

| | | |
|--|---|--|
| Filière / Studiengang SYND | Année académique / Studienjahr 2022-23 | No TB / Nr. BA IT/2023/82 |
| Mandant / Auftraggeber <input checked="" type="checkbox"/> HES—SO Valais <input type="checkbox"/> Industrie <input type="checkbox"/> Etablissement partenaire <i>Partnerinstitution</i> | Etudiant / Student Maxime Cesalli Professeur / Dozent François Corthay | Lieu d'exécution / Ausführungsort <input checked="" type="checkbox"/> HES—SO Valais <input type="checkbox"/> Industrie <input type="checkbox"/> Etablissement partenaire <i>Partnerinstitution</i> |
| Travail confidentiel / vertrauliche Arbeit <input type="checkbox"/> oui / ja <input checked="" type="checkbox"/> non / nein Expert / Experte (données complètes) Dario Biner Stenheim, Route du Rhône 10, 1963 Vétroz | | |

Titre / Titel

Audiophile 2-way splitter for active loudspeakers

Description / Beschreibung

Most loudspeakers are passive. The amplified audio signal is brought to all speakers, yet matched to each of their frequency range with the help of analog LC filters : lowpass for the bass, highpass for the tweeter and possibly bandpass for the mid-range speaker. For active loudspeakers, the line-level audio signal is limited to the bands associated to each of the speakers and amplified separately. This removes the distortions induced by the analog filters.

The aim of this project is to design a 2-way audio splitter (lowpass and complementary highpass) based on FIR-filters. The circuit is to be implemented inside an FPGA, with an I2S digital audio input and two I2S outputs. The system is first to be implemented with fixed filter coefficients and later with the possibility to download the coefficients into the FPGA.

Objectifs / Ziele

- Prepare a VHDL design environment
- Implement an I2S decoder and encoder, test them on the bass channel of the loudspeaker
- Implement a digital lowpass filter, insert it between decoder and encoder and test it
- Implement the complementary highpass filter and test both on the loudspeaker
- Propose a method to download the filter coefficients from a PC into the system

Signature ou visa / Unterschrift oder Visum

Responsable de l'orientation /
Leiter der Vertiefungsrichtung:

¹ Etudiant / Student:


Délais / Termine

Attribution du thème / Ausgabe des Auftrags:
15.05.2023Présentation intermédiaire / Zwischenpräsentation:
19 - 20.06.2023Remise du rapport final / Abgabe des
Schlussberichts:
18.08.2023, 12:00Expositions / Ausstellungen der Diplomarbeiten:
25.08.2023 – HEI
28.08.2023 – Monthey
31.08.2023 – VispDéfense orale / Mündliche Verfechtung:
Semaine/Woche 36 (04-07.09.2023)

¹ Par sa signature, l'étudiant-e s'engage à respecter strictement la directive DI.1.2.02.07 liée au travail de diplôme.
Durch seine Unterschrift verpflichtet sich der/die Student/in, sich an die Richtlinie DI.1.2.02.07 der Diplomarbeit zu halten.