

# Optimizing SWaP is our passion.



**ces**

## ROCK-3

Small Form Factor, scalable, modular, rugged, pre-qualified, COTS systems

### HIGHLIGHTS

- Rugged systems using conduction cooled VNX (VITA 74) modules
  - Single Board Computer (SBC)
  - Video Image Processor
  - Databus & Analog / Discrete I/O
  - Inertial Measurement Unit (IMU)
  - GPS / SAASM
- Multiple SBC processor options including
  - AMD G-Series SoC
  - Intel Atom E3845
  - Freescale QorIQ
  - ARM
- Multiple Databus & I/O Options including
  - MIL-STD-1553B
  - ARINC-429
  - RS-232/422/485
  - USB 2.0 / 3.0
  - GigE
  - GPIO
  - Discrete & Analog I/O
  - FPGA I/O\*

\*Contact your CES sales representative for more information

### Contact us

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The ROCK-3 series of systems are small form factor, scalable, modular, rugged, pre-integrated, Commercial Off The Shelf (COTS) systems optimized for C4ISR applications such as a

- Mission Computer
- Display Processor
- Video Image Processor
- Data Recorder
- I/O Signal Concentrator
- Communications Controller

Based on VNX (VITA 74) the ROCK-3 provides a smaller, lighter, less power hungry cousin to the ROCK-2\* family and communicates seamlessly with it. The ROCK-3 mission computer family extends ability of the system architect to deploy the right compute power at the right Size, Weight and Power (Swap) for any deployment. These ROCK-2 and ROCK-3 families provide the system designer with the widest continuum of safety certifiable mission computer products on the market.

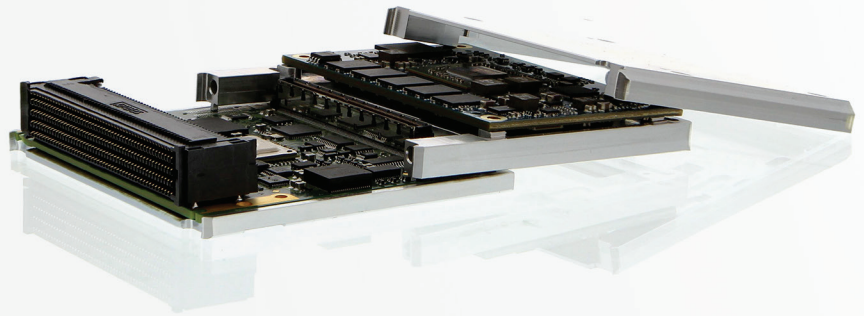
### A scalable architecture

Extensible from single module to entire complex system, or system of subsystems, VNX provides the ability to create required computing solutions for any deployment including distributed and/or redundant topologies. CES has designed a family of VNX enclosures for the ROCK-3 with varying numbers of board capacity to support compute requirements for a wide variety of mission computers.

### Because safety matters

Similar to the ROCK-2, the ROCK-3 will provide a straightforward path to DO-178 and other safety certifications. Even if you don't need to provide safety certification, why would you trust your mission to a design that wasn't done to that level of engineering?

\*See ROCK-2 Series fact sheet



## VNX - Rugged Small Form Factor standardized

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The ROCK-3 mission computer family extends the ability of the system architect to deploy the right compute power at the right Size, Weight and Power (SWaP) for any deployment.

VNX provides the first standards based approach to conduction cooled small form factor systems. The VNX specification prescribes two different conduction cooled module sizes, connectors and pinouts, leaving maximum flexibility to the system designer for packaging. Utilizing lessons learned from the VPX and OpenVPX™ standards, the bus structure of VNX is electrically compatible with those standards. The nature of the mechanical design provides an environmentally robust solution for shock, vibration and thermal management. For SWaP critical and price sensitive applications, VNX provides the flexibility of the VPX specification in a smaller form factor resulting in reduced weight and power consumption and lower cost.

