



# Arria V GX Video Development System

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The Arria V GX FPGA Video Development System is an ideal video processing platform for high-performance, cost-effective video applications. The Arria II development kit features 256MB of SDRAM memory, HDMI, and SDI connections to form a perfect solution for imaging applications.

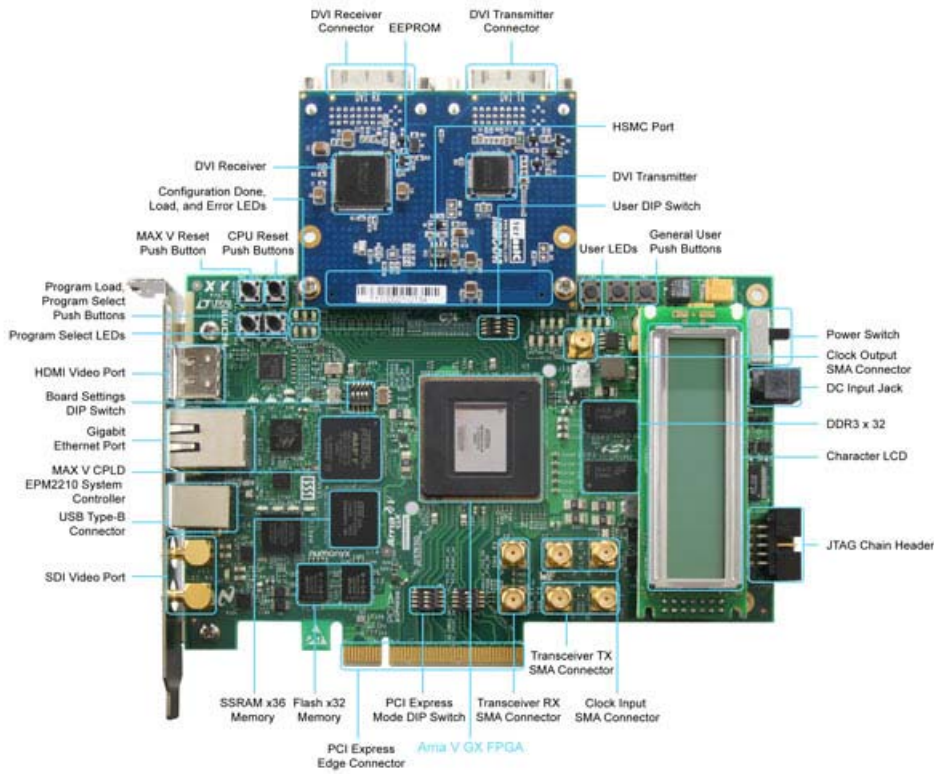
The DVI-HSMC daughter card part of the bundled package will allow developers to access high quality and high resolution video signals that can support resolution up to 1600x1200. A complete DVI video controller design with source code is provided.

Terasic recognized for its strong design expertise in high-end video, imaging and multimedia products have made available a video development package that targets video processing development. The platform can also allow users to experience advanced image processing designs incorporating VIP (Altera's Video and Image Processing Suite MegaCore Functions).

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## Altera Arria V GX Video Development System

### FPGA:

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- Arria V GX 5AGXFB3H4F35C5NES

### System controller: MAX<sup>®</sup>V 5M2210ZF256C4N

- Power monitor GUI
- Single analog-to-digital converter (ADC), eight channels
- Non-isolated power rail
- Fast passive parallel (FPP) x16 mode through parallel flash loader (PFL)
- Control and status registers

### Embedded USB-Blaster<sup>™</sup> II:

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- MAX II EPM570GM100C4N

### HDMI 1.3 TX

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- x4 XCVR, 2.7 Gbps (max by level shifter) and 270 MHz TX clock HDMI TX connector
- STMicroelectronics HDMI level shifter STHDLS101T
- Level shift XCVR PCML 1.5V <-> TMDS level
- DDC and HPD <-> HDMI compliant level
- Data channel up to 2.7 Gbps; HDMI 1.3 compliant
- Clock channel up to 270 MHz; enough to support 2.7 Gbps data rate
- HDMI specification: clock period = 10x of UI

### SDI 3G

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- x1 XCVR TX/RX loopback
- x2 SMB connectors and cable (cable not included in kit)
- Up to 2.97 Gbps
- Uses National Semiconductor driver/receiver LMH0384SQ/LMH0303SQx
- Requires 148.5 MHz and 148.35 MHz at XCVR refclk to support US and EU standard respectively
- Use VCXO to fine tune and lock to the recovered CDR frequency

### HSMC

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- x8 XCVR up to 6.375 Gbps
- Not complied to PCI Express<sup>®</sup>(PCIe<sup>®</sup>) HIP pin assignment
- x4 CMOS
- x8 TX and x9 RX differential interface using dedicated TX/RX channels
- x2 low-voltage differential signalling (LVDS) clock in
- x2 differential clock out

- I2C
- JTAG
- Minimum current support
- 2A @ 3.3V
- 1A @ 12V
- Dedicated clock domain from Si 5338 clock generator for xcvr refclk
- HSMC loopback with BTS GUI

