

keyestudio PRO MICRO 5V 16MHZ Development Board

(Black and Eco-friendly)





Content

1. Description	2
2. Specification	3
3. Pin Interfaces:	4
4. Specialized Functions of Pins:	5
5. Download the Arduino IDE	5
5.1 Installing Driver	7
5.2 Set Boards Manager	13
5.3 Arduino IDE Setting	. 16
5.4 Hello World!	. 22
6. Package List	. 27

1. Description

The processor core of Keyestudio PRO MICRO development board is

ATMEGA32U4-MU, fully compatible with ARDUINO.

It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable to get started.



It has 18 digital input/output pins (of which 5 can be used as PWM output),

9 analog input, a 16 MHz crystal oscillator and a micro USB port.

In addition, its working voltage is 5V and we can supply power via micro

USB cable and port RAW GND (DC 7-9V).

It is easy to integrate this Micro in everyday objects to make them interactive.

To facilitate the physical design, the board is not welded with pin headers, so you can solder the pin headers by yourself. And the package includes 2pcs of yellow 1*12 2.54 straight pins and 1m black micro USB cable.

2. Specification

- Microcontroller:ATMEGA32U4-MU
- RAW: DC 7-9V
- VCC: 5V at 500mA
- Digital I/O Pins:18 (of which 5 provide PWM output)
- Analog Input Pins:9
- Maximum current for chip: 200mA
- Maximum current per pin: 40mA
- Recommended current per pin: 20mA
- 8-bit Atmel AVR
- Flash Program Memory: 32kB
- EEPROM: 1kB



- Internal SRAM 2.5kB
- ADC:10-bit
- PWM:8bit

3. Pin Interfaces:





4. Specialized Functions of Pins:

Digital Port: RX (D0) 、TX (D1) 、D2-D10、D14-D16、A0-A3 (D18-D21) Analog Port: A0-A3、D4 (A6) 、D6 (A7) 、D8 (A8) 、D9 (A9) 、D10 (A10)

PWM Port (Pulse-Width Modulation): D3、D5、D6、D9、D10

External interrupt: D3(interrupt 0), D2(interrupt 1), D0(interrupt 2),

D1(interrupt 3) and D7(interrupt 4)

Serial Communication Port: RX (D0), TX (D1)

SPI Communication Port: D14 (MISO), D15 (SCLK) and D16 (MOSI)

I2C Communication Port: D2 (SDA) and D3 (SCL)

RAW: external power DC 7-9V

5. Download the Arduino IDE

Enter Arduino IDE official website: https://www.arduino.cc/,

Click SOFTWARE -





Download the Arduino IDE



ARDUINO 1.8.13 The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other opensource software. This software can be used with any Arduino board. Refer to the <u>Getting Started</u> page for installation instructions.



Mac OS X 10.10 or newer

Linux 32 bits Linux 64 bits Linux ARM 32 bits Linux ARM 64 bits

Release Notes Source Code Checksums (sha512)

You can download 1.8.13 version

In this project, we use 1.8.12 version



You need to install it manually if you click Windows Installer , however, the file



can be installed directly if you click Windows ZIP file for non admin install



5.1 Installing Driver

Windows 10:

The driver will be automatically installed if you plug control board to your

computer. Then the COM port is show below:



🛔 Device Manager X File Action View Help (= =) 📰 🗐 🛛 🖬 🛒 💺 头 📀 ✓ ♣ DESKTOP-eng > 🗃 Batteries > 🤜 Computer > 🕳 Disk drives > 🔙 Display adapters > 🔐 DVD/CD-ROM drives > 🙀 Human Interface Devices > 📷 IDE ATA/ATAPI controllers > 🔤 Keyboards Mice and other pointing devices > Monitors Retwork adapters Ports (COM & LPT) USB Serial Device (COM3) Print queues > D Processors Software devices > Storage controllers > 🛅 System devices > 🏺 Universal Serial Bus controllers

You need to install it manually if your computer is other Windows system.

We will take win7 system as example.

