Key Features

- 5th gen Intel Core i7 "Broadwell" processor with 32 GB RAM memory
- Quad-core (8-thread) i7-5850EQ at 2.7 GHz with turbo up to 3.4 GHz
- Modular rugged chassis with Mini-PCIe and stackable PCIe/104 I/O card expansion
- Internal fixed mSATA/removable 2.5" SSD options
- 28 VDC MIL-1275/704 and DO-160 power supply with transient protections and 50/200 ms hold-up, redundancy options
- Qual testing pending for MIL-STD-810G, DO-160G, MIL-STD-461G (EMI, thermal, shock, vibration, altitude, humidity, etc.)
- Rugged IP67 (dust and waterproof) aluminum chassis with MIL-DTL-38999 connectors

Applications

- Civil and military rugged mobile computing
- Multi-core x86 embedded processor
- Fixed and rotary wing (un)manned aircraft
- Tactical ground vehicles
- Outdoor and underground platforms
- Low SWaP
- C4ISR technology refresh and LRU upgrades

Overview

The Parvus® DuraCOR® 80-42 is a rugged Commercial Off the Shelf (COTS) tactical mission computer subsystem based on a quad-core (8-thread), 5th gen Intel® Core™ i7 (Broadwell) processor with PCI Express® (PCIe) Mini Card slots and a PCIe/104™ bus architecture to support platform-specific add-on I/O modules. Optimally designed for size, weight, and power (SWaP)-sensitive mobile, airborne, ground, manned/unmanned vehicle and sensor applications, the DuraCOR 80-42 combines powerful graphics and multi-core processing with ultra-reliable mechanical robustness and modular I/O expansion capabilities for demanding civil and military platforms. Featuring an integrated Intel Iris™ Pro Graphics GPU, the unit provides OpenGL® support for graphics-intensive applications, along with a 40-core GPGPU delivering up to 640 GFLOPS of performance with OpenCL™ support for data processing-intensive applications. The unit has qual testing pending 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.

Delivering new capabilities for C4ISR, image processing and surveillance applications, the DuraCOR 80-42 delivers high performance computing and graphics engines with integrated I/O interfaces (3 x display outputs, 2 x GbE network interfaces, 2 x USB 3.0 interfaces, 4 x USB 2.0 ports, 5 x COM ports, audio, GPIO and eSATA) and flexible I/O expansion capabilities for mission-specific payloads. The base 80-42 system supports two Mini-PCIe I/O slots with pre-routed pins going to external connectors for optional avionics databus interfaces (MIL-STD-1553/ARINC 429) or other COM, DIO, analog, network or video modules. One Mini-PCIe slot can alternatively support mSATA Flash storage, if two internal SSDs are required (a dedicated mSATA slot is also supported). Optional interlocking, add-on I/O expansion segments pre-fitted with MIL-DTL-38999 connectors support modified COTS (MCOTS) variants with application-specific PCIe/104 I/O cards. For high capacity (multi-Terabyte) or removable storage, optional single/dual-slot 2.5" SATA SSD add-on segments can be added to the chassis. Curtiss-Wright offers no/low-NRE application engineering services to pre-integrate Mini-PCIe modules (in the base system) and PCIe104 I/O modules (into add-on I/O expansion segments). These quick-turn MCOTS variants can reduce cost, schedule, and risk for system integrators.

The DuraCOR 80-42 mission computer is completely sealed (IP67) against dust and water ingress, requires no active cooling, and includes a military-grade power supply supporting aircraft (MIL-STD-704F, DO-160G) and ground vehicle (MIL-STD-1275D) voltages with capabilities for optional 50/200 ms power hold-up and N+1 failover redundancy.
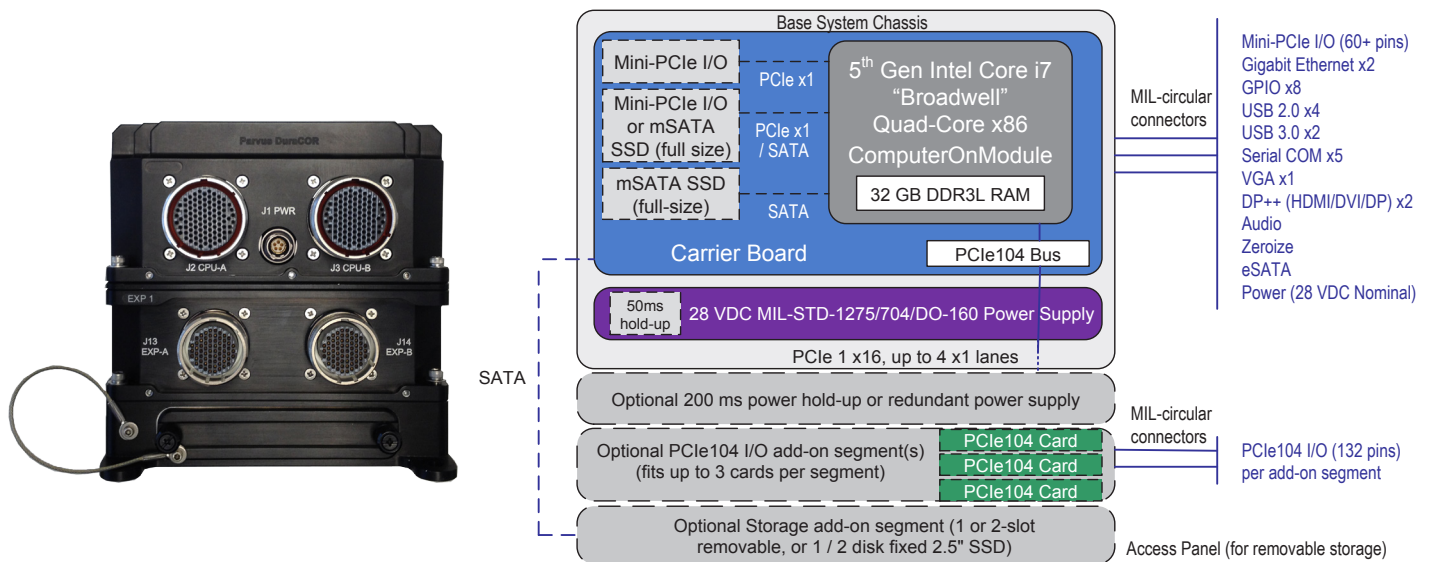
CURTISS – WRIGHT

