VX305H-40G

High-performance Xeon® Processor VPX SBC featuring 40 Gigabit Ethernet

- Designed to the Compute Intensive SBC OpenVPX profile
- 12 Core Xeon® Processor D, up to 64 GByte DDR4 with ECC
- Dual Data Planes (40 and 10 Gigabit Ethernet)
- 10 Gigabit Ethernet Control Plane
- x8 PCI Express® Gen3 XMC slot, x8 PCI Express® Gen3 Expansion Plane
VX305H-40G
Server-Class Power for High-Performance Computing

Featuring the 12 core version of the Intel® Xeon® D processor family (formerly Broadwell-DE) and developed in alignment with the SOSA™ technical standard, the VX305H-40G is a compute intensive SBC compliant with the VITA 65 (OpenVPX) slot profile SLT3-PAY-1F1U1S1U1U2F1H-14.6.11-n. The VX305H-40G combines server-class processing with a 40 Gigabit Ethernet Data Plane and an extra-wide 8-lane PCI Express® Gen3 Expansion Plane. The VX305H-40G also features an XMC site for non-volatile storage or other expansion options not requiring rear-panel I/O. The result is a powerful, flexible, single board computing platform suitable for a wide range of embedded applications.

Ideal for Virtual Machines and HPEC Applications
At the silicon level, the Xeon® D platform server heritage allows for advanced applications such as virtual machines and software containers. It can run diverse software workloads which dynamically share common resources or strictly bind to predefined resource usage profiles. Application can easily adapt to hardware evolution such as CPU count, memory, I/O availability, or even form-factor. Virtualization and container technologies enabled by the Xeon D processor transform embedded solutions into a future-proof solution, preserving investment into an application code base.

Typical demanding applications include:
- Radar, sonar, and other sensor processing applications
- Imaging systems
- Airborne fighter and UAV radar
- Long term programs in harsh environments

Long Term Programs: High reliability, low TCO
Kontron provides a robust program to increase reliability and to lower Total-Cost-of-Ownership (TCO) for VX305H-40G. Intel silicon reliability is 10 years, but Kontron offers a Long Term Supply service (LTS) for over 15 years. A comprehensive Health Management program is optionally available to support easy multi-year field maintenance. All this makes the VX305H-40G the ideal candidate for long term programs, and brings server class applications into the battlefield for many years to come.

VITA 46.11 Health Management
The VX305H-40G features a VITA 46.11 compatible Intelligent Platform Management Controller (IPMC) for centralized system health management. Supporting Tier-1 and -2 commands (and more), the Kontron-designed IPMC (both hardware and firmware), along with a comprehensive and flexible Power-On Built-In Test (PBIT) package brings a new level of system health and management capabilities to rugged deployed systems thanks to an innovative “Reference Learn” approach.

VITA 48-REDI Conduction-cooled Versions
The high-performance VX305H-40G server blade is available as Conduction-Cooled Plug-in units according to VITA 48.2 Type 2, Secondary Side Retainer, which enables the VX305H-40G to sustain 70°C card edge temperature according to VITA 47 depending on the processing load and XMC support. The VX305H-40G is also available with a VITA 48 Ruggedized Enhanced Design Implementation (REDI) Two-Level Maintenance bottom cover option. A lab-grade air-cooled version is also available.

Kontron VPX Ecosystem
VX305H-40G boards are compatible with all Kontron 3U VPX and 6U VPX building blocks (payload boards, carriers, switches, backplanes, OS, and drivers). For instance, OpenVPX 3U Rugged Ethernet Switch features 24x 10 Gbps channels which can be bound into 40 Gigabit Ethernet links, providing Layer 2 and Layer 3 switching/routing functions. The VX3920 is available both in Forced Air-Cooled and Rugged Conduction-Cooled versions.
## TECHNICAL INFORMATION

### INTEROPERABILITY
- OPEN VPX SLOT PROFILE
- VITA 65 (OpenVPX) profiles: SLT3-PAY-1F1IU15151U1U2F1H-14.6.11-n
- VITA 46.11 IPMC on board controller

### PROCESSOR
- CPU, CONNECTIVITY
  - Intel® Xeon® D-1559 Twelve Core, TDP 45 W, 1.5 GHz/2.1 GHz Turbo
  - 12 execution cores, 24 threads, 18 MByte Cache
  - PCIe gen3 ports to VPX Expansion Port and XMC
- 2x 10GETH links, Integrated Serial ATA host controller
- xHCI USB support (can be configured as SuperSpeed USB 3.0 ports)
- UART

### SYSTEM MEMORY
- DDR4 dual channel memory with ECC, 2133 Mbits/s over 144 bits,
  up to 64 Gbytes, soldered

### BACKPLANE
- P0 CONNECTOR (POWER, UTILITY)
  - Power Plane: VS1=12V and 3.3V_AUX; (VS2 not used; VS3=5V not used; -12V_AUX only for XMC slot)
  - Utility Plane: Dual Maintenance Ports, SMB
- P1 CONNECTOR (DATA, EXPANSION, CONTROL, I/O, UTILITY)
  - Data Plane 1: 40GBASE-KR4
  - Data Plane 2: 10GBASE-KR
  - Expansion Plane: x8 PCIe 3.0
  - Control Plane: 10GBASE-KR (or 1000BASE-KX)
  - Utility Plane: GPIO1, Maskable reset, GDISCRETE1, VBAT, SYSICON

