

Iteaduno PLUS with A10 core Manual

Overview

ITEAD A10 CORE is a minimum system module based on design of A10 chip. With ARM Cortex A8 core, it supports maximum frequency up to 1GHz. The high-speed digital circuit section and the overall power circuit design of SDRAM on the module has been completed, so it can work directly after powering up with a stable 5V supply.

Iteaduno Plus is a function evaluation baseboard for ITEAD A10 CORE, which breaks out the most of the interfaces such as HDMI interface, Micro-SD socket, USB socket, SATA interface (data and power), Ethernet RJ45 interface and audio input / output) socket on the core board module as well as some GPIO interfaces for users to make secondary development.

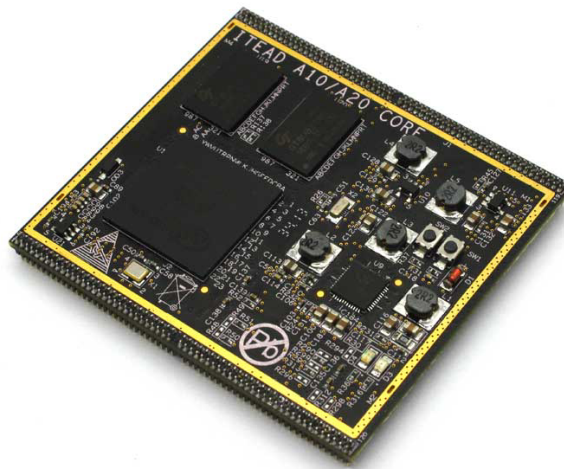
Core board and baseboard are designed and sold separately. In the future, we will provide more baseboards with various functions as well as more powerful core boards to meet the needs from different users. Users can very easily make secondary development to realize their ideas on such basis, and they can even design the shields on their own on the basis of the core board- the most complex high-speed circuit has been modularized, thus design of shields would be relatively easy and simple.

With a variety of powerful library functions offered with ITEAD OS, users can directly manipulate ordinary GPIO and UART interfaces (which has been achieved in β version), I2C and SPI bus (which will be realized in V1.0 version), and we will continue to release various library files, such as TFT drive, servo drive, FFT

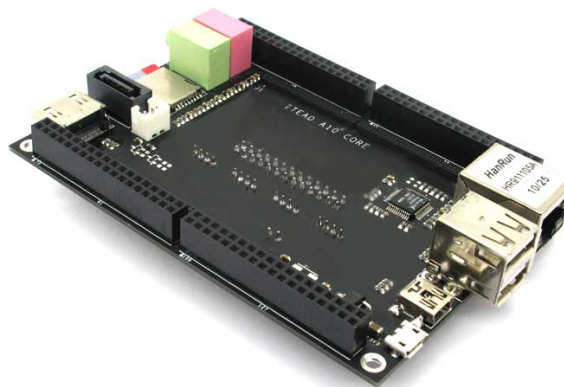
algorithm, PID algorithm and so on. As a result, users can easily operate different expansion hardware by calling library functions with ITEAD OS without need to learn the daunting driving principle of linux kernel. ITEAD OS's goal is to offer users development experience similar to that of Arduino under linux.

Accessories

1, Core board



2, Shield



3, Other accessories

SATA connection cable, Mini USB cable, Micro USB cable, EU standard 5V2A charger, EU-USA power converter, CD-ROM

4, Optional accessories

- Cable kit—including 1 piece of RJ45 network cable, HDMI cable, HDMI-DVI adapter cable, Raspberry Pi GPIO interface cable, 4 pieces of GROVE cable, 20 pieces of DuPont wires
- Foca
- Micro SD card installed with operating system
- Arduino PLUG adapter board—I2C interfaced OLED, able to display system information such as CPU occupancy rate, IP address, etc.; compatible with various Arduino Shields; able to connect to various electronic bricks through Grove interface
- Various Arduino Shields, electronic bricks and Raspberry Pi shields



Parameters

Parameters of core board



CPU	ARM Cortex-A8 @ 1Ghz
GPU	Mali 400 MP
Memory	1GB @ DDR800
Buttons	Uboot, Power
Power input	4.85~5.15VDC
Interfaces	4 groups of 2*30 1mm pitched female headers break out all A10 I/O interfaces
Dimension	62.72*56.39*1.61mm