Figure 1: Photo (left) and block diagram (right) for modular DuraCOR 80-42 architecture

Features

High performance CPU

- Intel 5th-gen Core i7 (Broadwell) processor, quad-core (8-thread), 32 GB DDR3L RAM, integrated Intel Iris Pro GPU, AVX and AVX2 signal processing

Connectivity and I/O

- 2 x Gigabit Ethernet 10/100/1000 Mbps LAN interfaces
- 2 x USB 3.0, 4 x USB 2.0, 5 x COM, 8 x DIO, 2 x PCIe MiniCard slots (additional I/O options available)
- 3 x independent displays (VGA, 2 x HDMI/DVI/DP)
- Up to two mSATA SSDs in base unit, External SATA (eSATA) interface on DTL-38999 connector, optional chassis add-segments for fixed/removable 2.5" SATA SSDs
- Other pre-integrated I/O configurations by special order (i.e. MIL-STD-1553/ARINC 429 interfaces or other Mini-PCIe or PCIe/104 I/O cards)

Rugged mechanical design

- Qual-tests pending for MIL-810G and DO-160G shock, vibration, thermal, altitude, humidity, ingress protection
- -40 to +71°C fanless extended temp operation with no moving parts (passive natural convection)
- Qual-tests pending for MIL-461F and DO-160 EMI/EMC

- Filtered, transient and EMI-protected MIL-STD-1275/704/DO-160 compliant power supply for aircraft and vehicles
- Options for 50/200 ms power hold-up (for MIL-STD-704/DO-160 power transfer) and N+1 power failover redundancy (dual supplies in parallel)
- Corrosion-resistant, aluminum chassis sealed against water, dust (IP67)
- Single/dual removable (or fixed) 2.5" SATA SSD options
- Rugged circular MIL-DTL-38999 Series III I/O connectors
- Conformal coating for humidity/tin-whisker mitigation
- Flexible installation – base flange mount or side boss mount

Modular/expandable

- Dual Mini-PCIe card slots and stackable PCIe/104 bus to add-on platform-specific I/O interfaces
- Modular interlocking chassis design supports add-on segments for I/O and storage with pre-integrated DTL-38999s
- Factory mateable with DuraMAR 5915 router, DuraNET 20-10 switch, DuraNET 30-2020 switch, other add-on I/O modules

Cisco IOS software router option

CISCO Technology

- Optional Cisco Systems 5921 Embedded Services Router (ESR) Linux® software application (for more information see page 11)

- Cisco Mobile Ready Net capabilities for highly secure, mobile data voice and video capabilities with extensive IPv4/IPv6 routing protocols, IP multi-casting, radio aware routing, DLEP, and Mobile Ad Hoc Networking (MANET)

- Remote voice services with Cisco Unified Communications Manager Express (CME)

- Protection against malicious attacks, unauthorized access with advanced security

Target Applications

- Civil and military tactical mission processing (server/computer) in ground vehicle, fixed wing or rotary aircraft, maritime platforms, outdoor, underground or other demanding embedded computing platforms

- Extending high performance Intel Core i7 computing architecture into embedded computing applications where harsh temperature, shock, vibration, altitude, dust, water environmental and EMI conditions exist

- SWaP-constrained mobile, tactical, airborne, vehicle, and sensor processing, including new and retrofit (C4ISR technology refresh) upgrades for enhanced situational awareness

- Commercial and military aerospace platforms requiring compliance to MIL-STD-810G, MIL-STD-461F and RTCA/DO-160

- Modular open architecture, LRU consolidation – multiple I/O and function integration into single box

- Layer 3 network routing for IP-enabled equipment (i.e. on-board computers, cameras, sensors, radios, SatCom, C4ISR gear)

Multi-Core x86 Processor

Intel 5th Gen (Haswell) Core i7 processor

- Quad-core (8-thread) i7-5850EQ @ 2.7 GHz with turbo frequency up to 3.4 GHz

- 256 KB L2 cache per core, 6 MB Intel Smart Cache

- 64-bit instruction set

- Intel Streaming SIMD Extensions (SSE 4.1/4.2)

- Intel Advanced Vector Extensions (AVX and AVX2) floating-point

- Intel Trusted Execution Technology (TxT)

- Intel Virtualization Technology (VT-x)

- Intel Iris Pro Graphics 6200 (GT3e)

- Intel QM87 Platform Controller Hub (PCH)

- Intel Hyper-threading technology

- RAM memory: 32 GB dual-channel DDR3L @ 1600/1333 MHz

Figure 2: Side view of base unit
(mounting features on side for optional side-mount installation)

