



lib_i2s: I²S/TDM library (README)

Publication Date: 2024/11/12

Document Number: XM-007055-UG v6.0.1

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vendor

XMOS

version

6.0.1

scope

General Use

description

I²S/TDM controller ("master") and target ("slave")

category

Audio

keywords

Audio, PCM

devices

xcore-200, xcore.ai

1 Summary

I²S (Inter-IC Sound) is a digital serial protocol developed for transmitting high-quality audio data between components, like microcontrollers, audio codecs, and DSPs. It's commonly used for PCM (Pulse Code Modulation) audio, which is the standard form for digital audio representation. I²S has three main lines: Serial Data (SD), Serial Clock (SCK)¹, and Word Select (WS)², with separate channels for clock and data, reducing jitter and ensuring synchronisation.

In TDM (Time-Division Multiplexing) mode, multiple audio channels can be sent over a single I²S data line, with each channel occupying specific time slots. This allows I²S to support multi-channel audio, useful for applications like surround sound.

lib_i2s allows interfacing to I²S or TDM (time division multiplexed) buses via *xcore* ports and can act either as I²S *controller* (previously termed *master*) or *target* (previously termed *slave*) or TDM *controller*.

¹ sometimes referred to as Bit Clock (BCLK)

² sometimes referred to as Left/Right(LRCLK)



2 Features

- ▶ I²S *controller*, TDM *controller* and I²S *target* modes.
- ▶ Supports multiple input and output data lines.
- ▶ standard I²S, left justified or right justified data modes for I²S.
- ▶ Multiple formats of TDM synchronisation signal supported.
- ▶ Sample rates up to 384 kHz (TDM limited to 192 kHz).
- ▶ Up to 32 channels in/32 channels out (depending on sample rate and protocol).

3 Known issues

- ▶ I²S target cannot support > 96 kHz on a 4-bit port ([#141](#))

4 Development repo

- ▶ https://github.com/xmos/lib_i2s

5 Required tools

- ▶ XMOS XTC Tools: 15.3.0

6 Required libraries (dependencies)

- ▶ lib_xassert (www.github.com/xmos/lib_xassert)

7 Related application notes

The following application notes use this library:

- ▶ [AN02016: Integrating Audio Weaver \(AWE\) Core into USB Audio](#)
- ▶ [AN02003: SPDIF/ADAT/I2S Receive to I2S Slave Bridge with ASRC](#)

8 Support

This package is supported by XMOS Ltd. Issues can be raised against the software at www.xmos.com/support



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