Meeting power, functionality, and cost requirements

Broadcast video and image processing

Cyclone III FPGAs deliver an unprecedented combination of low power, high functionality, and low cost for digital signal processing (DSP)-intensive applications.

Video and image processing applications increasingly require substantial data processing and sustained data integrity across a variety of electronic systems. There are also fast-evolving standards and, as always, competitive price pressures.

Altera® Cyclone® III FPGA families deliver an unprecedented combination of low power, high functionality, and low cost for digital signal processing (DSP)-intensive applications. With our devices, you'll reduce overall system cost, improve performance, and increase your productivity—all of which will give you an edge in this fast-moving market.

Design challenges

Your customers demand higher resolution images and faster access to video and image data, which has led to major advancements in image capture, compression techniques such as H.264, and video intelligence. As real-time processing bandwidth requirements accelerate, standards are rapidly changing. The off-the-shelf technology you've relied upon is no longer an ideal fit—you need a more flexible solution that delivers high-quality images at a low cost.

An innovative solution

Cyclone III FPGAs deliver a unique, low-cost architecture with abundant logic, memory, and DSP resources—a great alternative to ASICs and ASSPs. You can now respond quickly to market shifts and new standards with devices that are optimized for image processing applications.

By replacing multiple ASICs, ASSPs, or DSP devices, Cyclone III FPGAs reduce cost, power consumption, and board space while giving you the flexibility to respond to unexpected market requirements. Also, with our improved functionality you can easily upgrade to H.264 encoding, giving you the performance you need at great value.

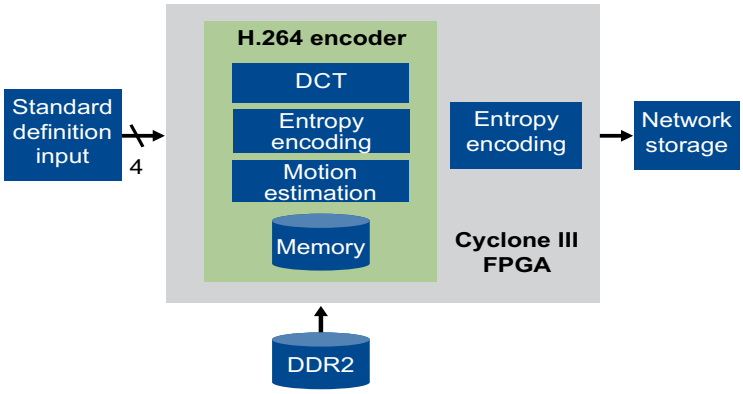
Our newest Cyclone devices, Cyclone III LS FPGAs, are optimized for high-throughput video, image, and audio processing. The variant provides 70K to 200K logic elements for less than ¼ Watt. Compared with competitive devices on the market, Cyclone III LS FPGAs deliver lower power and increased memory and multiplier densities—ideal for broadcast system designs.

The Cyclone III family offers video and image processing features beyond any other low-cost FPGA.

Cyclone III FPGA highlights

Highlighted features	Benefits
Embedded memory	Up to 8.2 Mbit of embedded RAM, ideal for video frame buffering
DSP multipliers	Up to 396 embedded 18x18 multipliers at 200 MHz to process DSP-intensive video algorithms
I/O bandwidth	Up to 600 Mbps QDR II memory interface performance, 400 Mbps DDR2 memory interface performance, and 840 Mpbs LVDS I/O performance with dynamic phase alignment (DPA)
Autocalibrating external memory interfaces	Easy implementation to support high performance of up to 400 Mbps with easy timing closure for DDR and DDR2
Video and Image Processing IP Suite	Pre-optimized video and image intellectual property (IP) cores to increase productivity
Nios® II embedded soft processor	The world's most versatile soft-core processor, ideal for implementing a low-cost microcontroller
Free Quartus® II Web Edition software	Industry-leading software for performance and productivity, with a power-aware design flow to minimize power consumption

Four-channel H.264 baseline encoder



Design a four-channel H.264 encoder in a single Cyclone III FPGA to meet your cost and performance requirements using IP available from Altera and our partners. You won't need to use multiple DSP devices or ASSPs to implement multiple channels.

Cyclone III FPGAs are optimized with the right mix of on-chip memory, embedded multipliers, and logic to perform DSP-intensive video algorithms at a lower cost and in a smaller footprint than alternative solutions. For example, you can perform digital cosine transform (DCT), entropy encoding and motion estimation algorithms in the H.264 encoder.

You can also use Altera's video over IP reference design in the same device to transport compressed video over IP through a network. These FPGAs also support multiple external memory interfaces such as DDR and DDR2 for data buffering.

Altera complete low-cost video and image processing solutions at your fingertips

- Cyclone III FPGAs—optimized for video and image processing applications
- Video and Image Processing Suite of IP cores
- A strong ecosystem of partnerships for leading-edge video and image processing solutions
- Nios II soft-core embedded processor
- Free Quartus II Web Edition software
- Application-specific reference designs
- Low-cost development kits
- White papers

Altera Video and Image Processing Suite of IP cores

- De-interlacer
- Color space converter
- Scaler
- Alpha blending mixer
- Gamma corrector
- Chroma resampler
- 2D filter
- 2D median filter
- Line buffer compiler

Want to dig deeper?

For more information about how our Cyclone III FPGAs can support your broadcast video and image processing design requirements, contact your local Altera FAE or sales representative, or visit www.altera.com/broadcast.

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