## **SMA**

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- 1x XCVR TX/RX channel
- 1x LVPECL clock input
- 1X LVPECL clock output

## **Clocking**

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- Dedicated clock domain from Si 5338 clock generator for xcvr refclk

## **DDR3 SDRAM x32**

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- Micron MT41J64M16LA-15E DDR3 SDRAM 8MX16X8
- Two devices: 2 x16 width = x32
- BTS DDR3 SDRAM GUI using Uniphy and high performance (HP) controller II

## **SSRAM**

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- 512k x36, 18 Mb ISSI IS61VPS51236A
- Shared address or data with flash

## **User IO**

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- LCD character
- x4 DIP switch
- x3 PB
- x4 LED

## **Configuration**

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- FPP x16 mode
- Dual flash 512Mbit Numonyx PC28F512P30BF (52 MHz  $F_{MAX}$  )
- JTAG header

## **Embedded USB Blaster II**

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- Cypress Microcontroller CY7C68013A as USB PHY 2.0
- MAX II

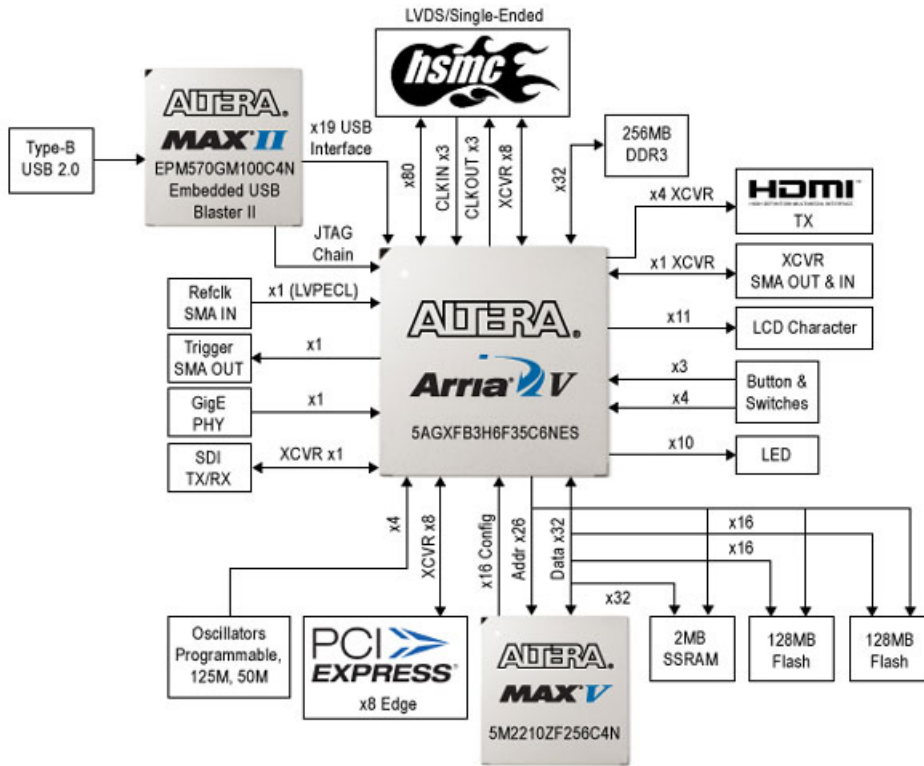
## **Ethernet**

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- 10/100/1000 Base-T
- RJ-45 connector, on-board LED for link status

- Marvell Ethernet PHY 88E1111
- Requires 50 MHz clock from CLKIN

### Altera Arria V GX Starter Board Block Diagram



### Terasic DVI-HSMC Card

#### Digital Transmitter

- One DVI transmitter with single transmitting port
- Digital Visual Interface (DVI) Compliant
- Supports resolutions from VGA to UXGA (25 MHz – 165 MHz Pixel Rates)
- Universal Graphics Controller Interface
  - 12-Bit, Dual-Edge and 24-Bit, Single-Edge Input Modes
  - Adjustable 1.1 V to 1.8 V and Standard 3.3 V CMOS Input Signal Levels
  - Fully Differential and Single-Ended Input Clacking Modes
  - Standard Intel 12-Bit Digital Video Port Compatible as on Intel™ 81x Chipsets
- Enhanced PLL Noise Immunity
  - On-Chip Regulators and Bypass Capacitors for Reducing System Costs
- Enhanced Jitter Performance
  - No HSYNC Jitter Anomaly
  - Negligible Data-Dependent Jitter
    - Programmable Using I<sup>2</sup>C Serial Interface
    - Single 3.3-V Supply Operation

#### Digital Receiver

- One DVI receiver with single receiving port
- Supports UXGA Resolution (Output Pixel Rates Up to 165 MHz)
- Digital Visual Interface (DVI) Specification Compliant
- True-Color, 24 Bit/Pixel, 16.7M Colors at 1 or 2-Pixels Per Clock
- Laser Trimmed Internal termination Resistors for Optimum Fixed Impedance Matching
- 4x Over-Sampling
- Reduced Ground Bounce Using Time Staggered Pixel Outputs
- Lowest Noise and Best Power Dissipation Using TI PowerPAD™ Packaging

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