



4DSP

Technology and Product Overview

Company Overview

4DSP is a multi-national technology provider with engineering and manufacturing in Austin Texas USA and the Netherlands. We are dedicated to the design and manufacturing of commercial off-the-shelf (COTS) board-level electronics, FPGA Intellectual Property (IP), and system level solutions.

“We believe in transforming the world into a safer place by designing COTS innovative electronic solutions and streamlining their adoption to better serve the evolving needs of the Scientific, Defense & Aerospace markets.”

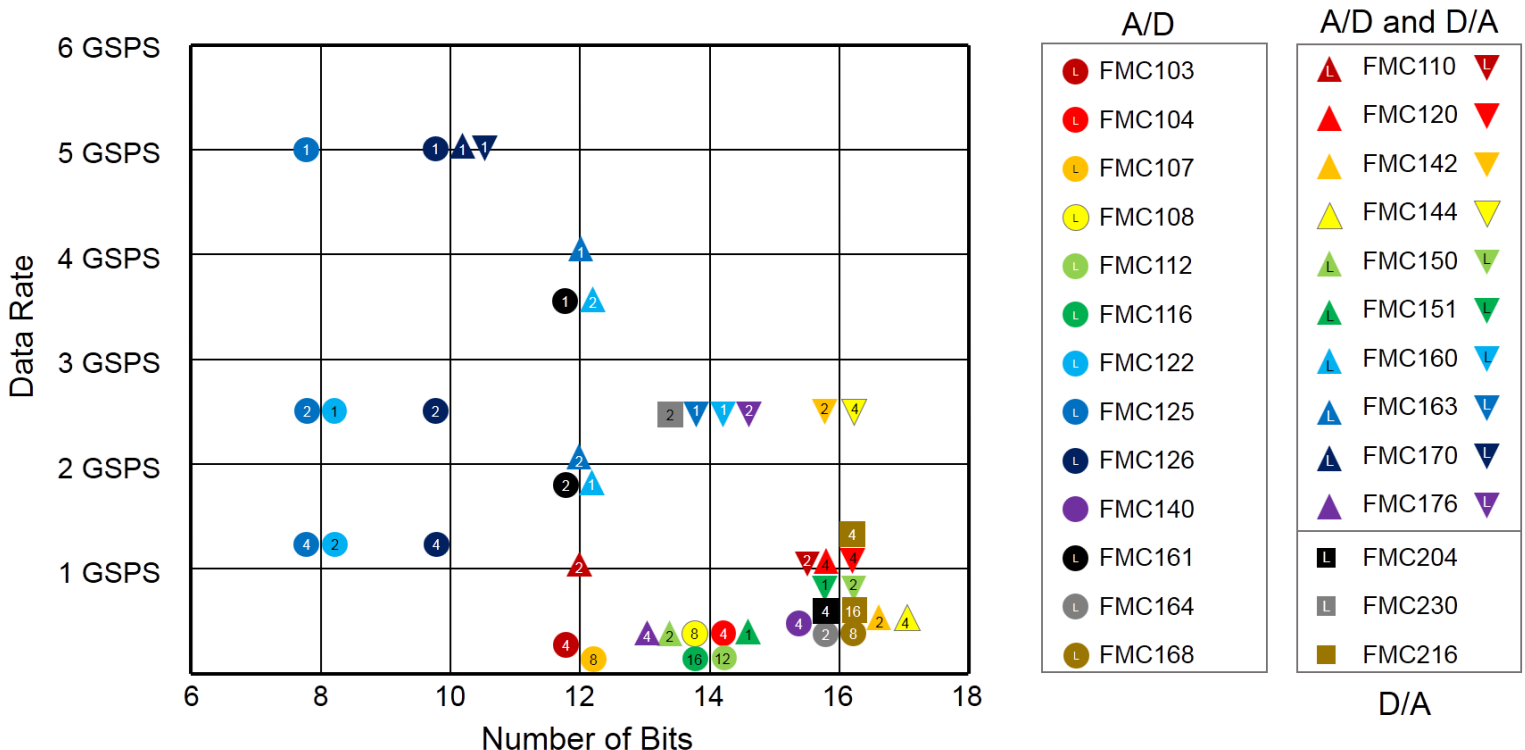
- Pierrick Vulliez, CEO and Founder, 4DSP LLC



certified to AS9100



Analog I/O FPGA Mezzanine Card (FMC) Overview



number in shape indicates number of channels
 “L” in shape indicates LVDS signaling, otherwise JESD204B is used

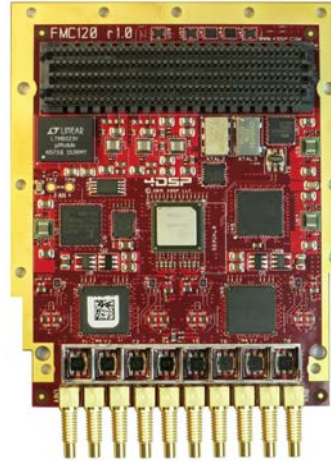


A/D and D/A Combo FMCs



FMC170

Ideal for DRFM Applications
 Low Latency LVDS IO
 1x A/D 10-bit 5 GSPS
 1x D/A 10-Bit 5 GSPS
 VITA 57.1 Compliant
 SSMC or MMCX
 Internal/External Clock
 Synchronization Trigger
 AC Coupled
 Conduction Cooled Ready



