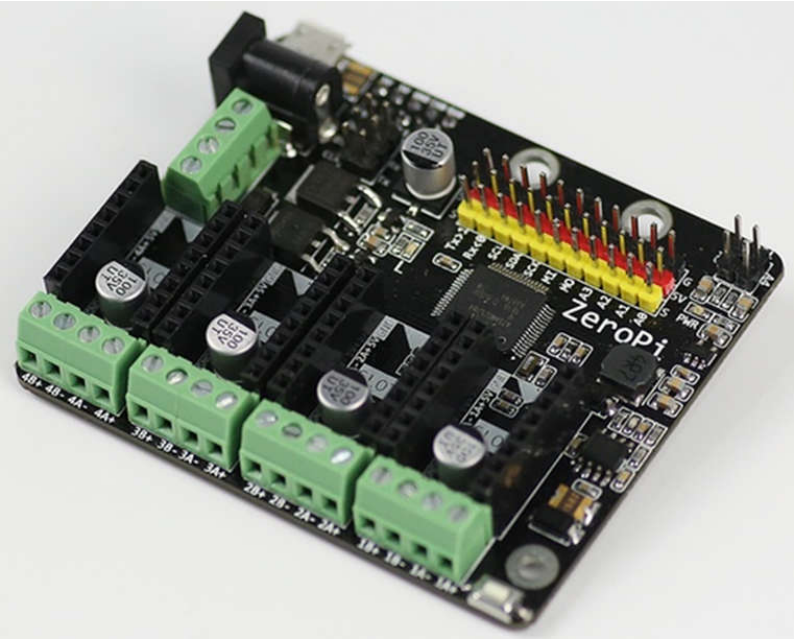
Introduction to ZeroPi and Driver Installation



ZeroPi

A. Brief Introduction to ZeroPi:

ZeroPi is a main control board developed based on Arduino Zero for robotic motion structure systems. It is fully compatible with Arduino and Raspberry Pi. The unique design of ZeroPi enables controlling 11 servos and 8 DC motors (or 4 stepper motors) simultaneously. You are able to replace the DC motor driver and stepper motor driver on ZeroPi according to your needs. ZeroPi can be applied to various application scene, for instance, controlling a 3D Printer.

B. Specifications:

MCU	Atmel SAMD21J18 32-bit ARM Cortex M0
Input Voltage	6~24V DC
Operating Voltage	3.3V
DC current per I/O Pin	7mA
ADC Accuracy	12-bit
Dimensions	73mm x 60.9mm

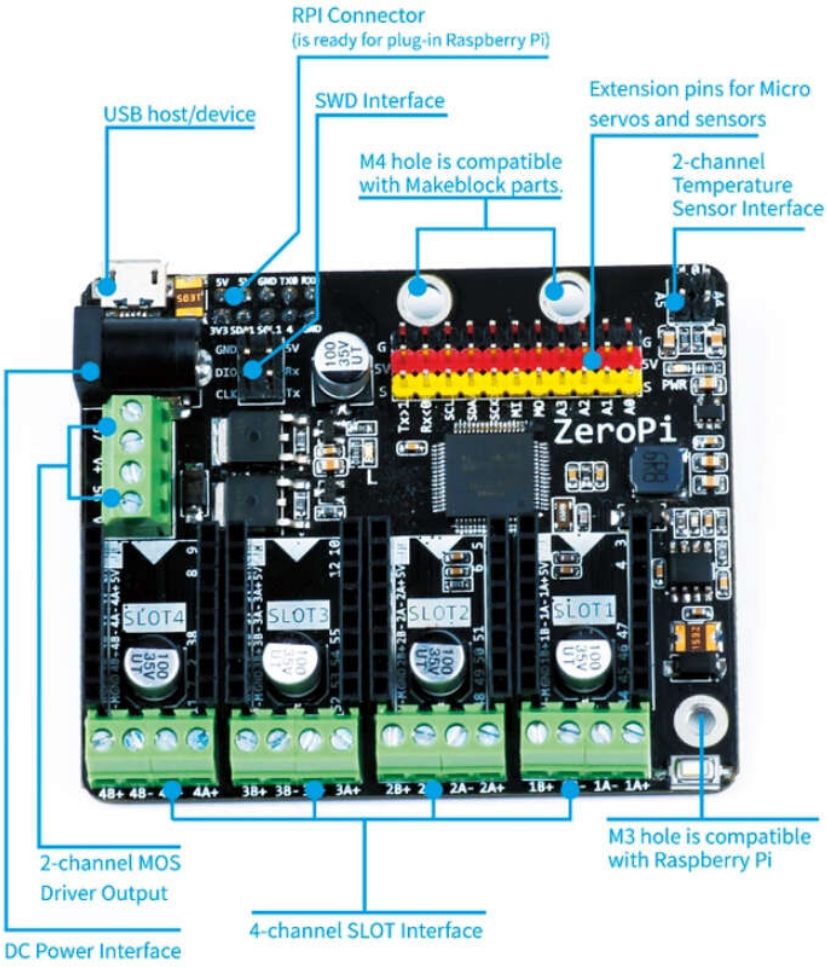
C. Features of ZeroPi:

