Cross Domain Computing Platform

MCOTS DuraCOR 8043 Xeon E3v5 Mission Processor Platform for Cross Domain Software

CURTISSWRIGHTDS.COM

Key Features

- Rugged mission processor with quad-core 2.8 GHz 6th Gen Intel CPU
- Compatibility to host Forcepoint High Speed Guard SP and/or Forcepoint Trusted Thin Client software
- Ethernet interfaces in electrically isolated, separate connectors
- Rugged SFF IP67 (dust and waterproof) aluminum chassis with MIL-DTL-38999 connectors
- Designed for MIL-STD-810/461 reliability (thermal, shock, vibration, altitude, humidity, EMI/EMC)
- 28 VDC MIL-1275/704 and DO-160 power supply with 200ms power hold-up
- Runs Forcepoint Cross Domain Solutions

Applications

- Civil and military in-vehicle and airborne trusted mission computing
- Multi-core fanless x86 embedded processor for SWaP-sensitive platform
- Secure multi-network access on-board fixed/rotary-wing aircraft
- Tactical ground vehicles and missile defense
- Interface for platform sensors, vetronics, and communications subsystems
- C4ISR technology refresh and LRU upgrades
- Embedded applications with demanding temp, shock, vibration, altitude, etc.

Overview

This Modified COTS (MCOTS) variant of the rugged Parvus® DuraCOR® 8043 modular mission computer has been integrated with additional Ethernet NIC cards and special connectors to support secure multi-network access using Forcepoint™ High Speed Guard Special Purpose (HSG SP), Forcepoint Trusted Thin Client (TTC) and/or other third-party cross domain guard (CDG) software. Based on a 6th gen “Skylake” Intel® Mobile Xeon® E3 v5 processor, integrated with PCIe104 and mini-PCIe Gigabit Ethernet (GbE) cards, along with a 2-slot removable SSD segment and 200ms power hold-up capacitance segment, the unit can provide aircraft with secure network access to multiple domains from a single device (when integrated with third-party software). Forcepoint’s HSG SP facilitates bi-directional, trusted rule set-based accredited transfer across domains, while Forcepoint’s TTC software provides users with secure, simultaneous access to multiple networks. Both are approved cross domain solutions and are included on the Unified Cross Domain Services Management Office (UCDSMO) Cross Domain Baseline.

Delivering new capabilities for trusted C4ISR applications, this DuraCOR 8043 variant is optimally designed for size, weight, and power (SWaP)-sensitive mobile, airborne, ground, manned/unmanned vehicle and sensor requirements. It combines powerful graphics and multi-core processing with ultra-reliable modularity, mechanical robustness in a fanless IP67 design (dust and waterproof) designed to support mission-specific payloads using mini-PCIe and PCIe104 add-on modules. The unit also supports removable 2.5” solid state disks capable of hosting high-capacity solid state media to host operating system and mission application software.

This MCOTS variant takes advantage of Curtiss-Wright’s cost competitive and quick-turn application engineering services, leveraging the unit’s PCI Express® (PCIe) Mini Card and stackable PCIe/104™ bus I/O architecture to support turnkey integration of add-on high-speed I/O and graphics card expansion without NRE cost. The unit requires no active cooling nor cold plate, and includes a military-grade power supply supporting aircraft (MIL-STD-704F, DO-160G) and ground vehicle (MIL-STD-1275D) voltages with capabilities for 50/200 ms power hold-up. Minimizing risk, the DuraCOR 8043 product will undergo qual tested to extreme MIL-STD-810G, MIL-STD-461G, MIL-STD-1275D, MIL-STD-704F and RTCA/DO-160G conditions for environmental, power and EMI compliance.