FMC120

4x A/D 16-bit 1 GSPS
 4x D/A 16-bit 1.25 GSPS
 1.5 GHz Analog Bandwidth
 VITA 57.1 Compliant
 SSMC or MMCX
 Internal/External Clock
 Synchronization Trigger
 DC Coupled
 Conduction Cooled Ready
 JESD204B I/O Signaling

A/D FMCs



FMC161

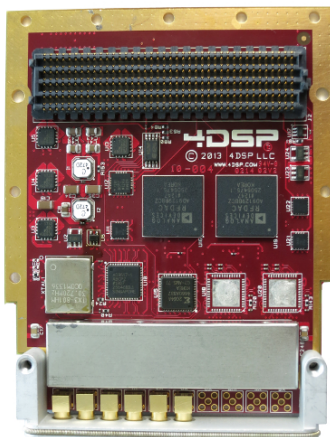
2x A/D 12-bit
 Dual or Single Channel
 Dual A/D 1.8 GSPS
 Single A/D 3.6 GSPS
 VITA 57.1 Compliant
 SSMC or MMCX
 Internal/External Clock
 Synchronization Trigger
 AC Coupled
 Conduction Cooled Ready
 LVDS IO Signaling



FMC116

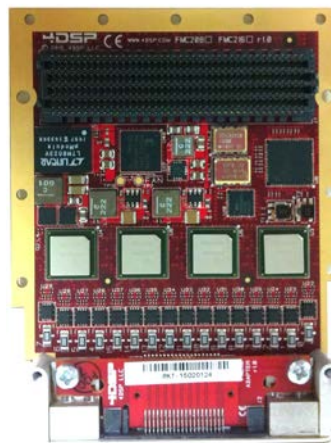
16x A/D 14-bit 125 MSPS
 VITA 57.1 Compliant
 Samtec QSE front panel
 Internal/External Clock
 Synchronization Trigger
 AC Coupled
 Conduction Cooled Ready
 LVDS IO Signaling
 Stackable with FMC216

D/A FMCs



FMC230

2x D/A 14-bit 5.7 GSPS
 2.85 Gbps w/o interpolation
 VITA 57.1 Compliant
 SSMC or MMCX
 Internal/External Clock
 Synchronization Trigger
 AC Coupled
 Conduction Cooled Ready
 LVDS IO Signaling



FMC216

16x D/A 16-bit 312.5 MSPS
 VITA 57.1 Compliant
 Samtec QSE front panel
 Internal/External Clock
 Synchronization Trigger
 AC Coupled
 Conduction Cooled Ready
 JESD204B IO Signaling
 Stackable with FMC116

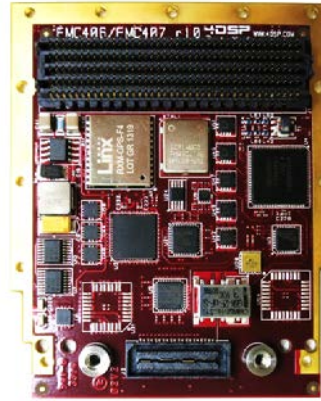


Clock and Trigger Distribution FMCs



FMC406

- 34.375 MHz to 250 MHz
- 8x Trigger/1PPS Outputs
- 8x Clock Outputs
- External Clock Input
- Onboard VCO
- External Reference
- Onboard Reference
- VITA 57.1 Compliant
- Conduction Cooled Ready
- Onboard GPS Timestamp



FMC407

- 34.375 MHz to 4.4 GHz
- 8x Trigger/1PPS Outputs
- 8x Clock Outputs
- External Clock Input
- Onboard VCO
- External Reference
- Onboard Reference
- VITA 57.1 Compliant
- Conduction Cooled Ready
- Onboard GPS Timestamp

Optical Digital Communications FMCs



FMC410

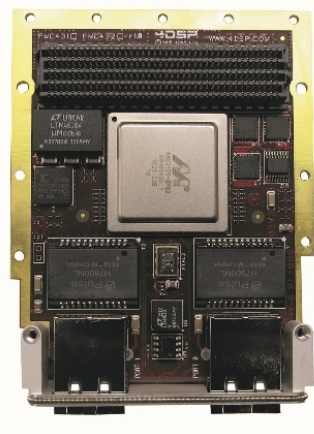
- Dual 10Gb or 40Gb Ethernet
- 10x independent TX Lanes
- 10x Independent RX Lanes
- 6.25Gbps or 10Gbps per direction (RX/TX)
- Low Power Consumption
- VITA 57.1 Compliant
- Conduction Cooled Ready
- LVDS IO Signaling



FMC424

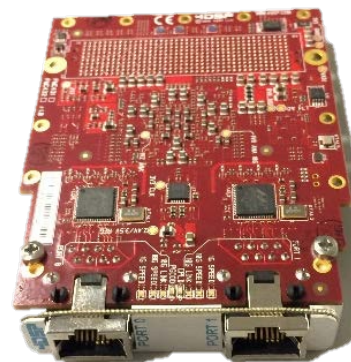
- 2x QSFP+
- 40 Gbps
- VITA 57.1 Compliant
- Conduction Cooled Ready

Ethernet Digital Communications FMCs



FMC432

- Dual 10 GbE (10Base-T)
- Dual RJ45 Connections
- VITA 57.1 Compliant
- Conduction Cooled Ready