- Replaceable motor driver
- Capable of controlling 8 DC motors simultaneously
- Capable of driving 4 stepper motors at the same time
- Capable of driving 11 micro servos simultaneously
- Support Arduino IDE, Eclipse, and Keil
- Comes with 2-channel large-current driver interface and 2-channel temperature sensor interface, which enables controlling 3D printer
- Compatible with Arduino Zero and Raspberry Pi

D. Introduction to Interfaces of ZeroPi:

We will give a brief introduction to every interface on ZeroPi. Below is a picture showing you the on-board resource of ZeroPi.

Interface	Description
DC Power Interface	This is the input interface of DC power(input voltage: 6~24V) The power of large-current peripherals (e.g. motors)comes from this interface
USB host/device	Mainly used for downloading programs
RPI Connector	Connect with Raspberry Pi to realize motion control
SWD Interface	Connect with CMSIS-DAP Debugger module to realize simulation and debugging
Expansion Pins	Support controlling up to 11 servos Also capable of controlling other common sensors
Temperature Sensor Interface	2-channel, support connecting with 2 temperature sensors, which can be used to collect temperature data in 3D Printer
4-channel SLOT Interface	Support connecting with DC motor driver board and stepper motor driver board. Capable of driving up to 8 DC motors or 4 stepper motor
2-channel MOS Driver Output	Drive large-current device (the extruder of 3D printer) The output voltage is the same as the DC power interface

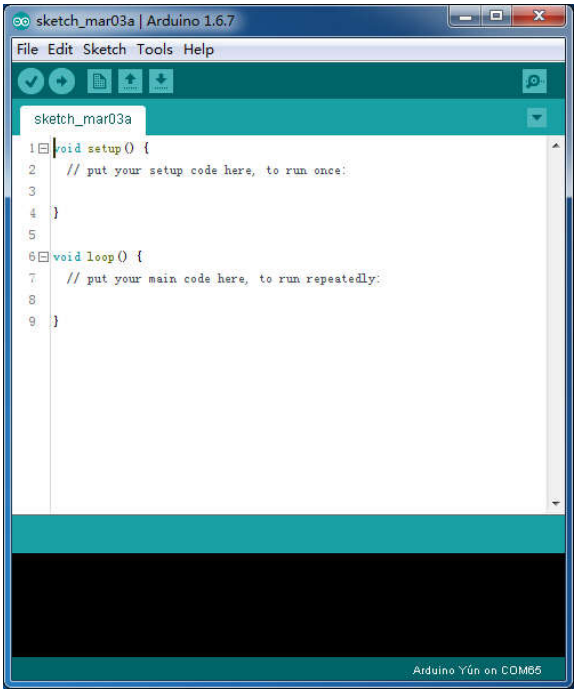


E. Configuring Arduino Environment and Driver Installation

ZeroPi is developed based on the main control chip SAMD21J18 of Arduino Zero. It uses 32-bit ARM Cortex M0+ as the MCU and has a 48MHz clock speed. Since it is compatible with Arduino Zero, you can use Arduino IDE to program this ZeroPi. Before started,we need to pre-configure Arduino IDE. We will use Arduino IDE 1.6.7 to explain how to configure Arduino IDE on Windows 7.

