

# Instruction of Building Application for VS1053B

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# 1 Introduction

This instruction will help readers understand how the application works on the VS1053 and learn how to upload and run customized code on the VS1053 chips.

## 2 Setup VSIDE environment

### 2.1 Introduction

VSIDE is an application developing environment for programming VS10xx series. By providing users various code templets, VSIDE enables users to make their own customized plugin and unlock more functions for the VS10xx series. VSIDE uses C programming language. If you have any integrated development experience before, it is easy to start with.

This instruction is only for users who bought finished products of VS1053 (Adafruit breakout, Sparkfun shield VS1053 etc.) rather than the developing board. If you are using a developing board, you should download and read the VSIDE User Manual

[http://www.vlsi.fi/software/VSIDE/vside\\_201.pdf](http://www.vlsi.fi/software/VSIDE/vside_201.pdf)

### 2.2 Setup environment

We will install this software on the Windows system. And the first step is download Windows version of VSIDE.

<http://www.vlsi.fi/en/support/software/vside.html>

In addition, we need a plugin for VSIDE to show the application hock address:

<http://www.vsdsp-forum.com/phpbb/viewtopic.php?f=7&t=1129&p=4659&hilit=aiaddr#p4647>

We should put makingloadingtable.exe under the bin folder which is in the root VSIDE installation folder, for example C:\Program Files (x86)\VSIDE\bin

To convert .plg file after compilation, we need the Active Perl software and the Perl script:

<http://www.activestate.com/activeperl/downloads>

[https://github.com/madsci1016/Sparkfun-MP3-Player-Shield-Arduino-Library/blob/master/plugins/vs\\_plg\\_to\\_bin.pl](https://github.com/madsci1016/Sparkfun-MP3-Player-Shield-Arduino-Library/blob/master/plugins/vs_plg_to_bin.pl)

We need to download Arduino IDE and include the SparkFun library to upload code:

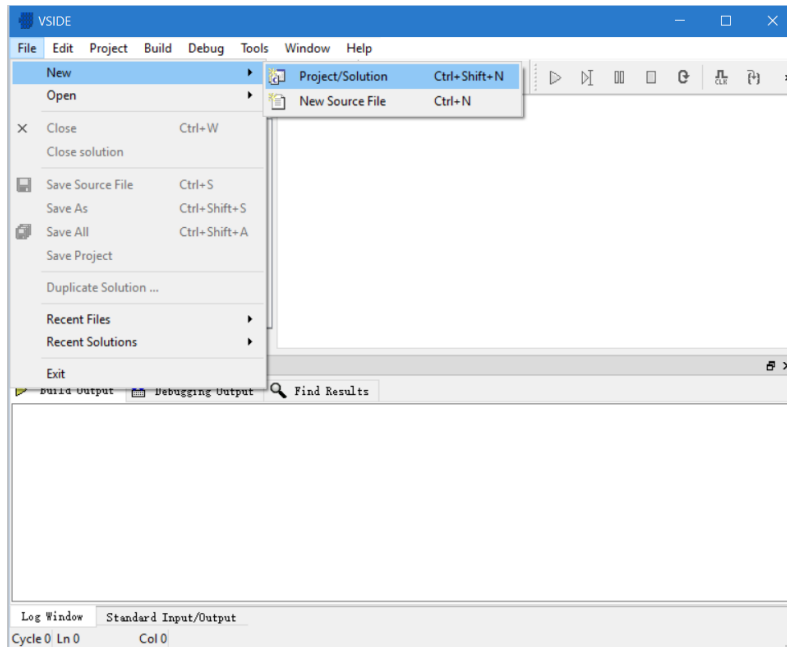
<https://www.arduino.cc/en/Main/Software>