Parameters of shield

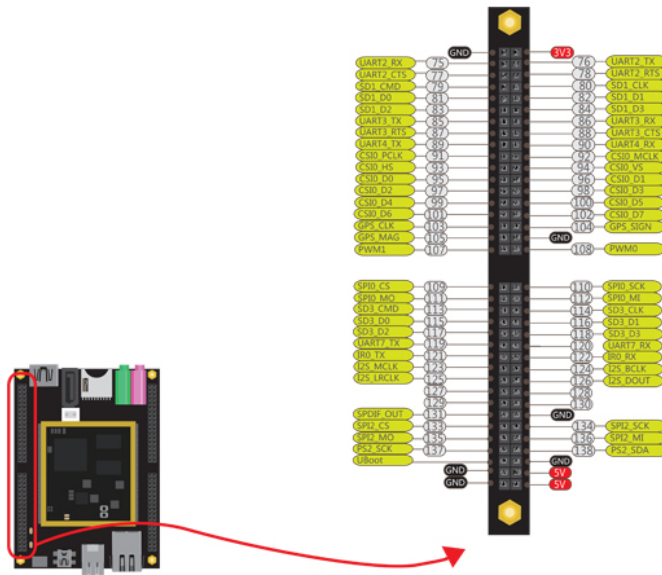
Dimension	109.22*76.2*1.2mm
Indicator	3V3/5V
Interface	HDMI/SATA/MICROSD/USB-A*2/MICROUSB/MINIUS B/RJ45/3.5MM sonic socket*2/2*36 2.54mm socket *2
Working voltage	5~6.3VDC
Working voltage at I/O port	3V3



Description of functions of Iteaduno PLUS expanded interfaces



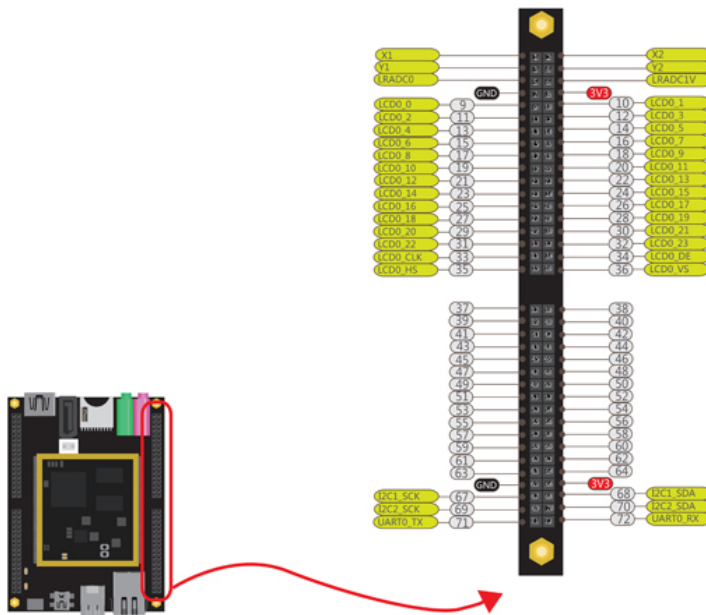
ITEAD OS Pin map for Iteaduno Plus
CN: www.iteados.com
EN: forum.iteadstudio.com



