



Altera Cyclone V FPGAs in Display Applications

Displays

Design for the largest displays or handheld screens. Convert standard definition (SD) displays to high definition (HD) and back again. Cyclone V FPGAs are ideal for medical imaging, automotive navigation, consumer HDTV, industrial monitors, and much more.



Cyclone V family FPGAs—the first low-cost FPGAs to meet 1080p HDTV performance requirements.

Your technical creativity can usher in the next generation of displays. But how will you convert your vision for the future into reality? Choose Altera® Cyclone® V FPGAs, with their unparalleled combination of high functionality, low system cost, and the lowest power of any 28-nm FPGA. Cyclone V FPGAs, enhanced with integrated transceivers and hard memory controllers, are ideal for differentiating your high-volume applications. With Cyclone V FPGAs, you can go to market faster, reduce overall cost, and increase your productivity.

The challenges you face

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 scalable solution that delivers high-quality images at a low cost.

You need to react fast

In the display market, who knows who your next competitor will be, or what features they will bring to market? You need the flexibility to change your designs—and get to production—fast. Because our devices are reprogrammable, you can update and enhance products quickly. You can also generate a single display platform for a wide array of display sizes and resolutions. You'll get your custom-fit solution while you increase productivity, get to market faster, and lower your development cost.

The Cyclone V family offers features beyond any other low-cost FPGA.

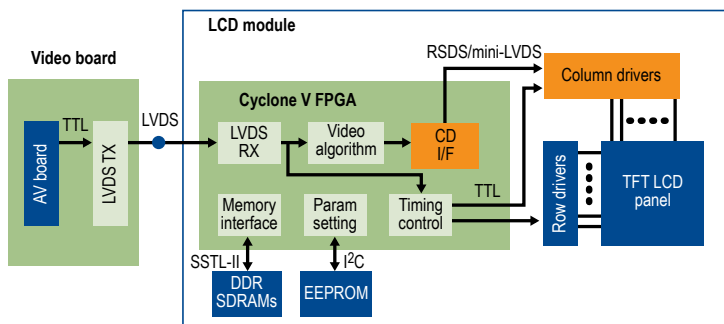
Cyclone V FPGA Key Features

Key Features	Benefits
Abundant memory and multipliers	Efficient frame buffering, HD video line buffering, and image processing
Flexible column driver interface support	Integrated differential buffers, including LVDS, mini-LVDS, reduced swing differential signaling (RSDS), and point-to-point differential signaling (PPDS)
Flexible phase-locked loops (PLLs)	Dynamically reconfigurable frequency and phase shifts to support multiple refresh rates Nine outputs for every fractional PLL to provide more clock outputs per device Cascadable to reduce jitter Supports 5-MHz to 550-MHz clock frequencies
Autocalibrating external memory interfaces	Easy implementation to support high performance of up to 800 Mbps with easy timing closure for DDR3 SDRAM

Design An Entire LCD TV System Around A Flexible Low-Cost Cyclone V FPGA

The Cyclone V FPGA is an image enhancement engine that drives a typical liquid crystal display (LCD) interface. To implement the video algorithm function for LCD image enhancement, you can use pre-optimized intellectual property (IP) cores including de-interlacers, scalers, filters, and more from Altera's Video and Image Processing (VIP) Suite. Process input from any video source and output to any LCD panel. Our devices support a wide range of I/O interfaces. They have reconfigurable PLLs for on-the-fly frequency and phase shifts to support changing refresh rates. Leverage a single platform to produce an entire product line.

LCD TV Interface



Altera's Complete Low-Cost Display Solutions

- Cyclone V FPGAs—optimized for display applications
- Video and Image Processing Suite of IP cores
- Nios® II soft-core embedded processor
- Free Quartus® II Web Edition software
- Application-specific reference designs
- Low-cost development kits
- White papers

Altera's VIP Suite Functions

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

Find out how you can enhance your image by using Cyclone V FPGAs today.

Want to Dig Deeper?

For more information about Cyclone V FPGA applications, contact your Altera representative, or visit the Cyclone V FPGA: End-Market Applications web page:

www.altera.com/devices/fpga/cyclone-v-fpgas/end-markets-applications/cyv-mkts-apps.html

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