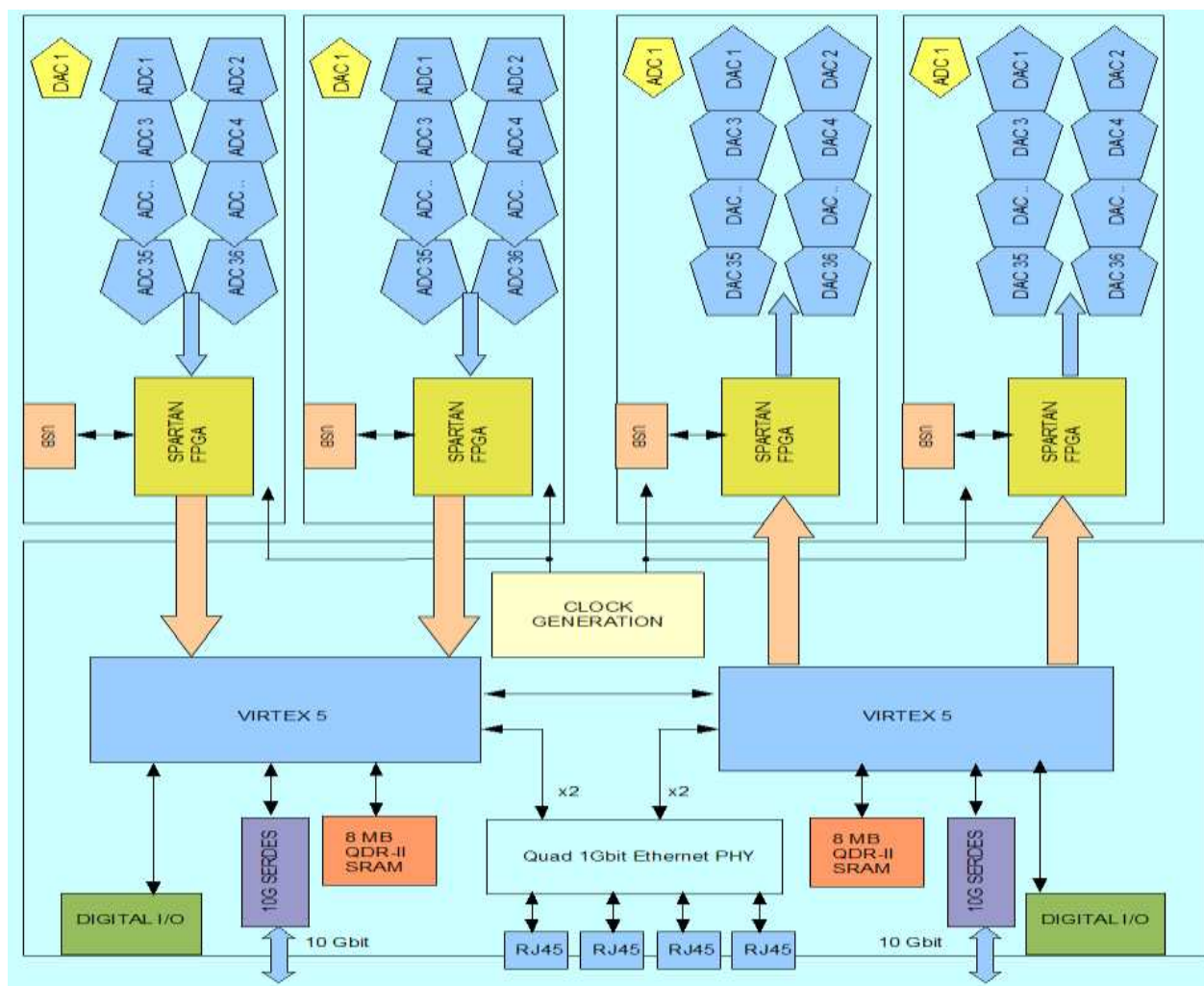


DTA-4100: High Frequency Acoustic Platform with FPGA

The DTA-4100 is an ultra high performance, high frequency acoustic transmit and receive platform offering up to 144 channels of 24-bit Sigma Delta ADCs or 16-bit DACs at sample rates in excess of 2.5 MSPS. The DTA-4100 also offers two Virtex 5 FPGAs and two 10GbE network interface. The DTA-4100 is available in a 19" rackmountable 1U high enclosure.



The DTA-4100 is an ultra high performance acoustic platform in a 1U form factor tailored for demanding acoustic applications like multi channel sonar, ultrasound, medical imaging, test and measurement etc. It offers the ultimate analog performance coupled with high-speed network connectivity and is ideally suited for network centric applications. A variety of ADC / DAC channel options are supported that makes it a very flexible system. 1 or 10 GbE based data transfer option, reduces system integration effort and enables system deployment on time and under budget.



A 144 channel High Frequency Acoustic Platform is built with the DTA-4100 and a Computer