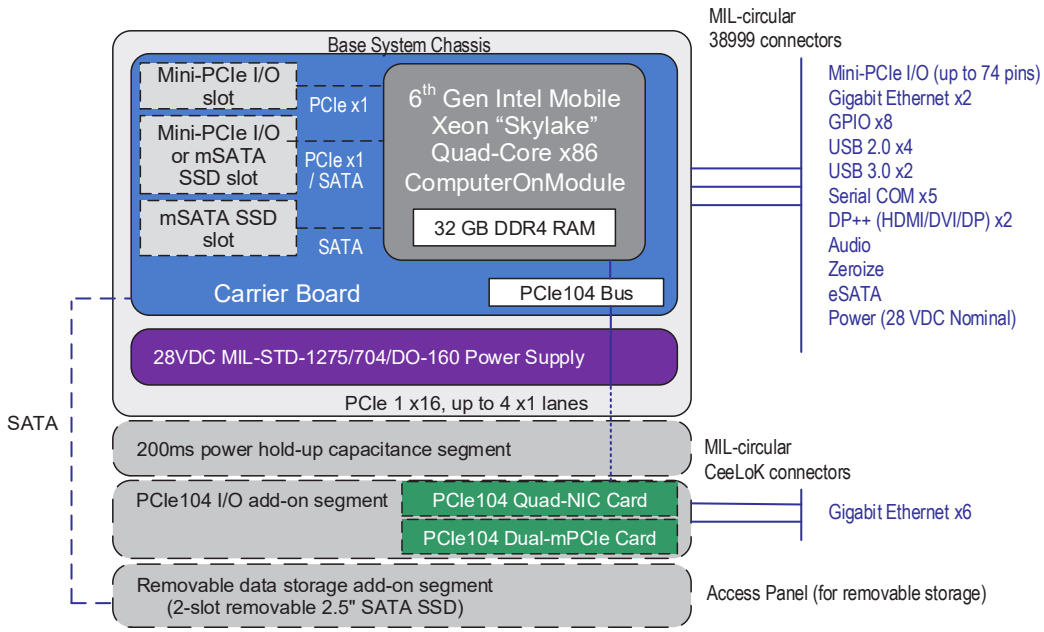

Figure 1: Block diagram of DuraCOR 8043 MCOTS system architecture

Features

High performance CPU and GPU

- 6th gen Intel Mobile Xeon processor, quad-core, 32 GB DDR4 ECC RAM

Connectivity and I/O

- 8 x Gigabit Ethernet NIC ports (# of ports expanded via PCIe104 and mini-PCIe add-on cards)
  - + 6 x ports in electrically/physically isolated connectors for cross-domain / thin client use
- 2 x USB 3.0, 4 x USB 2.0, 5 x COM, 8 x DIO, audio
- 2 x independent displays (2 x HDMI/DVI/DP)
- Other pre-integrated I/O by special order (i.e. ARINC 429, CAN, video encoder/streamer, DIO, etc)

Cross Domain Platform Ready

- Host for Forcepoint High Speed Guard SP for trusted rule set-based transfer between domains with special configurations for austere environments that require specific size, weight, power and cost (SWAP-C) considerations. Other High Assurance Cross Domain Guard software can also be considered.
- Host for Forcepoint Trusted Thin Client to provide users secure, simultaneous access to multiple networks.

Data storage

- Dual-slot removable 2.5” SSD storage

Rugged mechanical design

- MIL-STD-810G and DO-160G shock, vibration, thermal, altitude, humidity as well as MIL-STD-461F and DO-160 conducted/radiated emissions and susceptibility
- -40 to +71°C fanless extended temp operation with no moving parts (passive natural convection)
- Filtered, transient and EMI-protected MIL-STD-1275/704/DO-160 compliant power supply for aircraft and vehicles
- 200ms power hold-up capacitance (for MIL-STD-704/DO-160 power transfer)
- Corrosion-resistant, aluminum chassis sealed against water immersion, dust exposure (IP67 / MIL-STD-810G)
- Rugged circular MIL-DTL-38999 Series III and CeeLoK FAS-T connectors

Modular/expandable

- Pre-integrated rugged COTS Mini-PCIe I/O cards and stackable, PCIe104 I/O modules (other configs possible)
- Modular interlocking chassis design supports add-on segments for I/O and storage with pre-integrated DTL-38999s for I/O integration without mechanical changes

Forcepoint High Speed Guard Special Purpose

(Offered separately by Forcepoint)

- Forcepoint High Speed Guard, from which Forcepoint High Speed Guard SP is configured, is an approved transfer cross domain solution on the Unified Cross Domain Services Management Office (UCDSMO) Cross Domain Baseline for Top Secret/SCI and Below Interoperability (TSABI) and Secret and Below Interoperability (SABI). Supports fast bi-directional transfer rates
- Enables real-time video streaming while providing unparalleled control and auditing (MPEG2, MPEG4, H.264, STANAG 4609 encoding)
- Ideal for time-sensitive, large payload transfers
- Standards-based interoperability through SOAP/HTTP
- Provides highly customizable data validation rules for maximum flexibility
- Transfer Types:
  - Service-Oriented Architecture (SOA) Web Services
  - Real-Time Streaming Video
  - High Performance File Streaming
  - Adaptable Lightweight Messaging
  - Cross Domain Simple Network Management Protocol (SNMP)
  - Ultra High Data Rate User Datagram Protocol (UDP)
  - General Purpose File Transfer – Automated Secure Transfer (AST)

See www.forcepoint.com for more info

Forcepoint Trusted Thin Client

(Offered separately by Forcepoint)

