FM482

FOR DIGITAL SIGNAL PROCESSING
DESIGN & SYSTEM INTEGRATION

Virtex-4 PMC/PMC-X/XMC DSP accelerator

Features

- ➢ Virtex-4 FX, SX and LX based platform
- ➢ Large SRAM and DRAM resources
- ➢ Front Panel external I/O communication expansion options
- ➢ Embedded processor offers high level of programmability
- ➢ Optimized IP cores
- ➢ PCI-X 64-bit 133/66MHz, PCI 64/32-bit 66/33MHz
- ➢ PCI express 4 lanes
- ➢ Conduction Cooling –optional, Stand Alone –optional
- ➢ 4x serial FPDP

Applications

- ➢ High bandwidth data storage
- ➢ Radar/sonar signal processing
- ➢ Image processing
- ➢ Software Defined Radio
- ➢ FFT, convolution/correlations
- ➢ Polyphase filterbanks
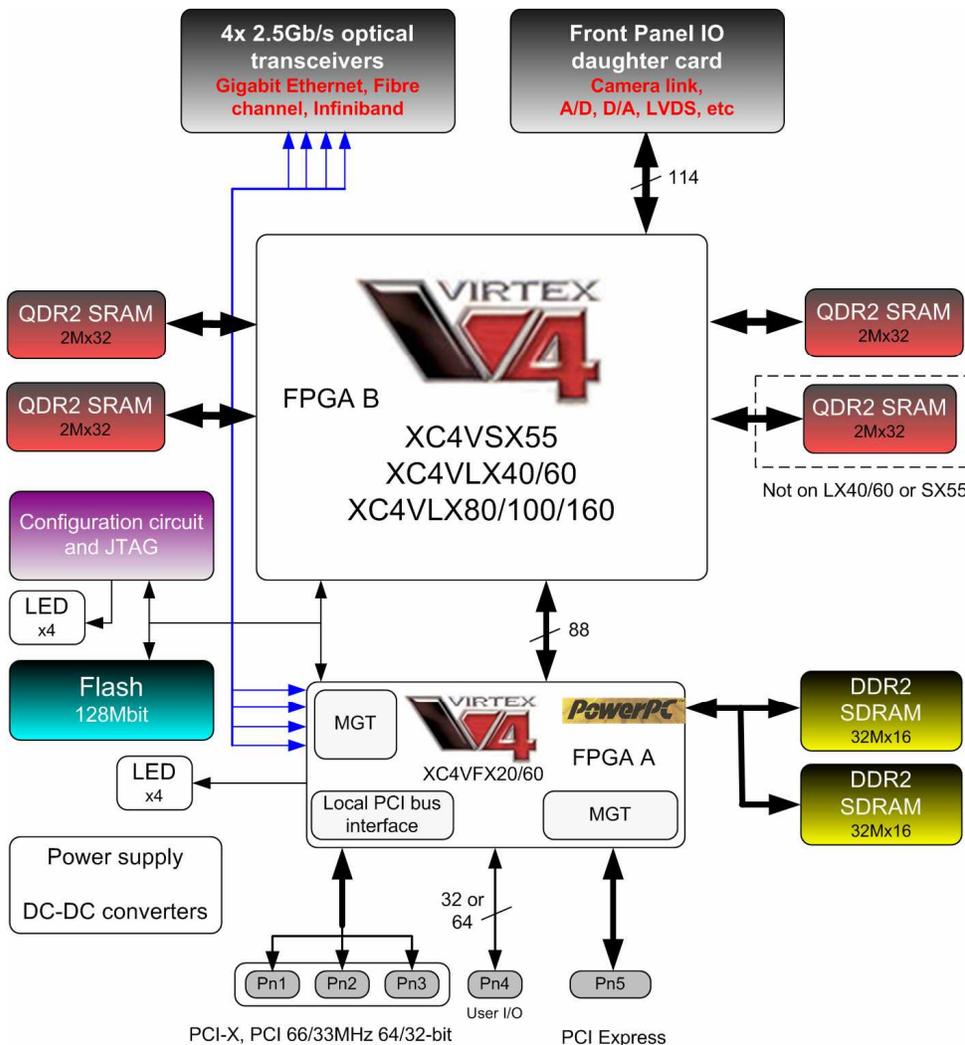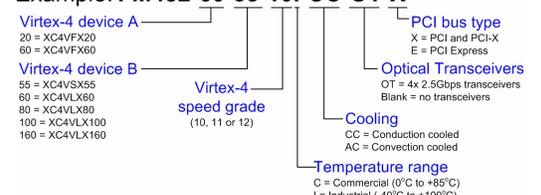- ➢ SAR processing
- ➢ Data acquisition

Description

The FM482 is a high performance PMC/PMC-X/XMC expansion card designed for DSP applications requiring high bandwidth and complex algorithms. Bundled with various interfaces, fast on-board memory resources, two Virtex-4 FPGA devices and optical transceivers, the FM482 delivers the highest level of performance for real-time processing in the most demanding environments.

Software support

The FM482 is available with a full software support package, including board voltage and temperature status, flash FPGA configuration utility, program examples, drivers and API. Test FPGA firmware and associated VHDL are also provided for many different applications.

