

You need to manage change—changing technology, standards, customer requirements, and product availability—and beat your competition to market.

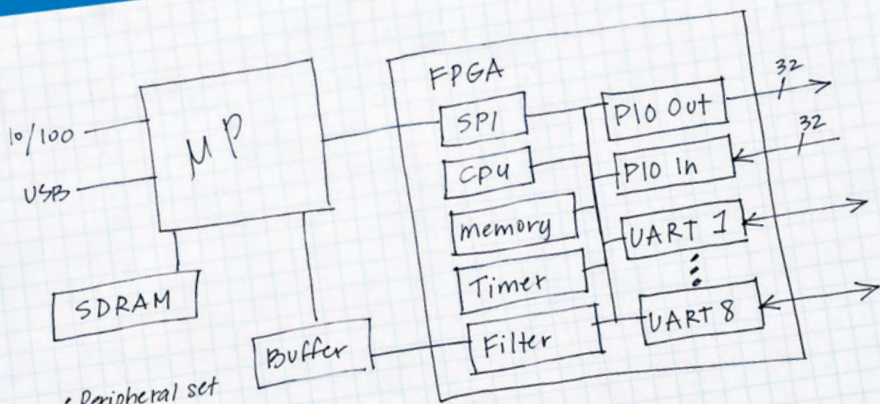


Think embedded?

You need to build an embedded system. Now. You need to manage change—changing technology, standards, customer requirements, and product availability—and beat your competition to market, all while minimizing the effect on your code and board. Your solution must be flexible, while still meeting your cost and performance requirements.

The ideal embedded solution would allow you to:

- Choose the exact set of processors, peripherals, memory, and interfaces you need for your application
- Remotely upgrade your designs in the field to improve competitiveness and address changing requirements
- Increase system performance without having to change your board design
- Eliminate the risk of processor and ASSP obsolescence
- Lower overall system cost, complexity, and power consumption by combining multiple functions on a single chip ▶

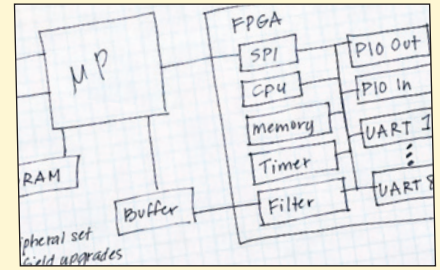


- Peripheral set
- In-field upgrades
- Parts availability
- Performance
- System cost
- Schedule !!

Think FPGAs.

Think Altera.

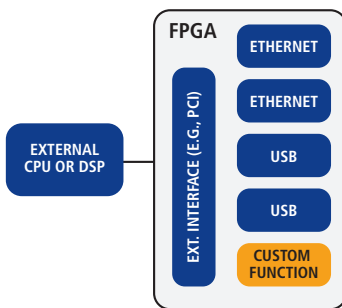
Concept to Silicon in Minutes.



Conceive It.

How do you create the exact system you need? Altera combines the versatility of programmable logic with high-performance embedded processors for a flexible embedded solution that scales to fit individual application needs. You can use Altera® FPGAs to complement an existing microprocessor or DSP for peripheral expansion, to offload computing tasks, or with a Nios® II embedded processor to integrate functions, lowering system cost and reducing the risk of obsolescence. Either way, you get the exact set of peripherals, memory, and I/O interfaces that fit your needs— together with FPGA flexibility, fast time-to-market, and system integration—all at the performance and cost points you're looking for.

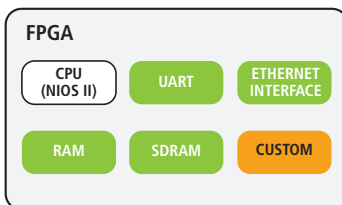
PROCESSOR COMPANION CHIP



Choose from Two Embedded Solutions

You can use Altera FPGAs to complement an existing microprocessor or DSP for peripheral expansion, to offload computing tasks, or with a Nios II embedded processor to integrate functions.

CUSTOM MICROCONTROLLER



Customer Success Story

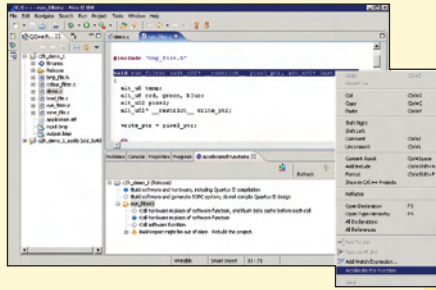
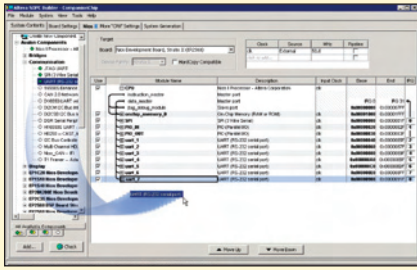
COMPANY: Blaupunkt

APPLICATION: TravelPilot Rome auto navigation system, which provides navigation and audio (radio and CD playback) for automobiles

ALTERA PRODUCTS: Cyclone™ FPGAs and Nios II embedded processor

Challenged with time-to-market pressures, Blaupunkt shortened design time by six months and minimized the component count of its TravelPilot Rome auto navigation system by using Altera Cyclone FPGAs and Nios II embedded processors. Blaupunkt replaced multiple standard components with a single Cyclone device with a Nios II processor, reducing complexity, simplifying development, and increasing product quality and reliability.