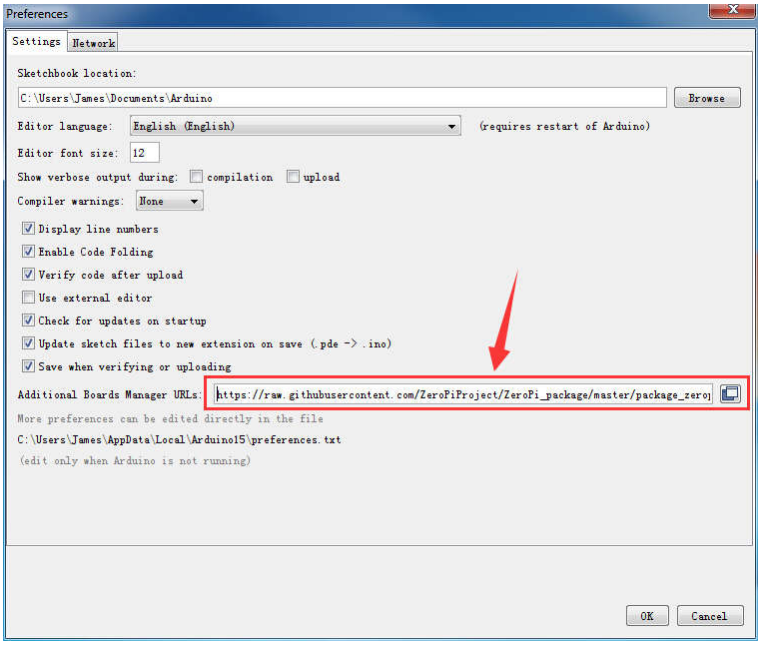
Note: In this example, please use Arduino IDE with version 1.6.7 or later.

1) Visit Arduino website to download Arduino IDE 1.6.7 and install it on your PC.
2) Open up Arduino IDE, as shown below:

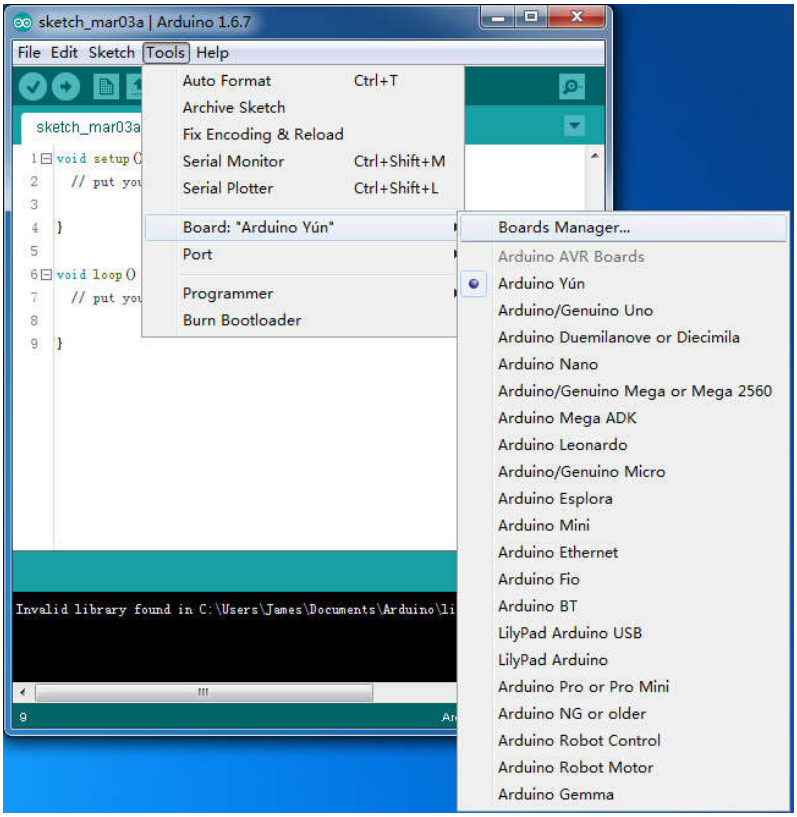


3) Go to “File”->”Preferences”, and paste the following URL into “Additional Boards Manger URLs” field, as shown in the picture. Then click “OK” button to close the window.