1. Place the **driver folder** on your desktop.

The driver files are shown below:



2. Connect board to your PC with Micro USB cable, open device manager.



Device Manager File Action View Help Device Manager File Action View Help Device Manager Device Manager Device Manager Device Manager Device Manager Disk drives Disk drives Display adapters Display a
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 desktop-eng Batteries Computer Disk drives Display adapters DVD/CD-ROM drives
 Human Interface Devices IDE ATA/ATAPI controllers Keyboards Keyboards Monitors Network adapters Other devices SparkFun Pro Micro Processors Sound, video and game controllers System devices Universal Serial Bus controllers

3. Right-click it and yellow exclamation mark appears





4. Click "Browse.....manually"



5. Find the "drivers" file, and tap "Next" .



Device Manager	
File Action View Help	
deskt	
b → B Ba b → Q Co b → Q Update Driver Software - SparkFun Pro Micro b → D D	
Browse for driver software on your computer	
Search for driver software in this location:	
Browse Browse Browse Browse Double Subfolders Nu	
 Book Pr Sc Sc Sc Ut Let me pick from a list of device drivers on my computer This list will show installed driver software compatible with the device, and all driver software in the same category as the device. 	
Next Ca	incel

6. Click "install this driver software anyway"





7. Then click "Close" and check the serial port.

	×
😡 📱 Update Driver Software - SparkFun Pro Micro (COM3)	
Windows has successfully updated your driver software	
Windows has finished installing the driver software for this device:	
SparkEup Pro Micro	
sparki dir Flo Micio	
	~
	Close
🛃 Device Manager	
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5.2 Set Boards Manager

We need to set board before using it. Firstly we need to add the website of

board manager in the Preferences

Website:

https://raw.githubusercontent.com/sparkfun/Arduino_Boards/master/IDE_

Board_Manager/package_sparkfun_index.json

As shown below:





Preferences		×
Settings Network		
Sketchbook location:		
C:\Users\Administrator\Docu	uments \Ar duino	Browse
Editor language:	English (English) v (requires restart of Arduino)	
Editor font size:	12	
Interface scale:	Automatic 100 💭 🏍 (requires restart of Arduino)	
Theme:	Default theme v (requires restart of Arduino)	
Show verbose output during:	: upload	
Compiler warnings:	None 🗸	
🗌 Display line numbers	🗌 Enable Code Folding	
✓ Verify code after upload	d 🗌 Use external editor	(
Check for updates on sta	artup 🗹 Save when verifying or uploading	
Use accessibility featur	res 📕	
Additional Boards Manager U	URLs: t. com/sparkfun/Arduino_Boards/master/IDE_Board_Manager/package_sparkfun_index.json	Ø
More preferences can be edi	ited directly in the file	
C:\Users\Administrator\AppD	Oata\Local\Arduino15\preferences.txt	
(edit only when Arduino is :	not running)	
	OK	Cancel

Then restart Arduino IDE.

The board is shown below:

e Edit Sketch To	pols Help		Boards Manager
) O D E	Auto Format Archive Sketch	Ctrl+T	Arduino AVR Boards
sketch_mar18a	Fix Encoding & Reload		Arduino Yún
id setup() {	Manage Libraries	Ctrl+Shift+I	Arduino Uno
// put your	Serial Monitor	Ctrl+Shift+M	Arduino Duemilanove or Diecimila
	Serial Plotter	Ctrl+Shift+L	Arduino Nano
I Loop (WiFi101 / WiFiNINA Firmware U	pdater	Arduino Mega or Mega 2560
// put your			Arduino Mega ADK
	Board: "Arduino Uno"		Arduino Leonardo
	Port	3	Arduino Leonardo ETH
	Get Board Info		Arduino Micro
	Programmer: "AVRISP mkII"	3	Arduino Esplora
	Burn Bootloader		Arduino Mini
			Arduino Ethernet
			Arduino Fio
			Arduino BT
			LilyPad Arduino USB
			LilyPad Arduino
			Arduino Pro or Pro Mini
			Arduino NG or older
			Arduino Robot Control
			Arduino Robot Motor
			Arduino Gemma



Search **sparkfun** and install the related files.



Click "Close" when the installation is finished.