Figure 3: Front view of base unit
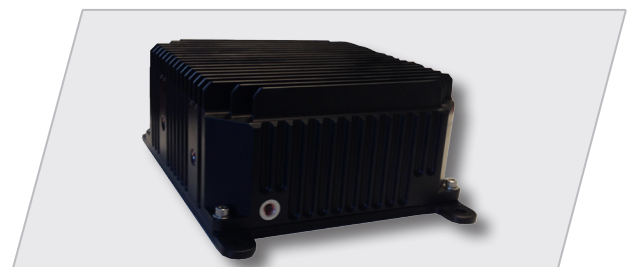(MIL-circular connectors bring out CPU & Mini-PCIe I/O, power input)

Figure 4: Rear view of base unit
(ground lug shown)

Operating system

- Pre-installed Linux or Windows 7 (or special ordered with other OS options)

Software applications (optional)

- Cisco 5921 IOS router running on Linux (for secure Layer 3 routing services)

Modular Architecture

PCIe/104 Bus

- PCIe/104 (PCIe v2.0, Type 1) bus – Gen3 x16 lane, up to four Gen2 x1 lanes

- Supports integration with stackable PCIe/104 and/or PCI/104-Express I/O cards natively; PCI-PCIe bridge adapter required to support PCI-104 and/or PC/104-Plus I/O cards

mSATA/Mini-PCIe

- 1 x slot dedicated for mSATA (full-size) SSD

- 1 x slot dedicated for Mini-PCIe card I/O module (i.e. MIL-STD-1553, ARINC 429, serial, Ethernet, GPS, etc.)

- 1 x slot auto-detectable full-size mSATA SSD or Mini-PCIe I/O

- 60+ pins available on DTL-38999 for Mini-PCIe I/O signals

Expansion I/O support

- 2 x slots available for Mini-PCIe modules with 60+ pins available on DTL-38999 connectors for I/O interfaces

- 2 to 3 card slots available for PCIe/104 or PCI/104-Express cards per expansion chassis segment added to base system

- Each chassis I/O expansion ring include 132 spare I/O pins on pre-installed DTL-38999 connectors

- Integrated power and control bus connects each chassis segment - supports capabilities for 5V, 3.3V and 12V power, Ethernet, serial, and zeroize signals to expansion I/O modules (internal dip switches enable/disable signals)

- Approx. 90W of power available for expansion cards added to system

Figure 5: Base system + 1-slot removable 2.5" SSD

Figure 6: Base system + 2 x PCIe104 I/O expansion segments

Figure 7: Base system + fixed SSD add-on segment

Data Storage

SATA

4 x SATA I/II/III controllers for mSATA, SATA, and/or eSATA devices:

- SATA Lane 0: pinned-out for External SATA (eSATA) on DTL-38999 connector for directed attached storage (DAS) device (default) or alternatively to removable SATA 2.5" SSD add-on segment

- SATA Lane 1: pinned-out for use with removable 2.5" SSD add-on segment

- SATA Lane 2: pinned-out to internal mSATA SSD socket for fixed storage

- SATA Lane 3: pinned-out for mSATA SSD socket or removable 2.5" SSD segment

Solid State Disk (SSD)

- mSATA SSD – 64 GB capacity default (128 GB, 256 GB, 512 GB and 1 TB special ordered), non-removable, up to 2 x slots

  + 1 x slot dedicated for mSATA SSD

  + 1 x slot for mSATA SSD or Mini-PCIe I/O module

- Optional add-on mechanical segments for 2.5" form factor SATA media storage: (a) 1-slot removable SSD segment, (b) 2-slot removable SSD segment, or (3) one/two disk fixed disk segment; removable SSD segments feature fully sealed removable door that can be opened by hand without special tools

- Optional rugged (-40 to +85°C) high capacity, industrial NAND Flash 2.5" SATA storage SSDs pre-loaded with Linux or Windows OS and pre-installed on compatible mounting trays that slide into the unit:

  + MLC-based 2.5" SATA Flash SSD, industrial temp, ~3,000 Flash program/erase cycles, 64 GB to 2 TB capacity options

  + eMLC/iSLC-based 2.5" SATA Flash SSD, industrial temp, ~30,000 Flash program/erase cycles, 64 GB to 512 GB capacity options

  + SLC-based 2.5" SATA Flash SSD, industrial temp, ~100,000 Flash program/erase cycles, from 64 GB to 512 GB capacity options

  + SLC-based 2.5" SATA Flash SSD, industrial temp, NIST-certified AES-256 HW encryption Microsemi® TRRUST-Stor® secure Flash military-grade with fast purge, 2, 4, 8, 16 petabytes of write endurance, 128 GB to 1 TB capacity options

  + Spare mounting trays optionally available (compatible with any industry-standard SATA 2.5" media)

Figure 8: Base system + 1 x PCIe/104 expansion I/O + dual removable 2.5" SSD

Figure 9: Base system + 1 x PCIe/104 I/O expansion segment (unit shown mounted on side)
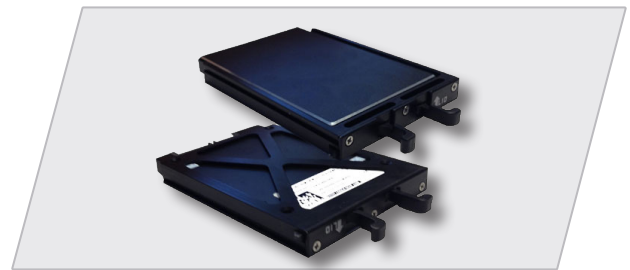

