3U VPX High Performance Electronic Warfare Platform

CURTISS-WRIGHT

DEFENSE SOLUTIONS

Application

- High speed ADC and DAC processing in a COTS package

- Software definable radio system utilizing high performance FPGAs

- SWaP optimized IP67 solution compliant to MIL-STD-810 and DO-160E

System

- 3rd Generation Intel® Core™ i7 Processor or Freescale Power Architecture SBC options

- Xilinx Virtex-7 combined with multi-gigasample per second (GSPS) transceivers

- 2-4 GSPS analog input and 2.8 GSPS output

Results

- Configurable, high bandwidth, low latency data paths in a compact low power form factor

- Reduced development time and lifecycle cost

- Fully qualified and packaged system solution

Application

Electronic Warfare applications are more diverse and more demanding than ever requiring the latest technology within a reduced size, weight and power (SWaP) constrained system. These applications require systems to have substantial low latency processing performance tied to multiple high-resolution channels capable of input in gigasamples per second (GSPS) range.

To make this possible, DSP-centric Field Programmable Gate Array (FPGA) components are utilized, allowing a wide range of high-speed algorithms to be integrated at the hardware level. In addition, the flexible open architecture hardware allows for the buildup of Software Defined Radio (SDR) system capabilities which pave the way for bi-directional encrypted communication systems.

Rugged 3U 2-slot
integrated subsystem

System

In order to provide the right combination of low SWaP and high performance, the 3U VPX form factor was leveraged as the core to this Electronic Warfare Platform. Knowing that this solution would then have to meet the harshest of aerospace and defense standards, the MPMC-9321 computer packaging was leveraged providing a compact, qualified, IP67-rated product. This COTS solution does not compromise on features and is ideal for a variety of electronic warfare and mission computing applications. A rugged, compact, and sealed 3U VPX chassis protects the electronics from adverse environmental conditions while providing optimal cooling paths for conduction or baseplate systems.

This variant of the MPMC-9321 features two key Curtiss-Wright manufactured module boards: the VPX3-1257 and the VPX3-530. The VPX3-1257 Single Board Computer (SBC) module acts as the central processor featuring a 2.1GHz Intel® 3rd Generation Core™ i7 quad-core processor with 16GB SDRAM, 16GB of NAND Flash, Gen2 PCI Express® (PCIe) fabric interfaces, and XMC expansion. The VPX3-530 module provides the high speed data interface and programmable processing through a combination analog I/O and FPGA monolithic board featuring the Xilinx Virtex-7 FPGA, and up to 8 GB of onboard Synchronous Dynamic Random Access Memory (SDRAM).

To facilitate and help with development time, Curtiss-Wright also provides a development package called FusionXF, allowing developers to quickly build reusable code while leveraging existing FPGA HDL code interfacing via APIs to the I/O interface on each board. The software is built for cross-platform support on VxWorks, Linux, and Windows and provides useful utilities such as error and status logging.

VPX3-1257

VPX3-530

3U VPX Architectures

MPMC-932x

Results

The MPMC-9321 system provides a configurable, high bandwidth, low latency data path in a compact low power form factor. It satisfies the most demanding field applications for unmanned aerial and ground vehicles, and is a fully qualified and packaged system solution with a range of flexible and rugged processing systems. Overall development time was significantly reduced by using proven rugged COTS technology, combined with Curtiss-Wright's FusionXF development software, which ultimately resulted in a faster time for deployment in the field.

Overall, Curtiss-Wright develops systems that can be readily configured to meet the needs of any military or aerospace requirements, including harsh avionics and vehicular environments, while providing complete hardware and software solutions.