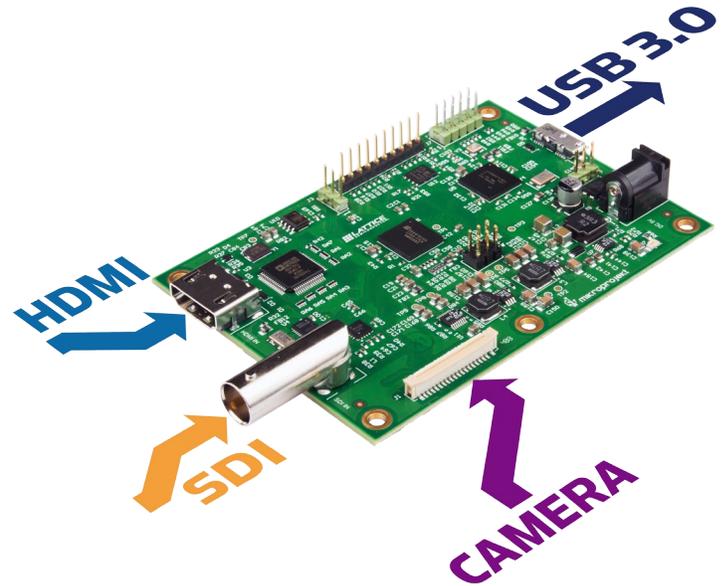# Lattice USB 3.0 Video Bridging Solution

Production-ready SuperSpeed USB 3.0 video capture solution with multiple interfaces and 1080p60 High Definition video streaming capability

The Lattice USB 3.0 Video Bridge Development Kit is a production-ready High Definition video capture and conversion system based on the LatticeECP3™ FPGA family, designed by Mikroprojekt. Supplied with Lattice's Video to USB3 Bridge reference design and USB 3.0 UVC video class firmware by Mikroprojekt, the kit works out of the box and can be easily demonstrated on USB 3.0 hosts running Windows, MacOS, or Linux. The board is recognized as a standard video capture device and will work with any commercial or open source software.

The solution, based on the LatticeECP3 supports high speed reception and packing of video and audio data into USB 3.0 UVC and UAC data frames without the use of external memory buffers. The Cypress EZ-USB FX3 USB 3.0 interface provides 5 GB streaming links to the USB host. The Analog Devices ADV7611 provides HDMI 1.4a capture capabilities (with optional HDCP decoding), and the Lattice Tri-Rate SDI PHY enables reception of professional audio and video signals over the LatticeECP3 SERDES interface. An expansion connector allows the connection of a Camera or sensor over either the MIPI CSI-2 interface, or SubLVDS differential lines, quickly transforming the board into a USB 3.0 High Definition camera suitable for industrial vision applications.

The kit offers manufacturers of professional video equipment a ready solution for a USB 3.0 video capture and conversion system enabling rapid evaluation and prototyping. Schematic and layout files are available for purchasers of the kit, enabling simple customization.

Live capture demo of "Big Buck Bunny" open movie over HDMI using the Lattice USB 3.0 Video Bridge Reference Design Board and VirtualDub Capture Software.
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Key Features and Benefits

- **Production-ready USB 3.0 Video Bridging Reference Design**
- **1080p Video Streaming over USB 3.0 at 60 fps**
- **HDMI 1.4a Audio and Video Capture**
- **SD-, HD- and 3G-SDI Audio and Video Capture**
- **Supports video capture from external MIPI CSI-2, SubLVDS or Parallel Sensors**
- **Reference design provides fast USB 3.0 UVC and UAC class data packing**
- **Plug and Play operation as a video capture device on multiple standard platforms (Windows, MacOS, Linux)**
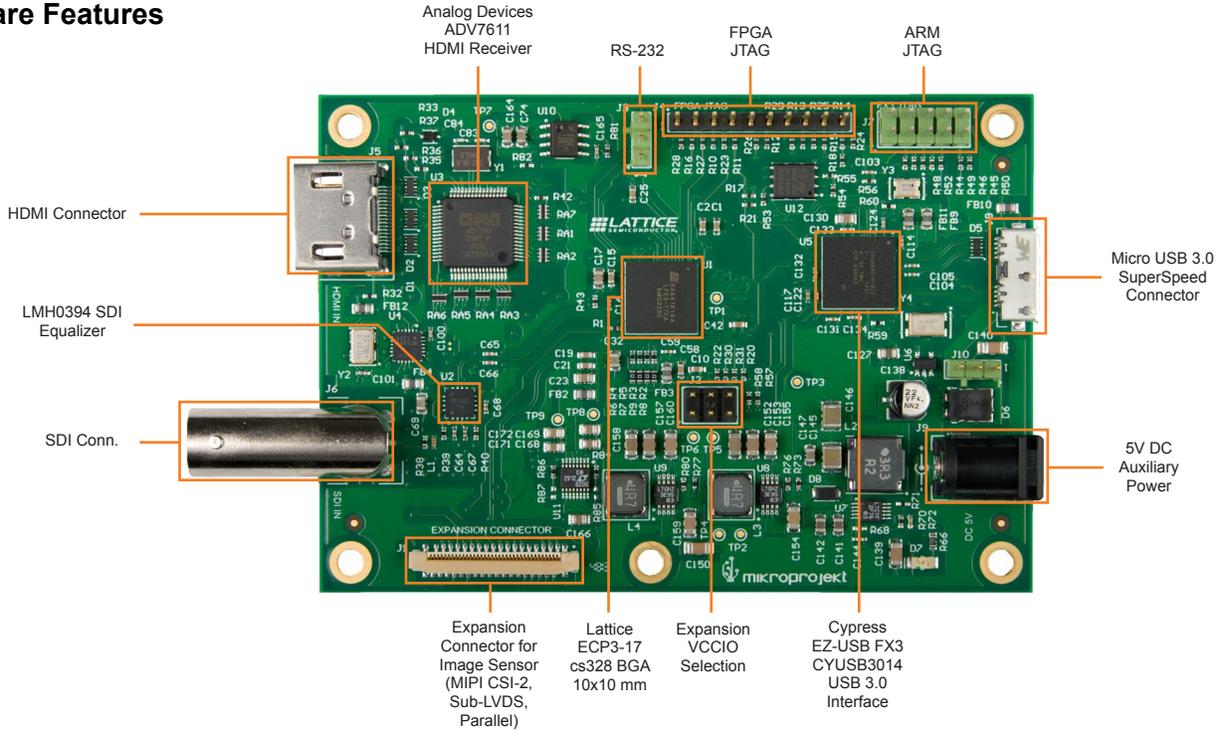- **Complete reference design schematics and documentation available**