Boards Man	ager				>
Type All	~	sparkfun			
SparkFun Arte RedBoard Arte <u>Online Help</u> <u>More Info</u>	mis Module, mis ATP, Sp	parkFun Artemis Dev Kit, SparkFun Artemis Micr rkFun RedBoard Artemis Nano, SparkFun Artemis	5Mod, SparkFun RedBoard Artemis, Spa 5 Thing Plus, SparkFun Edge, SparkFun	arkFun Edge <mark>2.</mark>	^
SparkFun AVR by SparkFun E Boards include RedBoard, Mai ATmega128RF Online Help More Info	Boards lectronics v d in this pac Key MaKey, A1 Dev Boar	sior 1.1.13 INSTALLED age ro Micro, Fio v3, Qduino Mini, Digital Sandbox, M , LilyPad USB Plus, SerLCD.	ega Pro, RedBot, Serial 7-segment Dis	play,	
Select version	n 🗸 Ins	all		Remove	
					_
SparkFun ESP	32 Boards				
SparkFun ESP by SparkFun E Boards include SparkFun ESP Online Help	32 Boards lectronics d in this pace 32 Thing, Sp	age: :kFun ESP32 Thing Plus, SparkFun ESP32 MicroM	od, SparkFun Lora Gateway 1-Channel.		

Then find out SparkFun Pro Micro as follows:





5.3 Arduino IDE Setting







To avoid the errors when uploading the program to the board, you need to select the correct Arduino board that matches the board connected to your computer.

Then come back to the Arduino software, you should click Tools \rightarrow Board, select the board. (as shown below)



Then select the correct working frequency

Then select the correct COM port (you can see the corresponding COM

port after the driver is successfully installed).

le Edit Sketch To	ools Help			
	Auto Format	Ctrl+T		
	Archive Sketch			
sketch_mar19a	Fix Encoding & Reload			
<pre>void setup() {</pre>	Manage Libraries	Ctrl+Shift+I	^	
// put your	Serial Monitor	Ctrl+Shift+M		
	Serial Plotter	Ctrl+Shift+L		
oid loop() [WiFi101 / WiFiNINA Firmware Up	odater		7
// put your	Board: "SparkFun Pro Micro"		>	
	Processor: "ATmega32U4 (5V, 1)	6 MHz)"	>	
	Port: "COM3"		2	erial por
	Get Board Info		~	COM3
	Programmer: "AVRISP mkII"		>	
			~	
	10		12	

Before uploading the program to the board, let's demonstrate the function of each symbol in the Arduino IDE toolbar.

🥺 sketch_mar19a Arduino 1.8.12	9 <u>222</u>		×
File Edit Sketch Tools Help			
		1	₽ -
<pre>void setup() { // put your setup code here, to run once:</pre>	F		^
ABCDE			
<pre>void loop() [// put your main code here, to run repeatedly:</pre>			
й.			
			÷
9 Spark	Fun Pro N	licro on C	омз

- A- Used to verify whether there is any compiling mistakes or not.
- B- Used to upload the sketch to your Arduino board.
- C- Used to create shortcut window of a new sketch.
- D- Used to directly open an example sketch.
- E- Used to save the sketch.
- F- Used to send the serial data received from board to the serial monitor.

5.4 Hello World!

Copy the following code to Arduino IDE.

int val;

```
int ledpin=13;
```

void setup()

{

```
Serial.begin(9600);
```

```
pinMode(ledpin,OUTPUT);
```

```
}
```

```
void loop()
```

{

```
val=Serial.read();
```

```
if(val = = 'R')
```

{

```
digitalWrite(ledpin,HIGH);
```

delay(500);

digitalWrite(ledpin,LOW);

delay(500);

Serial.println("Hello World!");

Set board and COM port, the corresponding board and COM port are shown on the lower right of IDE.

Click to start compiling the program, and check errors.

Click to upload the program, upload successfully.

Tap to open serial monitor, set baud rate to 9600, input "R" and

click "Send" . Then RX indicator flashes and serial monitor shows "Hello World!", which means "Hello World!" is sent by PRO MICRO development board.

© COM3		×
R		Send
Hello World!	1	
🗹 Autoscroll 🔝 Shov timestamp	Newline 🗸 9600 baud 🗸 Clear of	utput

6. Package List

- Keyestudio PRO MICRO 5V 16MHZ development board*1
- USB cable *1
- Yellow Pin headers * 2pcs

Resource

https://fs.keyestudio.com/KS0503