Mixed Signal ASIC achieves a 90% cost reduction

The adoption of mixed signal ASIC (application specific integrated circuit) technology has enabled Schwarzer GmbH to improve the performance of its EEG (Electroencephalography) equipment used in neurological diagnostic applications whilst achieving a cost saving of 90% per channel. The improved product competitiveness will enable the company to regain its market share in Germany, and to increase sales by 50%.

Schwarzer GmbH designs, develops, manufactures and markets medical diagnostic equipment, including ECG (electro-Cardiography) and EEG (Electro-encephalography) equipment, for patient diagnostics in the fields of neurology, cardiology and sleep polygraphy.

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Schwarzer’s market share was projected to decline as a result of increased competition from imported products. The improved product will enable this decline to be reversed, as a result of the improvement in performance and cost competitiveness. The prototype development cost of 176 K€ was funded by the FUSE project. Industrialisation costs were 163 K€ and the increased profits will repay this total investment in less than 18 months, and the return on investment over 5 years will exceed 500%.

Significant Economic Benefits

The current EEG equipment required a cost reduction to maintain its market competitiveness. The introduction of mixed signal ASIC technology has allowed Schwarzer to reduce the manufacturing costs of its improved equipment by 90% per channel, and enabled the following product improvements:

- Higher sensitivity and lower noise performance providing opportunities for the equipment to be applied in other treatment areas.
- A significant reduction in the size and weight of the ‘head top’ system enabling its application in longer term monitoring situations.
- Enhanced reliability through the reduction in the number of discrete components used.

Product Improvements
Schwarzer decided to use a mixed signal ASIC device to improve its EEG equipment because it offered the following benefits:

- The levels of digital and analogue circuit integration required to maximise size and weight reductions for the head-top processing unit.
- The closely-matched characteristics of the several analogue signal processing channels on one device eliminated the costly process of manually selecting discrete devices with matching performance.
- The lowest unit cost solution and an improvement in final system yield.

Schwarzer conducted the project as a FUSE application experiment. The company's staff participated in all of the project tasks in collaboration with selected subcontractors. The subcontractors provided support in:

- The management of the mixed signal ASIC development process.
- Mixed signal ASIC design and design tool training.
- Specification development.
- ASIC design and prototype device fabrication.
- Development of test sequences and prototype device testing.

The main project tasks, effort and costs are listed in the adjacent table.

Mixed signal ASIC technology provided Schwarzer with the means of improving its product and enhancing its market position. You can also achieve significant benefits by acquiring the right microelectronics technology and utilising it in your product or manufacturing process. You can get help from FUSE to realise this.

**FUSE** is a technology transfer programme, funded by the European Commission to stimulate the wider use of microelectronics technologies by European enterprises to increase their competitiveness and enhance their economic growth. The demonstrator described here is one of many examples in the public FUSE portfolio covering the whole spectrum of microelectronics technologies and spanning a wide range of applications and industry sectors.

**FUSE** provides you with:

- Best practice in acquiring specific microelectronics technologies and conducting full development projects through the FUSE portfolio of real life demonstrator documents.
- Local training and expert support to plan your innovation realistically and help you conduct your project successfully.

Further information and support relating to this and other demonstrators can be obtained from the addresses below.