FMC431

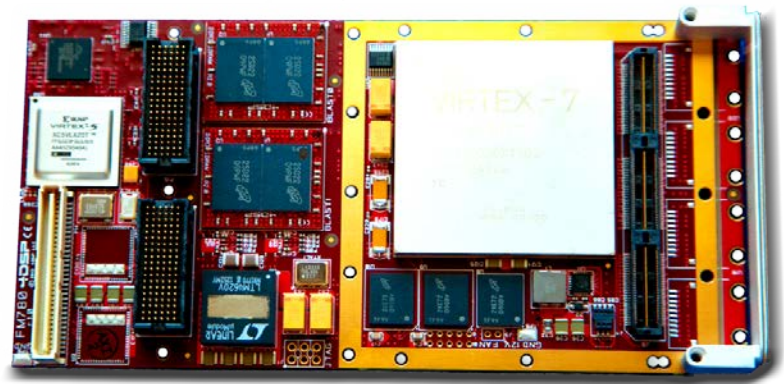
- Dual 1 GbE (1000Base-T)
- Dual RJ45 Connections
- VITA 57.1 Compliant
- Conduction Cooled Ready



XMC Products Overview

FM780

- High Performance XMC Module
- Built on Xilinx Virtex 7 Technology
- Gen 1, 2, and 3 PCIe Controller
4 and 8-Lane
- High Density Memory Options with
4DSP BLAST Technology
DDR3 SDRAM, QDR2+, SRAM,
NAND FLASH
- 1Gbit FPGA configuration on board Flash
- VITA 42.3 Compliant
- Front Panel I/O card for A/D, D/A, Video,
digital and optical communication
- 4DSP FMC Site Support on Back



FM788

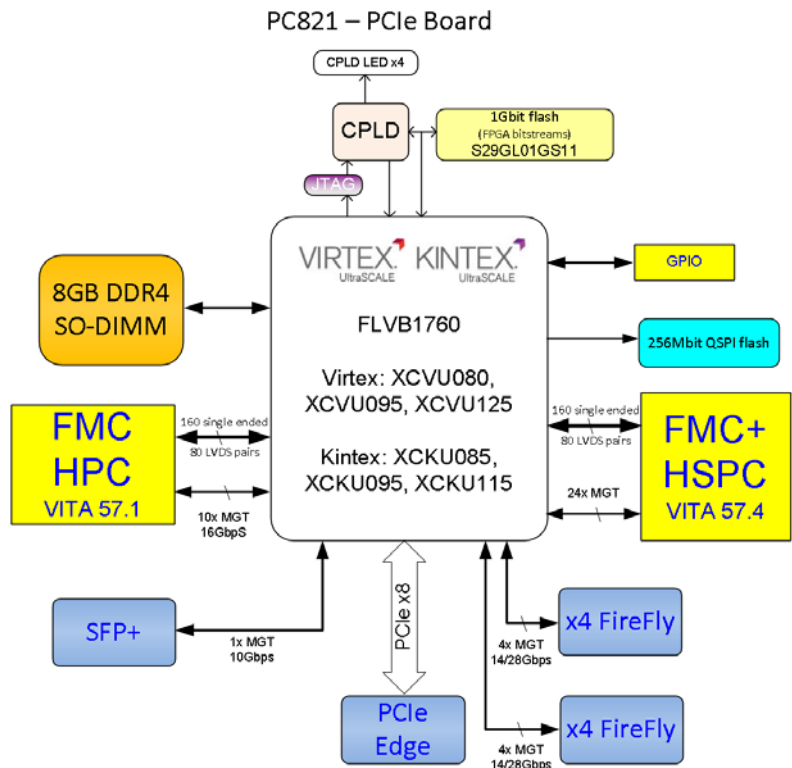
- High Performance XMC Module
- Built on Xilinx Virtex 7 Technology
- 8x 16-bit A/D at 250 Msps
- Conduction cooled ready
- SSMC analog front panel connections
- DC or AC coupled analog inputs
- 4x 10 Gbps transceivers
- Flexible clock tree (onboard or external)
- Analog trigger / sync input
- PCIe controller 4 and 8 lanes
- XMC to PCIe adapter available
- 1 Gbit configuration onboard Flash
- 128 Mbit user-defined Flash ROM