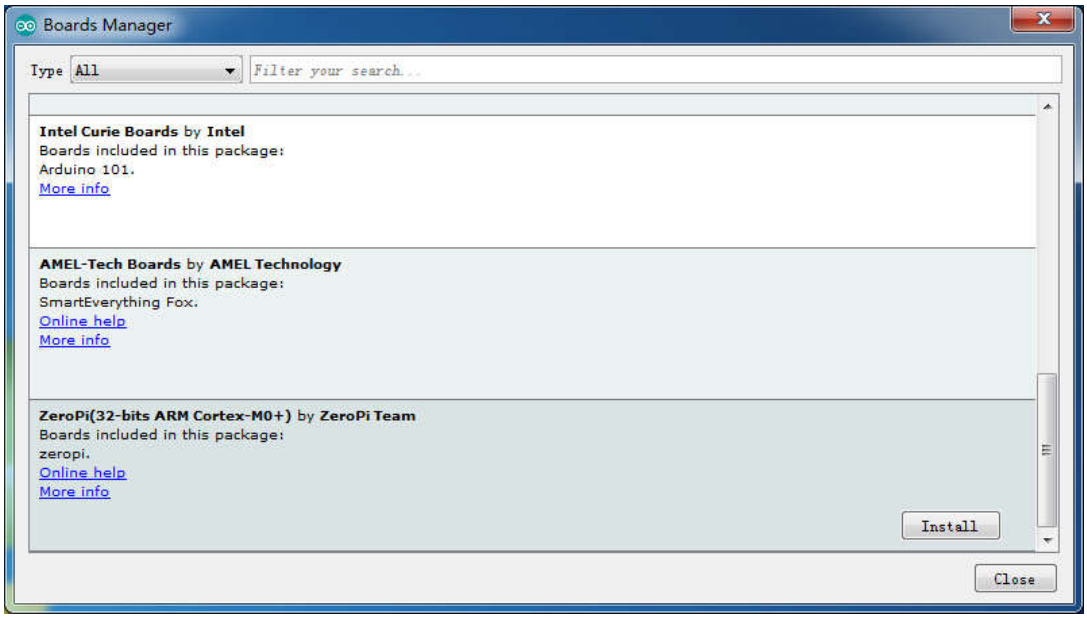
https://raw.githubusercontent.com/jiexinluoye/ZeroPi_package/master/package_zeropi_index.json



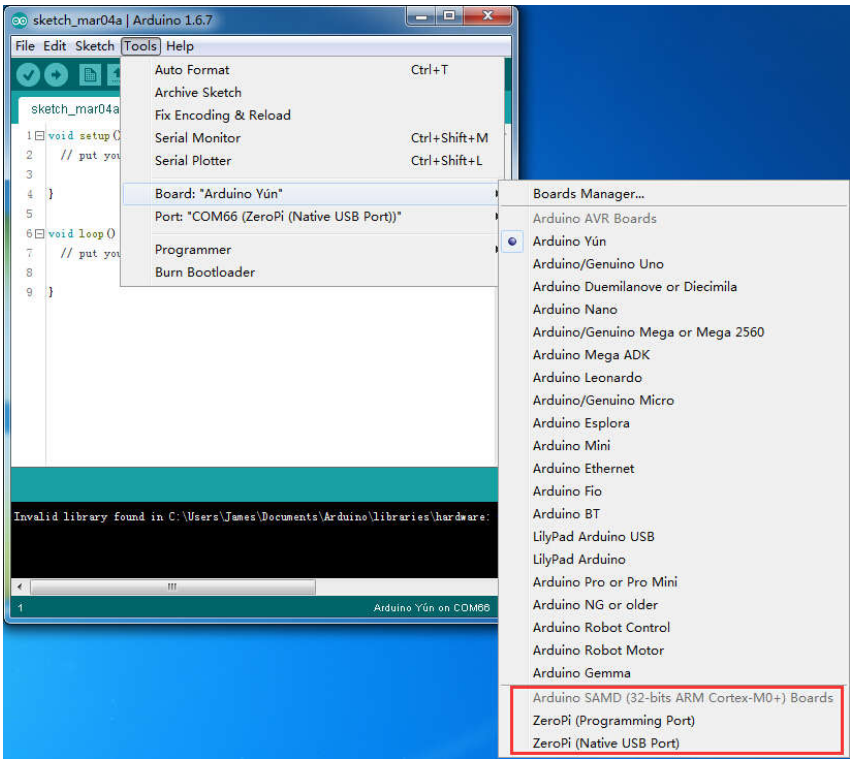
4) Next, go to “Tools” -> “Board” -> “Board Manager”, open up “BoardsManager” as below:



5) Find “ZeroPi (32-bits ARM Cortex-M0+) by ZeroPi Team” in the “Boards Manager” list. Click “Install”, then Arduino IDE starts to download required files for ZeroPi. The whole installation might take few minutes (it depends on your network speed), please wait for a moment. Close the “Boards Manager” window after installation.

