VS10XX AppNote: USER APPLICATIONS

Description

This application note describes how to load and use user applications to VS10XX audio processors.

This document applies to VS1011b/d/e, VS1002d/e, VS1003 and VS1033.

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Contents

1 Application Programs

There are 1280 32-bit words of Instruction RAM memory for user code in VS1011b/d/e, VS1002d/e, VS1003 and VS1033. This space can be used to provide features like digital equalizers or small codecs.

Loading an application programs is initiated by writing a base address to WRAMADDR register. The program and its data is then loaded by writing data to the WRAM register.

Any programs have to be reloaded every time the chip loses its power supply. The application address does not have to be set every time after the system software has been reset.

The C prototype for the application function is as follows:

s_int16 (*applAddr) (register s_int16 __i0 **data, register u_int16 __a0 n, register u_int16 __a1 mode);

Different values of *mode* are described in the following table. The user needs only to be able to handle calls with *mode* set to APPL_RESET and APPL_AUDIO. Calls with other values may return immediately with undetermined return value if the user has no use for the specific call.

Symbol	Value	Description
APPL_RESET	0	Reset all values, n is sample rate
APPL_AUDIO	1	Audio samples offered, n is number of L/R sample pairs
APPL_W0	2	SCI_AICTRL0 has been written to
APPL_W1	3	SCI_AICTRL1 has been written to
APPL_W2	4	SCI_AICTRL2 has been written to
APPL_W3	5	SCI_AICTRL3 has been written to
APPL_R0	6	SCI_AICTRL0 has been read from
APPL_R1	7	SCI_AICTRL1 has been read from
APPL_R2	8	SCI_AICTRL2 has been read from
APPL_R3	9	SCI_AICTRL3 has been read from
APPL_BITSTREAM	10	One frame of MP3 data has been received

Note: When returning from APPL_RESET, the user function should return its sample rate if it wished to change it. Otherwise, return 0.

Note: When returning from APPL_AUDIO, the user function should return the number of samples it created in the function. If the number of samples did not change, returning 0 is also acceptable. If the number of samples did grow, samples must be written to some other location than what is pointed to by **d*. This new pointer must be returned in *d*.

Note: APPL_BITSTREAM provides a pointer to Y Data memory in *data* (contrary to what the prototype of *data* suggests . If *n* is non-zero, the higher part of the word has alredy been read.

Input data is always interleaved stereo, left channel first.

Volume control is placed after any user applications. Thus it is generally a better idea to only write filters that attenuate some frequencies and don't emphasize any. To compensate for the lower volume, main

volume setting may be set up a few dB whenever tone control is activated.

An example of how to write an application that employs all the features mentioned here, may be found in VLSI Solution's Web pages.

2 Document Version Changes

Version 1.00, 2006-02-28

- Separated document from VS10XX Application Notes.

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Note: If you have questions, first see
http://www.vlsi.fi/vs1001/faq/
http://www.vlsi.fi/vs1011/faq/
http://www.vlsi.fi/vs1002/faq/
http://www.vlsi.fi/vs1003/faq/