PCIe Products Overview

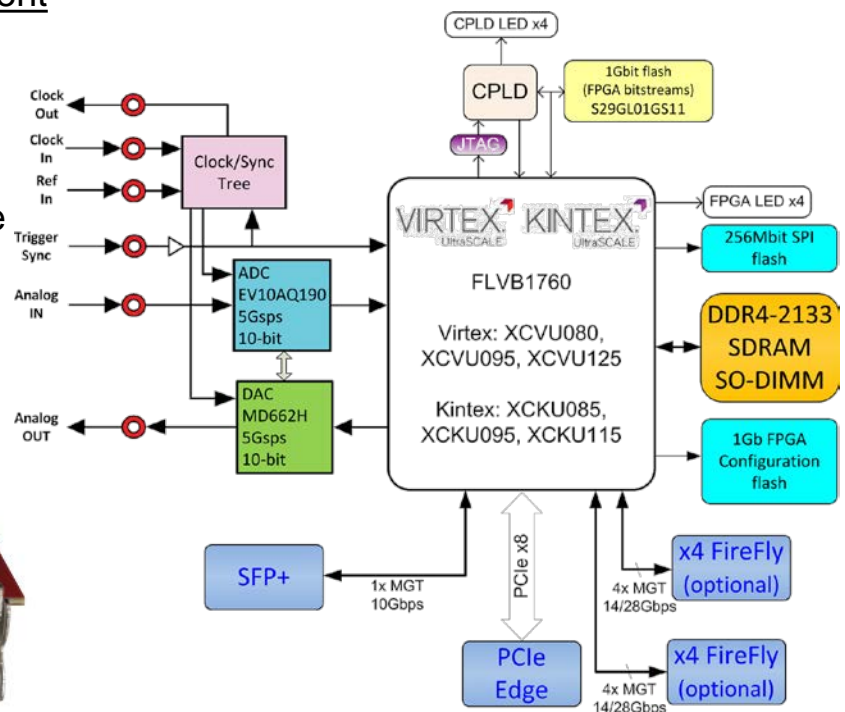
PC821 Dual FMC PCIe FPGA Board

- 1x FMC+ (Front), 1x FMC site (Back)
- External Rear Facing FMC I/O
- Xilinx Ultrascale Technology
- PCIe Gen3 x8
- PCIe FPGA Core Included with BSP
- 8GB DDR4-2133 SDRAM SO-DIMM
- 1 Gb FPGA Configuration Flash
- 256 Mb Serial Flash
- Single-lane SFP+ Interface



PC870 5GSPS I/O DRFM Development Platform

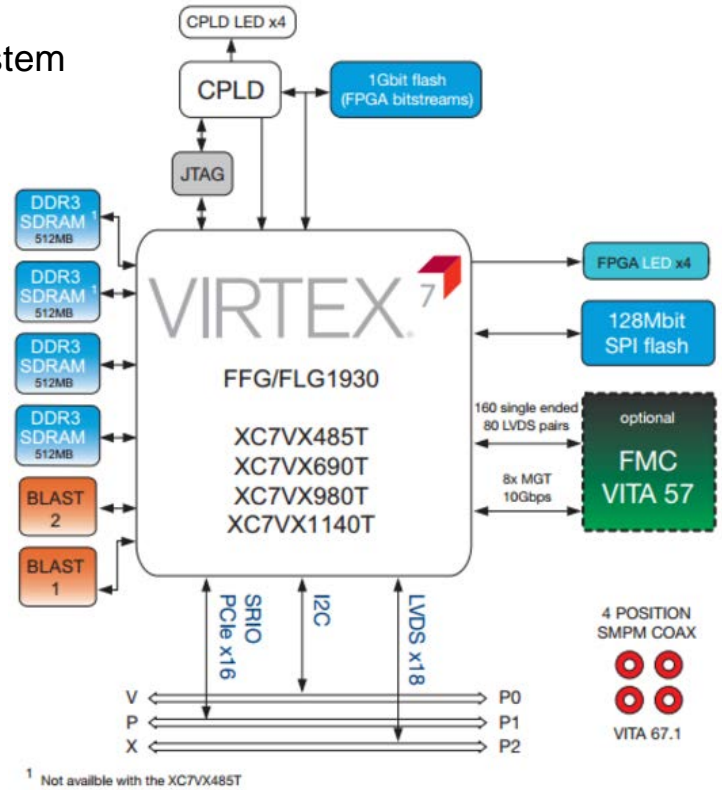
- Ideal for RADAR or DRFM Development
- Built On Xilinx Ultrascale Technology
- Low Latency LVDS I/O Signaling
- Single-channel 10-bit A/D 5GspS
- Single-channel 10-bit D/A 5GspS
- Full Featured Board Support Package
- PCIe FPGA Core Included with BSP
- Single-lane SFP+ interface



VPX Products Overview

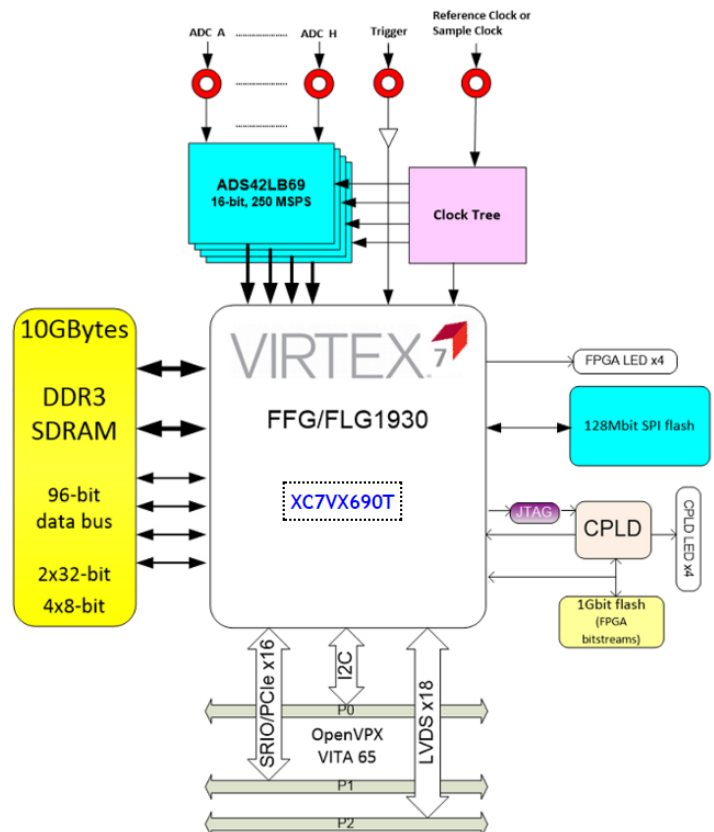
VP780

- 3U VPX Development Board or Deployed System
- 1x FMC HPC Site (VITA 57.1)
- Built on Xilinx Virtex 7 Technology
- Fully Featured BSP Available
- 2 GB DDR3 SDRAM
- Up To 8GB of DDR3 SDRAM,
- OpenVPX Compliant
- Air or Conduction Cooled
- DSP Core of VPX167 Airborne System



