S43X (S4-3U-VPX)

Commercial & Rugged Altera Stratix® IV GX 3U VPX Board with Optional VITA 57 FMC for I/O

- High density Altera Stratix IV GX
- VITA 57 FMC site for processing and I/O expansion
- BittWare FINe™ Host/Control Bridge provides control plane processing and interface
- Fully connected to VPX: GigE, 15 SerDes, 32 LVDS
- Additional I/O: 10/100 Ethernet, RS-232, JTAG

BittWare's S4-3U-VPX (S43X) is a commercial or rugged 3U VPX card based on the high-density, low-power Altera Stratix IV GX FPGA. The Stratix IV GX is designed specifically for serial I/O-based applications, creating a completely flexible, reconfigurable VPX board. The board provides a configurable 25-port SerDes interface supporting a variety of protocols, including Serial RapidIO, PCI Express, and 10 GigE. The board also features 10/100/1000 Ethernet, and up to 4 GB of DDR3 SDRAM. Providing enhanced flexibility is the VITA 57-compliant FMC site, which supports 10 SerDes, 60 LVDS pairs, and 6 clocks.

VITA 57 FMC Site for Processing and I/O Expansion

The FMC (FPGA Mezzanine Card) site provides 8 high-performance SerDes, 60 LVDS pairs, 6 clocks, I²C, JTAG, and reset to the Stratix IV GX. The connector is compliant with the VITA 57 mezzanine standard for FPGA I/O, enabling designers to customize the S43X to their individual needs with optional FMC I/O boards.

Altera Stratix IV GX FPGA

The Altera Stratix IV GX was specifically designed for serial I/O-based applications requiring high-density, reconfigurable logic. The Stratix IV GX provides 23 high-performance, full-duplex, multi-gigabit transceivers, supporting PCI Express (Rev 1.0/2.0), 10 GigE, GigE, Serial RapidIO (Rev 1.0/2.0), and SerialLite II standards. It contains up to 530k equivalent LEs, over 20 Mbits of embedded memory, and 1,024 embedded 18x18 multipliers.

I/O Interfaces

A debug utility header provides 10/100 Ethernet, RS-232, and a JTAG port for debug support. The rear panel VPX interface includes GigE to the FINe, and 15 SerDes channels and 32 LVDS pairs (16 in, 16 out) to the Stratix IV GX FPGA.

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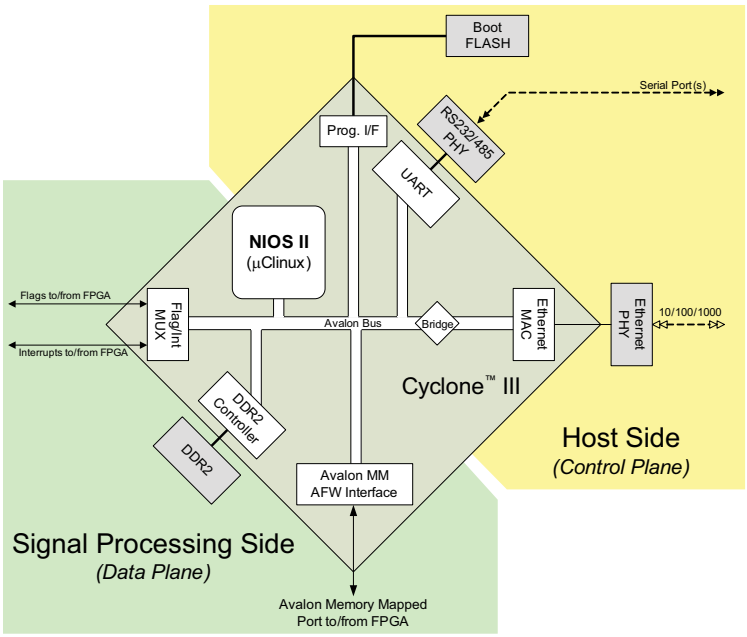
FINe™ III Host/Control Bridge

BittWare's FINe III Host/Control Bridge implements a complete control plane interface for the S43X, facilitating separate control and data planes, and greatly simplifying the development of data plane I/O and processing. BittWare's BittWorks software tools provide extensive software support and are tightly integrated with the FINe. The FINe provides GigE via the rear panel, along with 10/100 Ethernet and an RS-232 monitor port via a utility header, and it is connected to the FPGA via a local control bus.