Ordering information

Example: **FM482-60-55-10I-CC-OT-X**

Virtex-4 device A
20 = XC4VFX20
60 = XC4VFX60

Virtex-4 device B
55 = XC4VSX55
60 = XC4VLX60
80 = XC4VLX80
100 = XC4VLX100
160 = XC4VLX160

Virtex-4 speed grade
(10, 11 or 12)

PCI bus type
X = PCI and PCI-X
E = PCI Express

Optical Transceivers
OT = 4x 2.5Gbps transceivers
Blank = no transceivers

Cooling
CC = Conduction cooled
AC = Convection cooled

Temperature range
C = Commercial (0°C to +85°C)
I = Industrial (-40°C to +100°C)

Block diagram labels:
- 4x 2.5Gb/s optical transceivers — Gigabit Ethernet, Fibre channel, Infiniband
- Front Panel IO daughter card — Camera link, A/D, D/A, LVDS, etc
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- QDR2 SRAM 2Mx32
- VIRTEX V4 — FPGA B — XC4VSX55, XC4VLX40/60, XC4VLX80/100/160
- QDR2 SRAM 2Mx32 — Not on LX40/60 or SX55
- Configuration circuit and JTAG
- LED x4
- Flash 128Mbit
- LED x4
- Power supply — DC-DC converters
- MGT
- VIRTEX V4 — XC4VFX20/60 — FPGA A — PowerPC
- Local PCI bus interface
- MGT
- DDR2 SDRAM 32Mx16
- DDR2 SDRAM 32Mx16
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- 32 or 64
- Pn1 Pn2 Pn3 Pn4 (User I/O) Pn5
- PCI-X, PCI 66/33MHz 64/32-bit
- PCI Express

Application example

Data acquisition and processing system

- **Analog inputs** sampling up to 1 GSPS per channel with real-time signal processing.
- **Camera link**, up to 300 frames/s with real-time JPEG2000 compression.
- **Full control** from host computer running Windows or Linux. Enclosed in a VME, CPCI, standard PC or stand alone chassis.
- **Optical transceivers** for connection to a remote disk array, up to 1GBytes/s full-duplex.
- **Disks controller**, up to 1GBytes/s real time storage and playback.
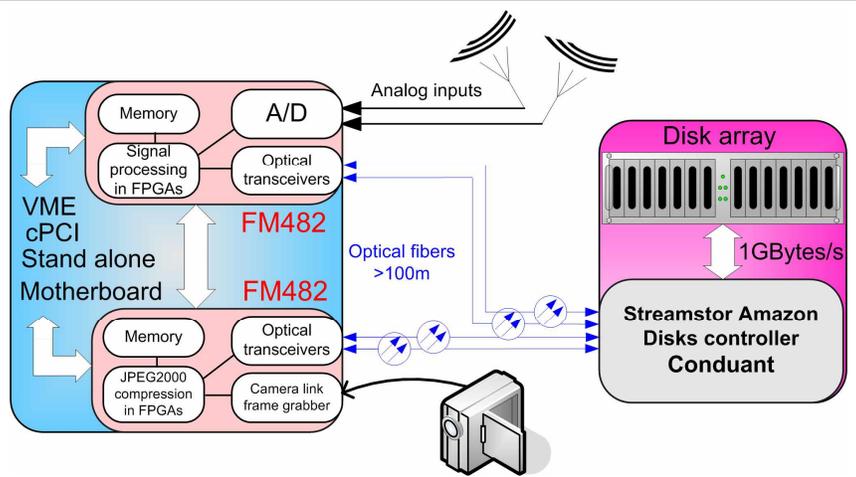
Virtex-4 FPGAs

By combining on the same board the FX and SX/LX Virtex-4 device families, 4DSP offers the most flexible and most powerful mezzanine card in the FPGA and DSP world for applications requiring processing performance and speed in a small form factor.

Memory resources

- 128MBytes of DDR2 SDRAM, 32-bit data. (256Mbytes optional)
- Up to 32Mbytes of QDR2 SRAM split over four 32-bit data banks.
- 128Mbit flash device for FPGA bitstreams storage.

PCI performances

PCI-X 64-bit 133/66MHz, 3.3V.
PCI 64/32-bit 66/33MHz, 3.3V.
PCI-express 4 lanes
Measured sustained bandwidth:
- 64-bit 133MHz = 750Mbytes/s.
- 64-bit 66MHz   = 450Mbytes/s.
- 32-bit 33MHz   = 120Mbytes/s.
- PCI express = 800Mbytes/s.

Optical transceivers

4x 2.5Gbps for Gigabit Ethernet, serial FPDP, Fibre channel, Infiniband applications.
The FM482 optical transceivers offer 1Gbytes/s sustained bandwidth full-duplex (2Gbytes/s aggregate) on the front panel for connection to a remote host system or storage box.

Front Panel daughter cards

Description	Daughter card	PMC/XMC part number
Camera link	FP-CL	VID471 & VID472
LVDS 32-pair	FP-LVDS	
2 A/D ch 125MSPS & 2 D/A ch 500MSPS	ADC250 *	AD450
4 A/D ch 125MSPS	ADC284 *	AD484
2 A/D ch 210MSPS	ADC290 *	AD490
2 A/D ch 1GSPS	ADC291 *	AD491
2 D/A ch 1GSPS	DAC281 *	AD481

*Fitted on side 2 of the FM482.

Power

Maximum current at 5V: 5A.
Maximum current at 3.3V: 5A.
Typical application power consumption: 1024x1024 points 2D IEEE-754 floating point FFT, 133MHz PCI-X => 17 Watts.

Environment

Operating temperature:
- 0°C to +60°C (Commercial).
- -40°C to +85°C (Industrial).

Optional conduction cooling.
Convection cooling 300LFM minimum if conduction cooling not used.