CASE STUDY

3U VPX High Performance Display Processing Platform

CURTISS-WRIGHT

DEFENSE SOLUTIONS

Challenge

- Acquire and display multiple channels of high definition video
- Accommodate a flexible mix of I/O including Ethernet, 1553, avionics discretes and more
- Provide highest level of performance in the smallest space possible

Solution

- Powerful VPX3-133 SBC and the high density VPX3-716 Graphics Processor
- The VPX3-685 provides the strongest perimeter defense available in a 3U VPX form factor
- The VPX3-133 SBC combines the performance and the advanced I/O capabilities of the Freescale's Power Architecture Quad-core AltiVec enabled T2080 processor

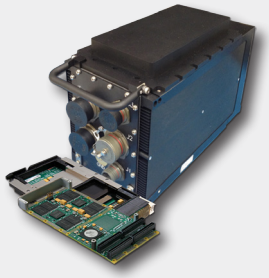
Results

- High performance, real-time computer with up to 6 video outputs and 6 video inputs
- Scalable, flexible and SWaP optimized solution based on 3U VPX form factor
- Accelerated time to market using pre-validated, off the shelf components

Challenge

Capturing video feeds from several sensors and making that data available to the user is required for a myriad of applications: surveillance, tracking, collision avoidance, diminished vision environment situations, targeting, etc. In all of these applications, whether the data is being fed to a pilot during flight or to an operator on the ground - the data is critical for mission completion, post mission analysis and personal safety.

While providing this graphical data output is of great importance, with the ongoing additions of new requirements and new functions, there is a shrinking amount of volume and power available for the computers that provide this information. This is to allow more sensors, which add weight and power, or to increase availability of the platform. A size, weight and power (SWaP) optimized solution is critical to future proof continuing growth of the platform.



MPMC-9351:
Multi-Platform Mission
Computer, 3U 5-slot system

Solution

The solution must capture streams of video data, process the captured images and drive multiple displays in real time using high performance graphic processors, high performance CPUs and high bandwidth data paths.

3U VPX™ technology, available from Curtiss-Wright is the ideal fit. The 3U VPX form factor can accommodate the stringent physical constraints of almost any platform, and can provide a Display Processor solution that fit these requirements.

The primary components of this solution are the powerful VPX3-133 Single Board Computer (SBC) and the high density VPX3-716 Graphics Processor.

The VPX3-133 SBC combines the performance and the advanced I/O capabilities of the Freescale™ Power Architecture® Quad-core AltiVec™ enabled T2080 processor with an extensive I/O complement to provide the best performance per watt for a quad-core processor. Designed for space constrained applications, the VPX3-133 represents the latest step in the evolution of rugged high-performance, highly integrated small form factor SBCs.

The VPX3-716 graphics module provides an expansion mezzanine site to integrate high resolution and high channel count video with the flexibility of selecting the interface types suitable to the end application. A unique feature of this mezzanine site is the option to route up to two of the six total outputs directly to provide the capability for additional custom video outputs. In addition to the processing needs, if the data is to be compressed and output to a downlink of some sort, the VPX3-716 has a built in H.264 compression engine that can be leveraged.

The compressed data can be fed into the VPX3-685 secure router that can directly interface to the downlink and provides the separation of the local network and the wide area network. This provides an accelerated path to secure network-ready architectures that can interoperate seamlessly within the Global Information Grid (GIG). The VPX3-685 provides the strongest perimeter defense available in a small 3U VPX form factor.

These three powerful components are packaged within the deployed MPMC-9351 computer housing to provide a deployable solution within an extremely short lead time. The MPMC-9351 is a sealed, rugged enclosure that accommodates up to five conduction cooled 3U VPX cards, redundant power supplies, built-in forced air cooling, and volume available for fiber optic interfaces if required.

Results

The MPMC-9351 based system provides a configurable, high bandwidth, low latency display processor in a compact low-power form factor. It satisfies the video capture, processing and compress needs for unmanned aerial vehicle or video capture, processing and display needs for a manned aircraft in a fully qualified and packaged system solution.

Overall, Curtiss-Wright develops systems that can be quickly configured to meet the needs of any military or aerospace requirements, including harsh avionics and vehicular environments.

Platform images courtesy of Department of Defense

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