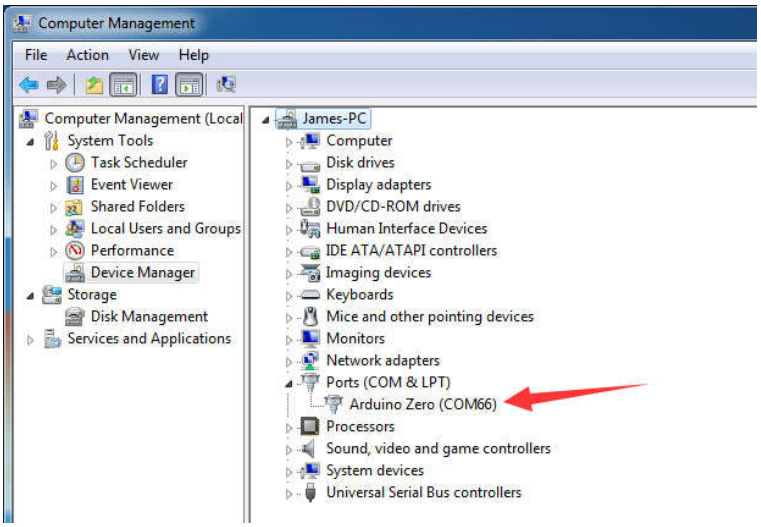


6) Click “Tools”->”Board”. If “ZeroPi(Programming Port)” and “ZeroPi(Native USB Port)” are in the list, it means you have successfully installed ZeroPi data package.



7) Connect ZeroPi with your PC via Micro USB. Your PC will install ZeroPi driver automatically, please wait for a moment.

8) Open “Device Manager”window on your PC, you are able to see the port number of ZeroPi. Different computers may show different port number. The port number of ZeroPi on my PC is COM66, as below:

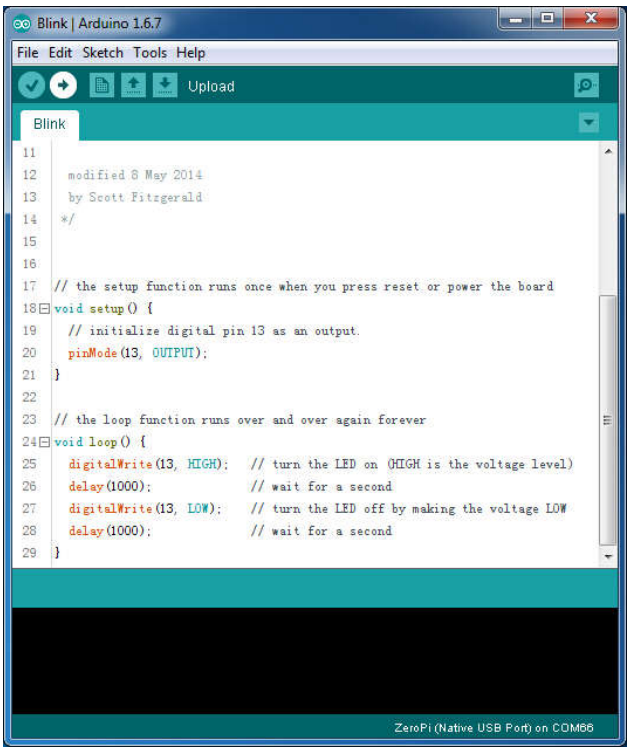


9) So far, we finished the configuration parts. We take “Blink” as example to test what we had done.

<1>Open up Arduino IDE, Click “Tools” ->“Board”, choose “ZeroPi (Native USB Port)”

<2>Click “Tools” ->“Port”, find ”COM66(ZeroPi (Native USB Port))”. Please note that different computer may show different port number

<3>Click “File” ->“Example” ->“01.Basics” -> “Blink” to open up Blink. Then click “Upload” to upload programs:



<4>When upload completed, the blue LED on ZeroPi will blink in 1 second interval; if not, please check whether ZeroPi has been connected to your PC or not (via Micro USB cable).