- Forcepoint Trusted Thin Client is an approved transfer cross domain solution on the Unified Cross Domain Services Management Office (UCDSMO) Cross Domain Baseline for Top Secret/SCI and Below Interoperability (TSABI) and Secret and Below Interoperability (SABI)
- Meets or exceeds NIST 800-53, NIST 800-37 (SP), CNSS Instruction 1253 requirements, and RMF as required by Intelligence Community Directive (ICD) 503 and Department of Defense (DoD) IT for securing the most sensitive information
- Trusted Thin Client Distribution Console server component leverages Common Criteria evaluated (EAL4+) Red Hat Enterprise Linux operating system with Security-Enhanced Linux (SELinux)
- Provides connectivity to multiple security domains through common virtualization and desktop and application redisplay technologies (e.g., Citrix, Microsoft, VMware)
- Each network has a separate physical network interface connection on the Distribution Console assigning the classification level of the domain

See www.forcepoint.com for more info

Power Specifications

- 28V nominal power input voltage (11 to 35.5 VDC continuous; 1500 VDC galvanic isolation (input to system power)
- MIL-STD-704F 28 VDC compliant for aircraft electrical operation: over/under voltages, spikes, surges for normal, transfer, abnormal, emergency, starting, and power failure
- MIL-STD-1275D 28 VDC compliant for ground vehicle operation: steady state DC voltage variations, no fault/single fault conditions, ripple voltage susceptibility on input power leads, imported voltage spikes, overvoltage and under voltage surges, starting disturbances, ESD immunity
- RTCA/DO-160 compliant for aircraft operation (Sections 16-18, 25): power input, voltage spikes, audio frequency conducted susceptibility-power inputs, electrostatic discharge
- Power consumption: <75W maximum (approx)
- Power Hold-up Capacitance: meets or exceeds 50/200 ms power hold-up requirement of MIL-STD-704 / DO-160 for aircraft power switch-over

Physical Specifications

- Dimensions (H x D x W, excluding connectors/mounts):
  - Approx. 8.258 x 6.75 x 6.25” (20.98 x 17.15 x 15.85 cm)
- Chassis: aluminum alloy, corrosion resistant
- Ingress protection: dust and water proof (similar to IP67)
- Finish: black anodize finish per MIL-A-8625, Type II, Class 2
- Connectors: LEMO M Series circular (power), MIL-DTL-38999 Series III (for base I/O), and CeeLoK FAS-T for add-on GbE NIC ports
- Installation: base flange mount or side boss mount (90° rotated orientation)
- Cooling: natural passive convection/conduction, no moving parts

Environmental Specifications

MIL-STD-810G, RTCA/DO-160G (qualification pending)

- Operating temperature: -40 to +71°C (-40 to +160°F) ambient
- Storage temperature: -55 to +85°C (-67 to +185ºF)
- Humidity (operating/transport): Up to 95% RH @ 40°C, non-condensing
- Operating shock: 40 g, 11 ms, 3 pos/neg per axis
- Crash hazard shock: 75 g, 11 ms, 12 terminal peak shock pulses
- Random vibration: Combined jet-helo-tracked vehicle profile
- Ingress (dust/sand): No ingress (similar to IP67)
- Water immersion: No leakage per 1 meter submersion, 30 minutes
- Operating altitude: 50,000 ft (15,240 meters)
- Storage altitude: 60,000 ft (18,288 meters)

EMI Compliance

EMI/EMC isolation

MIL-STD-461G, RTCA/DO-160G, EN55022/55024 (qualification pending)

- Conducted emissions:
  - MIL-STD-461F, CE102
  - DO-160G Sec. 21; Category L
  - EN 55022 Class A
- Conducted susceptibility:
  - MIL-STD-461F, CS101
  - MIL-STD-461F, CS114
  - MIL-STD-461F, CS115
  - MIL-STD-461F, CS116
  - RTCA/DO-160G Sec. 20
  - EN 55024 electrical fast transient/conducted immunity
- Radiated emissions:
  - MIL-STD-461F, RE102
  - DO-160G Sec. 21
  - EN 55022, Class A
- Radiated susceptibility
  - MIL-STD-461F RS-103
  - DO-160G Sec. 20
  - EN 55024 radiated electromagnetic field and immunity

Figure 2: Side view

Figure 3: Rear view

Figure 4: Front view

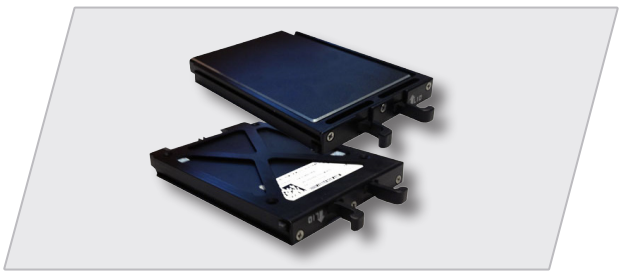

Figure 5: Removable SSDs

Other Specifications

Reliability

- Designed and manufactured using AS9100 aerospace grade/ISO 9001:2000 certified quality program

Export jurisdiction

- Hardware is ITAR-free, U.S. Commerce EAR controlled (ECCN 5A002) ; refer to third-party software providers for export classification of cross domain solutions
- Forcepoint High Speed Guard and TTC are export controlled. Releasable to FVEY partners.

