

## VS1053 APPNOTE: PLAYBACK AND RECORDING

### Microcontroller example code

**All information in this document is provided as-is without warranty. Features are subject to change without notice.**

Revision History			
Rev.	Date	Author	Description
1.10	2016-05-09	HH	Changed quick sanity check registers.
1.03	2012-12-11	HH	Removed rec cmd 'p', added chip type recognition.
1.02	2012-12-04	HH	Corrected output for command '_ '.
1.01	2012-11-28	HH	Added imafix.plg, untabified player1053.c.
1.00	2012-11-27	HH	Initial version.

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## 1 Playback and Recording on VS1053

The VS1053 Datasheet, along with the documentation of such software packages as the *VS1053 Ogg Vorbis Encoder Application* tell how to play back and record files using VS1053 as a slave processor. This AppNote and software package provides the same information as generic microcontroller C code.

Note that this code is not written for any particular microcontroller. It has been written in standard C, and the few parts having to do with SPI bus communication that are environment-specific, have not been included.

To create your own program, read the included source code, make the modifications and additions suggested in this document, compile with your favourite microcontroller compiler, and run.

The rest of this Chapter introduces the files in this package.

### 1.1 vs10xx\_uc.h

Contains symbols for VS10xx registers and register bits.

### 1.2 vs1053b-patches-flac.plg

This file is not included in this package.

Get this file from the latest *VS1053 Patches* package, available at <http://www.vlsi.fi/en/support/software/vs10xxpatches.html>

You can use either the version with or without the FLAC decoder. If you use it without the FLAC encoder, edit *player1053.c*.

For best playback and recording quality, keep this file updated with the latest version.

### 1.3 venc44k2q05.plg

This file is not included in this package. It is one of the Ogg Vorbis encoder profiles for the *VS1053 Ogg Vorbis Encoder Application*, available at <http://www.vlsi.fi/en/support/software/vs10xxapplications.html>

To change to another Ogg Vorbis profile, edit *player1053.c*.

For best recording quality, keep this file updated with the latest version.

If you don't wish to encode into Ogg Vorbis format, you can delete the lines that are associated with Ogg Vorbis in *player1053.c*.

## 1.4 imafix.plg

This file fixes the startup of recording IMA ADPCM or PCM files as described in the VS1053 Datasheet Chapter *Activating ADPCM Mode*. It is the same file as in the *VS1053b IMA ADPCM Encoder Fix* plugin, available at <http://www.vlsi.fi/en/support/software/vs10xxpatches.html>. The file is provided in this package because it is not expected to change.

## 1.5 player.h

Definitions and prototypes for the player. The following functions are declared:

### **int VSTestInitHardware(void)**

Initializes microcontroller for VS10xx operations. You need to add the microcontroller-specific code to this file in `player1053.c`.

Returns 0 on success, non-zero on failure.

### **int VSTestInitSoftware(void)**

Makes a software reset for VS1053 and initializes it for use, including loading the patches package.

Returns 0 on success, non-zero on failure.

### **int VSTestHandleFile(const char \*fileName, int record)**

Plays back a given file or records to it, depending on whether `record` is 0 or 1.

**u\_int16 ReadSci(u\_int8 addr)**  
**void WriteSci(u\_int8 addr, u\_int16 data),**  
**int WriteSdi(const u\_int8 \*data, u\_int8 bytes)**

You need to provide these functions that read and write from the VS1053's Serial Control and Data SPI Interfaces. For details on how to implement these functions, see Application Note *Connecting VS10xx SPI Buses*, available at <http://www.vlsi.fi/en/support/applicationnotes.html>

```
void SaveUIState(void)  
void RestoreUIState(void)  
int GetUICommand(void)
```

You need to provide these functions if you want your player to have a simple demonstration user interface.

SaveUIState() saves the user interface environment before execution, and RestoreUIState() restores it. In many cases these may be implemented as empty functions.

GetUICommand() should return -1 if there are no messages and -2 if forceful cancel is requested. By returning 63 (ASCII code for '?'), you get the list of other options from the player or recorder. See `player1053.c` for details.

## 1.6 player1053.c

Contains the implementation for VS1053 playback and recording.

See the source code for details.

## 1.7 Main Program

Your main program, which is not included in this package, should look something like this:

```
int main(...) {  
    if (VSTestInitHardware() || VSTestInitSoftware()) {  
        printf("Failed initializing VS10xx, exiting\n");  
        exit(EXIT_FAILURE);  
    }  
  
    /* ... */  
  
    /* Playback example. You can call these functions many times in a row  
       because they leave VS1053 in a known state. */  
    VSTestHandleFile("MyPlayFile.mp3", 0);  
  
    /* Recording example */  
    VSTestHandleFile("MyRecordFile.ogg", 1);  
  
    /* ... */  
}
```

## 2 Latest Version Changes

### Version 1.10, 2016-05-09

The following source code changes have been made:

- Changed quick sanity check registers in this package from registers SCI\_HDAT0 and SCI\_HDAT1 to SCI\_AICTRL1 and SCI\_AICTRL2.

### Version 1.03 2012-12-11

The following source code changes have been made:

- Recording pause command 'p' removed because it is only available in VS1063.
- Added chip type recognition. Now code will refuse to run if the chip is not a VS1053.

### Version 1.02 2012-12-04

Playback print command '\_' incorrectly printed some VS1063 specific fields. This has been corrected.

### Version 1.01 2012-11-28

Added *imafix.plg* to this package and Chapter 1.4.

Untabified *player1053.c*.

### Version 1.00, 2012-11-27

Initial version.

### 3 Contact Information

VLSI Solution Oy  
Entrance G, 2nd floor  
Hermiankatu 8  
FI-33720 Tampere  
FINLAND

URL: <http://www.vlsi.fi/>  
Phone: +358-50-462-3200  
Commercial e-mail: [sales@vlsi.fi](mailto:sales@vlsi.fi)

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[support@vlsi.fi](mailto:support@vlsi.fi)