Features

- Ease of Integration and System deployment
- Ultra-high performance scalable architecture for high frequency sonar, ultrasound, medical imaging, digital audio, test & measurement, acoustic simulator etc.
- Two 10 GbE interfaces and Quad 1GbE interfaces
- Optional USB interface for direct transfer of ADC / DAC data
- Fully Synchronous channel Options:
 - 144-channel, 2.5 MSPS (simultaneous sampling), 24-bit Sigma Delta ADCs with 4-pole anti-aliasing filter and 40 dB programmable gain
 - 144-channel, 16-bit 2.5 MSPS (simultaneous sampling) DAC with 4-pole reconstruction filter
 - 72-channel Sigma Delta ADC (24-bit, 2.5 MSPS) & 72-channel DAC (16-bit, 2.5 MSPS)
 - Other channel configurations as options
- Multi unit synchronization
- Differential inputs and outputs
- Separate ADC, DAC for calibration & BIT
- Two Virtex 5 50LXT FPGAs. 95SXT devices available as options
- User I/O connected to the FPGA for control of external devices like Tx/Rx switch, amplifier etc
- Optional Digital Down Converters and Digital Up converters programmed in the FPGA
- Inter FPGA high speed connectivity
- 1-pps input for distributed unit to unit synchronization
- External trigger and sync inputs for multi module synchronization
- Programmable VCO based sampling clock locked to external reference or internal 100MHz TCXO reference
- Internal PLL with built in synchronized divider for fine control of sampling rates
- Ability to accept external sampling and conversion clocks
- Time stamping of packets with better than 5ns resolution
- GPS time stamping
- 19" rackmount enclosure (1U high)
- 110/220V (optional DC input)
- Custom enclosure available



The DTA-4100 is an ultra high performance high frequency acoustic platform tailored for demanding acoustic system applications. The high speed 1 or 10 GbE network capability of the platform makes it an ideal platform for network centric applications and allows quick system deployment. Standard Ethernet based data transfer greatly reduces software development and saves time and money.

The DTA-4100 is architected in a modular fashion and comprises of two modules: Analog I/O modules and an Acoustic Network Interface Module. The architecture provides extreme flexibility and ease of use. Different analog modules may be used in the same DTA-4100 platform thereby giving even greater flexibility.

Common Platform for Demanding Applications

- High Frequency Sonar transmit and receive
 - Ultrasound and medical imaging
 - Digital Audio
 - Underwater Intruder detection
 - Acoustic Simulator and Stimulator
 - Test & Measurement and Machine Health Monitoring
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Acoustic Network Interface Module:

The Acoustic NIM provides two large data FPGAs and two fully duplex 10 GbE network interfaces for high-speed data transfer. The 10 GbE interfaces are capable of handling the raw ADC and DAC data rate in a point-to-point connection. Each data FPGA implements a 10 GbE Ethernet MAC for direct network connectivity. The NIM can host up to four Acoustic AIMS and implements all the clocking required for synchronized sampling and conversion. This flexible architecture allows other I/O modules to be connected without extensive redesign to the system. Dual 1GbE interfaces to each of the FPGAs can be used for control and set-up. These can also transfer processed data (e.g. partially beamformed data).

The two data FPGAs are interconnected with two GTP links. The FPGAs are also connected to an expansion header via two GTP links. Expansion modules with delay memory, beamformers, processors etc., may be added to expand the functionality of the DTA-4100. DTA-4100 comes with two Virtex 5 XC5VLX50T as standard data FPGAs. Larger FPGAs like the XC5VSX95T are available as options. Please contact factory for details.

Each FPGA has digital I/O capability that allows the user to input and output digital signals directly to and from the FPGA. This allows for real time control of external devices (like Tx/Rx switch, GPS receiver, etc.) and also merge external parameters with the signal data.

The Acoustic NIM generates all the sampling clocks required by the AIMS. The DTA-4100 can accept an external reference signal (10 to 100 MHz) or can run from an internal TCXO (10 MHz). It can also accept up to two external clocks. It has an internal VCO (375 to 415 MHz), which is locked to the reference by a PLL/divider. The locked VCO frequency can be divided (integer 1 to 32) and provided as ADC / DAC sampling clocks. Multiple modules can be very easily synchronized.

The following clocking schemes are supported:

- All ADC / DAC clocks locked to an external reference clock (10 MHz to 100 MHz). ADC / DAC clocks are generated by an integer division of the VCO frequency.
- All ADC / DAC clocks locked to an internal TCXO based reference clock (100 MHz). ADC / DAC clocks are generated by an integer division of the VCO frequency.



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- Separate external ADC and DAC clocks
 - Common external ADC and DAC clocks

The sampling clocks for each Analog I/O module has a programmable clock delay that allows very precise delay control. This allows for ease of multi board synchronization and calibrating out any cable mismatches for external clock signals.

Analog I/O Modules:

D-TA offers a variety of Analog I/O Modules that work seamlessly in the DTA-4100 platform. The various options are:

- A 36-channel ADC module with 24-bit of Sigma Delta Module at a max simultaneous sampling rate of 2.5 MSPS. The module provides differential input capability, four-pole anti-aliasing filter and up to 40 dB programmable gain. A built in DAC provides test signal generation capability for calibration and BIT.
- A 36-channel 16-bit DAC module with a conversion rate in excess of 2.5 MSPS. The module provides differential output capability and a four-pole reconstruction filter. A built in ADC enables calibration and BIT functionality.
- Other Custom Modules: Please contact factory for details

Custom FPGA Development:

The FPGA in the Master Controller implements the logic required to implement 1Gbit Ethernet links and interfacing to the ADC/DAC devices. Users can implement their own custom DSP functionality. D-TA Systems offers custom FPGA development services to help users speed up their system deployment. D-TA Systems offers extensive FPGA application capability including DDC/DUCs, FFTs, beamforming, etc.

Please contact factory to discuss specific requirements.

Customized Solution

D-TA Systems can easily tailor the DTA-4100 platform for specific customer requirement. This may include a custom enclosure, different input/output configurations, etc. Please contact factory for more information.

DTA-4100 Ordering Info:

DTA-4100-zzzzz-xxx-yyy

xxx: Number of input (ADC) channels. Valid options are: 0, 36, 72, 144

yyy: Number of output (DAC) channels. Valid options are: 0, 36, 72, 144

zzzzz: FPGA Option. Valid options are 50LXT for Virtex 5 XC5V50LXT; 95SXT for Virtex 5 XC5V95SXT

Please contact factory for more information

