Home > Products > Dev Kits & Hardware > Vertical Market Solutions > LCD-Pro Evaluation Kit

Lattice LCD-Pro Advanced Video Graphics Controller Evaluation Kit

The LCD-Pro Evaluation Kit enables evaluation and demonstration of the functions of the LCD-Pro Library, a set of flexible, configurable IP cores which can be used to implement versatile and powerful display control, graphics and video applications. The library is based around the industry standard AMBA™ bus architecture, allowing interconnection of the LCD-Pro IP with a wide range of system components compatible with the AMBA™ bus. The LCD-Pro IP cores are targeted to Lattice FPGAs, specially optimized for the LatticeECP2 low-cost FPGA family. The library contains several IP providing advanced graphics system functionalities.

Key Features

Fast Time-to-Market

Easy Core Integration into LatticeECP2 and LatticeXP2 FPGAs

Field-Proven IP

High-Performance Advanced Video Architecture

Design Optimized for Cost-Sensitive Applications

Video Controller supports LCD Displays from 2 inches to 23 inches and larger

Easy to add Custom or Proprietary IP Cores from Third Parties

Manufacturer

Exor International

Kit Contents

Carrier Board including 2x CVBS and 1x VGA Video Input Ports

LatticeECP2-50 based FPGA module

7" WVGA LCD Color Touch Display

Color Video Camera

12 VDC Power Supply

USB 2.0 Cable

Adapter for Lattice JTAG Cable

SPI Flash

M25P32 - 4Mx8bit DDR Video Memory 64MB (32Mx16bit)

48MHz Oscillator

JTAG port

Analog circuits for A/D – D/A converters,

Analog front end for Video Input,

Universal LCD and Touch Screen connectors

CD-ROM

Applications

Industrial and automated control	**Building Automation HMI**
Automotive graphics and video systems	**Marine automation systems**
Medical monitors and instrumentation	**Consumer automation (Kiosks, Vending Machines, ATMs)**
Household Appliances (Washers, Refrigerators)	
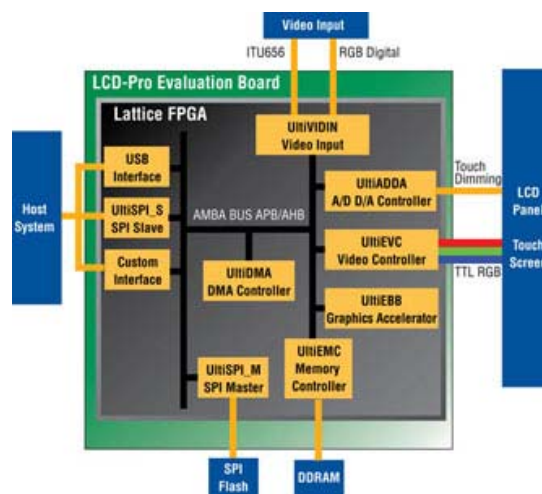
Extensive LCD-Pro IP Library

The library offers simplified system and host interfacing due to the use of the widely adopted, industry standard, AMBA® bus architecture and included system interface cores. The cores, which are configurable with various implementation options available, offer a high degree of solution scalability. Additionally, the cores are designed and optimized for high speed required in state-of-the-art graphics systems, providing simplified timing closure and short development time.

Lattice LCD-Pro IP Library

LCD-Pro IP	Description	Suite 1: Base Video Controller (BVC)	Suite 2: BVC +2D Accelerator	Suite 3: BVC +2D Accelerator +Video Input IP
UltiEVC Video Controller	Advanced flat panel display controller	✔	✔	✔
UltiEMC Memory Controller	Low slice cost, high bandwidth, DDR memory controller	✔	✔	✔
UltiADDA	FPGA based AD/DA/touch screen controller (coupled with external analog circuitry). These cores are supported by a reliable and efficient set of system IP	✔	✔	✔
UltiAHB_I	AMBA 3 AHB™ multi-layer switch matrix interconnect	✔	✔	✔
UltiAPB_B	AMBA 3 AHB™ to APB™ bridge	✔	✔	✔
UltiSPI_M	SPI master controller	✔	✔	✔
UltiSPI_S	SPI slave core providing AMBA® bus access to external host	✔	✔	✔
UltiI2C_M	I2C master controller	✔	✔	✔
UltiUSBDMA	USB to AMBA® AHB™ interface - versatile test and debug link	✔	✔	✔
UltiEBB 2D Graphics Accelerator	Advanced BITBLT core providing ROP and Alpha blending operations		✔	✔
UltiVIDIN Video Input	Advanced video input/frame grabber core			✔

