

## SCHEMATTIICS

The basic board contains one ADSP Tiger Share 201 processor and one Xilinx Virtex IV FPGA used for processing data in and out of the PCI bus and I/O daughter card (which may contain ADCs or DACs). A smaller FPGA is used for data transfer through PCI bus. The boards can be driven with clocks up to 500 MHz.

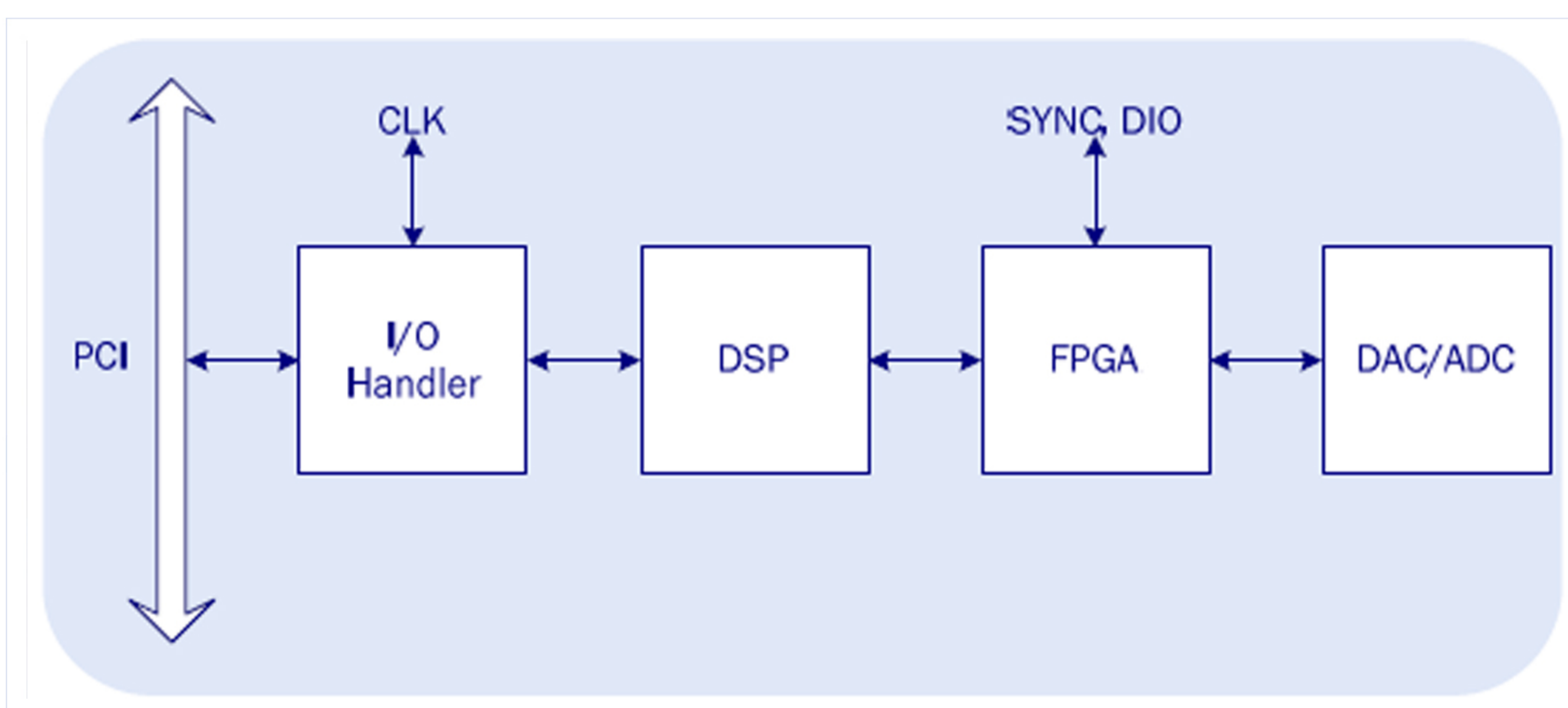
The FPGAs can be loaded through the JTAG port, PCI interface, or the configuration can be stored in the EPROM for loading on power-up. Similarly, the DSP software can also be loaded through the PCI interface or via an EPROM on power-up.

The 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.

PCI-1DSP1FPGA-500M-01-09 is a versatile standard sized PCI board with two daughter cards; one for self contained power generation and the other can be sued for a variety of ADC/DAC or other I/O functions. The board can be used as a stand alone processor plugged into any standard PCI bus, it can act as a daughter card to other systems with PCI interface. It can also have independent I/O and spearte bus through the plug in daughter card.

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.

The board can be used for generation of large bandwidth complex signals through DACs or can be used for processing similar signals acquired through ADCs. Processing can be distributed between the FPGA and DSP connected through high speed link.





## SIGNAL PROCESSING BOARD

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 highspeed Link Ports. Communication can be interrupt based or polling based depending upon user requirements. The schematics of the board is shown in the figure on the first page. In general use, the data flow can be from left to right, right to left or mixed. For RF signal generation, the information coming from PCI bus is processed in the DSP and passes on the results through hi-speed serial link to FPGA. The FPGA provides the samples are transferred to DACs for analog signal generation. The process can be reversed using ADCs. The card is standard full-size PCI card. It can accept three daughter cards. The picture shows each of daughter cards as well as main PCB.

### **Main PCB has four main components:**

- IO FPGA

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PCI Controller

- DSP

- Processing FPGA

Analog output daughter card (DCPROBRD-01-09-2DACDC-003-09) consists of four D/A channels. Output is provided on SMB connectors. The DACs can operate in interpolation mode and can generate either 4 independent outputs, 2 pairs of I&Q outputs or 2 digitally upconverted analog signals at GHz level. The Analog input daughter card (DCPROBRD-01-09-2ADCDC-005-09) consists of 4 ADCs with 16 bits and up to 250 MSPS sampling. Power supply daughter card (SIMCARD-DCDCPS-002-09) has high-precision, low-noise voltage regulators. Input is +5V DC. It provides the following DC voltages at the output:

- +3.3V

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+2.5V

- +1.6V

- +1.2V

Digital Data Interface (DDI) outputs are provided through another plug in daughter card (DCPPROBRD-01-09-DIODC-004-09)

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.

### **DAUGHTTER CARDS ((STANDARD))**

Standard I/O daughter card contains 4 x ADC chips or 2 x DAC chips with dual DAC in each chip. They communicate Both ADC and DACs are 16 bit and can allow direct sampling at rates up to 250 MHz. The interpolating DACs however, may generate samples up to GHz, through digital upconversion.

Various optional I/O cards can be provided as needed directly with the FPGA in the main card.

### **POWER SUPPLY CARD (STANDARD)**

The stand power supply card takes 2.5V 5A power from external sources and generate all the necessary power distribution needed for the main processor card and the I/O card.

### **FEATTURES**

- 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.

### **APPLLIICATIONS**

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