CES is a co-sponsor and developer on the VITA 74 Technical Committee. CES currently holds the chair position for the VITA VNX Marketing Alliance which consists of multiple suppliers and customers who are embracing the VNX standard.

## The inspiration

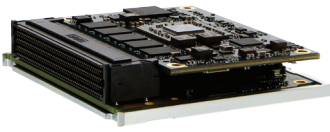
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VNX was designed to answer the need of system designers trying to provision vehicles requiring a rugged but much smaller and lighter compute platform. VNX leverages VPX technology and backplane topology along with the proven FMC connector technology to provide low risk and high Technology Readiness Level (TRL) systems solutions. This approach also creates a straight-forward migration path from 3U VPX to VNX.



# Building blocks

## Single Board Computer (SBC) modules



The ROCK-3 family of systems offers a range of 19mm SBC modules to accommodate the different needs of the embedded community. These modules contains power supplies, a Trusted Platform Module (TPM), a PCIe switch, a FLASH storage, and interfaces for DP Video, GigE, Audio, GPIO, Serial, SATA and I2C. LVDS, HDMI and VGA are also available\*. The exact signal count varies as a function of the processor\* which can be an AMD, Intel or Freescale processor.

- AMD G-Series SoC
  - 2-Core GX201 @ 1.0 GHz
  - 4-Core GX411 @ 1.5 GHz
- Intel Atom E3845
- Freescale QorIQ P2041\*\*
- Freescale ARM Cortex A9\*\*
- 32 GB SLC FLASH
- 2x HD Display Port Video
- Configurable 4x Lanes PCIe (Gen 2)
- 2x GigE, 4x Audio, 2x RS-232, 4x GPIO
- 4x SATA II, 6x USB 2.0, 2x USB 3.0

## Video module



The ROCK-3 19mm video module is a full-function Video Image Processor module able to stand alone or operate with an accompanying Single Board Computer. This module is ideal for streaming video capture, compression, storage, processing, metadata overlay, and display generation. It is based on the Texas Instruments (TI) DaVinci System on Chip processor, combining a powerful ARM core, a floating point Digital Signal Processor, a Graphics Processing Unit, and a video image co-processor supporting multiple video compression formats. The module is capable of simultaneous capture of 4x SD or 2x HD Video input streams. Similarly, the module is capable of real-time H.264 compression of 1x 1080p60 stream, or multiple streams at lower resolution.

- TI DaVinciTMS320DM8148 Digital Media Processor
- 1 GHz ARM Cortex A8 RISC Processor
- TMS320C674x Floating Point VLIW DSP
- SGX530 3D GPU
- Video Image Coprocessor with Compression / Decompression Engine
  - MPEG-4 H.264, VC1, MPEG-2, JPEG/M-JPEG
- Simultaneous capture of 4x SD or 2x HD Streams
- 2x SD Inputs (CVBS, YPbPr, NTSC, PAL, RS-170A, SECAM)
- 2x HD Inputs (CVBS, HDMI, PGBHV, YPbPr, NTSC, P{AL, RS-170A, SECAM)
- 1x CVBS, S-Video Output
- 1x HDMI Output
- 1x PCIe X1, 1x GigE, 1x SATA II
- 2x CAN Bus, 2x USB 2.0, 3x UART

## Communication, I/O & other features



In addition to video and processing modules, the ROCK-3 family includes a series of 12.5mm modules that are driven by a host processor through either a PCIe x1 or USB 2.0 data bus. These modules bring a wide variety of expansion analogic, discrete or data bus I/O in and out of the VXN system. A module equipped with the VN-200\*\*\* GPS-Aided Inertial Navigation System completes this series of 12.5mm module on offer.

