

Data Capture and Signal Processing (DCSP) Board

Data Capture and Signal Processing (DCSP) board is a VPX based conduction cooled card in 6U form factor. It employs high performance and high speed ADCs for digitizing the analog data, resource rich FPGA for performing operations such as decimation and TI's Keystone series DSPs for carrying out signal processing operations. The board is built as a lower power, light weight, single card replacement for Digitization card and Signal processing cards.

The DCSP board finds application in multiple airborne radar platforms:

- Exciter Receiver Processor
- Radar Processing Unit



KEY FEATURE

- Data acquisition, signal processing and DSP algorithms on the same platform
- Blind mate RF connection which mates to custom VPX Backplane.
- Two 16-bit Dual Channel ADCs sampling at 160MHz
- Time synchronously sampling at the four ADCs
- Remote FPGA programming support via LAN
- Board health monitoring over I2C interface

FPGAs/Processor

- One Kintex-7 XC7K325T used for ADC interface and implementation of Signal processing functions.
- 2 instances of Keystone DSP TMS320C6674 with 4 cores each. Each chip provides a computational capability of 160 GMAC / 80 GFLOPs when operated at 1.25 GHz
- Two onboard 16-bit, 160 MSPS dual channel ADCs with Dynamic range 2.25Vp-p and 50 ohms impedance, each interfaced to Kintex FPGA.

ADC IF input

- SNR: SNR>70dBFS @Fin=70 MHz, Fs = 160 MHz
 - SNR>68 dBFS @Fin=200 MHz, Fs = 160 MHz
- SFDR: SFDR>85dBFS @Fin=70 MHz, Fs = 160 MHz
 - SFDR>75dBFS @Fin=200 MHz, Fs = 160 MHz
- ENOB: > 11.4 @Fin=70 MHz, Fs = 160 MHz
 - 11.2 @Fin=160 MHz, Fs = 160 MHz

Interfaces

- sRIO interface: Two x4 sRIO Gen2 interfaces for communication through backplane for high-speed data transfer from DCSP card operating at 5 Gbps
- Two sFPDP interface operating at 2.5 Gbps through backplane for data transfer from DCSP board to external system
- Ethernet interface: Gigabit Ethernet switch on board provides connectivity among the processors, FPGA and other sub-systems through Front panel and back plane. The Microblaze based embedded sub-system implements the necessary software stack.

Software

- Control, Configuration and Status monitoring
 - MicroBlaze based embedded processor with peripherals such as boot memory, system monitor, timer module, UART, Interrupt controller etc. on Kintex-7 FPGA.
 - SYSBIOS is an advanced real-time operating system from Texas Instruments for use in a wide range of DSPs, ARMs, and microcontrollers. It is designed for use in embedded applications that need real-time scheduling, synchronization, and instrumentation. SYS/BIOS provides a wide range of system services such as:
 - Pre-emptive, deterministic multi-tasking
 - Hardware abstraction
 - Memory management
 - Configuration tools
 - Real-time
- Exhaustive support for debug operations in the terms of counters, status registers etc.

