

Design more features before the next re-spin  
with Altera PLDs

## Altera in portable entertainment



*The MAX® II device helps us stay competitive in the extremely price-sensitive consumer electronics market. We have been able to implement digital signal processing more economically than with alternative solutions and reduce costs at the manufacturing level*

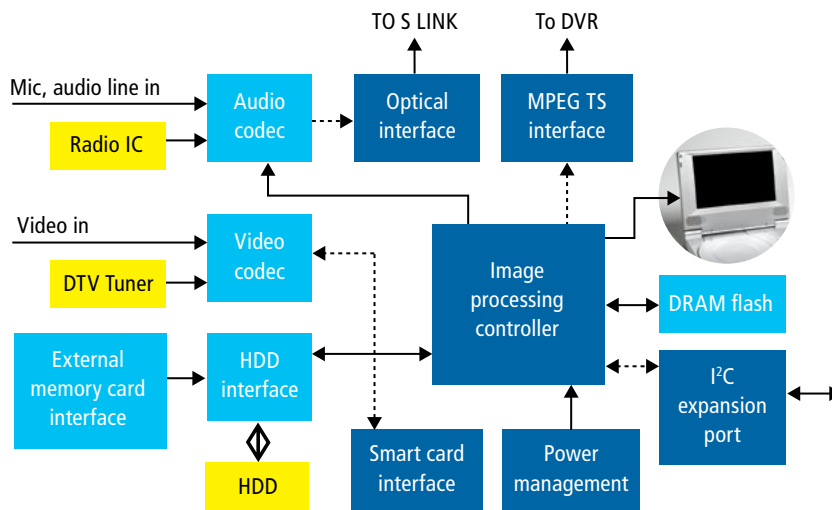
Mike Chai  
Senior Vice President of R&D  
LeapFrog

Your customers demand light-weight mobility and more functionality than ever before. Not only do you have to design all the latest features into your products, but you have to do it in an ever-smaller board space, use less power, and integrate into a wide array of other technologies to stay ahead of the curve. Whether you're designing for media players, edutainment toys, handheld games, GPS navigators, or another portable device, Altera delivers flexible programmable solutions that will get you to market faster and reduce your total cost of development.

### Altera in portable media players

A new generation of portable media players is here. Altera® solutions make it easy for you to deliver all the functionality this new generation demands. Your customers will be able to listen to music, watch videos, and view pictures, functionality that's integrated into one product that they can carry in the palm of their hand. Envision the future with wireless media sharing, image and video capture, and gaming capabilities. Because Altera is at the forefront of portable media player design, we'll be able to help you deliver these kind of features and more, only faster.

#### Portable media player example

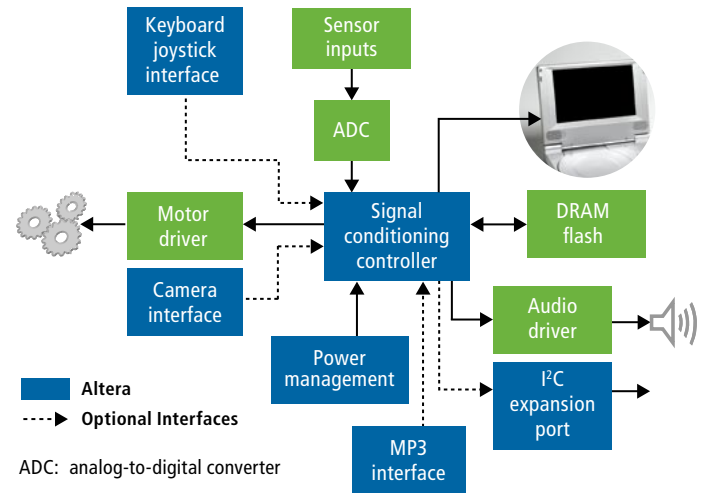


DTV: digital television  
HDD: hard disk drive

Altera  
Optional Interfaces

In a typical portable media player system, the central functional block is the image processing controller. The basic functions required for the image processing controller can be implemented either in an ASIC, ASSP, or DSP device. A companion Altera programmable logic device (PLD) can also be incorporated into the basic design for feature enhancements. Because PLDs are reprogrammable, this companion device allows you to differentiate products and get them to market faster than designers who use ASICs, ASSPs, or DSP devices alone.

## Portable edutainment toy example



## Altera in edutainment toys

Educating children while keeping them entertained is the objective of portable edutainment toys. In a typical portable edutainment toy system, the central functional block is the signal conditioning controller. The signal conditioning controller positions the motor, based on inputs from an external sensor. It processes and loads images to the display panel, handles audio processing functions, such as audio tone synthesis, and manages external audio sources. These three functions are unique to an edutainment toy system specification, and a PLD gives you maximum design flexibility, low risk, and fastest time to market in your designs. Similar to the portable media player application, PLDs are ideal for interface bridging, I/O expansion, power management, voltage-level shifting, DSP configuration, and clock generation functions.

## Portable entertainment features and benefits

Functions	MAX II CPLDs	Cyclone® Series FPGAs	Features	Benefits
Power management	✓		Dynamic power management	Adapts to application for optimal power consumption
Video and image processing		✓	Abundant memory and multipliers for video processing applications	Image processing, quality enhancement
Signal conditioning controller	✓	✓	MAX II CPLDs are lower cost than digital signal processors; Cyclone series FPGAs have configurable soft processor for custom-fit solutions	Cost and board space reduction
LCD timing controller		✓	Built-in LVDS, reduced swing differential signaling (RSDS), mini-LVDS, point-to-point differential signaling (PPDS) display column driver interfaces	Cost and board space reduction
Interface bridging	✓	✓	Configurable I/O buffers with built-in interfaces for common I/O standards and external memory interfaces	No extra components needed for interface bridging
General purpose I/O (GPIO) pin/I²C/system port expansion	✓		Adding more I/O or system user I/F	Flexibility and expandability at minimal cost, highest I/O per mm <sup>2</sup> <sup>1</sup>
Data format conversion		✓	High bandwidth memory for fast data format conversion	Fast performance, less timing delay
ASSP-function complement	✓	✓	Add features to complement ASSP: smart card, game stick I/F	Expandability, time to market
Security	✓		Store encryption key in User Flash Memory (UFM)	Personal content protection
Voltage level shifter	✓		On-chip voltage regulator	No need for additional voltage regulator
Clock generation	✓	✓	MAX II UFM interface clock-sync and power-up sequencing; Cyclone series phase-locked loops (PLLs) can generate multiple independent clocks from a single low-cost clock source	Internal clock generation, no need for additional clock

<sup>1</sup> Device using eight 16-bit counters and no outputs switching

Visit us at [www.altera.com/consumer](http://www.altera.com/consumer) for more information.

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