Ordering information

Product	Description	Order Code
Lattice USB3 Video Bridge Development Kit	• Lattice USB 3.0 Video Bridge Development Board • Nanovesta Sensor Adapter board • Adapter board to USB3 board connecting cable • 5V Power supply • USB 3.0 cable • Quick start guide	LFE3-17EA-USB3-EVN

Hardware Features

- HDMI Connector
- LMH0394 SDI Equalizer
- SDI Conn.
- Analog Devices ADV7611 HDMI Receiver
- RS-232
- FPGA JTAG
- ARM JTAG
- Micro USB 3.0 SuperSpeed Connector
- 5V DC Auxiliary Power
- Expansion Connector for Image Sensor (MIPI CSI-2, Sub-LVDS, Parallel)
- Lattice ECP3-17 cs328 BGA 10x10 mm
- Expansion VCCIO Selection
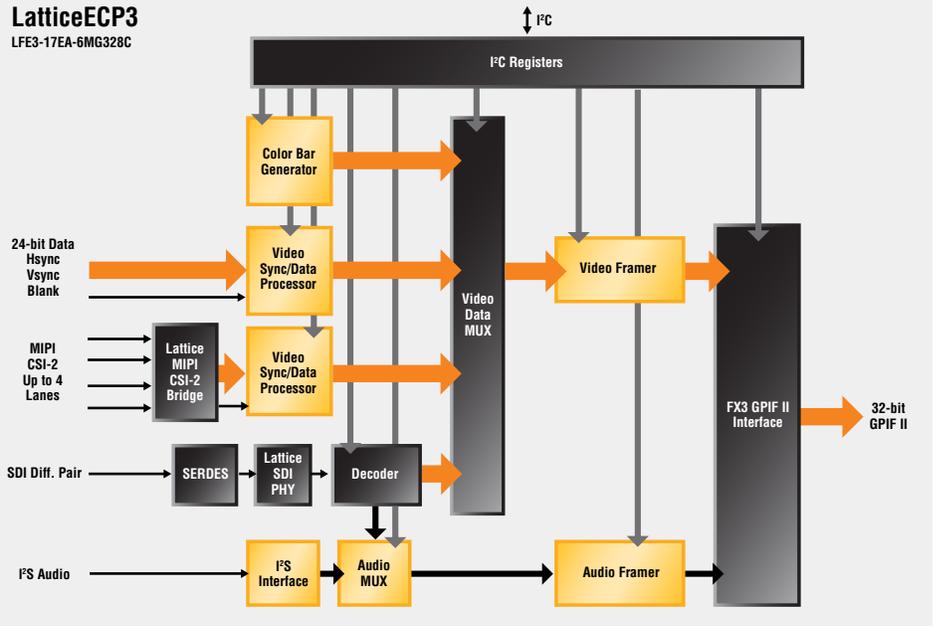- Cypress EZ-USB FX3 CYUSB3014 USB 3.0 Interface

Target applications

- **Frame grabber**
- **DVRs, Transcoding systems**
- **Video editing systems**
- **Surveillance**
- **Industrial video systems**
- **Machine vision**
- **USB 3.0 Cameras**

FPGA Solution Block Diagram

LatticeECP3
LFE3-17EA-6MG328C

- I²C
- I²C Registers
- Color Bar Generator
- 24-bit Data Hsync Vsync Blank
- Video Sync/Data Processor
- MIPI CSI-2 Up to 4 Lanes
- Lattice MIPI CSI-2 Bridge
- Video Sync/Data Processor
- Video Data MUX
- Video Framer
- SDI Diff. Pair
- SERDES
- Lattice SDI PHY
- Decoder
- FX3 GPIF II Interface
- 32-bit GPIF II
- I²S Audio
- I²S Interface
- Audio MUX
- Audio Framer

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Mikroprojekt is an electronic design engineering services company based in Zagreb, Croatia. Mikroprojekt is a Lattice LEADER and CoreConnection Partner.

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