MOSARC VIDEO MIXING MODULE

Safety-critical video processing

High-integrity video processing and advanced control functionality

Collins Aerospace's Mosarc® video mixing module is used in all of our safety-critical avionics computers. It was developed with DO-254 DAL A processes, meeting OpenVPX standards in a 3U form factor. It hosts our Mosarc video mixer field-programmable array (FPGA) as well as an optional video stream FPGA for decoding and encoding H.264 compressed video to merge with other sources.

Mosarc FPGA delivers high-integrity, hardware-accelerated video processing, including control functions (rotate, reposition, resize, frames per second (fps) conversion, zoom and crop) and merge functionality between video inputs and internally generated computer graphics providing low-latency video manipulation. It supports four independent merge planes, each able to combine inputs from up to eight image sources into a composite output image by layering and blending images. Images are fed to Mosarc FPGA either directly from internal graphics engines, directly from synchronized external video or indirectly through one of up to four video engines.

VMX3 Video Mixing Module

Mosarc FPGA can drive up to eight independent video outputs, four of which can include merged video outputs, and two of which are direct passthrough video. Each merged video output can be split into left/right halves to support unique interface and resolution requirements of large-area displays. Mosarc FPGA's powerful capabilities enable a single Air Vehicle Computer (AVC) with VMX3 to drive multiple display surfaces.

KEY FEATURES & BENEFITS

- 3U OpenVPX video management module
- High-integrity FPGA (MerVE3) video merge functionality for external video inputs and internally generated computer graphics channels
- Low latency video management
- Enables a single AVC to drive multiple independent displays
- FPGA developed to DO-254 DAL A processes for safety-critical graphics
- Lower SWaP compared to custom or commodity video mixing solutions
- High-technical readiness level (TRL) hardware and software
- Mezzanine extensions for Collins' GPMX 2D graphics engines
- Available in a Collins customized 3U OpenVPX development station with breakouts of major interfaces for early development

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Model: VMX3

FIRMWARE

- MerVE3 FPGA– MerVE3 provides high-integrity hardware video processing (rotate, reposition, resize, fps conversion, zoom, crop) and merge functionality between video inputs and internally generated computer graphics providing low-latency video manipulation
- Module Manager (MM) – VMX3 includes a module manager FPGA that uses system management bus (SMBus) protocols to send health data to the chassis manager on the SCX3

CORE PLATFORM SOFTWARE

- Merge device driver – This driver abstracts the details of the MerVE3 send/receive command interface from applications
- Video device driver – This driver provides low-level control of the video engines on the VMX3
- MM device driver – The MM FPGA is supported with a driver to pull or push data from/to the SMBus

CORE MIDDLEWARE

- Merge API – third party applications can use this API to control the MerVE3 video processing functions
- Video API – third party applications can use this API to control the video engines processing external video inputs

SPECIFICATIONS

- 4 GB double data rate (DDR) dynamic RAM (DRAM) (32-bit) at DDR4-2666 million transfers per second (MT/s)
- (16x) high-speed digital video inputs, configurable to ARINC 818, SMPTE, serial digital interface (SDI) and Merge Protocol V3™/DisplayPort interfaces
- 8x high-speed digital video outputs, configurable to ARINC 818, SMPTE and SDI interfaces
- 4x STANAG 3350 RGB analog video inputs
- 3x STANAG 3350 RGB analog video outputs
- 7 low-voltage complementary metal oxide semiconductor (LVCMOS) bi-directional vertical synchronization (VSYNC) interfaces
- SWaP
  - Size – 3U OpenVPX form factor (100 mm x 160 mm)
  - Weight – 1.05 lb. (1.35 lb. with dual GE5 mezzanine)
  - Power – 22.5 W (typical) 37.5 W (with dual GE5 mezzanine)

APPLICABLE RELEASES

- 828-5A61-102 (VMX3 CCA)
- 828-4A99-100 (GPMX mezzanine)
- 983-9131-228 (complete module assembly with VMX3 CCA, GPMX mezzanine, heatsink and wedgelocks)

Specifications subject to change without notice.

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