- MIL-STD-1553
- ARINC-429
- RS-232, -422, -485
- CAN Bus
- GigE
- Firewire
- Discrete GPIO
- Analog I/O
- Cyclone II FPGA
- VectorNAV VN-200
- Extended Kalman Filter @ 200 Hz
- Pressure Sensor
- u-blox GPS Receiver
- 3-Axis Accelerometers, Gyros, and Magnetometers
- Rockwell Collins Microgram@ SAASM GPS

## System Scalability

The ROCK-3 series of systems are scalable from a synergistic single-slot system where it is desirable to place a small amount of processing inside of an existing system component, or a fully integrated multi-slot system requiring a large amount of computing or I/O resources. CES provides a series of COTS systems described in terms of number of 19mm and 12.5mm slots. New systems configurations are planned and will be soon available\*:

Series	19 mm slots	12.5 mm slots	Cooling	Interface
ROCK-321x	2	1	Conduction, Convection	Mil connectors, Commercial connectors
ROCK-322x*	2	2	Conduction, Convection	Commercial connectors
ROCK-341x**	4	1	Conduction, Convection	Mil connectors

\*Contact your CES sales representative for more details.

\*\*Coming soon.

\*\*\*<http://www.vectornav.com/products/vn200-rugged> for more information



## Technical Specifications

### Compliance

- MIL-STD-810G
- DO-160G

### Power Consumption

minimum	typical	maximum	units
20	50	80	Watts

### Memory

- Up to 512GB flash disk

### Software

- Maintenance / Mission mode
- Board Support Package: Windows, Linux and VxWorks@653
- Built In Tests (PBIT, CBIT and IBIT)
- Drivers: MIL-STD-1553, ARINC 429, RS232/422/485, USB, Ethernet, Video module

### Dimensions

- Without connectors:
  - ROCK-321x: 132 x 137 x 127 mm (W x H x D)
  - ROCK-341x: 132 x 137 x 170 mm (W x H x D)

### Weight

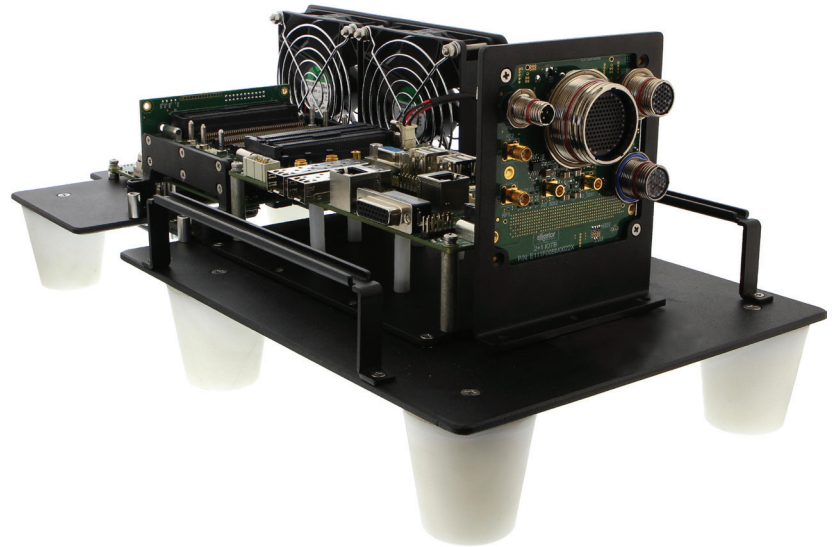
- 2 - 5Kg

### MTBF

- Under evaluation

## ROCK-3 Evaluation/Development Platform

For application development CES offers a three slot VNX chassis with two 19mm slots, one 12.5mm slots and an I/O transition panel provisioned with mil connectors. An intermediary I/O card provisioned with commercial connectors allows the use of readily available cables and data interfaces.



ROCK-3 Evaluation Platform

## Product Ordering

- ROCK-3210Axxxx01** ROCK-3 evaluation/development platform with two 19mm slots and one 12.5 mm slot, commercial connectors
- ROCK-3210Axxxx02** ROCK-3 evaluation/development platform with two 19mm slots and one 12.5 mm slot, commercial connectors, front panel with MIL connectors
- ROCK-3210Cxxxx01** ROCK-3 rugged mission computer, with two 19mm slots and one 12.5 mm slot, front panel with MIL connectors