<https://github.com/madsci1016/Sparkfun-MP3-Player-Shield-Arduino-Library>

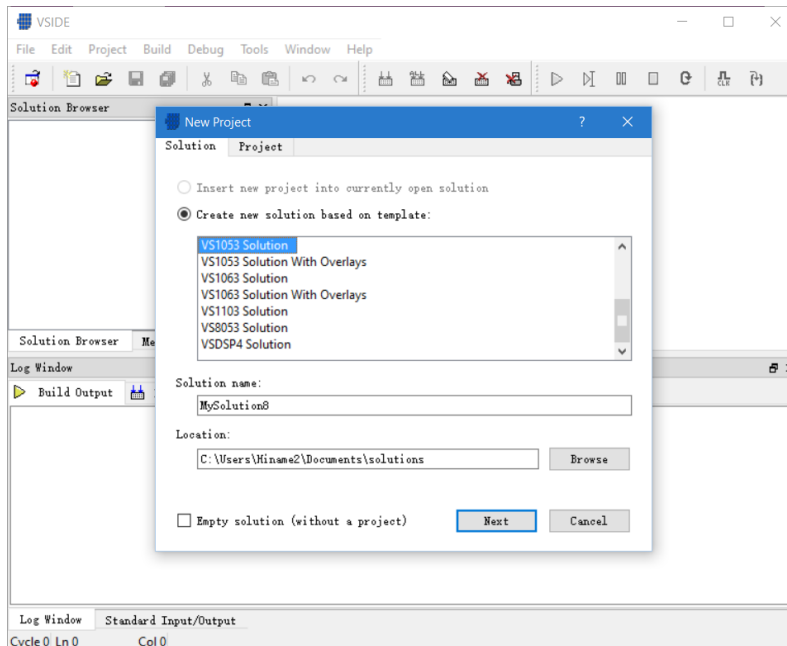
## 2.3 Installation and Create project

After installation, we should be able to create a new project.

1. Go to the menu bar, under the File menu, click new and then click Project

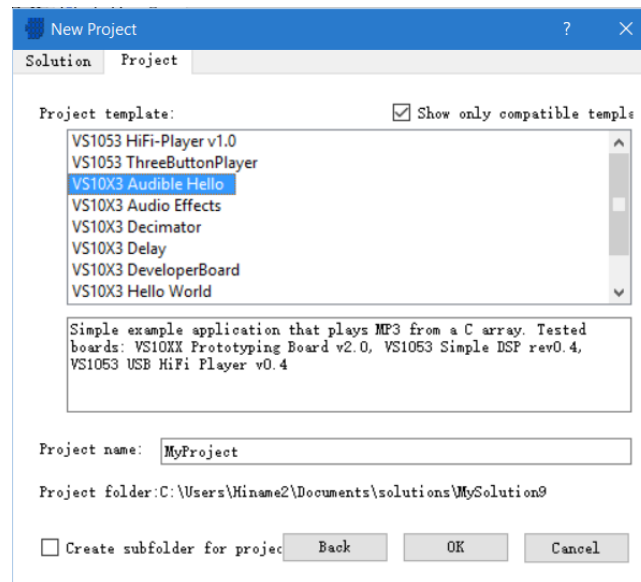


2. Select the second option, "Create new solution based on template", select VS1053 solution, and then click next.



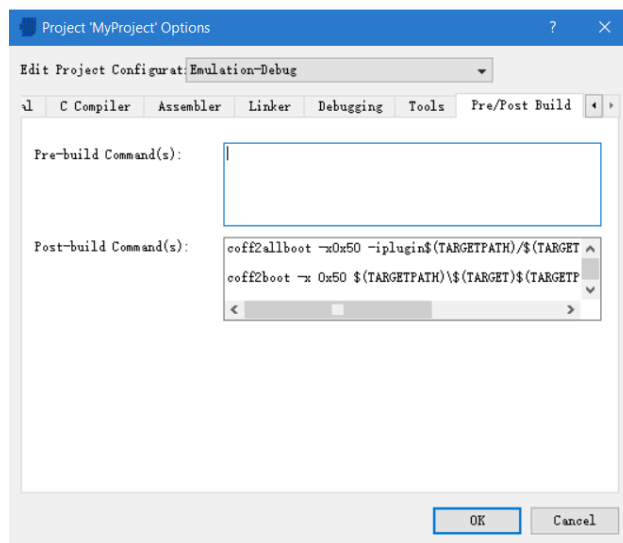
3. Select one of the templates on the list:
  - a. VS1053 HiFi-Player v1.0
  - b. VS10X3 Audible Hello

We test all the solutions and find only the solution does not include board.h can be upload into the finished board's VS1053. And the two templates listed above are the only two to can be loaded.