Build It.

Altera solves the intellectual property (IP) integration problem with a tool that allows you to drag and drop the exact mix of peripherals and processors you need to build your system. It automatically generates the interconnect logic required to configure and connect system components while ensuring optimal system performance.

You can quickly assemble IP cores and embedded processor configurations not available in off-the-shelf processors, customizing your FPGA to your specific application. It's fast. And it's easy. Plus, Altera tools work seamlessly with other industry-standard tools, minimizing training time.

Code It.

If you're designing with the Nios II processor, you'll feel right at home with an Eclipse-based integrated development environment (IDE) and a full range of software and operating system support offered by Altera and its partners. Need to boost performance? No problem. Simply right-click to accelerate your performance-critical C-language software algorithms and the tools will automatically convert them to hardware.

Ship It.

It's that simple. And if your standards or customer requirements change, you can easily upgrade the design in the field without having to change your board. It's obsolescence-proof. Embedded system design has never been so easy.

Embedded system design has never been so easy.

Choosing Altera's programmable solutions over ASICs or ASSPs gives Blaupunkt an accelerated product development model that minimizes the cost of multiple silicon iterations and enables the company to quickly bring additional automotive navigation products to market.

Other examples of customers using Nios II processors in FPGAs are available on www.altera.com/niossuccess.

- Cisco 2600 and 3600 Series routers
- Siemens WayMAX Base Station
- General Dynamics Joint Tactical Radio System (JTRS) Cluster 5 software-defined radio

- Navman Fish 4350 fish finder
- Panasonic 3.5G Network Base Transceiver Station (BTS) for wireless networks
- Alcatel 7300 Advanced Services Access Manager and other products for telecommunications infrastructure
- Barco Olite 510 LED display system, and Networked Broadcast Monitoring System for video display, broadcast, and distribution
- Hirschmann hybrid car-TV receiver, a digital TV antenna for automobiles

For more information, visit www.altera.com/embedded

Ask the experts.

You can add programmable logic as a *companion chip* for as low as US\$0.99

Q How can FPGAs help me with my embedded design?

A FPGAs can be used in two ways. When you use FPGAs as companion chips for peripheral expansion or co-processing, you can keep your current processor and use the FPGA to fill in peripheral gaps, expand your product's feature set, or add custom logic to secure a competitive advantage. You can also use FPGAs to create a stand-alone custom microcontroller that has one or more processors and the exact set of peripherals and interfaces that meet your needs.

Q What does it cost?

A As always, cost depends on your needs. As a stand-alone microcontroller, a Nios II processor can consume as little as US\$0.32 of logic. You can add programmable logic as a companion chip for as low as US\$0.99. Many developers use FPGAs to manage system cost by integrating components such as processors or DSP functions into the FPGA, which reduces cost, saves board space, and avoids potential ASSP availability problems. For higher volumes, you can seamlessly migrate the design to Altera's HardCopy® structured ASICs.

Q How can I create a stand-alone processor using an FPGA?

A You can add one or more 32-bit Nios II processor cores to your FPGA. Altera's FPGA design software allows you to drag and drop processors, peripherals, on-chip memory, and interfaces from a list of system resources to build a system that meets your performance, feature, and cost requirements.

Q What software development tools are available for the Nios II processor?

A The Nios II processor includes a complete embedded design suite (EDS) including compiler, linker, JTAG debugger, IDE, HAL drivers, utilities, and reference designs. It is also supported by a wide range of embedded tools from industry-leading suppliers.

Q What are the benefits of using an FPGA in embedded systems?

A FPGAs offer a number of unique benefits. They allow you to scale performance as needed, adding processors, custom instructions, and hardware accelerators—even after the product ships—to boost your system performance. FPGA-based solutions reduce risk by improving flexibility, reducing time-to-market, and obsolescence-proofing your design. With 15,000 kits shipped and the world's top 20 OEMs already using Altera embedded products, these solutions are a proven alternative for a wide range of embedded systems.

Q How do I get started?

A A fully functional evaluation version of the Nios II processor and software tools can be downloaded for free from the Altera web site. The best way to evaluate Altera's embedded solutions is by purchasing a low-cost development kit that includes the Nios II processor, peripherals, interfaces, development board, Nios II EDS, JTAG programming/debug cable, FPGA design software, reference designs, documentation, and tutorials.



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For more information, see www.altera.com/embedded

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