VP788

- Rugged 3U VPX DAQ / DSP Board
- Built on Xilinx Virtex 7 Technology
- 8x 16-bit A/D 250 MSPS
- On board VCXO and Clock Distribution
- External clock and trigger
- 10 GB DDR3 SDRAM
- OpenVPX Compliant



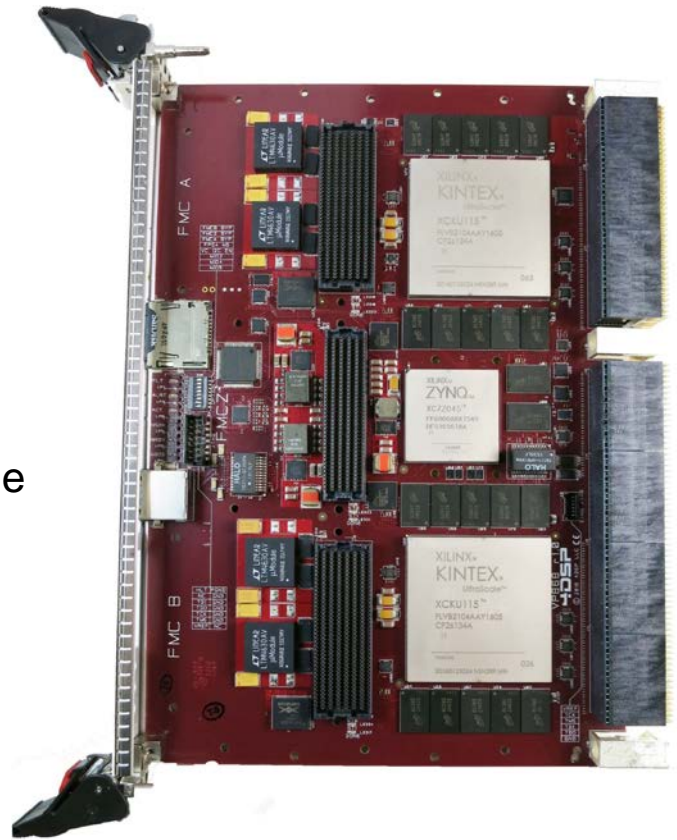
6U VPX,

Features

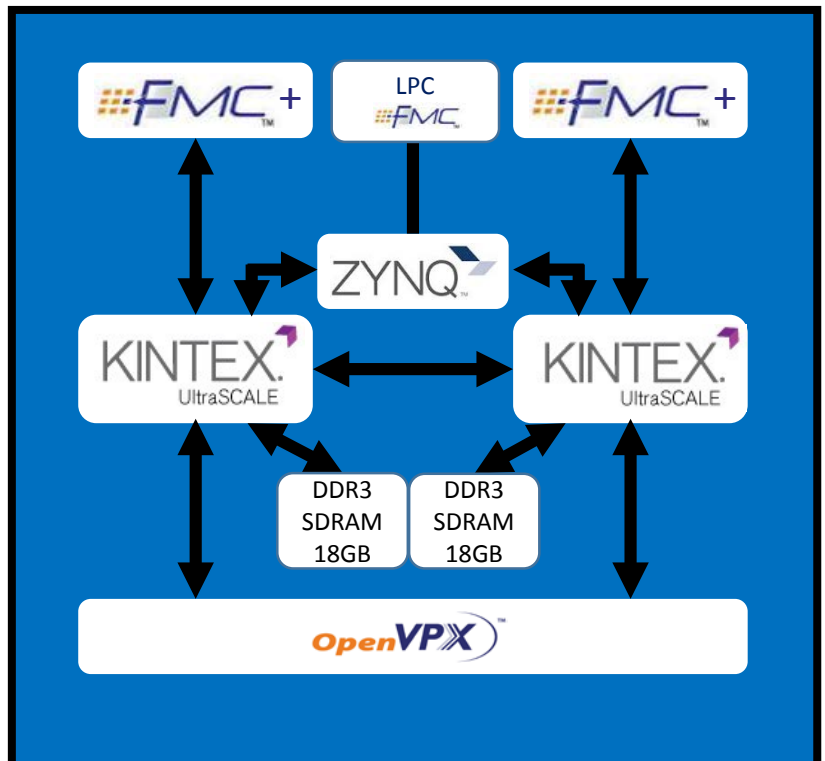
- Dual Xilinx UltraScale FPGAs
 - Kintex or Virtex
- Over 100 Gb/s Inter chip communication
- Dual FMC+ Sites (VITA 57.4)
- Zynq Processor w/ 1GB DDR3
- 36 GB DDR3 Onboard Memory w/ECC
- VITA 65 OpenVPX Compliant
- Storage and I/O Expansion Module
- Support for All 4DSP FMC Modules
- Air and Conduction Cool Options Available
- Migration Path to Ultrascale+

Applications

- Digital RF Memory (DRFM)
- Radar Signal Processing
- Telecommunications Processing