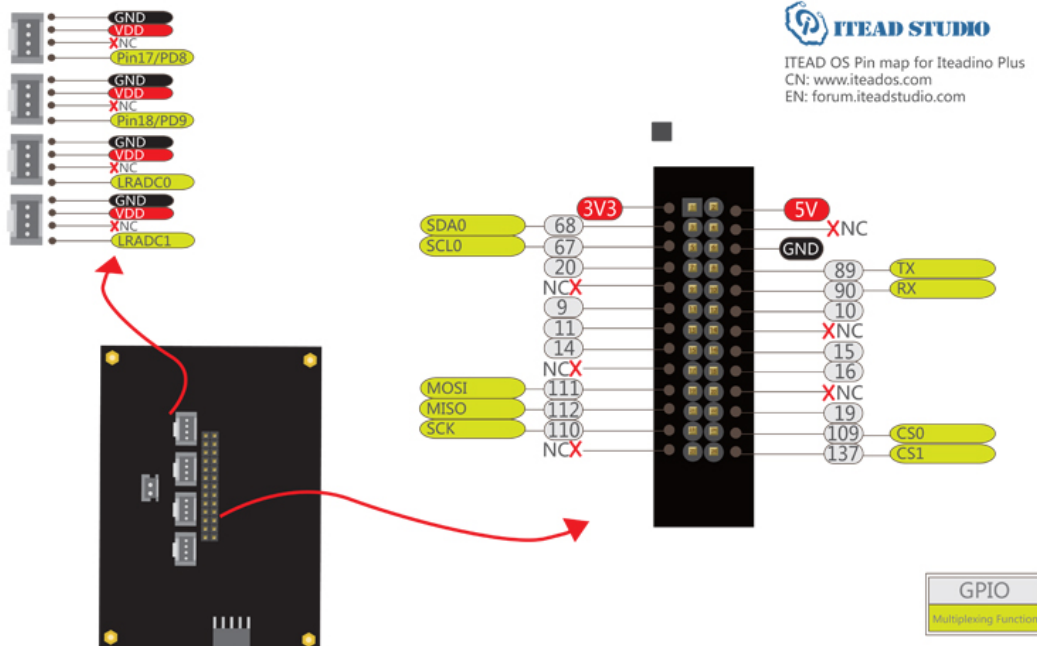
GPIO
Multiplexing Function



ITEAD OS Pin map for Iteaduno Plus
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GPIO
Multiplexing Function



For clear pinmap, you can download in the following addresses: <http://url6.org/ktE>

Installing systems

1. Downloading links of the mirror files

ITEAD OS β for Iteadino PLUS: <http://url6.org/ixC>

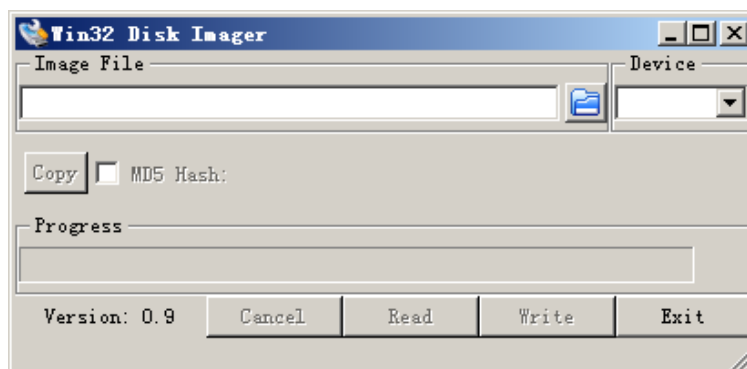
ITEAD OS β for Cubieboard: <http://url6.org/ixB>

2. Installing ITEAD OS under Win system

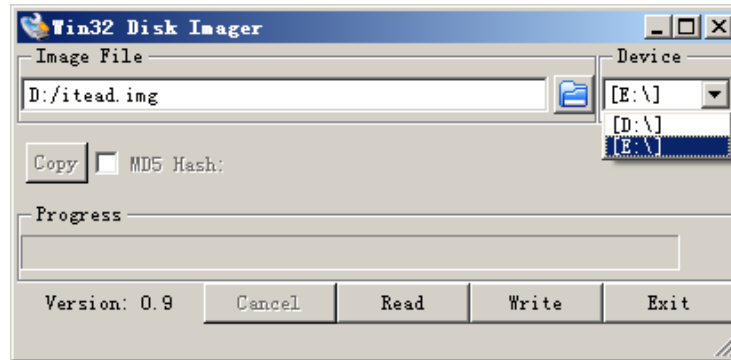
a) Official address for downloading win32disk imager:

<http://sourceforge.net/projects/win32diskimager/files/latest/download>

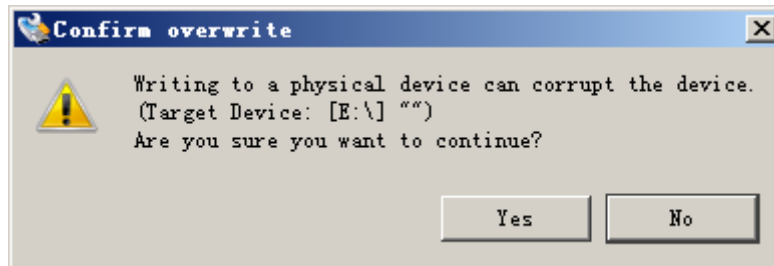
b) Run win32 disk imager



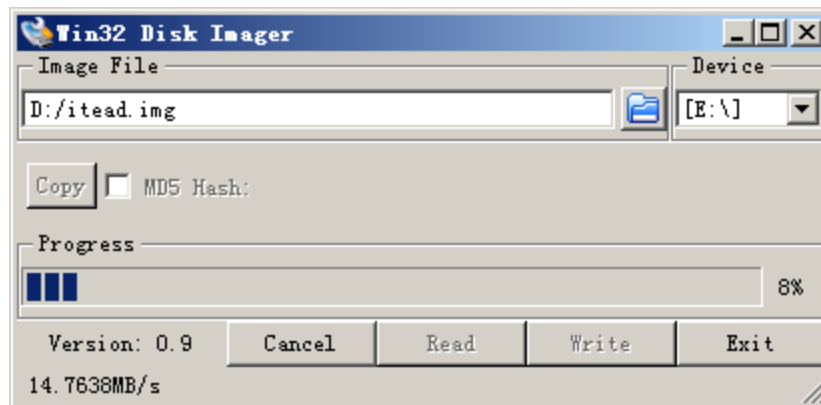
- c) Select the downloaded ITEAD OS mirror image and Micro-SD card drive. In this case, Micro-SD card drive is E and OS mirror address is D:/itead.img



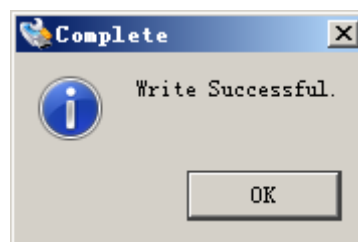
- d) Click 'Write', select 'Yes' in the pop-up dialogue box, and write ITEAD OS mirror image to Micro-SD card.



- e) System is being written, please wait...



- f) After it is successfully written, the system will prompt 'Write Successful'.



- g) Withdraw Micro-SD card and then insert it into socket on Iteduino PLUS, connect to power

supply and monitor, then we can enter the wonderful world of ITEAD OS.

3. Installing ITEAD OS under linux system (let's take Ubuntu as an example)

- a) Use shortcut keys Ctrl+Alt+T to open the terminal
- b) Insert Micro-SD card into the system and confirm device name of Micro-SD via entering command fdisk

```
sudo fdisk -l
```

As shown in the following figure, in this case, Ubuntu system loads Micro-SD card as /dev/sdc

- c) And Micro-SD card file system can be unloaded via command umount

```
sudo umount /dev/sdc1
```

```
sudo umount /dev/sdc2
```

- d) In the folder where img file locates, write mirror image file to SD card via command dd

```
dd ms=1M if=itead-plus-beat-0814-final.img of=/dev/sdc
```

- e) After the card is successfully written, the system will prompt information such as time spent on and speed of writing the card.
- f) Withdraw Micro-SD card and then insert it into socket on Iteaduno PLUS, connect to power supply and monitor, then we can enter the wonderful world of ITEAD OS.



```

ubuntu@ubuntu:~/Downloads$ sudo fdisk -l

Disk /dev/sda: 128.0 GB, 128035676160 bytes
255 heads, 63 sectors/track, 15566 cylinders, total 250069680 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x0d4a0d49

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1  *           2048        206847    102400    7   HPFS/NTFS/exFAT
/dev/sda2                206848    250066943  124930048    7   HPFS/NTFS/exFAT

Disk /dev/sdb: 33.6 GB, 33554432000 bytes
255 heads, 63 sectors/track, 4079 cylinders, total 65536000 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0xcad4ebea

   Device Boot      Start         End      Blocks   Id  System
/dev/sdb4  *            63        65535999  32767968+    c   W95 FAT32 (LBA)

Disk /dev/sdc: 7969 MB, 7969177600 bytes
246 heads, 62 sectors/track, 1020 cylinders, total 15564800 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000

   Device Boot      Start         End      Blocks   Id  System
/dev/sdc1                2048        133119     65536    c   W95 FAT32 (LBA)
/dev/sdc2            133120    15564799     7715840   83   Linux
ubuntu@ubuntu:~/Downloads$ sudo umount /dev/sdc1
ubuntu@ubuntu:~/Downloads$ sudo umount /dev/sdc2
ubuntu@ubuntu:~/Downloads$ █

ubuntu@ubuntu:~/Downloads$ ls
itead-plus-beta-0814-final.img
ubuntu@ubuntu:~/Downloads$ sudo dd bs=1M if=itead-plus-beta-0814-final.img of=/dev/sdc
1886+0 records in
1886+0 records out
1977614336 bytes (2.0 GB) copied, 268.242 s, 7.4 MB/s
ubuntu@ubuntu:~/Downloads$ █

```

Start ITEAD OS

The following accessories are needed for starting up Iteduino PLUS:

- Micro-SD card with system written

If you purchase 8G Micro-SD card from ITEAD, it will have the latest system written; if you already have a Micro-SD card, you can download ITEAD OS mirror package from the Internet and write it to the card according to the instructions.