Figure 10: Removable storage cartridges support 2.5" SATA SSDs (top/bottom view)

Figure 11: Base system + 2 x PCIe/104 expansion I/O segments (provides 4 x 66-pin connectors for up to 6 x PCIe104 form factor cards)

I/O Interfaces

Ethernet

- 2 x Gigabit Ethernet LAN interfaces (10/100/1000 Mbps)
- Optional additional GbE NICs (via Mini-PCIe cards)

Serial

- 2 x RS-232 serial ports
- 2 x RS-422 serial ports, full duplex
- 1 x RS-485 serial port, half duplex
- Optional additional ports possible with pre-integrated Mini-PCIe module

USB

- 2 x USB 3.0 ports
- 4 x USB 2.0 ports

Video

- 3 x independent high definition video outputs:
    + 1 x VGA
    + 2 x DisplayPort++ (HDMI/DVI/DisplayPort)
- Integrated Intel Iris Pro Graphics 6200 (GT3e) GPU with 300 MHz base clock with up to 1 GHz performance, and 40 graphics execution units with up to 640 GFLOPS performance.
- Optional pre-integrated Mini-PCIe or PCIe/104 video frame grabber/video encoder/network streamers
- Optional pre-integrated PCIe/104 AMD/NVIDIA GPU module for more display outputs or dedicated GPGPU engine

Audio

- Stereo audio (left/right) and microphone (left/right)

GPIO

- 8 x general-purpose digital I/O, 5V tolerant
- Special order factory configuration option: up to 16 GPIO onboard, configurable as serial ports, I2C, SPI

MIL-STD-1553/ARINC 429

- Optional pre-integrated Mini-PCIe modules for 1553/ARINC 429, up to 2 modules:
    + 2 x channel BC/MT MIL-STD-1553 or multi-RT/MT per channel, IRIG-B time input
    + 6 x ARINC 429 channels - 2 x Rx, 4 x Tx/Rx, IRIG-B time input

CAN

- Optional pre-integrated one or two-channel Mini-PCIe CANbus controller module

TPM

- Trusted Platform Module Type 1.2 (ATMEL AT97SC3204) for creating secure computing environment, ensuring only trusted and signed BIOS and software can execute on system

eSATA

- External SATA (eSATA) interface for external direct attached storage device

Power Compliance

- 28V nominal power input voltage (11 to 35.5 VDC continuous <100W systems; 18 to 35.5 VDC for up to 150W systems); 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
- Optional 50/200 ms power hold-up capacitance (per MIL-STD-704 / DO-160) for aircraft power switch-over requirements
    + 50 ms hold-up optionally integrated in base chassis
    + 200 ms hold-up optionally integrated in chassis add-on segment
- Optional N+1 failover capable redundant power supplies - second supply integrated into add-on segment
- <65W maximum power consumption (base system); ~100W available for I/O expansion modules
- Grounding lug for connection to system chassis ground
- Field-replaceable battery for Real-time Clock (RTC) maintains time/day for estimated 10 years

Physical Specifications

Physical

- Weight: base system estimated at < 5.7 lb (2.6 kgs)
  + PCIe/104 I/O expansion add-on segments add 1.4 lb (0.6 kgs) each (max 2 segments) - weight exclusive of integrated PCIe/104 cards
  + Removable 2.5" SSD add-on segment adds ~1.25 lb (1-slot) / ~1.45 lb (2-slot); fixed 2.5" SSD add-on segment (for either 1 or 2 non-removable 2.5" disks) adds 0.60 lb - weight exclusive of SSD devices
  + 50 ms/200 ms power hold-up options add approx 0.25/1.75 lb (0.11/0.79 kg), respectively
  + Redundant power supplies for N+1 failover add approx. 1.5 lb (0.68 kg)

- Dimensions (H x D x W, excluding connectors/mounts):
  + Base unit approx. 3.3 x 6.75 x 6.25" (8.38 x 17.15 x 15.85 cm) with or without optional 50 ms power hold-up
  + 200 ms power hold-up add-on segment adds approx 0.5" (1.3 cm) to height
  + N+1 redundant power supply add-on segment adds approx 1.5" (3.8 cm) to height
  + Each expansion I/O segment adds 2.0" (5.08 cm) to height
  + Add-on removable 2.5" SSD segment adds 1.2"/1.75" (3.05/4.45 cm) to height for one/two slots; fixed disk 2.5" SSD segment add approx. 0.50" (1.27 cm) to height

- Chassis: aluminium 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: MIL-DTL-38999 Series III (Ethernet, console), LEMO M Series circular (power) - same pinout as DuraCOR 80-41
- Installation: base flange mount or side boss mount (90° rotated orientation)
- Cooling: natural passive convection/conduction, no moving parts

Environmental Specifications

Qual testing pending for MIL-STD-810G and RTCA/DO-160G

- Operating temperature: -40 to +71°C (-40 to +160°F) ambient (per MIL-STD-810G Methods 501.5 and 502.5) and -40 to +70°C (per DO-160G, Section 4 Category A2 and D2 and Section 4.5.5, Category V/Table 4-1)
- Storage temperature: -40 to +85°C (-40 to +185°F) (per MIL-STD-810G Method 502.5 and Method 501.5) and -55 to +85°C (per DO-160G, Section 4, Category A2)
- Humidity (operating/transport): Up to 95% RH @ 40°C, non-condensing (per MIL-STD-810G, Method 507.5, Procedure II; DO-160G, Section 6, Category B, Section 6.3.2)