OpenVPX™

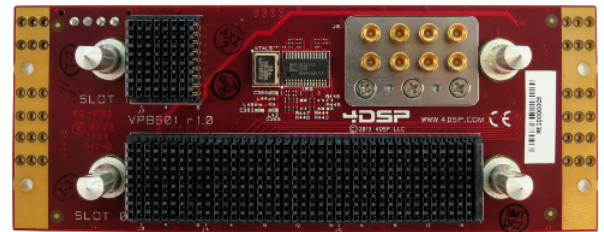


4DSP



VPB601

- 2-Slot backplane
- 1" pitch
- PCIe switch with 5 fat pipes
- VITA 48.2 compliant
- back plane expansion for multiple non-coplanar systems
- VITA 67.2 I/O for analog connections



VPB602

- 2-Slot backplane
- 1" pitch
- 16-lane PCIe Gen 2 connection between slots
- PCIe switch with 5 fat pipes
- VITA 48.2 compliant
- back plane expansion for multiple non-coplanar systems



VPB603

- 3-Slot backplane
- 1" pitch
- PCIe switch with 5 fat pipes
- 12-lane Gigabit connection between slots 1 and 2
- VITA 48.2 compliant
- back plane expansion for multiple non-coplanar systems
- VITA 67.2 I/O for analog connections



VPX167 Aircraft Pod Mounted System

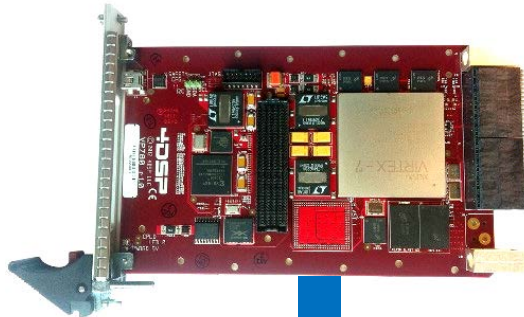
3U VPX Modular Platform for Aircraft Pods

- 3U 7-slot VPX embedded System using FlexVPX backplanes
- High Speed External Digital Communication using 10Gb or 1Gb Ethernet
- High Speed inter-slot communication using PCIe
- Ruggedized, conduction cooled enclosure designed to perform in harsh military environments.

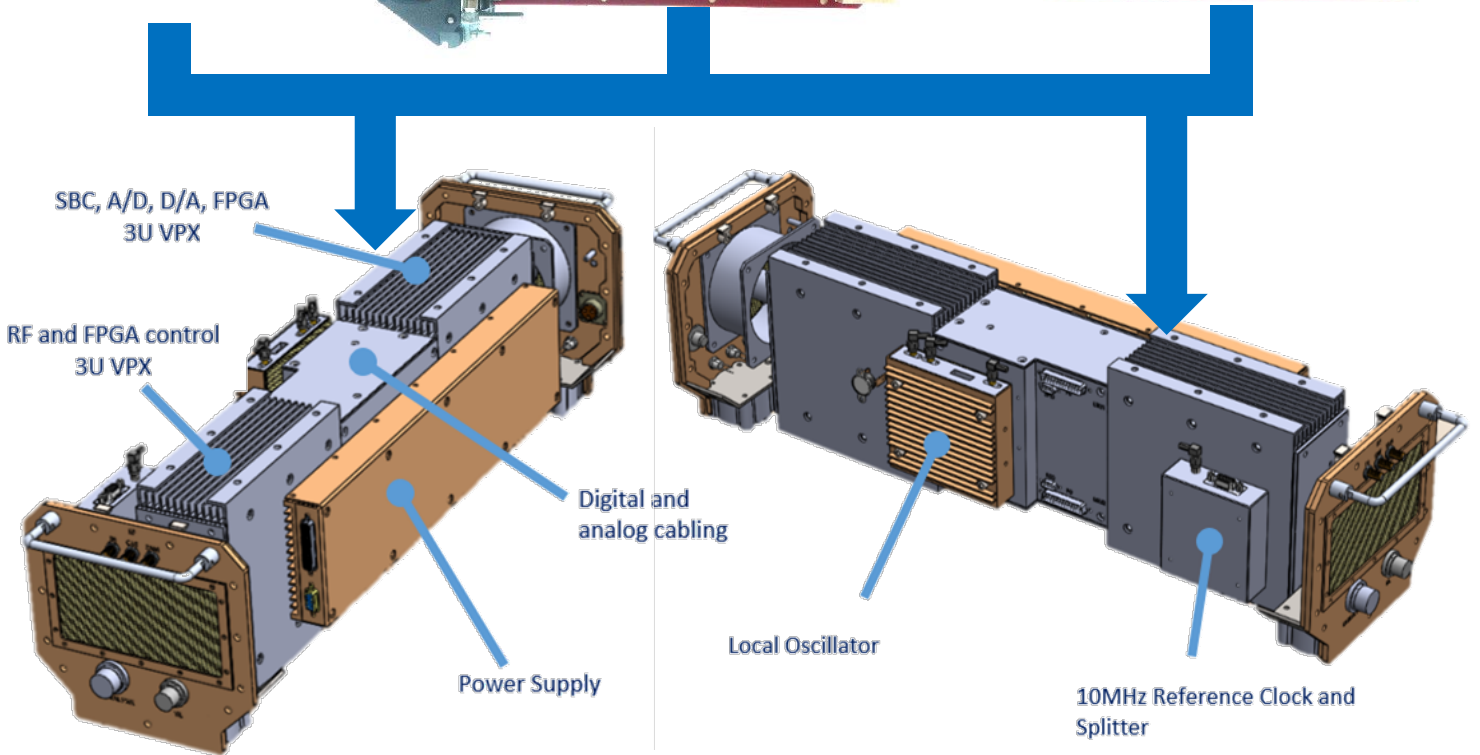
4DSP FMC I/O



4x VP780



2x VPB603



VPX370

- 3U OpenVPX Embedded System
- Single Board Computer (1 Slot)
- 4GB/s Adjacent Slot Communication
- 4U enclosure
- 300W Power Supply
- Supports four VP780 modules
- 4 user-defined OpenVPX (VITA 65) expansion slots
- PCIe communication between slots



