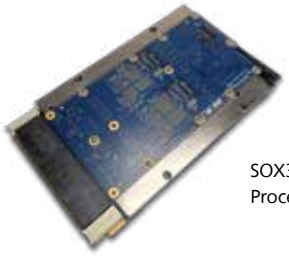
MOSARC GENERAL PURPOSE PROCESSING MODULE

Safety-critical multi-core general purpose processing

A complete software ecosystem and network stack

Collins Aerospace's Mosarc® general processing module is used in all our safety-critical air vehicle computers (AVCs). Its design meets OpenVPX standards in a 3U form factor. The Mosarc general purpose processing module features our FAA Technical Stand Order (TSO) certified multicore processor for deterministic operation with all cores active. This modular 3U OpenVPX processor enables customers to take full advantage of the NXP T2080 through our technology augmentation and safety analysis to achieve low risk airworthiness certification.

The Mosarc general purpose processing module provides a complete software ecosystem of libraries, application programming interfaces (APIs), drivers, configuration aids, analysis tools, and instructions—far more than commodity board suppliers provide. This includes APIs for file systems, persistent storage, graphics, health monitoring, and MIL-STD-1553, serial and discrete I/O.



SOX3 General Purpose Processing Module

The Mosarc general purpose processing module also includes a Wind River®-certified network stack, supplemented with a Software Criticality Index (SwCI) level of rigor (LoR) 2 configurable traffic scheduler API for safe, deterministic and reliable network support. Featuring two 10/100/1000 BASE-T external connections and multiple SerDes port configurations. The Mosarc general purpose processing module's TSO-certified multicore processor includess a security/encryption engine (SEC 5.2) supporting secure boot has provisions for IEEE 1588 Precision Time Protocol v2.

The Mosarc general purpose processing module product line manages obsolescence. All Mosarc modules contain Collins intellectual property (IP)-based firmware and portable/reusable platform software, middleware and application software components.

collinsaerospace.com/mosarc

KEY FEATURES & BENEFITS

- HOST/SOSA-aligned, 3U OpenVPX module
- FAA TSO certified for use of all cores
- Meets CAST-32A and AA 22-01 criteria for safe multi-core interference channel management and deterministic operation
- Approved by FAA's Aircraft Evaluation Division (AED) for airworthiness certification on the U.S. Army A/MH-6
- High-technical readiness level (TRL) hardware and software
- Available security/encryption engine (SEC 5.2) for trusted secure boot and Media Access Control-capable
- Mezzanine extensions for Collins' GPMX 2D graphics engines and/or M.2 non-volatile memory express (NVMe)
- Provisions for IEEE 1588 Precision Time Protocol v2
- Available in a Collins customized 3U OpenVPX development station with breakouts of major interfaces for early development

Model: SCX3

OPERATING SYSTEMS

- Wind River VxWorks ARINC 653 Hypervisor
- LynxOS-178 Guest Operating System (GOS) v2.2.4
- VxWorks 6.6.7 GOS

FIRMWARE

- Hardware monitoring (HM) – SCX3 includes a chassis manager field-programmable gate array (FPGA) that uses system management bus protocols to monitor health across all modules within the AVC

CORE PLATFORM SOFTWARE

- Boot: SCX3 platform software includes basic boot functionality and has provisions for secure boot using an RSA public/private key validation algorithm
- Hypervisor: Wind River VxWorks ARINC 653 hypervisor
- VxWorks GOS: VxWorks 6.6.7 GOS aligned with FACE

SAFETY BASE PROFILE

- LynxOS-178 GOS v2.2.4 aligned with FACE safety-extended profile

CORE MIDDLEWARE

- File System: SCX3 provides access to NVMe based file systems, including security provisions to access and validate keyed items
- Zeroize: SCX3 comes with a zeroize API to perform NSA 800-88 Rev 1 purge/zeroize for any classified data retained in magnetoresistive RAM (MRAM) persistent storage

CORE APPLICATIONS

- Health monitor: SCX3 provides APIs for BIT services and SNMP health data
- Data load: SCX3 supports ARINC 615-3 standard data loads. Collins offers XML tools to support DevSecOps-automated and coordinated batch loading of software
- Network: SCX3 includes a Wind River-certified network stack combined with our own application to add flow control, traffic shaping, and statically configured resource partitioning to create a deterministic network stack with access from all cores and partitions. Local clients operating within the GOSs access the network via POSIX BSD sockets and ARINC 653 ports and queues.

SPECIFICATIONS

- Collins' Assured MultiCore™ is implemented with a NXP QorIQ T2080 PowerPC processor with four e6500 cores at 1.5GHz
  - Private 32 KB instruction and data L1 caches per core
  - Shared 2 MB L2 cache
- Hardware acceleration functions:
  - Queue and buffer manager
  - Security/encryption engine (SEC 5.2)
  - Pattern matching engine (PME 2.1)
- 4-GB-embedded double data rate (DDR3) at 1600MT/sec with error-correcting code (ECC)
- 1 GB NOR flash memory with read-only hardware control
- 6 MB embedded MRAM/nonvolatile RAM
- External I/O
  - 14 predefined configurable SerDes ports:
    > Up to 5x PCIe Gen 2 interfaces (one Gen 3)

    > Up to 3x 1000 BASE-KX or serial gigabit media-independent interface (SGMII)

    > Up to 2x 10G BASE-KR or XFI

    > Up to 2x SATA 2.0
  - (1x) RS-232 and (1x) low-voltage complimentary metal oxide semiconductor (LVCMOS) serial ports
  - (2x) 10/100/1000 BASE-T ports (magnetics on-board)
  - I2C interfaces
- SWaP
  - Size – 3U OpenVPX form factor (100 mm x 160 mm)
  - Weight – 1.05 lb. (1.10 lb. with mezzanine)
  - Power – 30.0 W (typical at 1.5 GHz)
    34.8 W (with M.2 SSD mezzanine)

APPLICABLE RELEASES

- 966-6879-103 (SCX3 CCA)
- 828-6A11-401 (M.2 NVMe memory mezzanine)
- 828-6A11-301 (GPMX mezzanine)
- 983-9641-242 (complete module assembly with SCX3 CCA, M.2 mezzanine, heatsink and wedgelocks)
- 983-9641-240 (complete module assembly with SCX3 CCA, GPMX mezzanine, heatsink and wedgelocks)

Specifications subject to change without notice.

Collins Aerospace
An RTX Business

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