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eNews

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Multi-gigabit bandwidth for industrial system

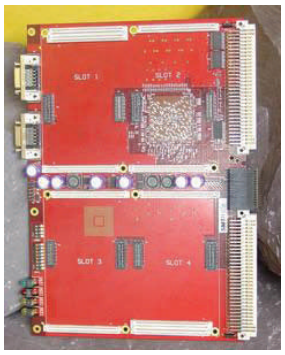
The new SMT329 family of VME64 and VXS intelligent IO carrier modules accelerate Sundance into the next generation of industrial embedded systems.

These carrier boards are built around a Virtex-4 FX60 FPGA. They provide an entire range of signal processing solutions closely coupled with the Xilinx Virtex-4 FPGAs, Texas Instruments C6455 DSPs and ADC/DAC sampling up to several gigahertz within a 6U form factor together with fast off-board communication links.

By implementing the VME64 2eSST protocol, the SMT329-VME64 offers up to 2.56Gb/s across the VME parallel bus, while the SMT329-VXS and its 8-VXS serial ports give a massive 20Gb/s for data transfer to the Host.

Featuring the usual comports for inter-sites links, the carriers also have RSL ports for gigabit serial inter-module communications. Moreover 4 gigabit Ethernet controllers are directly routed to the P2 rear connector.

More Details



SMT329-VXS/VME carrier module

Configuring FPGA networks

3L Diamond FPGA now supports system architectures built around networks containing only FPGA modules.

Design engineers can define all their FPGAs as processors in a Diamond configuration file, either directly or using the Diamond IDE, and then build a single application file. This one file will contain all the information necessary for booting each of the FPGA devices. The Diamond server running on the host PC can then load the network automatically using the host comport link.

In fact, engineers will no longer need the Xilinx Parallel cable to load their FPGA bitstreams into Sundance's FPGA-only modules. The JTAG boundary-scan becomes redundant as a communication mechanism once designers switch to the latest version of the 3L Diamond FPGA software.

This new feature is ideal for prototyping as well as deploying OEM solutions without the time and hassle of manually booting each individual FPGA.

More Details

Zoom in on the ALBA synchrotron radiation

Article written in cooperation with Dr. Francis Perez and Angela Salom, CELLS, Spain

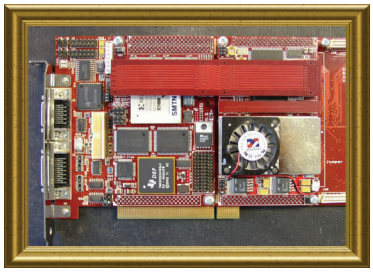
ALBA is a circular-shaped machine, called a synchrotron, that uses arrays of magnets, called insertion devices to generate bright beams of synchrotron light. ALBA will be located near Barcelona.

A synchrotron is an accelerator of electrons. The electrons are maintained in a circular ring by magnetic field and produce X-Rays tangentially to their trajectory. These X-Rays are used by several beamlines located around the storage ring to analyse samples for chemistry, materials science, magnetism, life sciences, macromolecular crystallography and industry.

The new ALBA synchrotron

CELLS, a consortium in charge of building the synchrotron, has chosen the SMT8036 Kit to design and build a prototype of Digital Low Level RF system for the ALBA synchrotron. The Sundance system is intended to be used to regulate amplitude voltages (within 0.1% rms), phase (within 0.1° rms) and resonant frequency of the RF cavities of the accelerator machine. This type of cavity restores the lost energy of the electron beam due to synchrotron radiation and they also focus the X-Ray beam longitudinally.

The 500MHz RF input signals are down-converted to 20MHz IF by a front-end module. The IF signals, which are equivalent in phase and amplitude to the RF signals, are sent to the ADCs to be demodulated into I/Q components. The FPGA regulates the amplitude, phase and resonance frequency of the cavity with control and tuning loops. The DACs transform the IF control signals into analogue signals that are finally up-converted to RF in a second analogue module. The DSP connected to the FPGA reports 14 diagnostic signals, generated in the FPGA during the processing stage, to the Host PC.



The SMT8036 dual ADC/DAC with mixed DSP+FPGA

All of the I/Q reference, I/Q cavity, I/Q computed and I/Q control actions signals are stored and displayed using a MATLAB interface.

The ALBA synchrotron is currently being built. The initial 7 beamlines will be able to start their operations from 2010 to carry out a wide variety of experiments using ALBA's light.

More Details

Sundance Multiprocessor Technology Ltd is a limited company registered in England and Wales, number 2440991

Registered office: Chiltern House, Waterside, Chesham, Bucks, HP5 1PS