

Scalable Multichannel I2S Audio Inputs and Outputs for a Multimedia-Processor

Nowadays the demand to be able to perform almost any task on the internet is enormous. This includes sending and receiving video signals. The Barox Kommunikation AG is striving to be able to cut and edit live transmissions in a different location to the camera recording. To this end, the Institute of Embedded Systems (InES) is developing a device that has a multimedia processor at its core which can be connected to the internet. This system primarily supports the video protocol SDI because this connection is commonly used in professional live transmissions. This device is modular so that various video and audio cards can be added. This thesis examines the audio connection between a SDI input and the multimedia processor. The goal is to extract 8 audio channels from the incoming video input and to combine these from 4 I2S streams into a single TDM (time division multiplexed) audio stream. The multimedia processor should read the TDM input and save the data. This process should also work in the opposite direction.

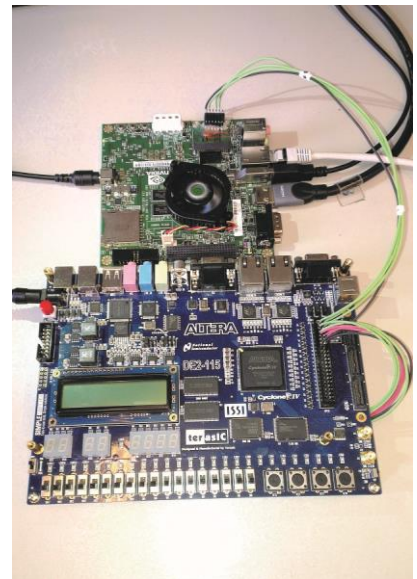
To achieve this, a converter was developed on a FPGA (Field Programmable Gate Array). Additionally a driver was written for the Linux multimedia computer.

The converter requires 13% of the FPGA to convert the stream in both directions. On the Lattice board it can run with a maximal frequency of 82 MHz, although only 12,288 MHz is necessary. The converter has been written in a way that it can easily be transferred to a different FPGA form another manufacturer. Both converter and driver have been written for 8 channels, 24 bit and 48 kHz.



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The foreground shows the FPGA development board with the I2S to TDM converter.
The background shows the development board of the Multimedia-Processor. Both boards are linked via the TDM Interface.