- Operating shock: 40 g, 11 ms, 3 pos/neg per axis, 18 terminal peak shock pulses per MIL-STD-810G Method 516.6, Procedure I; 6 g, 11 ms, terminal peak shock pulses per DO-160G, Section 7, Class A)
- Crash hazard shock: 75 g, 11 ms, 12 terminal peak shock pulses, 2 pos/neg per axis (per MIL-STD-810G method 516.6, Procedure V)
- Random vibration: 3 axes, 1 hour/axis (per MIL-STD-810G, Method 514, per Procedures I and II and DO-160G Section 8, Category S, Curve B3 per combined Jet-Helo-Tracked vehicle profile)
- Ingress (dust/sand): no ingress (per IP67, MIL-STD-810G Method 510.5, Procedure I and II, DO-160G, Section 12, Category S)
- Water immersion: no leakage per 1 meter submersion, 30 minutes (similar to IP67 and MIL-STD-810G, Method 512.5, Procedure I (1 meter, 30 minutes))
- Operating altitude: up to +50,000 ft (15,240 meters) (per DO-160G, Section 4, Category D2, Section 4.6.1) and +30,000 ft (9,144 meters) (per MIL-STD-810G, Method 500.5, Procedures I-II).
- Storage altitude: up to 60,000 ft (18,288 meters) (per MIL-STD-810G, Method 500.5, Procedures I-II)

EMI Compliance

EMI/EMC isolation

Qual testing pending to MIL-STD-461G, RTCA/DO-160G, EN55022/55024

- Conducted emissions, MIL-STD-461G, CE102, power leads, 10 KHz to 10 MHz, basic curve, Figure CE102-1; DO-160G Sec. 21; conducted RF emissions, 150 kHz to 152 MHz, Category L; Figures 21-1, 21-2; EN 55022 Class A (power line conducted emissions)
- Conducted susceptibility: MIL-STD-461G, CS101, power leads, 30 Hz to 150 KHz, Curve 2, Figure CS101-1 (28V and below); CS114; bulk cable injection, 10 k to 200 MHz; Curve 3, Figure 1; CS115; bulk cable injection, impulse excitation; impulse, Figure 1; CS116; damped sinusoidal transients, cables/power leads, 10 k to 100 MHz; transient, Figures 1-2; RTCA/DO-160G Sec. 20; conducted susceptibility, 10 kHz to 400 MHz, category M; Figure 20-6; EN 55024 electrical fast transient/burst immunity and conducted immunity (per EN 61000-4-4, criteria B, EN61000-4-6, criteria A)
- Radiated emissions, MIL-STD-461G, RE102, electric field, 10 KHz to 18 GHz, fixed wing internal < 25 meters, Figure RE102-3; DO-160G Sec. 21; radiated RF emissions, 100 MHz to 6 GHz, Category L; Figure 21-7; EN 55022, class A (power line radiated emissions)
- Radiated susceptibility, MIL-STD-461G RS-103, electric field, 2 MHz to 18 GHz, 200 V/m, Table VII, RS-103 limits; DO-160G Sec. 20; radiated susceptibility, 100 MHz to 8 GHz, Category R; Figure 20-10; EN 55024 radiated electromagnetic field and immunity tests, perf. criteria A

Other Specifications

Reliability

- Designed and manufactured using AS9100 aerospace grade/ ISO 9001:2000 certified quality program
- No moving parts, passive cooling, conformal coated boards for humidity and tin whisker mitigation
- MTBF: Calculated per MIL-HDBK-217F, available with qual test report, upon request
- Built in Test (BIT) self-diagnostics capabilities to detect critical systems faults

Export jurisdiction

- ITAR-free, dual use, U.S. Commerce EAR controlled (ECCN 5A002)

Regulatory compliance

- European CE Mark pending (including EN55022, EN55024, RoHS2)

Warranty

- 1 year return to depot warranty (extended warranty available with service contract)
- Extended, multi-year service agreements available (basic/ priority service)

Starter cable set

- Optional starter breakout cable set mates with MIL-DTL-38999 connectors to break out standard CPU I/O and power signals to traditional PC style interfaces (RJ-45/DB-9/ USB/HDMI/VGA/audio/banana plug connectors) for lab or bench testing purposes

Ordering Information

Note: Due to the modularity of the DuraCOR 80-42 (mSATA vs 2.5" SSD, operating system options, pre-integrated PC/104 I/O cards/Mini-PCIe cards, etc.), numerous configuration variants are possible. For customers migrating from the DuraCOR 80-41 (4th gen Core i7) to the 80-42 (5th gen Core i7), these systems share the same breakout cable sets, connector pinouts, removable SSDs, and physical size. Please consult with your sales representative and application engineer to assess your technical requirements and recommended system configuration.