Additional information

- 2GB DDR3memory on Kintex-7 FPGA
- 2GB of DDR3 memoryfor each Keystone DSP Chip

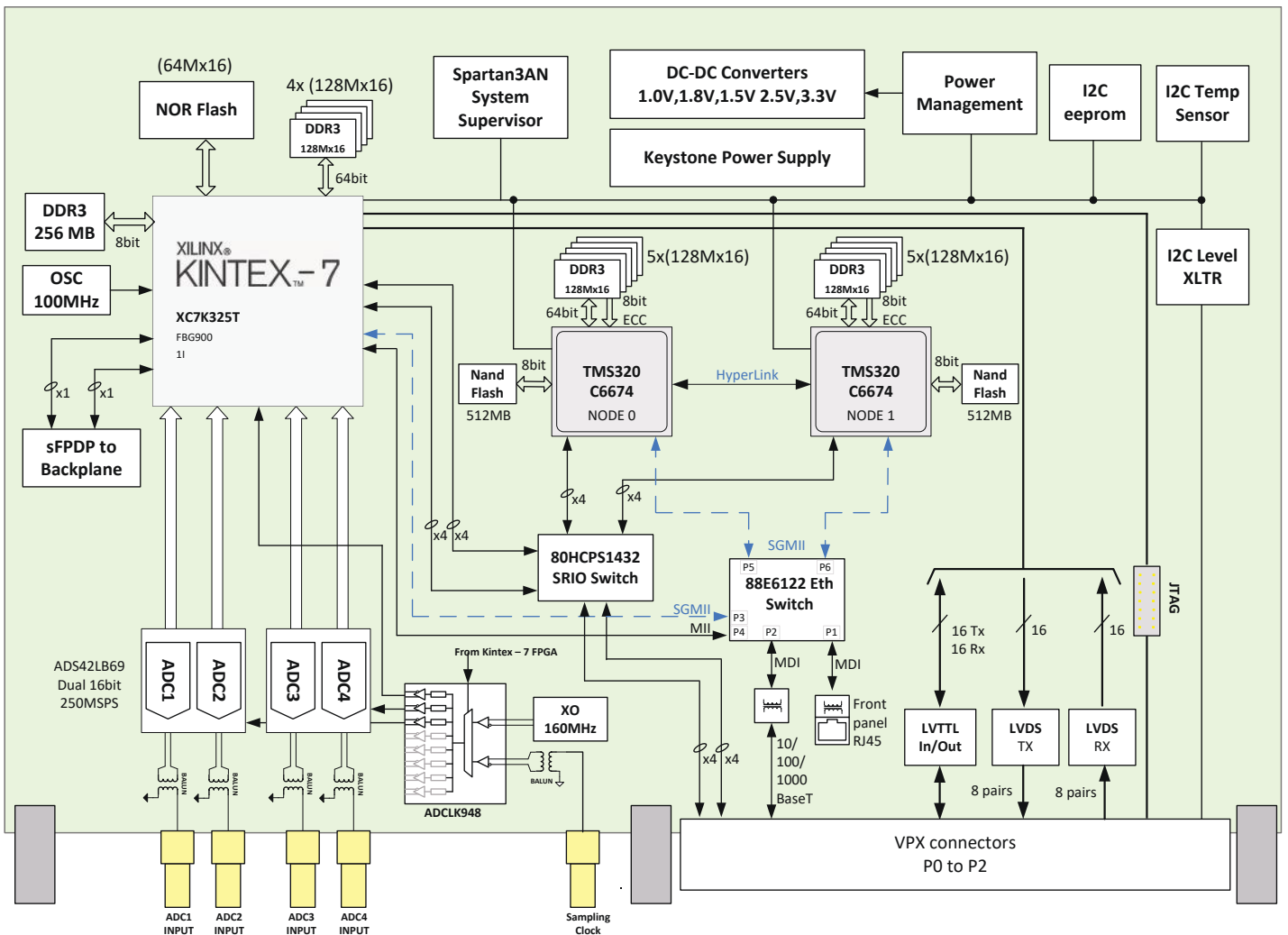
- Conduction cooled 6U custom VPX form factor with Blind mate RF connection which mates to custom VPX Backplane.
- The board weighs 1.1 kg

POWER CONSUMPTION

- The board consumes a maximum of 55 W power
- Input voltages is 12V, 5V and 3.3V as per VPX standard

ENVIRONMENTAL

- Qualification
 - MIL-STD810D
 - EMI/EMC MIL-STD-461E
 - ESS: MIL-STD-2164 (EC)
- Temperature range
 - -40°C and +85°C (Storage)
 - -40°C and +55°C (Operational)



DCSP Block Diagram

CoreEL Technologies is a Customer Application Specific Product & Solutions (CASPS) company offering innovative solutions from its diverse portfolio of expertise that includes Intellectual Property (IP) cores, system design, manufacturing, sustenance and OEM solutions in the form of EDA tools, Mechanical Engineering tools, COTS products and Technology Training. CoreEL's strength lies in its ability to blend deep domain knowledge with the right ingredients across its portfolio of offerings. It is a leading developer of advanced electronic system level products and solutions to three primary markets- Aerospace & Defence, Digital Media Broadcast, and Universities and Institutions of Higher Learning.