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# **T5-4.7 & T5-4.7 Plus Programming Guide**

***Release master***

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## GET STARTED

This document is intended to guide users to build a software environment for T5-4.7 and T5-4.7 Plus hardware development.

### 1.1 Install prerequisites

Please complete the installation of the tool first. The specific steps are as follows:



### 1.2 Install dependent libraries

Download a zipfile from github using the “Download ZIP” button and install it using the IDE (Sketch` -> Include Library -> Add .ZIP Library...).

- [PCF8563\\_Library](#)
- [LilyGoEPD47](#)

## 1.3 Compile On Arduino

- T5-4.7

Auto Format	Ctrl+T
Archive Sketch	
Fix Encoding & Reload	
Manage Libraries...	Ctrl+Shift+I
Serial Monitor	Ctrl+Shift+M
Serial Plotter	Ctrl+Shift+L
ESP32 Sketch Data Upload	
WiFi101 / WiFinINA Firmware Updater	
Board: "ESP32 Dev Module"	>
Upload Speed: "921600"	>
CPU Frequency: "240MHz (WiFi/BT)"	>
Flash Frequency: "80MHz"	>
Flash Mode: "QIO"	>
Flash Size: "16MB (128Mb)"	>
Partition Scheme: "Default 4MB with spiiffs (1.2MB APP/1.5MB SPIFFS)"	>
Core Debug Level: "None"	>
PSRAM: "Enabled"	>
Arduino Runs On: "Core 1"	>
Events Run On: "Core 1"	>
Port	>
Get Board Info	
Programmer	>
Burn Bootloader	

- T5-4.7-Plus

Auto Format	Ctrl+T
Archive Sketch	
Fix Encoding & Reload	
Manage Libraries...	Ctrl+Shift+I
Serial Monitor	Ctrl+Shift+M
Serial Plotter	Ctrl+Shift+L
ESP32 Sketch Data Upload	
WiFi101 / WiFinina Firmware Updater	
Board: "ESP32S3 Dev Module"	>
Upload Speed: "921600"	>
USB Mode: "Hardware CDC and JTAG"	>
USB CDC On Boot: "Enabled"	>
USB Firmware MSC On Boot: "Disabled"	>
USB DFU On Boot: "Disabled"	>
Upload Mode: "UART0 / Hardware CDC"	>
CPU Frequency: "240MHz (WiFi)"	>
Flash Mode: "QIO 80MHz"	>
Flash Size: "16MB (128Mb)"	>
Partition Scheme: "Default 4MB with spiffs (1.2MB APP/1.5MB SPIFFS)"	>
Core Debug Level: "None"	>
PSRAM: "OPI PSRAM"	>
Arduino Runs On: "Core 0"	>
Events Run On: "Core 0"	>
Port	>
Get Board Info	
Programmer	>
Burn Bootloader	

## 1.4 Schematic

- [T5-4.7 Schematic \(pdf\)](#)
- [T5-4.7 Plus Schematic \(pdf\)](#)

## 1.5 Datasheet

- [ESP32 \(Datasheet\)](#)
- [ESP32-WROVER-E \(Datasheet\)](#)
- [ESP32-S3 \(Datasheet\)](#)
- [ESP32-S3-WROOM-1 \(Datasheet\)](#)
- [ED047TC1 \(Datasheet\)](#)
- [PCF8563 \(Datasheet\)](#)



## 2.1 fontconvert

Prerequisite you need to install python3 and install *freetype-py* using pip The approximate process is like this:

```
sudo apt install python3-pip
python3 -m pip install freetype-py
```

The previous is the prerequisite for implementation, and then you need to store the font file you want to convert in the same path as fontconvert.py. This is just for more convenient operation. You can also fill in the font path.

Then just follow the command below to convert the font.