Sample ordering codes

Base system with internal mSATA SSD (sampling of options):

- C8042-0D0: DuraCOR 80-42 with internal 64 GB mSATA SSD-Linux OS
- C8042-0E0: DuraCOR 80-42 with internal 64 GB mSATA SSD-Win7 OS

Base system + removable 2.5" SSD segment (sampling of options):

- C8042-001: DuraCOR 80-42, no mSATA SSD, 1-slot removable 2.5" SSD segment (2.5" SSD sold separately)
- C8042-002: DuraCOR 80-42, no mSATA SSD, 2-slot removable 2.5" SSD segment (2.5" SSDs sold separately)

Base system with internal mSATA SSD + PC/104 I/O expansion segments (sampling of options):

- C8042-1D0: DuraCOR 80-42, 64 GB mSATA SSD-Linux OS, 1 x PC/104 expansion segment
- C8042-2D0: DuraCOR 80-42, 64 GB mSATA SSD-Linux OS, 2 x PC/104 expansion segments

Accessories and cables:

- MCH-8041-00: spare mounting tray for 2.5" form factor SSD - DuraCOR 80-41/80-42
- CBL-8041-00: starter breakout cable set for J1, J2, J3 (mating circular 38999 to PC-style connectors and banana plugs) - DuraCOR 80-41/80-42

Removable 2.5" SSDs (sampling of options):

- SSD8041-512M: 512 GB 2.5" SATA SSD, industrial MLC NAND Flash -40/+85°C, mounting tray, no OS
- SSD8041-512E-L: 512 GB 2.5" SATA SSD, industrial eMLC/ iSLC NAND Flash -40/+85°C, mounting tray, Linux
- SSD8041-512S-W: 512 GB 2.5" SATA SSD, industrial SLC NAND Flash -40/+85°C, mounting tray, WIN7-Pro64
- SSD8041-M1TBS: 1 TB 2.5" Secure SSD, Microsemi Trrust-Stor, industrial SLC NAND Flash, mounting tray, no OS

Special order options

- Breakout cables for user defined add-on expansion I/O (for add-on Mini-PCIe/PCIe/104 card I/O)
- Pre-integrated Mini-PCIe or PCIe/104 I/O or datacom modules (e.g. MIL-STD-1553/ARINC 429 data bus controllers, video frame grabber, CANbus interface, multi-port serial/DIO, Ethernet NIC, etc)
- Additional GPIO interfaces onboard (factory jumper configuration, for up to 16 GPIO, does not utilize any Mini-PCIe lanes)
- Integrated Cisco IOS Router/Switch or Vitesse-based GbE Ethernet Switch Subsystem as a "DuraWORX" system (DuraMAR 5915 Router/ DuraNET 30-2020 Switch / DuraNET 20-10 Switch)
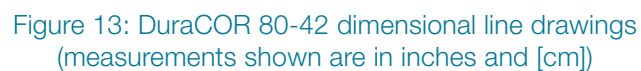- 38999 connector caps, mechanical changes, custom metal finishes

Figure 12: Starter break-out cable set for J1, J2, J3

Line Drawings

Figure 13: DuraCOR 80-42 dimensional line drawings
(measurements shown are in inches and [cm])

Functional architecture block diagram

SBC
Intel Core i7 Quad-Core,
2.7 GHz, 32 GB DDR3L RAM

Mini-PCIe card I/O
- 1 x dedicated slot
- 1 x slot shared with mSATA

Internal Storage
- 1 x slot dedicated mSATA
- 1 x slot shared Mini-PCIe/mSATA

Power
MIL-1275/704, DO-160, DC/DC,
50 ms power hold-up option

**200 ms power hold-up /
redundant power supply
(optional add-on)**

**PCIe/104/ I/O expansion
(optional add-on)
2-3 x PCIe/104 cards per
expansion segment added**

**2.5" SATA storage
(optional add-on)
removable or fixed, 1 x or 2 x slots**

SATA

PCI Express

MIL-38999 Connectors

SATA

- Mini-PCIe I/O (60+ pins)
- GigE LAN x2
- Serial COM x5
- USB 3.0 x2
- USB 2.0 x4
- VGA
- External SATA (eSATA)
- DisplayPort++ (HDMI/DVI/DP) x2
- Audio
- GPIO x8 (or x18 special order)

