **Analog Pins** On board has 16 analog inputs, labelled A0 to A15.

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

22 **ICSP (In-Circuit Serial Programming) Header** 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 to the SPI bus host.
When connecting to PC, program the firmware to ATMEGA2560-16AU.

23 **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.

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

Specialized Functions of Some Pins

Serial Communication: D0 (RX0) and D1 (TX1); Serial 1: D19 (RX1) and D18 (TX1); Serial 2: D17 (RX2) and D16 (TX2); Serial 3: D15 (RX3) and D14 (TX3).

Used to receive (RX) and transmit (TX) TTL serial data. Pins 0 and 1 are also connected to the corresponding pins of the ATmega16U2 USB-to-TTL Serial chip.

PWM Pins (Pulse-Width Modulation): D2 to D13, and D44 to D46.
Provide 8-bit PWM output with the analogWrite() function.

External Interrupts: D2 (interrupt 0), D3 (interrupt 1), D18 (interrupt 5), D19 (interrupt 4), D20 (interrupt 3), and D21 (interrupt 2).
These pins can be configured to trigger an interrupt on a low level, a rising or falling edge, or a change in level. See the attachInterrupt() function for details.

SPI communication: D53 (SS), D52 (SCK), D51 (MOSI), D50 (MISO).
These pins support SPI communication using theSPI library. The SPI pins are also broken out on the ICSP header, which is physically compatible with the Arduino Uno.

IIC communication: D20 (SDA); D21 (SCL). Support TWI communication using the Wire library

Tips

Automatic (Software) Reset:
Rather than requiring a physical press of the reset button before an upload, the Mega 2560 board is designed in a way that allows it to be reset by software running on a connected computer.
The Mega 2560 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/Ks0342_Keyestudio_MEGA_2560_Compatible_Board_Advanced