VPX361

- 3U OpenVPX embedded system
- Scalable Backplane, up to 13 slots
- Single Board Computer (1 Slot)
- High-speed inter-slot communication via independent links
- 4U 19" rackmount enclosure
- 300W Power Supply
- Supports multiple VP780 modules
- PCIe communication between slots
- Highly customizable w/ 4DSP FlexVPX



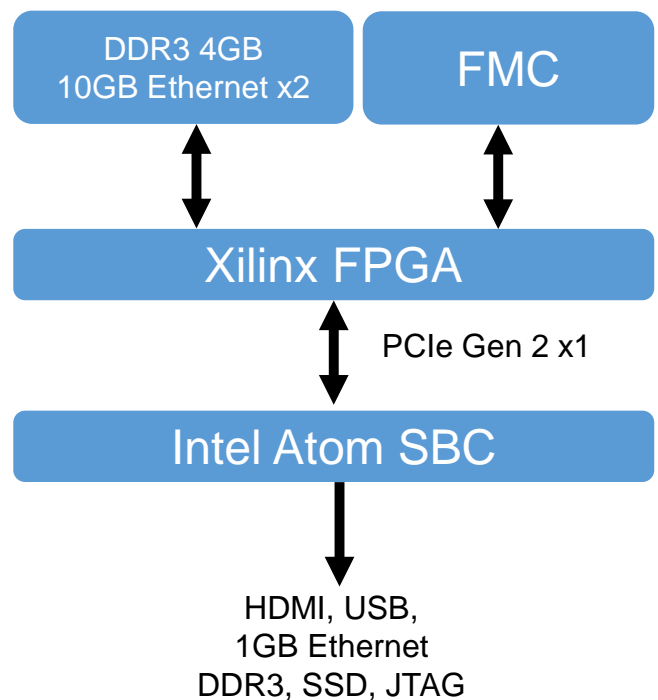
VPX372

- 6-slot VPX ATR System
- 3U OpenVPX Ruggedized embedded system
- High-speed inter-slot communication via independent links
- 250W Power Supply
- Rear Transition Modules for slot expansion



Low Size Weight Power and Cost (SWaP-C) Applications

- No backplane Required
- Stacked Architecture with FMC
- FPGA + CPU + FMC (VITA 57.1)
- Conduction or Convection Cooled
- Enabled for battery solar power systems (16V-30V)
- Windows and Linux OS Support
- System I/O
 - HDMI, USB, 10 GBE, JTAG, FMC HPC
- Ideal for ISR / UAV Applications



CESCC820

System Controller

Intel Atom, Quad Core, E3845 1.91GHz

2 GB DDR3 SDRAM

Up to 128GB SSD, Windows or Linux

FPGA

Kintex Ultrascale 040

4GB DDR3 SDRAM

PCIe Controller Communication

Size, Weight, and Power

163 x 147 x 100 mm (WxHxD), 3.0 Kg

DC 16V – 30V



CES820

System Controller

Intel Atom, Quad Core, E3845 1.91GHz

2 GB DDR3 SDRAM

Up to 128GB SSD, Windows or Linux

FPGA

Kintex Ultrascale 040

4GB DDR3 SDRAM

PCIe Controller Communication

Size, Weight, and Power

132 x 75 x 125 mm (WxHxD), 0.86 Kg,

DC 16V – 30V



CES821

System Controller

Intel Atom, Quad Core, E3845 1.91GHz

2 GB DDR3 SDRAM

Up to 128GB SSD, Windows or Linux

FPGA

Kintex Ultrascale 040

4GB DDR3 SDRAM

PCIe Controller Communication

Size, Weight, and Power

132 x 75 x 125 mm (WxHxD), 0.86 Kg,

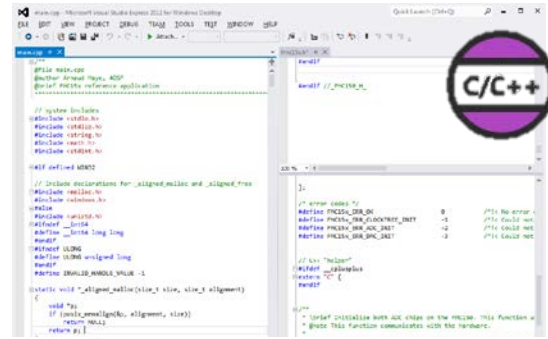
DC 16V – 30V



4DSP Board Support Package

Host Tools

- Open Source C/C++ APIs
- Comprehensive C/C++ Example
- FPGA Register and DMA Transfer Engine
- Low Level Device Configuration
- Support for Multiple Operating Systems
- StellarIP Framework Integration