### I/O ENGINE
- DATA PLANE ENGINE
  - XL710-BM 40GETH Controller (to BP P1)

### STORAGE
- FLASH (UEFI BIOS) EEPROM
  - 2x 16 Mbyte FLASH, (BIOS + Rescue)
- USER FRAM* (1 MByte)
  - 1 256 Kbit sEEPROM dedicated to system data
  - 1 256 Kbit sEEPROM dedicated to application data
  - Data persistence across power cycles for Application fast changing state data (unlimited write cycles)

### MEZZANINES
- XMC SLOT
  - 1x x8 PCIe gen 3
- M.2 SOCKETS
  - M.2 22mm x 42mm M Type Slot
  - VITA 61-2011: Support of XMC Card stacking height of 12mm as per Bottom socket: for storage modules Type M, 22 mm x 42 mm.
  - (Top socket populated with graphics unit)

### BOARD UTILITIES
- WATCHDOGS, POWER MANAGEMENT
  - WD: PLD-based, timeout ranging from 2 μs to 510s, IRQ, Reset, dual-stage
  - Board Controller: power sequencing, reset handling, monitoring, failure detection
- LEDs RESET
  - 5 LEDs reporting the board CPU health status and activity
  - Reset (push button)
  - Independant low power RTC with optional onboard battery

### SOFTWARE
- BIOS
  - Portable Linux BSP, tested with Fedora, Windows, VxWorks on demand.
- BSP
- PBIT
  - CMON PBIT EXPERT: BIOS Health PBIT, with system change detection (learn and compare method, no programming)
- OPTIONAL: CBIT
  - CMON MONITORING: Linux health Monitoring engine.
  - Creates Continuous flow of health data from customizable test points for remote or local use
PB-VX3-40G-H-601 VITA 46.10 Rear Transition Module

Development on VX305H-40G boards can be started before the final system backplane is available using a rear transition module and development backplanes. The PB-VX3-40G-H-601 is available for lab use and offers the following connectivity:

- Two serial COM ports (including maintenance port)

ENVIRONMENTAL SPECIFICATION

<table>
<thead>
<tr>
<th></th>
<th>SA - AIR COOLED VERSION (NO FRONT I/O)</th>
<th>RC - RUGGED CONDUCTION-COOLED COMPLIANT WITH TYPE 1 PLUG-IN UNIT 2 LEVEL MAINTENANCE AS PER VITA48.0 AND VITA48.2 STANDARDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONFORMAL COATING</td>
<td>Optional</td>
<td>Standard</td>
</tr>
<tr>
<td>AIRFLOW</td>
<td>tbd. cfm typ. for 45 W TDP</td>
<td>Conduction</td>
</tr>
<tr>
<td>COOLING METHOD</td>
<td>Convection</td>
<td>Convection</td>
</tr>
<tr>
<td>OPERATING TEMPERATURE</td>
<td>20 °C to +35 °C (LAB VERSION)</td>
<td>-40 °C to +70 °C</td>
</tr>
<tr>
<td>STORAGE TEMPERATURE</td>
<td>-45 °C to +85 °C</td>
<td>-45 °C to +100 °C</td>
</tr>
<tr>
<td>VIBRATION SINE (OPERATING)</td>
<td>20-500 Hz - 2 g</td>
<td>20-2.000 Hz - 5 g</td>
</tr>
<tr>
<td>RANDOM</td>
<td>VITA 47-Class V1</td>
<td>VITA 47-Class V3</td>
</tr>
<tr>
<td>SHOCK (OPERATING)</td>
<td>20 g/11 ms Half Sine</td>
<td>40 g/11 ms Half Sine</td>
</tr>
<tr>
<td>ALTITUDE (OPERATING)</td>
<td>-1,500 to 60,000 ft</td>
<td>-1,500 to 60,000 ft</td>
</tr>
<tr>
<td>RELATIVE HUMIDITY</td>
<td>90 % without condensation</td>
<td>95 % without condensation</td>
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ORDERING INFORMATION

<table>
<thead>
<tr>
<th>ARTICLE</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>VX305H-40G</td>
<td>VX305H-40G-RCCGF05013P</td>
<td>Conduction Cooled VX305H-40G SBC with PBIT option</td>
</tr>
<tr>
<td>VX305H-40G</td>
<td>VX305H-40G-RCCGF05013Q</td>
<td>Conduction Cooled VX305H-40G SBC with PBIT and eval Linux on SSD</td>
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<tr>
<td>VX305H-40G</td>
<td>VX305H-40G-SACGC05013Q</td>
<td>Air Cooled VX50C-40H-40G SBC with PBIT and Eval Linux on SSD</td>
</tr>
<tr>
<td>PB-VX3-40G</td>
<td>PB-VX3-40G-H-601</td>
<td>Rear Transition module (Tooling equipment for lab use)</td>
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</tbody>
</table>

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