VPX3-127

Freescale Power Architecture™ MPC8640D Processor

- Powerful general-purpose Single Board Computer (SBC) with MPC8640D

- Dual Freescale Power Architecture cores up to 1.25GHz

- Up to 2GB DDR2 SDRAM controlled by dual 64-bit controllers

- Full complement of I/O capability (Ethernet, serial, USB 2.0, PCI Express®, TTL and differential discretes)

- VPX format with two 4-lane PCI Express fabric ports or one 4-lane PCI Express port and one 4-lane Serial RapidIO® port

- VxWorks® 6.x BSP, Driver Suite supporting Workbench 2.x IDE, Curtiss-Wright Controls Wind River® Linux GPP LE and INTEGRITY® available from Green Hills®.

- Continuum Software Architecture (CSA) firmware providing a comprehensive suite of system debug, exerciser, and update functions, built-in-test (BIT), and non-volatile memory sanitization function

- Designed for harsh environment applications, both air- and conduction-cooled

Curtiss-Wright Controls Embedded Computing's VPX3-127 combines the performance and the advanced I/O capabilities of the Freescale's Power Architecture™ MPC8640D processor with an extensive I/O complement to provide a highly capable processing platform for a wide range of harsh environment embedded applications. Designed for space constrained applications, the VPX3-127 represents the latest step in the evolution of rugged high-performance, highly integrated small form factor SBCs.

The challenge of high density computing is to pack the greatest functionality into the smallest standard form factor, with the lowest power possible while retaining as much flexibility as possible. In conjunction with its processing power, the VPX3-127 easily meets this challenge by offering impressive complement of I/O capability in order to satisfy the most demanding application needs.

The VPX3-127's integral high-speed backplane and PMC/XMC connectivity allows for multi-GB/s data flows from board-to-board through the backplane interface and from the backplane to PMC/XMC site supporting the acquisition, processing, and distribution of sensor data such as video, radar, and sonar data. A rich I/O complement includes two Gigabit Ethernet (GbE) ports (1000-x capable), four serial channels, up to 8-bits of discrete digital I/O, Universal Serial Bus (USB) 2.0 ports and a PMC/XMC site with 64-bits of I/O mapped to the backplane.

The VPX3-127 is supported by a wealth of software including Curtiss-Wright Controls Embedded Computing's standard CSA firmware, VxWorks Board Support Package (BSP) and Driver Suite, MIL-STD-1553 software driver, Continuum Vector™ signal processing library and Curtiss-Wright Controls Wind River Linux GPP LE.
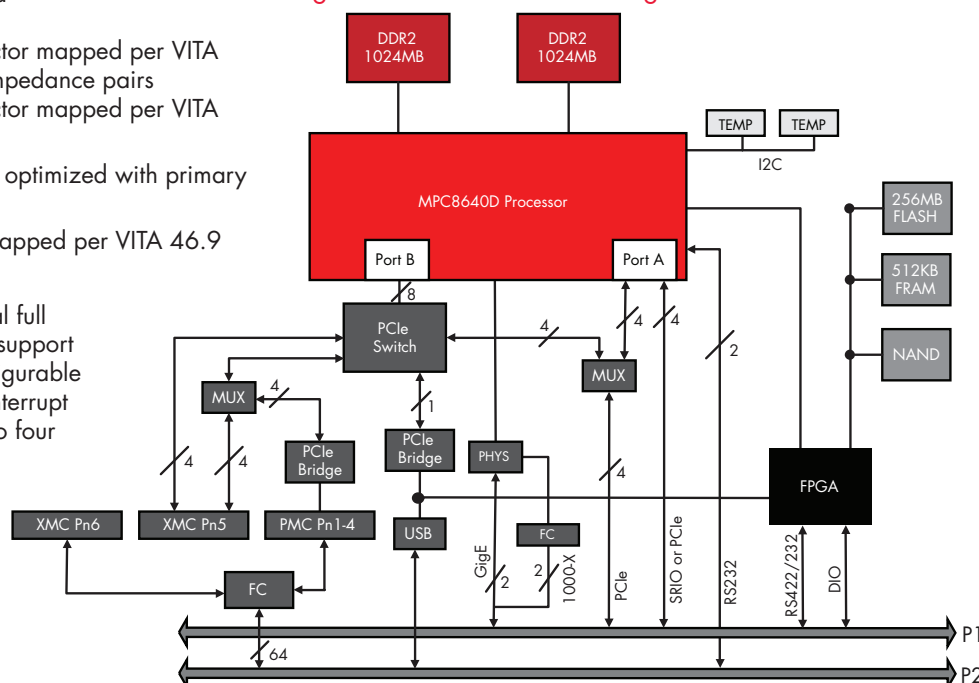
ABOVE & BEYOND

OpenVPX
OpenVPX Ready

CURTISS WRIGHT Controls
Embedded Computing
cwcembedded.com

Features

- Freescale MPC8640D processor with two Power Architecture cores up to 1.25GHz, each core with:
  - 64KBs L1 data cache
  - 64KBs L1 instruction cache
  - SIMD vector unit (VMX)
  - 1MB internal L2 Cache per Core
- Two independent 64-bit DDR2 SDRAM controllers integrated into the MPC8640D processor
- Up to 2GBs of DDR2 SDRAM with ECC to correct single-bit errors and detect double-bit errors
- 1GB of resident NAND Flash
- 256MBs of contiguous direct-mapped Flash memory
  - Hardware Flash write protection jumper
- Permanent Alternate Boot Site (PABS) provides back-up boot capability
- 512KBs AutoStore FRAM
- Fabric Ports
  - Two x4 lane PCIe fabric ports on the VPX P1 connector mapped as per VITA 46.2
- One PMC/XMC (VITA 42.3) sites on independent PCI and PCIe buses
  - Provides either a 133MHz PCI-X capable interface or 8-lane PCIe interface, auto-selected
  - PN1 – PN6 connectors supported
  - 64-bits of I/O through Pn4 connector mapped per VITA 46.9, 32 differential, controlled impedance pairs
  - 20-bits of I/O through Pn6 connector mapped per VITA 46.9
- Conduction-cooling of PMC/XMC sites optimized with primary and secondary thermal interfaces
- Two GbE interfaces on P1 connector mapped per VITA 46.9
- Two asynchronous RS-232 serial ports
- Two synchronous capable RS-422 serial full duplex channels with DMA and HDLC support
  - Each serial signal is software configurable as differential discrete I/O, with interrupt capability on inputs. Provides up to four differential I/O inputs and four differential I/O outputs
- Up to eight LVTTL discretes, each is software configurable as input or output, with interrupt capability as input
- Up to two USB 2.0 port
- Four general-purpose 32-bit user timers per core provided by Core Functions FPGA

- General purpose DMA controllers provided by the MPC8640D
- Two avionics-style watchdog timers with external watchdog event indicator discrete
- Status LEDS
- +5V- operation
- CSA firmware providing a comprehensive suite of system debug, exerciser, and update functions, BIT, and non-volatile memory sanitization function
- Available in a range of ruggedization levels
  - Air-cooled level 0 and 100, conduction-cooled level 100 and 200 per VITA 46.0 (.8" pitch)
  - Conduction-cooled per VITA 48.2, Type 1 card (.85" pitch with top and bottom covers, compatible with 1.0" pitch usage) upon customer request
- Circuit card assembly is done to Class 3 standards of IPC-A-610C, Acceptability of Electronic Assemblies
- Standard conformal coating is acrylic
- PWB meets UL 94 V-0 flammability rating

Figure 1: VPX3-127 Block Diagram

Note
FC - Factory Configuration