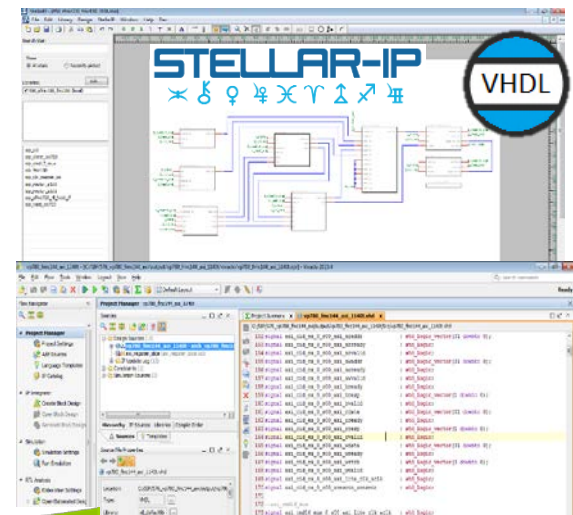
Linux



VxWorks

FPGA Tools

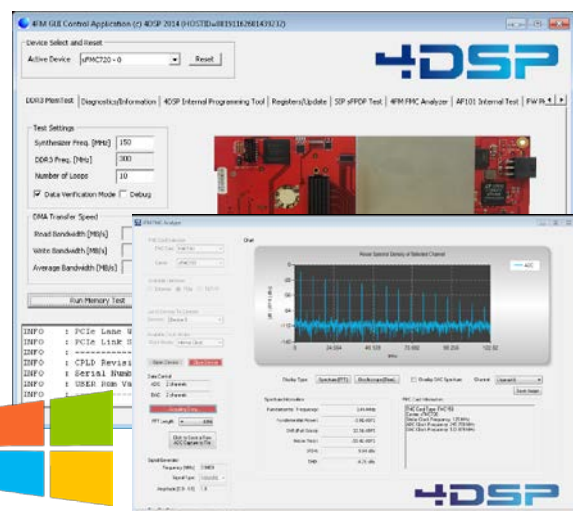
- StellarIP Graphical Design Flow Assistant
 - Simplified Top Level Code Generation
- Open Source VHDL Reference Design
 - Vivado / ISE
- Constraints Generation & Synthesis Scripts
- Communications Cores Included
 - JESD204B Core for FMC
 - PCIe Communication Core for Host
 - TCP/IP Offload Engine for Ethernet



VIVADO

Diagnostic Tools

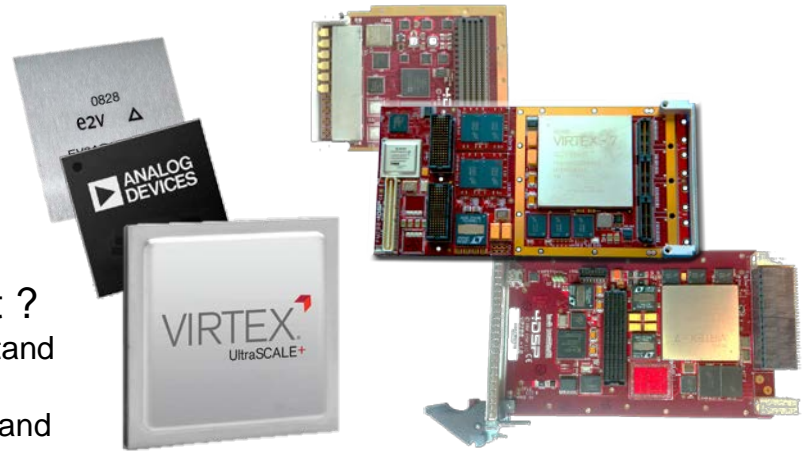
- 4FM Windows GUI Included with BSP
- Interfaces Tests
 - Memory, PCIe, FMC
- Temperature
- ADC/DAC Data Analyzer



Custom Hardware Design

- High Speed A/D and D/A
- FPGA Boards
- Monolithic Designs

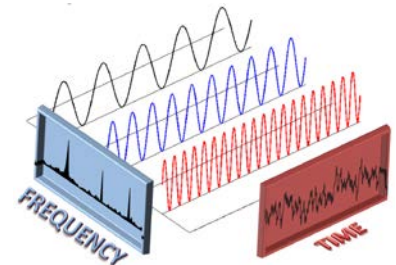
Have a specific hardware requirement ?
Trust our experienced engineering team to understand your requirements and develop custom hardware through our AS9100C certified quality engineering and manufacturing process.



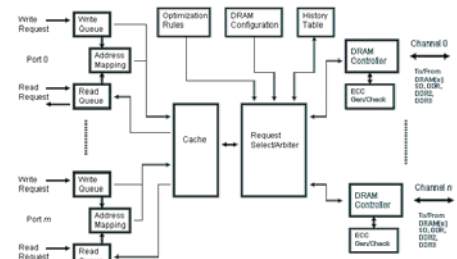
Custom Firmware Design

- Stellar IP or AXI-4 Compliant Cores
- Fast Fourier Transform, Filters, DSP Algorithms
- Memory Controllers
- High Speed Communications

Have a specific digital architecture or algorithm ?
Trust our experienced engineering team to understand your requirements to develop advanced open source firmware to meet your specific application need.



ChipEnet System Memory Controller



System Integration

- Aircraft Pod Applications
- Beamforming
- Distributed Antenna Systems
- Data Recording

Have a Turnkey System Requirement ?
Trust our experienced engineering team to understand your requirements to develop and integrate a complete solution from commercial grade servers to aircraft pod based systems.



www.4dsp.com

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4DSP

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