LEMO M Series Connector — 11 to 35.5 VDC input

MIL-38999 Connector — 132-pin I/O expansion per expansion chassis segment added

Removable 2.5" SATA SSDs — PCIe/104 (PCIe) bus
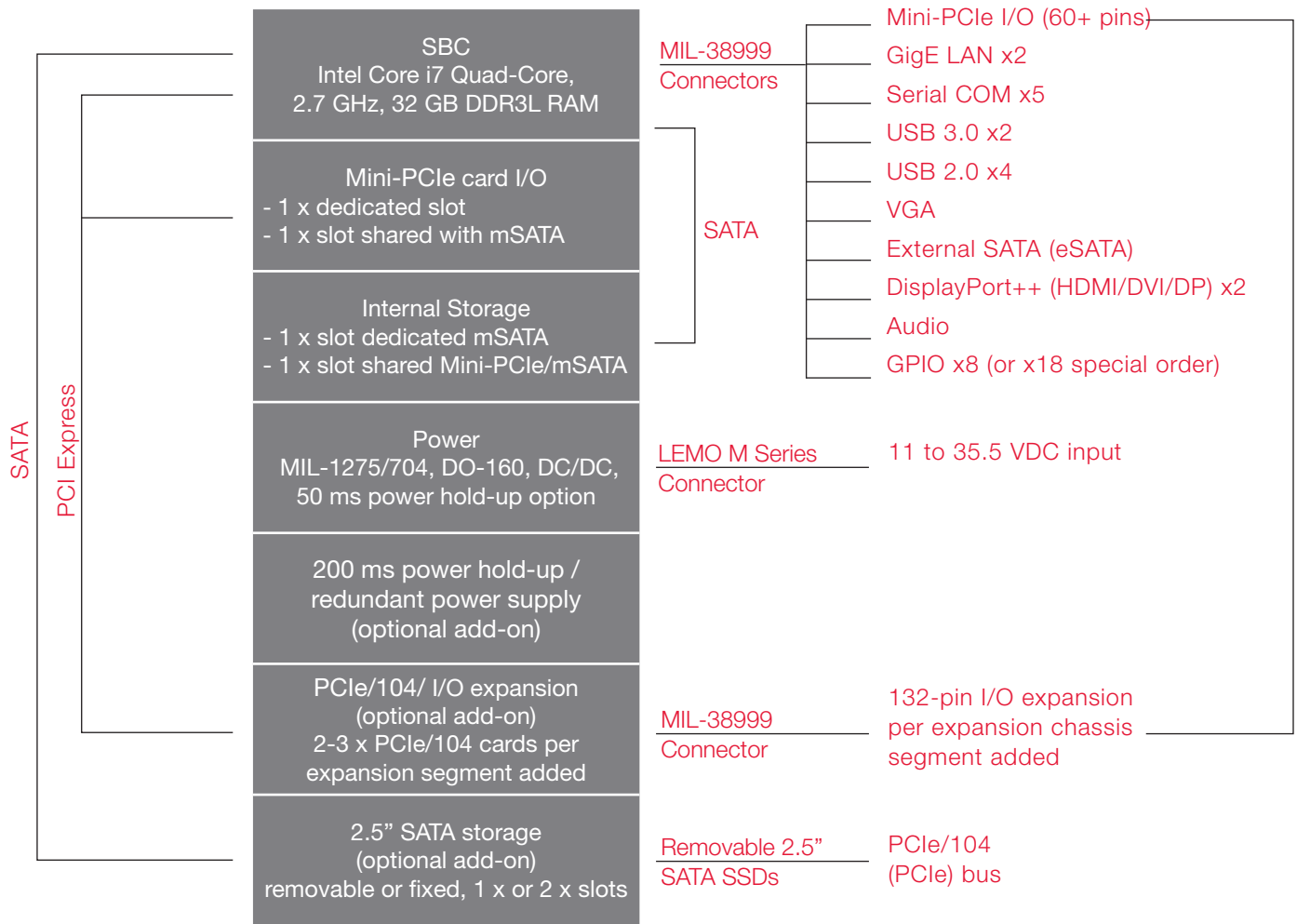
Figure 14: Functional architecture block diagram

Common pre-integrated I/O options

Base system

+1 Expansion segment

+2 Expansion segments

Common pre-integrated I/O options:

- MIL-STD-1553
- CANbus
- Ethernet NICS
- Ethernet switch
- Frame grabber
- Serial controller
- Analog I/O
- DIO
- USB/Firewire
- FPGA
- MPEG/JPEG
- Data storage
- ARINC 429
- GPS receiver

- Cameras, ISR Sensors
- Avionics Controls
- Weapons Systems
- Vehicles Sensors
- Diagnostic Terminals
- Comms Radios
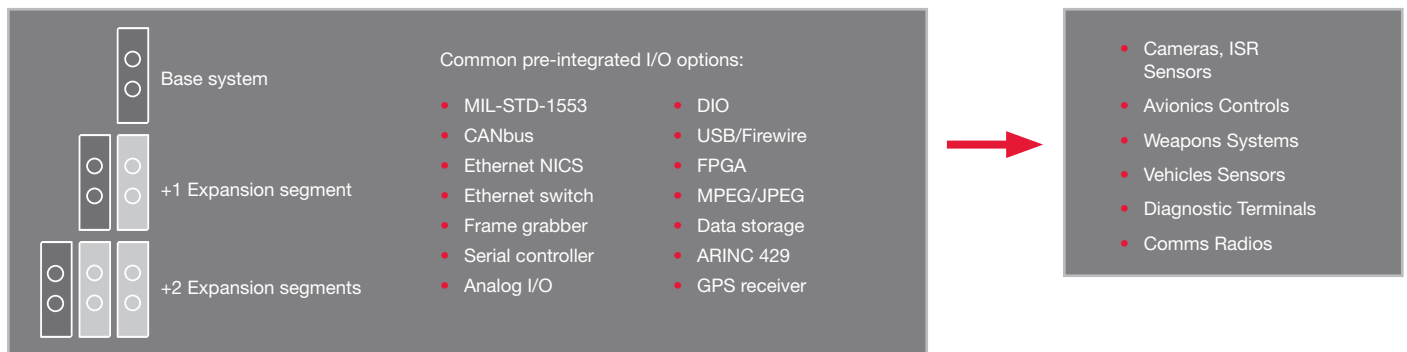
Parvus DuraCOR computers feature modular, expandable designs—based on stacking PC/104-Plus, PCI-104 or PCIe/104 card architectures. Curtiss-Wright provides application engineering/subsystems integration services to extend the base general-purpose computing functionality of the integrated SBC, adding application-specific I/O and communications cards.

With pre-integrated subsystems, customers reduce schedule risk and meet program-specific requirements by maximizing use of open architecture COTS technologies. These modified COTS subsystems may include mechanical changes and application-specific functionality (i.e. Ethernet Switch, MIL-STD-1553/ARINC 429 interface, video encoders/frame grabbers, GPS receivers, discrete I/O).