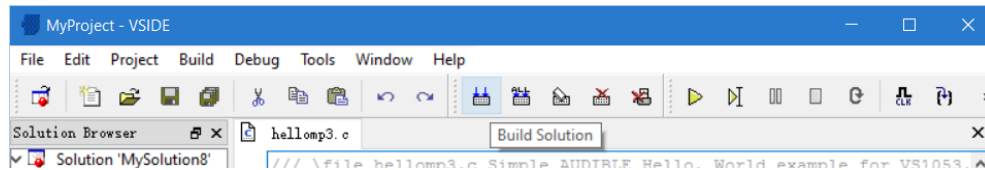


4. Modify the code
5. Go to the menu bar, under the Project menu, click properties and paste the below code at the Post-build Command.

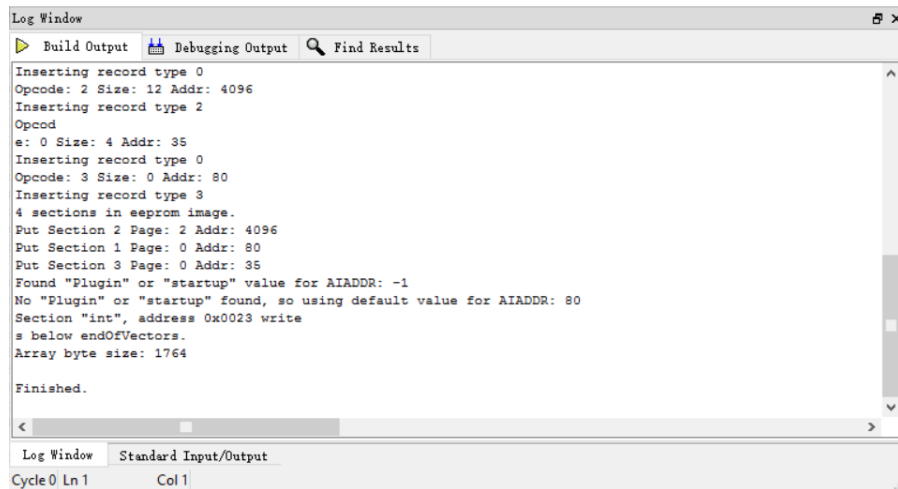
```
coff2allboot -x0x50 -iplugin $(TARGETPATH)/$(TARGET) -o $(TARGETPATH)/$(PROJNAME).plg
coff2boot -x 0x50 $(TARGETPATH)\$(TARGET) $(TARGETPATH)\eeprom.img
makeloadingtable $(TARGETPATH)\eeprom.img $(TARGETPATH)\$(TARGET)
```



6. Click the Build solution button



7. And then the AIADDR address should be displayed in the log window. And the generated .plg file should be in the solution folder.



## 2.4 Convert plugin to executable file

1. Make sure you have already installed the ActivePerl
2. Copy the perl script under your Emulation-Debug folder which is in the solution folder. The VSIDE solutions folder is usually inside your computer's Document folder.

For example:

C:\Users\%PCName%\Documents\solutions\MySolution\Emulation-Debug

3. open you commandd prompt in the folder (press and hold the Shift key, then right click, click open command prompt)
4. type and modify the following command in the command prompt:

```
perl vs_plg_to_bin.pl (ProjectName).plg (ProjectName).053
```

press Enter to run this command and you will get .053 file.

## 3 Arduino code modification and Plugin Activation

### 3.1 Code modification

Make sure you include the Sparkfun library in the Arduino IDE, then paste and modify the code below in your code.

```
char pluginname[] = "ProjectName.053"; //Name of plugin

result = MP3player.VSLoadUserCode(pluginname); //load plugin

if (result != 0) {

    Serial.print(F("Error code: ")); // return Any Value other than zero indicates a problem
    occurred. * - 0 indicates that upload was successful. * - 1 indicates the upload can not be
    performed while currently streaming music. * - 2 indicates that desired file was not found. * - 3
    indicates that the VSdsp is in reset.

    Serial.print(result);

    Serial.println(F(" Load function terminated"));

}

else {

    Serial.println(F("Plugin Loaded!"));

}

MP3player.Mp3WriteRegister(SCI_AIADDR, 0x50);

Serial.println("Activated");
```

### 3.2 Plugin Activation

The second line in the code above is the plugin activation functions. AIADDR is the user defined application hock. When VS1053 wants to start the application, it will fetch the AIADDR's data, which stores the start address of the user defined application (main function address). If the user wants to run plugins or application, he will write the user defined main function address

into the AIADDR.