Ordering Information

- C8042-1022-100: DuraCOR 8043 mission computer with PC104 I/O expansion segment with 6 x additional GbE ports, 2-slot removable 2.5” SSD, 200ms power hold-up segment, consisting of:
  - + Base DuraCOR 8043 processor system
  - + I/O expansion segment (with PCIe104 quad-NIC card, dual Mini-PCIe carrier, and two Mini-PCIe NICs, TE CeeLOK connectors)
  - + 200ms power hold-up segment
  - + 2-slot removable SSD segment
  - + CDS software offered separately by Forcepoint
- Starter breakout cable set from DTL-38999 connectors to commercial PC-style connectors can be provided
- Delta qual testing/qual by similarity analysis available

Refer to full Parvus DuraCOR 8043 product sheet for more detailed technical specifications on the base COTS system architecture and capabilities. Tailored MCOTS variants like shown here can be integrated to satisfy platform-specific requirements at minimal/no NRE cost, including pre-integration of add-on Mini-PCIe and PCIe/104 I/O cards.

Line Drawings

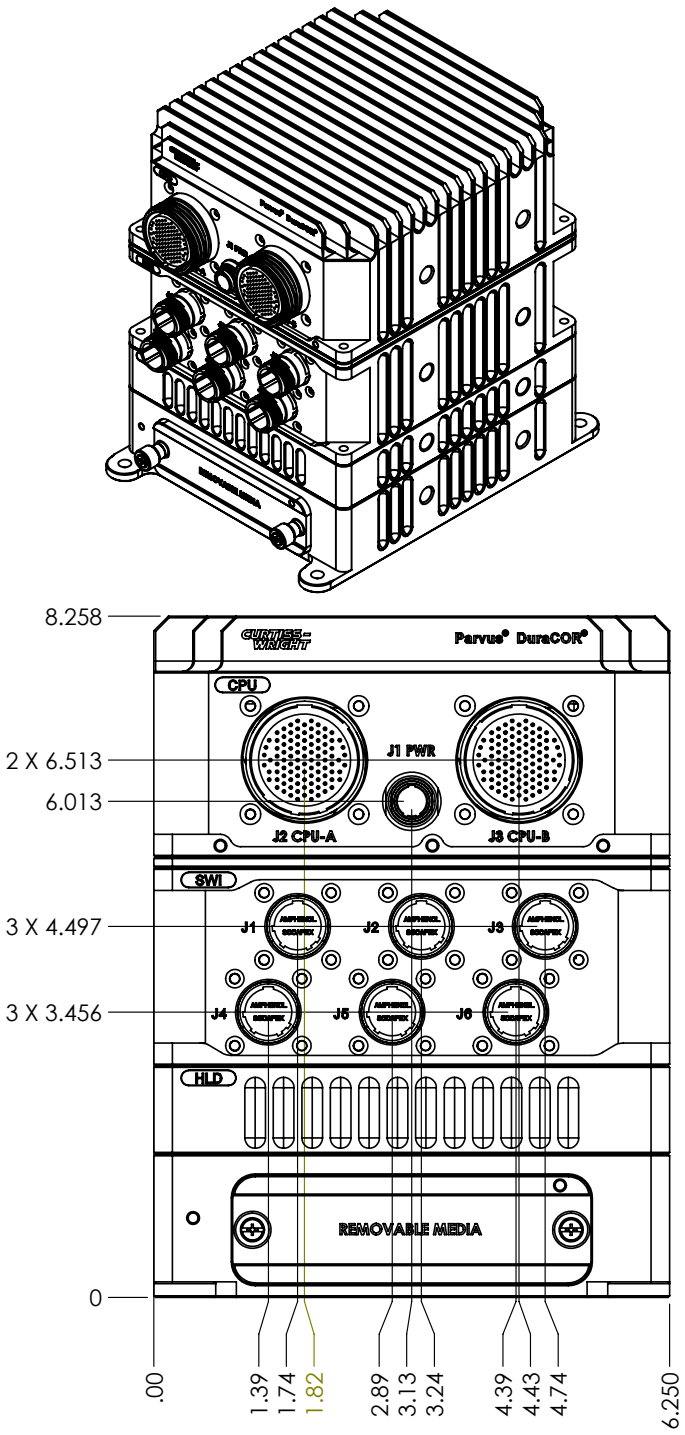

Figure 6: DuraCOR 8043 MCOTS unit dimensional line drawings (measurements shown are in inches and [cm])