- Mouse and keypad with USB interface

ITEAD OS supports most of the keypads and mouse with standard USB interfaces.

- Connecting to computer through monitor or FOCA

Iteaduno PLUS supports HDMI output, so you can use the monitor that supports HDMI input or monitor which supports DVI input via HDMI to DVI adapter cable. Alternatively, under circumstances without graphical interfaces, you can use FOCA to connect to Iteaduno PLUS, and then log in command interface with software such as putty/secrueCRT/HyperTerminal.

- 5V2A charger

When CPU works under large load, voltage loss on USB cable should be considered. If the current is more than 2A, there will be more than 600mV line loss, and there might be abnormalities such as program running away due to insufficient voltage supply. As power supply from USB port of PC can only support the system working properly under low load, an external AC ~ DC power supply with output voltage of a little bit more than 5V is recommended, and the maximum input voltage should be no more than 6.3V.

Connect all the accessories:

- a. Insert the Micro-SD card loaded with operating system into the socket.
- b. Connect USB keypad/mouse to USB interfaces on Iteaduno PLUS. You can also connect with a USB HUB if you have one.

- c. Connect with HDMI cable or FOCA.
- d. Connect with other optional accessories, such as USB WIFI, network cable, external SATA hard disk, etc, here you may need a USB HUB.
- e. Start display screen.
- f. Connect one end of Micro-USB power adapter to power supply.
- g. Connect another end of the power adapter to Micro USB interface on Iteaduno PLUS, here Mini USB also works.

We do suggest connecting to the power supply after you connect all the accessories. Although most connections support insertion and pulling when powering up, some products such as monitor are better to be powered up after the cable is well connected.

Features and operations of ITEAD OS

1. Features of Itead OS

ITEAD OS is a minimum operating system modified based on Ubuntu customization including but not limited to customizations of the original system as follows:

- Core: Linux linaro-alip 3.4.29
- CPU performance optimization: running at the fixed 1.0GHz
- Preloaded with wireless LAN driver with RTL8188EU chip
- Preloaded with Chinese font
- ITEAD OS SDK development kit offers support for simple GPIO operations
- ITEAD OS SDK development kit offers support for GPIO 8-bit and 16-bit bus operations
- ITEAD OS SDK development kit offers support for simple UART operations
- ITEAD OS SDK development kit offers simple upper-layer time operation functions

- Script expansion is automatically done according to the actual capacity of Micro-SD card
- Clock synchronization with the Internet time server is automatically done
- Offers a simple compiling tool iteadcompile to simplify compiling process

The following common tools software is preinstalled:

- Vim: Text Editor
- Git: Git version controls Shared Virtual Hosting services of the system projects
- Samba: SMB / CIFS network protocol link software between UNIX and Windows
- Build-essential: supports compiling environment such as gcc
- Perl: programming language tool
- SSH: Secure network connection program,
- Python: python language compiler tool

2. "iteadcompile" use instructions

ITEAD OS β offers a small script called iteadcompile, whose function is to simplify the compilation process. During common gcc compiling process, we need to use "-l" parameter to develop the library used when compiling. However, when we use iteadcompile to compile, we do not need to include libraries that Itead Studio offers as which have already been supplied in the script.

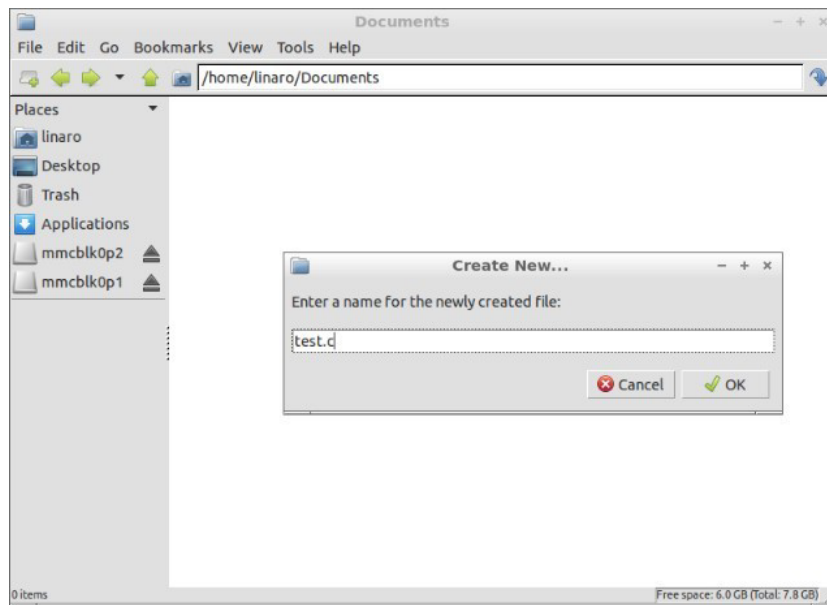
Syntax is :

```
iteadcompile DES_File_Name SRC_File_name
```

