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SKARAB Agile Extreme Scale Networked FPGA Supercomputing



Technical Description



Product Description

The SKARAB is an extremely scalable, energy-efficient 1U 19" rack mount network-attached FPGA computing platform. The heart of the platform is a motherboard featuring a Xilinx Virtex 7 (XC7VX690T-2-FFG1927) FPGA that provides unparalleled I/O bandwidth (1.28 Tera-bits per second total bandwidth) to four high performance mezzanine sites.

The FPGA features dedicated supervisory and diagnostic interfaces (1 Gb Ethernet and USB), allowing highly scalable platform management (large scale cluster reconfiguration and health/status monitoring).

An advanced reconfiguration interface allows sub-second on-the-fly reconfiguration of the Virtex 7 FPGA over 1Gb Ethernet, enabling compute clusters to rapidly change function with minimal down-time.

Four symmetrical mezzanine sites provide flexibility in optimal balancing of digital or analog I/O and local (cache) memories:

- ❑ A 4 x 40 Gb Ethernet mezzanine option supports high bandwidth, low latency Ethernet interfaces directly from the FPGA.
- ❑ A high performance memory mezzanine option featuring next-generation Micron Hybrid Memory Cube (HMC) technology, provides extremely high bandwidth, high capacity local cache memory.
- ❑ A four-channel, 14 bit, 3 GSPS ADC mezzanine with built-in digital down-conversion, capable of digitizing up to 1.5

GHz of bandwidth positioned from near-DC to 3.2 GHz

A 5th COM Express-compatible mezzanine site supports high-performance management processor sub-system (e.g. 4-core Intel Atom/NVidia Tegra K1.)

A rich board support package is available to allow users to take full advantage of the platform's features and allow rapid customization to a specific application.

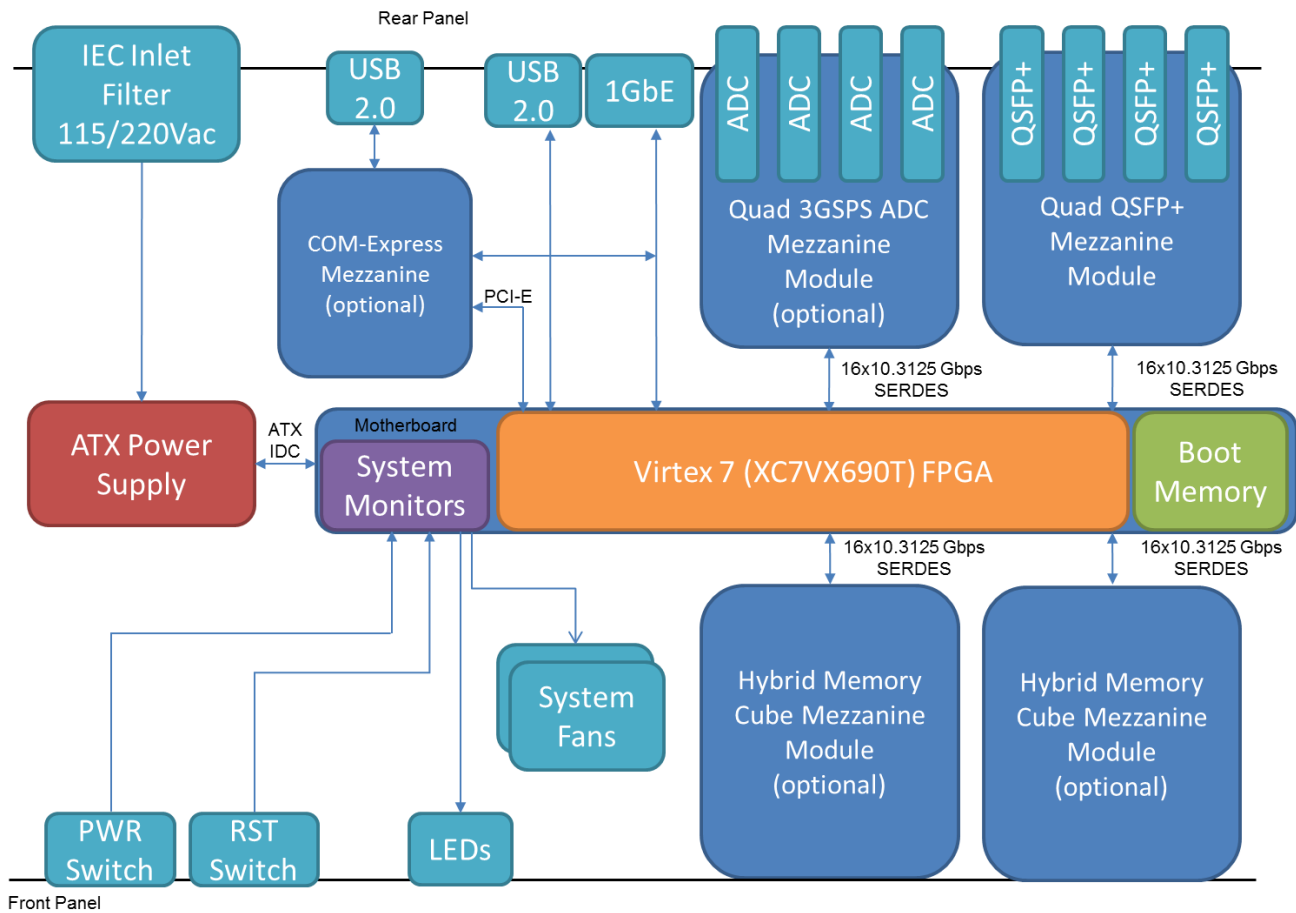
Applications

- ❑ High Performance Computing (HPC)
- ❑ Financial analysis/High Frequency Trading (HFT)
- ❑ Network packet analysis/routing
- ❑ Software defined radio (SDR)
- ❑ ASIC prototyping

Features

- ❑ Xilinx Virtex 7 (XC7VX690T-2-FFG1927) FPGA (3600 DSP Slices; 52Mb BRAM; 693120 LCs)
- ❑ Four high bandwidth mezzanine sites (1.28 Tbps total throughput)
- ❑ 5th COM Express-compatible mezzanine site (optional)
- ❑ Ethernet-hosted central cluster management
- ❑ Built-in health monitoring, logging and protection circuitry (voltage, current, temperature and fan monitoring/shutdown) allowing easy maintenance with reduced down-time

Block Diagram



Product Specifications:	
Parameter	Specification
Input power	90-264V AC; 47-63 Hz
Available power	350W
Power Consumption (Typ.)	45 W (Base infrastructure firmware supporting 1GbE and 4 x 40 GbE, system management); includes 4 x 40 GbE mezzanine.
Operating temperature range	+5°C to +40°C (Extended temperature ranges available on request)
Storage temperature range	-10°C to +70°C
Form Factor	1U 19" rack-mountable.

skarab spec-04.doc

This specification is subject to change without notice.

www.peralex.com

tel: +27-21-710-7440 • email: sales@peralex.com
Peralex House, 5 Dreyersdal Road, Bergvliet 7945, Cape Town
PO Box 215, Bergvliet 7864, South Africa