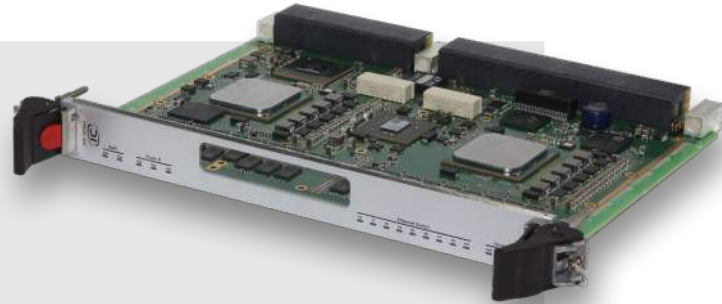


# IC-INT-VPX6d

Dual Intel® Xeon® SBC (Broadwell-DE SoC)

- Dual Intel® Xeon® D-1500 processor
- up to 128 GB DDR4 with ECC
- AMD Kintex™ 7 FPGA
- PCIe Switch
- XMC slot



## Overview

The new VPX 6U Digital Signal Processing (DSP) board **IC-INT-VPX6d** is the result of the experience and expertise gained by Interface Concept in the High Performance Embedded Computing (HPEC) field.

Taking advantage of the latest Intel® 14nm Xeon® enhancements and the intercommunication capabilities provided by the OpenVPX standard, the **IC-INT-VPX6d** is the current most comprehensive dual Intel® processor design for applications requiring the highest processing capabilities together with “controlled” power consumption.

In the same spirit, IC offers the users with its own boot loader the security of always being able to support them as expected.

## Description

The two computing nodes (A&B) are populated with Xeon® D processors implementing up to twelve cores, and operate with up to 64GB DDR4/nodes offering the board an overall capability of 128GB.

For Data Plane and Expansion Plane, the **IC-INT-VPX6d** implements one PCIe Gen2/Gen3 switch attached to both CPUs via x8 links and to the backplane through 16 lanes (4 x4 or 2 x8) on P1 and, optionally, 12 lanes (4 x4 or 2 x8) on P2. Optimized features of this PCIe switch (such as virtualization) allow versatile PCIe backplane configurations. Moreover, the two processors are linked together via a PCIe x4 link.

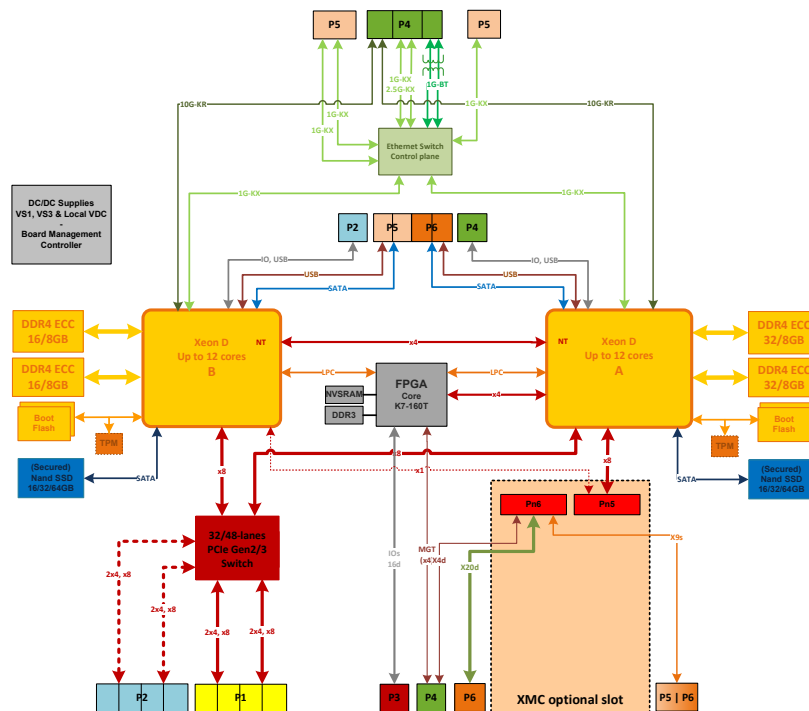
For Control Plane, the **IC-INT-VPX6d** implements an ultra low latency GbE switch attached to each CPU and offering seven GbE ports (two of them capable of handling 2.5 Gbps). Moreover, one rear 10 GbE port is connected directly to each processor (10G KR).

An XMC site is attached to Node A (PCIe X4 / optional attachment to Node B PCIe X1 for custom application) and provides 20 differential I/O pairs routed from Pn6 to P6 in accordance with X12d+X8d pattern of VITA 46.9 and 9 single-ended IO to P5/P6.

The **IC-INT-VPX6d** also takes advantage of the capabilities of this SoC solution to provide GPIOs, two USB and one SATA ports per processor. For storage, the board also features soldered SATA NAND SSD.