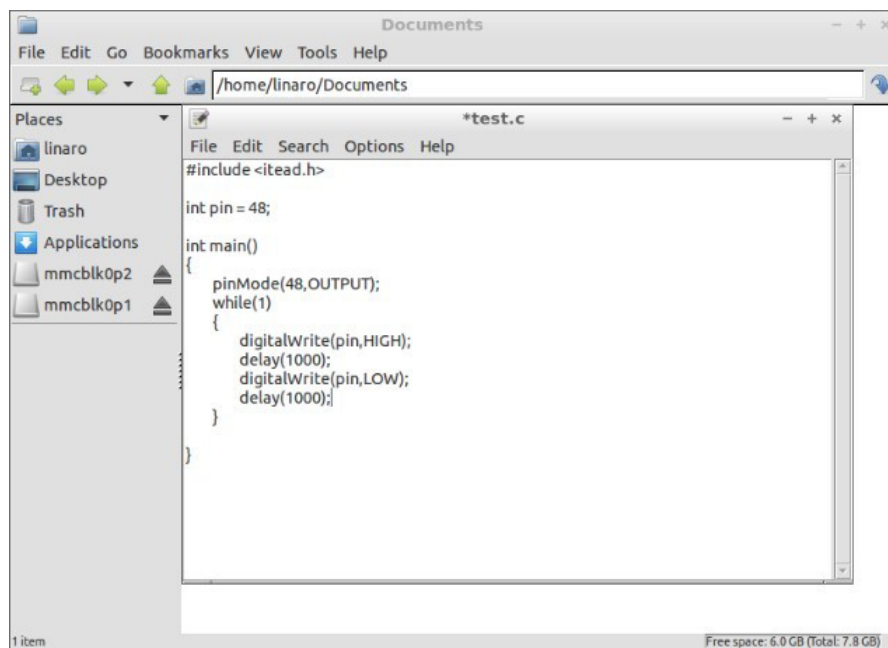
Between which, DES_File_Name is the object file name and SRC_File_Name is the source file name.

For example, write a C program in /home/linaro/Documents, name it as test.c, and output a square wave at pin 48. The operation process is as below:

- a. Right click to create file test.c under folder /home/linaro/Documents



- b. Write codes



The source codes are shown below:

```
#include <itead.h>

int pin=48;

int main()

{
```



```
pinMode(48, OUTPUT);  
  
while(1)  
{  
  digitalWrite(pin, HIGH);  
  
  delay(1000);  
  
  digitalWrite(pin, LOW);  
  
  delay(1000);  
}  
}
```

c. Compile and run

After the program is composed and saved, exit, open the terminal with shortcut keys ctrl + alt + T, and enter the following in the pop-up command line port:

```
cd /home/linaro/Documents
```

Press Enter, and then enter

```
ls
```

Then you should be able to see file test.c. Next, perform

```
iteadcompile test test.c
```

You can see the program named test in folder /home/linaro/Documents by executing command ls.

Then execute the program:

```
sudo ./test
```



```
linaro@linaro-alip: ~/Documents
File Edit Tabs Help
linaro@linaro-alip:~$ cd /home/linaro/Documents/
linaro@linaro-alip:~/Documents$ ls
test.c
linaro@linaro-alip:~/Documents$ iteadcompile test test.c
your src code file is : test.c
your object file is   : test
now building.....
build finished,enjoy yourself.
linaro@linaro-alip:~/Documents$ ls
test test.c
linaro@linaro-alip:~/Documents$ sudo ./test
```

Finally, measure voltage value at pin 48 with a multimeter or oscilloscope, you will find the voltage changes between 0 and 3.3V periodically.

Although the script is relatively simple now, we will follow this idea to update the upgrades all along and our ultimate idea is to make an IDE similar to Arduino and to let the program compile and run directly after writing it in the IDE.