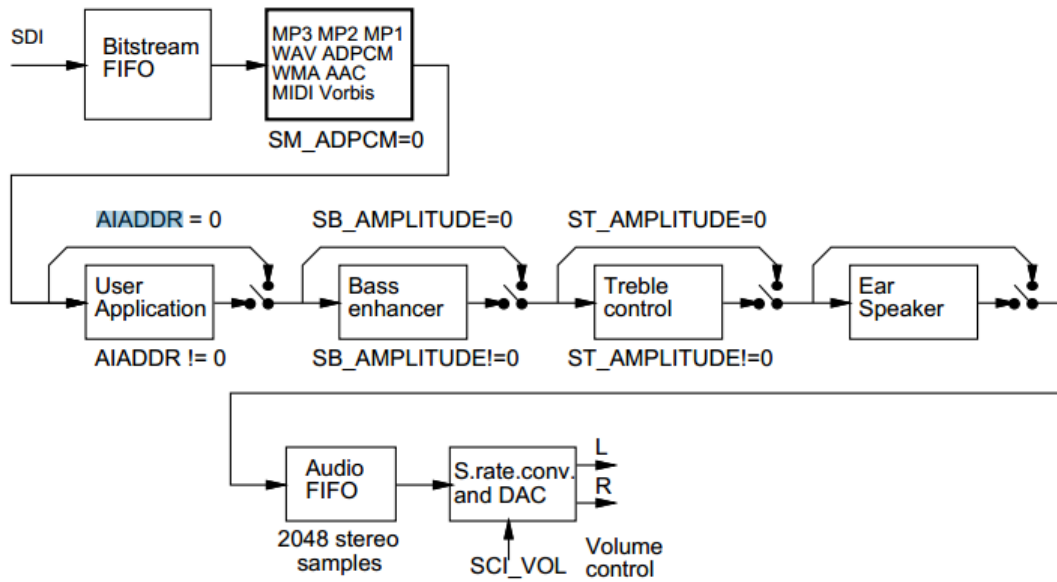
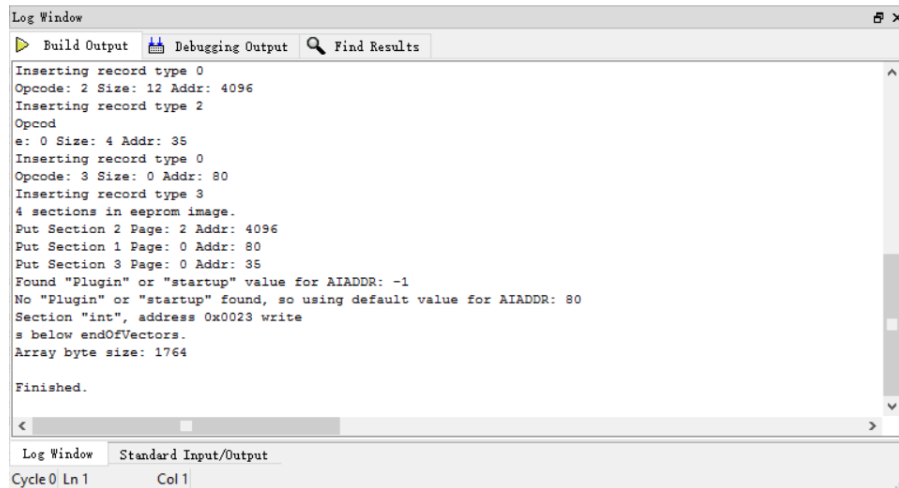


Figure 13: Data Flow of VS1053b.



The AIADDR's value (in decimal representation) can be found in the log window after building solution.



## 4 Reference

VS1053 Datasheet

<https://www.sparkfun.com/datasheets/Components/SMD/vs1053.pdf>

VSIDE User Manuel

[http://www.vlsi.fi/software/VSIDE/vside\\_201.pdf](http://www.vlsi.fi/software/VSIDE/vside_201.pdf)

Sparkfun VS1053 library

<https://github.com/madsci1016/Sparkfun-MP3-Player-Shield-Arduino-Library>