The library allows easy integration of advanced FPGA-based graphics systems with powerful features:

Ability to control of a wide range of flat panel displays ranging from low end CIF and QVGA up to high definition TFT, in 8, 16 or 24 bit color (fi led proven with more than 30 commercially available displays)

Multi-layer image compositing available in display controller, supporting simple overlaying, color keyed transparency, alpha blending and alpha masking

Variable layer color depth, size, positioning, memory geometry and location, smooth scrolling

Display refresh synchronization

Support for fast hardware BITBLT operations with standard ROP or Alpha composition

Support for 8,16, 24 and 32 bit bitmap formatting, variable and independent memory geometry for source and destination bitmaps

Powerful alpha blending operations supporting the Porter-Duff alpha composition rules.

Solid and Pattern fill operations

Hardware color expansion of monochromatic bitmaps, color channel mixing support.

Versatile video input allowing multiple video input channels with multiple input muxing, supporting ITU-R BT.656 (ITU656) or Digital RGB video inputs

Real-time down-scaling of input video stream

Variable video image memory geometry, cropping and positioning

Frame grabbing, video input signal synchronization

High bandwidth DDR frame buffer memory support

FPGA-based AD/DA controller employing external analog circuitry.

Touch sensing, Backlight and dimming control

Control of embedded peripheral memories over SPI and I2C buses.

System interfacing over peripheral SPI bus or via USB link from an external USB host

Required Software

STEP 1 - Configurator: The Lattice LCD-Pro Advanced Touch-Screen Video Graphics Controller Evaluation Kit comes complete with the full LCD-Pro library of time-limited IP and LCD-Pro Configurator software and Plugins on CD-ROM. The LCD-Pro Configurator software can be installed on a PC and the LCD-Pro Evaluation Kit connected to the PC via the included USB cable. The kit does not require any additional software for evaluation of the functionality of the included IP.

To download the latest version of the LCD-Pro Configurator software, **visit this link**.

STEP 2 - LCD Pro IP Cores: : The LCD-Pro IP library comprises 11 cores from Exor-Sitek which offer a variety of functions for use with the LCD-Pro Evaluation Kit. A single download from IP Express provides access to all cores for evaluation. To purchase, customers can buy one of 3 suites which comprise various IP as shown in the table above.
Evaluate: Similar to other Lattice IP cores, the IP cores for LCD Pro can be evaluated free of charge. The IP ("Display Controller Suite") download from IP Express includes all the IP cores listed in the table above. Some or all the cores can be selected during the installation process.
Purchase: To purchase one of the 3 suites, please contact your **local Lattice Sales Representative**.

Download IP Core User Manuals (zip)	📥

STEP 3 - Tutorial and Supporting Software: For building an FPGA design successfully using the LCD-Pro IP cores, a few other supporting IP cores and logic modules are provided along with the top level RTL templates. A tutorial document has also been created to work you through an example design using these IP cores. To use the tutorial, the user must have the LCD-Pro Evaluation Kit and have the LCD-Pro IP cores downloaded and installed.

Download Tutorial Document (pdf)	📄
Download Supporting IP Cores, Modules and Top Level RTL Templates (zip)	📥

Ordering Part Number

LCD-Pro Evaluation Kit:	**LFE2-50E-LCDPRO-EVN** (To purchase, please visit our online store.)
IP Suite 1:	BVC-BASE-P2-N
IP Suite 2:	BVC-2DACC-P2-N
IP Suite 3:	BVC-2DACCVI-P2-N