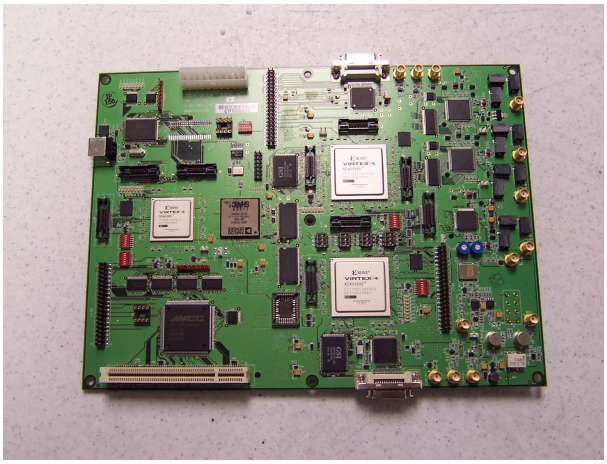
DSP/FPGA Processing Boards

(CRS-PROBRD-PCI-DSP-FPGA-XDSPXFPGA-XCLOCK-XX)



The PCI-DSP-FPGA series of boards provide advanced capabilities of using both DSPs and FPGAs enabling a variety of sequential and parallel processing tasks to be integrated in truly real-time operation. These boards provide enhanced functionalities over the PCI-DSP series.

The board can act as a stand-alone processor plugged into any standard PCI based motherboard, or it can act as a daughter card to other systems with the PCI interface. It can operate as a stand alone board with a USB interface.

The board provides 2 x 16 bit ADCs and 2 x 16 bit DACs connected directly to the FPGAs, enabling a variety of analog signal capture and analog signal generation. The cards can be driven with clocks up to 500 MHz. The clock is generated on the board and can be synchronized with external 10 MHz. Software support of the board is provided through PCI drivers. Optional IP cores for various signal analysis and signal generation are available.

These boards are used in numerous applications ranging from general purpose processing, signal analysis, signal generation, software radio, radar, navigation, communication, medical electronics, sonar, audio systems, and so-on.

SCHEMATICS

The PCI-DSP-FPGA series of boards have 3 Xilinx Virtex-4 FGPAs in addition to a DSP Processor (ADSP-TS201). It can function as a stand-alone processing board or can be plugged in and controlled via PCI interface. The FPGAs can be loaded through the JTAG port, PCI interface, or the configuration can be stored in the EPROM for loading on power-up. Similarly, the DSP software can also be loaded through the PCI interface or via an EPROM on power-up.

The communication FPGA on the board handles the PCI interface. The 2 processing FPGAs are high-performance FPGAs that can be used for Digital Logic/DSP applications. The FPGAs communicate with the DSP using high-speed Link Ports. Communication can be interrupt based or polling based depending upon user requirements. One of the FPGAs is also interfaced with 2 16-bit ADCs and DACs. Also, high speed Digital IOs are provided for all FPGAs.

The board is capable of independent operation through an USB interface implemented in DSP without involving a PCI bus. The FPGAs and DSPs can be loaded through EPROM or through a PCI interface. Special efforts have been made to ensure high-speed communication within and outside the board. The FPGAs are connected directly to a pair of high speed serializers enabling data transfer at the rate of 6.1 Gb/s.

The board is rich with debug features for application development. All the FPGAs are connected to debug ports in order to monitor FPGA activity. Also, a specialized connector for connecting the ADSP-ICE (In-Circuit-Emulator) is provided, which can be used to debug the DSP code.

Center for Remote Sensing, Inc.
Advancing Technology

3702 Pender Drive, Suite 170
Fairfax, VA 22030
www.cfrsi.com
Phone: 703.385.7717
Fax: 703.385.7719
E-mail: gps@cfrsi.com

DSP/FPGA Processing Boards

FEATURES

- Stand-alone and pluggable FPGA board with PCI Interface / USB Interface
- On-board clock with External Sync
- 3 Xilinx Virtex-4 FPGAs
  - General Purpose Communication FPGA for PCI Interface
  - 2 High Performance FPGA for Logic/DSP Applications (approx. M gates)
- 1 ADSP-TigerSharc201 Processor
  - Operates at 600 MHz
  - 3 MB internal and 128 MB external memory
  - 4 High Speed Link Ports for communication
- 2 x 16-bit ADCs—AD 9446*, 100 MSPS sampling rate
- 2 x 16-bit DACs—AD9777* 160 MSPS/400MSPS input/output data rate. Interpolating filter
- High Speed Serial Digital Output (6.1 Gb/s)
- Debug Features Include:
  - Debug Ports for all FPGAs
  - Debug Port for connecting ADSP In-Circuit Emulator for DSP
- Board Dimension: 8” x 11”
- Power Requirements:
- PCI Driver provided
- Several signal processing and signal generation cores available

APPLICATIONS

- General Purpose Processing
- Signal Analysis
- Signal Generation
- Software Radio
- EW application
- Radar
- Navigation
- Communication
- Medical Electronics
- Sonar
- Audio Systems