The **IC-INT-VPX6d** implements one FPGA interfaced with Node A (PCIe x4) to add Core Functions, for which IC provides a variety of IPs. This FPGA is connected directly to the P3/P4 connectors (SERDES/GPIOs).

## Block Diagram



## Main features

### Processing Unit (per processor)

- Intel® Xeon® D-1500 processor
- DDR4 with ECC (up to 64GB)
- Boot flash memory
- On board SATA SSD (up to 64GB)
- TPM 2.0

### Communication subsystem (per processor)

- 1 \* PCIe x8 to PCIe switch
- 1 \* PCIe x4 to second processor
- 2 \* USB ports (2 rear)
- 1 \* Console port
- 2 \* rear SATA interfaces
- GPIOs (Rear)
- 1 \* GbE port (attached to the switch)
- 1 \* 10GBASE-KR (rear)

### Ethernet Switch

- 7 \* GbE ports (rear.2\*1000BASE-T and 5\*1000BASE-BX)

### Extension (Node A)

- 1 \* XMC slot (PCIe x8)
- 20 differential pairs (from Pn6 to P6 - X12d+X8d)

### FPGA (Node A)

- 1 \* AMD Kintex™ 7 FPGA
- MGT x4 (to P4)
- 16 differential pairs (to P3)

### Miscellaneous

- BMC for System Management (per VITA 46.11)
- Power supply monitoring / Temperature sensor
- Status LEDs
- Engineering kit for debug: JTAG
- 6U Rear Transition Module

The **IC-INT-VPX6d** is a 6U x 5HP (1") VPX board compliant with 6U module definitions of the VITA 46.0 standard (0.80 or 0.85" : please consult us), available in air-cooled and conduction cooled (without any front I/O) versions.

Note: this board is compatible with our previous versions of Intel® Core™ i7 (Gen 2 & 3) SBCs to allow customers to upgrade existing systems and/or maintain existing design for long term support.

## Software Features

### BMC

- VITA46.11 IPMC
  - TIER-2 IPMI
  - Redundant IPMB
- Power-on Built-In Test
  - On-board hardware components
  - Add-on cards (XMC, FMC)
  - Accessible from the OS
- Human Machine Interface
  - Devices management
  - Health management
  - Password
  - Log
- Over-temperature board protection

### OS Support

- Supported Linux distributions
  - Yocto
- BSP Features
  - Standard or Preempt-RT kernel (Yocto only)
  - BMC drivers
  - IC Control Node driver
  - Board information (P/N, S/N, PBIT results...)
  - IBIT/CBIT (Integrated/Continuous)
  - Other utilities

Please consult us for other Linux distributions (Debian, Fedora, etc), VxWorks® and Windows.

### Firmware

- UEFI-compliant Boot Firmware
  - Based on EDK2 UEFI BIOS
  - Integrated and tested by IC R&D team
- Boot options
  - UEFI shell
  - Storage devices (HDD, USB, CD, DVD)
  - Network
- Power-on Built-In Tests (PBIT)
  - On-board hardware components
  - Add-on connectivities (VPX PCIe, XMC PCIe, SATA disks, USB devices...)
  - Results accessible from the OS

### Multiware

- In-house software for Linux and VxWorks
- PCIe domains exchanges over Non-Transparent Bridges (NTB)
  - DMA transfers
  - Ethernet emulation over PCIe
  - Shared memory
  - Messages and semaphores, etc.
- API (Application Programming Interface)
  - Kernel-space functions
  - I/O devices
  - Ethernet socket
  - Sysfs (Linux)

## Grades

Criterion	Coating	Operation Temperature	Rec. Airflow	Oper. HR% no cond.	Storage Temperature	Sinusoidal Vibration	Random Vibration	Shock 1/2 Sin. 11ms
Standard	Optional	0 to 55°C	1 .. 2 m/s	5 to 90%	-45 to 85°C	2G [20..2000]Hz	0.002g <sup>2</sup> /Hz [10..2000]Hz	20G
Extended	Yes	-20 to 65°C	2 .. 3 m/s	5 to 95%	-45 to 85°C	2G [20..2000]Hz	0.002g <sup>2</sup> /Hz [10..2000]Hz	20G
Rugged	Yes	-40 to 75°C or 85° C (*)	2 .. 5 m/s	5 to 95%	-45 to 100°C	5G [20..2000]Hz	0.05g <sup>2</sup> /Hz [10..2000]Hz	40G
Conduction-Cooled 71°C	Yes	-40 to 71°C at the thermal interface (*)	-	5 to 95%	-45 to 100°C	5G [20..2000]Hz	0.05g <sup>2</sup> /Hz [10..2000]Hz	40G
Conduction-Cooled 85°C	Yes	-40 to 85°C at the thermal interface (*)	-	5 to 95%	-45 to 100°C	5G [20..2000]Hz	0.1g <sup>2</sup> /Hz [10..2000]Hz	40G

(\*) : Temperature grades are subject to availability according to IC products. Please consult us.

All information contained herein is subject to change without notice.

For more information, please contact:



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