CASE STUDY

Airborne Signal Processing and Display Computer

CURTISS-WRIGHT

DEFENSE SOLUTIONS

Challenge

- Capability upgrade for extended-service aircraft
- Integrate high performance processing and graphics
- Strict power restraints

Solution

- Space-efficient 3U VPX system
- Based on VPX open architecture system utilizing latest processing technology
- Additional power supply capabilities

Results

- Highly capable processing package
- Meets legacy aircraft power and environmental needs with modern solution
- Fully qualified custom solution delivered

Challenge

An extended-service marine patrol aircraft required a signal processing and display computer to provide an upgrade in capability and performance.

The chosen solution had to be a flexible and rugged processing system which could be utilized for other applications and on other vehicles. Onboard this aircraft the more usual 28V DC power feed was unavailable for use due to insufficient power capacity as it was already heavily utilized. As a result the new system needed to be powered using a three phase 115V 400Hz AC supply which is an unusual implementation for a 3U system.

To address the need for the three phase power input, additional unique requirements associated with an extended service aircraft as well as the dense processing and high performance graphics requirements – a customized solution was proposed that also included capabilities to support future program needs.

MPMC-9355
5-slot 3U VPX Multi-platform Mission Computer

Curtiss-Wright's VPX3-1257, VPX3-716, VPX3-652 (top to bottom)

Solution

To meet the requirements for this project, the MPMC-9355 was chosen. This is a leading edge, flexible and rugged processing system which can be readily configured to meet customers' individual needs. A space-efficient 3U VPX system configuration was proposed and packaged in a rugged half-ATR chassis with integral fan cooling.

Three Intel Core-i7 Single Board Computers (SBC) are used for processing and an AMD E8860 Graphics Processing Unit (GPU) provides two high resolution video outputs. Communication between multiple systems and the internal SBCs was implemented via a Layer 2 managed Ethernet switch.

As part of this unique chassis configuration a power supply module was selected and tailored to the specific requirements of this platform, including extended hold-up capacity and the ability to support three-phase 115V AC input.

As development progressed additional requirements became clear, the close working relationship between Curtiss-Wright and the customer ensured that these additional requirements could be assessed quickly and incorporated in a timely manner.

To support the diverse I/O requirements and a desire to meet Lightning Induced Transient requirements the design team used previous experience and existing IP building blocks to create a solution that passed qualification testing.

Result

Fully qualified, tailored systems were delivered to the customer incorporating the original requirements plus others that were identified during the development.

As well as the unusual three-phase power supply and other legacy requirements, the system incorporated additional flexibility allowing future deployments to replace the GPU with a fourth SBC.

Clearly defined points of contact for program and technical management from the outset were key to the success of this project.

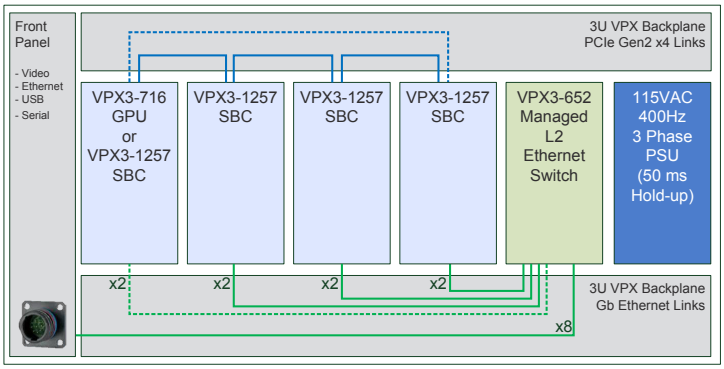

Figure 2: MPMC-9355-0002 block diagram

Platform images courtesy of Defense.gov

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