Development Tools

BittWare offers complete software support for the S43X with its BittWorks II software tools. The BittWorks II Toolkit is a collection of libraries and applications for BittWare's Stratix IV and V FPGA-based boards. Designed to make developing and debugging the applications for BittWare's boards easy and efficient, the Toolkit provides the glue between the host application and the hardware. The Toolkit supports 32-bit, and 64-bit Windows and Linux platforms.

FINe III Architecture Overview



Data Conversion and Processor FMC Options

A variety of VITA-57 FMCs are available to add I/O or Anemone processors to the S43X's VITA-57 FMC site:

- 3F104: 4 channels 14-bit, 250 MSPS ADC
- 3F107: 8 channels 12-bit, 65 MSPS ADC
- 3F125: 1-4 channels 8-bit, up to 5 GSPS ADC
- 3F126: 1-4 channels 10-bit, up to 5 GSPS ADC
- 3F150: 2 channels, 14-bit, 250 MSPS ADC and 2 channels, 16-bit, 800 MSPS DAC
- 3F204: 1 - 2 channels 16-bit, up to 1 GSPS DAC
- AAFM: 4 Anemone104 co-processors

S43X Specifications

Board Architecture

FPGA

- Altera® Stratix® IV GX FPGA (4SGX230/530)
- 23 full-duplex, high-performance, multi-gigabit SerDes transceivers @ 6.25 GHz
- Over 530k equivalent LEs
- Over 20 Mbits of RAM
- Over 1,024 embedded multipliers

External Memory

- Four banks of up to 1 GByte DDR3 SDRAM configured as x32
- 128 MBytes of Flash memory for booting FPGA and FINe

BittWare FINe III Host/Control Bridge

- GigE to rear panel
- Supports host- and Flash-based booting of Stratix IV GX FPGA
- Runs BittWorks server for full remote access via the BittWare Toolkit

Rear Panel I/O

- GigE via BittWare's FINe™ Host/Control Bridge to rear panel (VPX P1)
- 15 channels of high-speed SerDes transceivers from rear panel (VPX P1) to Stratix IV GX
- 32 LVDS pairs (16 Tx and 16 Rx) from rear panel (VPX P2) to Stratix IV GX

Debug Utility Header

- 10/100 Ethernet
- RS-232 port to FINe
- JTAG debug interface to the Stratix IV GX

VITA 57 FMC Site

- VITA 57-compliant
- 8x high-performance SerDes to FPGA
- 60 LVDS pairs to FPGA
- 6 clocks, I^2C, JTAG, and reset to FPGA

Size

- VPX 3U single slot (160mm x 100mm)

Development Tools

System Development

- BittWorks II Toolkit - host, command, and debug tools for BittWare hardware
- BittWorks II Porting Kit - source code and prebuilt ports for porting the BittWorks II Toolkit to other operating systems

