

# HIGH PERFORMANCE SINGLE BOARD COMPUTERS

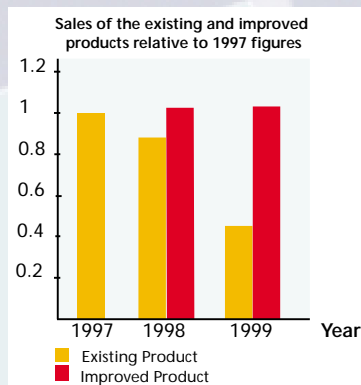
## digital ASIC increases processing speed by 50%

*Mentec Ltd developed an application specific integrated circuit (ASIC) as the core of its high performance single board computers. By utilising ASIC technology, Mentec has responded positively to the market demand for higher performance computer boards with an increase in processing speed of 50%. The improved performance, reduced manufacturing costs and increased reliability will enable Mentec to achieve a significant growth in its sales to the finance, telecommunications and process control industries.*

Mentec Ltd addresses a number of segments within the information technology market. It has operations in Europe and the USA, and markets its products throughout the world. Mentec designs and manufactures single board computers, desktop videoconferencing systems and other specialist hardware products. It also provides complete software and hardware solutions to clients in finance, manufacturing and distribution.

MENTEC LTD	
Employees	175
Turnover	25 M€/year
Industrial Sector	Computers NACE code: 30
Technical expertise before the project	FPGA & CLPD
Technical expertise at the end of the project	Digital ASIC

## SIGNIFICANT ECONOMIC BENEFITS



The market for single board computers demands higher performance and software compatibility with existing systems. To increase its market share and respond to the demands of its customers, Mentec must deliver higher performance products ahead of its competitors. The developed ASIC has enabled the company to reverse the potential decline in its sales with an expected doubling of sales volume in the second year of production as shown in the chart. This was achieved by a 50% increase in performance, higher reliability, reduced components and test costs. The prototype development work was funded under the FUSE programme. The total cost of the project was 250 K€. The payback period for this investment is 3 months and was covered by the value of the first batch of orders. The total return on investment is estimated at 350% over the product's 2 year lifetime.

## PRODUCT IMPROVEMENTS

The improved single board computer products have their core elements integrated into the new digital ASIC. This has provided significant technical and cost benefits including:

- Increased processing speed of more than 50%.
- Software compatibility with existing products including those of the competition.
- Reduction in the number of components by 30% leading to increased reliability.
- Reduction in the printed circuit board costs due to reduced component interconnections.
- Overall reduction in manufacturing and testing costs.



# How to go about it

## CHOOSING THE RIGHT TECHNOLOGY

The digital ASIC was designed with VHDL and fabricated using CMOS technology. These options were chosen because they offered the following advantages:

- VHDL enables moving the design in the future to other ASIC technologies and manufacturers at minimum cost.
- Performance improvement of more than 50% due to the speeding up of internal timings and reduction of critical delay paths.
- High gate density allowing the integration of significant parts of the existing board into a single 313 pin package.
- Flexibility in production allowing small volumes to be supplied for the whole product lifetime (1000 parts).

PROJECT OVERVIEW	
Main Activity	Digital ASIC design development
Duration	12 months
Effort	484 person days
Overall prototype development costs	250 K€

## A PARTNERSHIP FOR SUCCESS

The project was conducted by Mentec as a FUSE application experiment with the support of two experienced subcontractors.

The project was managed by Mentec, and its staff participated actively in all its main stages.

The subcontractors provided:

- Training on digital ASIC design and the usage of the CAD tools.
- Support in VHDL design.
- Assistance in simulation and synthesis.
- ASIC layout.
- ASIC prototyping and fabrication.

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

EFFORT & COST		
Task	Company's effort (days)	Subcontractors' costs (K€)
Specification	48	2.5
VHDL Development	72	2.5
Simulation	76	2.5
Synthesis	264	1.5
Layout	24	4.0
Fabrication		96
Total	484	109

## YOU CAN ALSO BENEFIT FROM MICROELECTRONICS

ASIC technology provided Mentec with the means of improving its single-board computer products 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.*

### The Technology Transfer Node

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