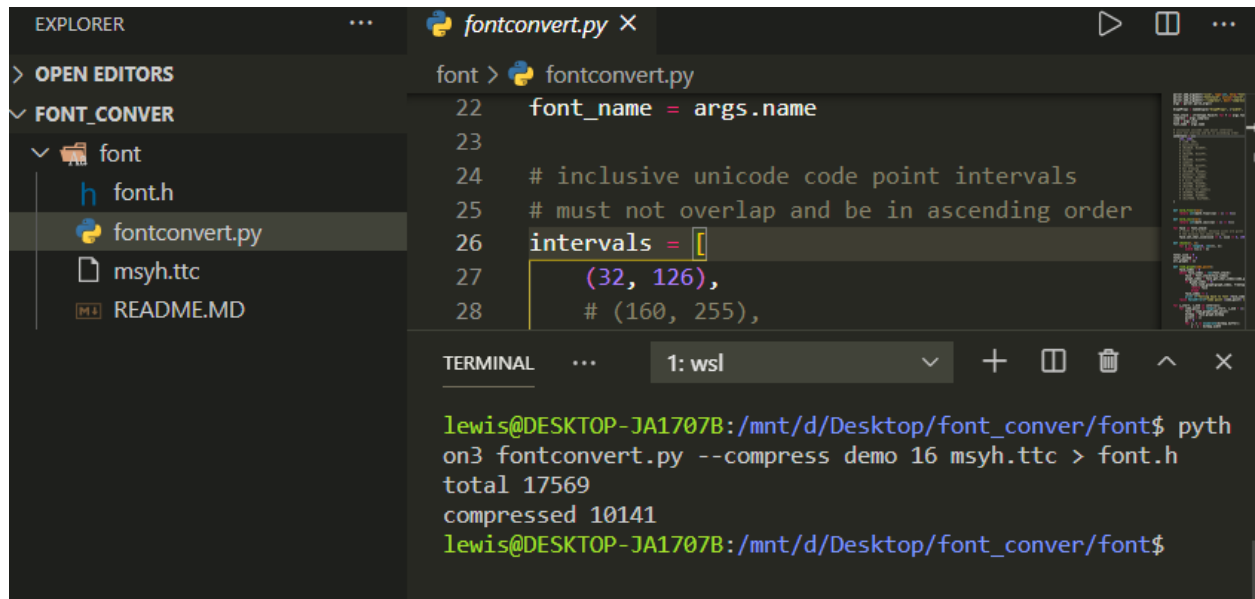
```
python3 fontconvert.py --compress demo 16 msyh.ttc > font.h
```

Explanation of specific parameters:

```
python3 fontconvert.py --compress [generated font name] [font size] [font file path] >↵
↵[generated font file]
```

Of course, this only demonstrates the generation of standard ascii codes. If you need other fonts, you only need to fill in the unicode encoding of the font to be generated in the *fontconvert.py intervals* list.

Please make sure that the unicode encoding in the fontconvert.py intervals list is included in your font file, otherwise please comment other encodings and only keep the 32,126 range!



The screenshot shows a VS Code editor with a file explorer on the left and a code editor on the right. The file explorer shows a project named 'FONT\_CONVERT' with a subdirectory 'font' containing 'font.h', 'fontconvert.py', 'msyh.ttc', and 'README.MD'. The code editor shows the 'fontconvert.py' file with the following code:

```
22 font_name = args.name
23
24 # inclusive unicode code point intervals
25 # must not overlap and be in ascending order
26 intervals = [
27     (32, 126),
28     # (160, 255),
```

The terminal window at the bottom shows the following output:

```
lewis@DESKTOP-JA1707B:/mnt/d/Desktop/font_conver/font$ python3 fontconvert.py --compress demo 16 msyh.ttc > font.h
total 17569
compressed 10141
lewis@DESKTOP-JA1707B:/mnt/d/Desktop/font_conver/font$
```

## 2.2 imgconvert

### 1. Prerequisites

```
python3 -m pip install pillow
```

### 2. Instructions

```
imgconvert.py [-h] [-i INPUTFILE] [-n NAME] [-o OUTPUTFILE]
```

### 3. examples:

```
python imgconvert.py -i demo.png -n demo -o demo.h
```