FPGA Development

- Altera Quartus® II software

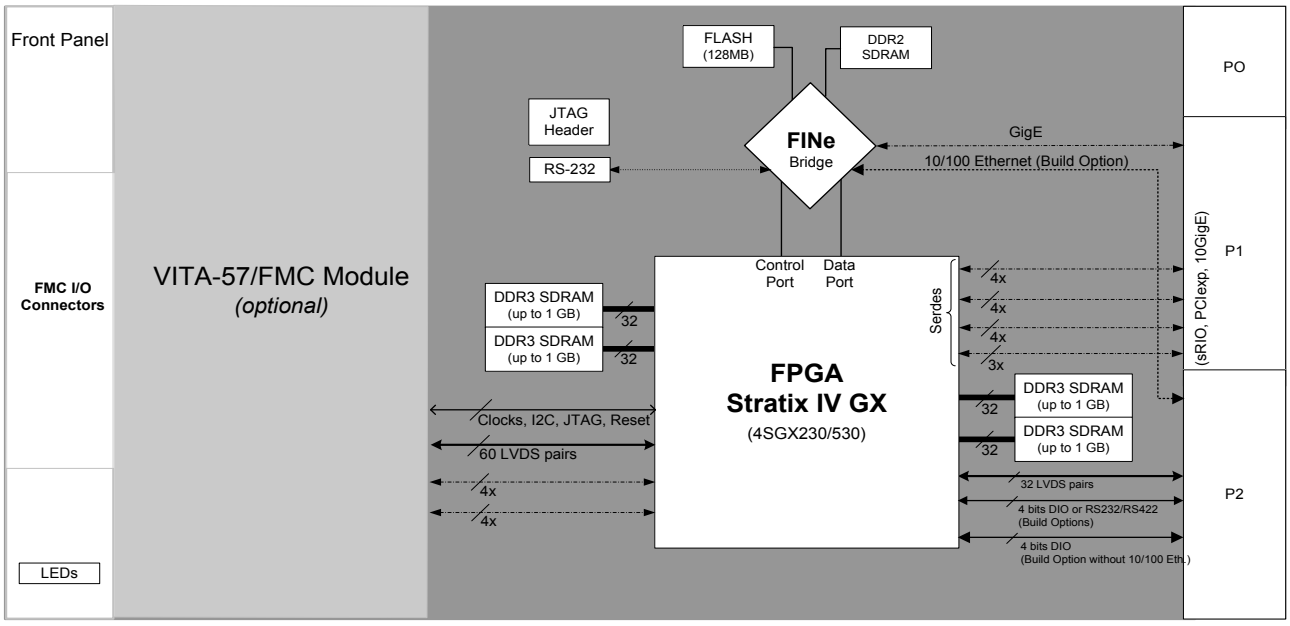
Development Platforms

- VPX Rapid Development Platform

Accessory Boards

- BittWare S43X-BORT rear transition module for rear panel I/O breakout
- BittWare GXBO breakout board for front panel I/O access

S43X System Block Diagram



S43X Ordering Options

S43X-RW-AABB-CC-DEFG-HIJKL

RW	Ruggedization Level 0U = Commercial (0C to 50 C)* 2C = Conduction cooled; conformal coating (-40C to 75C)* 3C = Conduction cooled; conformal coating (-40C to 85C)†
AA	Stratix IV GX FPGA 23 = Altera Stratix IV GX 230 53 = Altera Stratix IV GX 530
BB	Stratix IV Temperature Range & Speed I3 = Industrial temperature speed grade 3 I4 = Industrial temperature speed grade 4*
CC	DDR3 Memory Size & Configuration 00 = No memory 92 = 1 GB (x16) A4 = 2 GB (x32)*
D	10/100 Ethernet U = Utility header* R = Rear panel
E	UART/DIO R = RS-232/RS-422* D = ATLANTiS DIO
F	FMC Voltage 0 = Auto
G	Oscillator Configuration 0 = Standard (100 MHz and 156.25 MHz clock)* 1 = TSE (100 MHz and 125 MHz clock)
H	Mechanicals 0 = 0.8" Pitch front panel (air cooled)* 1 = Standard frame (conduction cooled)* 2 - 1" Pitch front panel (air cooled)
I	Environmental Assembly P = SnPb assembly*
J	Factory Configuration 1 = BittWorks II compatible*
K	VPX Key Position 1 1 = 0 Degrees 2 = 45 Degrees 3 = 90 Degrees 7 = 270 Degrees 8 = 315 Degrees 9 = Unkeyed*
L	VPX Key Position 2 1 = 0 Degrees 2 = 45 Degrees 3 = 90 Degrees 7 = 270 Degrees 8 = 315 Degrees 9 = Unkeyed*

* Default
† Contact Sky Blue or Zerif for availability.

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