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Optional Cisco Software Router

Cisco 5921 ESR

- Pre-integrated Cisco 5921 Embedded Services Router (ESR) IOS software router application running on Linux OS (Roadmapped option for pre-loaded 5921 router application for Linux guest operating system on VmWare ESxi hypervisor)

- Choice of routing performance license tiers: (a) 5 Mbps, (b) 10 Mbps, (c) 25 Mbps, (d) 50 Mbps, (e) 100 Mbps or (f) 200 Mbps (rate limited based on aggregate outbound data rate of all active software router interfaces) to match radio/backhaul bandwidth and budgetary requirements

- 5921 ESR is single-threaded software application that utilizes resources of one core of Core i7 processor
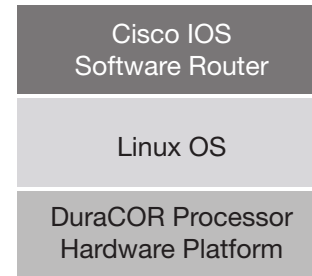
Routing/Mobility

- Routing protocols: RIPv1/v2, OSPF, EIGRP-IP, BGP, Cisco Discovery Protocol, IP policy routing, IP multicast PIM v1/v2, IGMP v1/v2/v3, IP multicast load splitting, Cisco GMP

- Encapsulations: Point-to-Point Protocol (PPP), PPP over Ethernet (PPPoE) client and server for Fast Ethernet, 802.1q VLAN trunking support, Generic Routing Encapsulation (GRE)

- IPv4: IPv4 support

- IPv6: IPv6 routing and Cisco Express forwarding switching, IPv6 QoS, IPv6 tunneling support, Cisco IOS zone-based firewall for IPv6 traffic

- VLAN: Up to 32 VLANs supported per router

- Radio Aware Routing (RAR): optimizes IP routing over fixed or temporary radio networks, factors radio link metrics into route calculations, immediately recognizes and adapts to changes in network neighbor status, supports Dynamic Link Exchange Protocol (DLEP), supports Dynamic Link Exchange Protocol (DLEP), Router Radio Control Protocol (R2CP), and RFC 5578

- MANET: OSPFv3 enhancements for mobile ad-hoc networks

- Mobile IP and Cisco Mobile Networks in Cisco IOS software: home agent and mobile router redundancy, mobile router preferred interfaces, mobile router reverse tunneling, mobile router asymmetric links, mobile router static and dynamic networks, static co-located care-of address, Authentication, Authorization, and Accounting (AAA) server, Cisco Mobile Networks Network Address Translation (NAT) traversal over mobile IP, support for mobile IP tunnel templates, allowing configuration of IP, multicast and IPsec on mobile IP tunnels, mobile IP foreign agent local routing optimization

CISCO Technology

| Cisco IOS Software Router |
| Linux OS |
| DuraCOR Processor Hardware Platform |

Figure 15: Optional Cisco router software loaded on DuraCOR system

Security

- Encryption: next-generation encryption support in Cisco IOS software cryptography, including Suite-B-GCM-128, Suite-B-GCM-256, Suite-B-GMAC-128, and Suite-B-GMAC-256 as described in RFC 4869

- Authentication: route and router authentication, Password Authentication Protocol (PAP), Challenge Handshake Authentication Protocol (CHAP), Microsoft CHAP (MS-CHAP) local password, IP basic and extended access lists, time-based access control lists (ACLs)

- Secure connectivity: secure collaborative communications with group encrypted transport VPN, Dynamic Multipoint VPN (DMVPN), or Enhanced Easy VPN

- Integrated threat control: responds to sophisticated network attacks and threats using Cisco IOS Intrusion Prevention System (IPS), Cisco IOS firewall, Cisco IOS zone-based Firewall, Cisco IOS content filtering, and Flexible Packet Matching (FPM)

- Identity management: intelligently protecting endpoints using technologies such as AAA and public key infrastructure (PKI)

- Security protocols: IPsec, SSL/TLS, 3DES, AES, IKE

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Management

- Traffic management: QoS, generic traffic shaping, class-based Ethernet matching and mobile access routing (802.1p class of service [CoS]), committed access rate, flow-based Weighted Random Early Detection (WRED), Class-based Weighted Fair Queuing (CBWFQ), Low Latency Queuing (LLQ), priority queuing, Weighted Fair Queuing (WFQ), traffic policing Resource Reservation Protocol (RSVP)

- Management services: Simple Network Management Protocol (SNMP) Versions 2 and 3, Telnet, RADIUS, TACACS+, Cisco Service Assurance Agent Syslog, Response Time Reporter, Trivial File Transfer Protocol (TFTP) client and server, Dynamic Host Configuration Protocol (DHCP) client and server, DHCP relay, Secure Shell (SSH) Protocol Client and Server v2.0

- Address conservation: NAT Many-to-One (Port Address Translation [PAT]), NAT Many-to-Many (Multi-NAT), DHCP Client Address Negotiation, Easy IP Phase I

- MLD proxy: multicast listener discovery proxy enables a device to learn proxy group membership information and simply forward multicast packets based upon that information

- IP mutiplexing: Cisco IP multiplexing improves bandwidth efficiency over a packets-per-second (pps)-constrained link by using multiplexing schemes to combine small IP packets from a single stream, or multiple streams, into a large packet. It then sends this large packet over the pps-constrained link.

- Cisco SAF: Cisco Service Advertisement Framework (SAF) allows servers and clients to advertise, discover, and select services. It provides real-time service advertisement, discovery, presence, and selection, reduces ongoing operational costs by eliminating manual configuration, reduces services deployment time to realize faster ROI, improves business continuity, avoiding potentially costly network downtime.

Voice services

- Cisco Unified Communications Manager Express (CME) support: this feature supports up to 20 phones for remote IP telephony on vehicles and for other command-and control communications