The SBC329 Rugged Single Board Computer (SBC) from Abaco Systems features the high performance, highly integrated 7th Generation Intel Core processor platform.

The Intel Xeon processor offers integrated graphics and memory controller plus quad core processing up to 4.0 GHz all in one device. Coupled with the CM238 chipset, this provides an upgraded level of I/O bandwidth for both on-board and off-board functions.

In addition to a comprehensive range of onboard I/O features, the SBC329 also offers an on-board mezzanine expansion site for enhanced system flexibility. Memory resources include 16 GB DDR4 SDRAM, up to 32 GB NAND Flash (SSD), 32 MB BIOS Flash and 16 MB BIOS backup Flash.

**Features of the 7th Gen Core Technology**
- Graphics support for DX11.1, OpenCL 1.2, OpenGL 3.2
- CPU performance boost over previous generation
- Intel TurboBoost Technology
- Intel AVX 2.0 extensions and AES-NI instructions
- Hardware-assisted security features
- Hyper-Threading Technology – two threads per core

**FEATURES:**
- Single slot 3U VPX Single Board Computer
- Intel Xeon E3-1505M or E3-1505L v6 quad core CPU (7th Generation Intel Core technology)
- Up to 16 GB DDR4 SDRAM with ECC
- 32 GB NAND Flash
- 512 kB NVRAM
- FPGA with advanced security features
- TPM (Trusted Platform Module)
- 8 PCIe lanes (Gen 3 capable) switch
- Rear I/O:
  - Up to 3x Gigabit Ethernet ports
  - Up to 2x DVI / HDMI ports
  - Up to 3x SATA ports
  - Up to 2x COM ports
  - Up to 3x USB ports
  - Up to 4x GPIO lines
- Five levels of ruggedization (convection and conduction cooling variants)
- AXIS and Deployed Test Software
- Windows®, Linux® and VxWorks® OS support
SBC329  Rugged 3U VPX Single Board Computer with Intel® Xeon® Processor (7th Generation Intel Core™ Technology)

Designed to meet the requirements of a wide range of applications from industrial through to fully rugged defense and aerospace programs, the SBC329 offers extended temperature capability and a range of air- and conduction-cooled build levels.

The SBC329 also incorporates a range of security features designed to assist with customers’ Anti-Tamper and Information Assurance strategies. These include an inherently secure FPGA solution, and support for Intel’s Trusted Execution Technology.

A rich software choice is planned for the SBC329, including:

- AMI UEFI including support of BIOS Guard for signed image execution
- FSP* enabled coreboot (Open Source bootloader)
- Open Linux (Fedora), Red Hat Enterprise Linux, RedHawk Linux, VxWorks 7, Windows 10
- Comprehensive Deployed Test Software: FSP* enabled BIT (PBIT function), and BCS (CBIT and IBIT function)

Examples and assistance are also available for integrating ‘chain of trust’ operation (from power-up to application start), plus Wind River’s FSP* enabled VxWorks Boot Loader, into system scenarios. Other Operating System support is available on request.

Block diagram
SBC329 **Rugged 3U VPX Single Board Computer with Intel® Xeon® Processor (7th Generation Intel Core™ Technology)**

### Specifications

**Processor**
- Intel Xeon E3-1505M v6 (Quad Core) @ 3.0 GHz (45W/35W) base frequency, up to 4.0 GHz TurboBoost
- Intel Xeon E3-1505L v6 (Quad Core) @ 2.2 GHz (25W) base frequency, up to 3.0 GHz TurboBoost

(Note: CPU speed is dependent on environment, consult manual for details)
- 14 nm monolithic die processing technology
- 8 MB Last Level Cache

**SDRAM**
- Up to 16 GB DDR4 SDRAM soldered with ECC

**Non-Volatile RAM**
- 512 kB FRAM

**BIOS**
- 2x 16 MB SPI Flash for BIT and BIOS plus 1x 16 MB SPI Flash for Recovery

**Data Plane / Expansion plane**
- 8x PCIe lanes from Gen - 3 capable switch to P1, can be configured as 1 x8, 2 x4 or 4 x2 ports PCIe REFCLK can be driven or received

**Control Plane (Gig Ethernet)**
- ETH0 is driven from C236 (VPRO compliant) to P1 and is always configured as 1000BASE-T
- ETH1 and ETH2 are routed to P1 and are configured as 1000BASE-BX by default. Optionally ETH1 can be configured as 1000BASE-T and ETH2 is then unused.

**Management Plane**
- Baseboard Management Controller (BMM) in accordance with VITA 46.11

**USB Ports**
- Two USB 2.0 ports (USB0, USB1) are routed to P1 connector and are available on all variants
- One additional USB 3.0 port (USB2) is routed to P2 but shares pins with XMCIO – so is only available on selected variants

**Serial Ports**
- Two 16C550 compatible async serial ports are available on P1 and P2
- COM1 is 2-wire RS-232 port
- COM2 shares pins with GPIO lines and can be configured as a 2-wire RS-232 port, a 4-wire RS-232/422 port or as not present

**XMC Site**
- x8 PCIe
- Tracked as P2w1 - X24s+X8d+X12d in accordance with VITA 46.9
- X12d is always available
- X8d shares pins with DV12
- X24s shares pins with SATA1, SATA2 and USB2
- Available with VITA 42 connectors (contact factory for VITA 61 connectors)

**Video**
- One DVI / HDMI port (DVI0) routed to P1
- One additional DVI / HDMI port (DVI1) is routed to P2 but shares pins with XMCIO – so is only available on selected variants

**SATA**
- One SATA port (SATA0) is always available on P1
- Two additional SATA ports (SATA1, SATA2) are routed to P2 but share pins with XMCIO – so are only available on selected variants
- All three ports are SATA 6 Gb/s capable

**GPIO**
- Up to 4 GPIO pins (5V Tolerant) all of which share pins with other functions – so number is dependent on variant selected.

**FPGA**
- SmartFusion2 FPGA with advanced security features
- Enhanced Anti-Tamper Features
- Zeroization

**LED**
- 3x power/ reset status LED
- 4x BIT status LED
- 8x Port-80 POST code
- Ethernet/SATA/PCIe link status LEDs

**Power Requirements**
- +12V (Vs1), +5V (Vs3), +3.3V (Vs2) for main power
- +3.3V for P3V3_AUX is required
- +/-12V AUX only required for mezzanines

**Watchdog/ Timers/ TPM / ETI**
- Software programmable watchdog
- Timers in PCH (SW programmable)
- TPM (Trusted Platform Module)
- ETI (Elapsed Time Indicator)

**Temperature Sensor**
- PCB, CPU and PCIe Switch temperature sensors

**Other HW Feature**
- Hardware Write Protection

**Environment**

<table>
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<td>0.002g/Hz*</td>
<td>0.04g/Hz**</td>
<td>0.1g2/Hz**</td>
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<tr>
<td>Shock</td>
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<td>20g***</td>
<td>20g***</td>
<td>40g***</td>
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</table>

* With a flat response to 1000 Hz, 6 dB/Oct roll-off from 1000 to 2000 Hz
** From 10 to 1000 Hz
*** Peak sawtooth 11 ms duration

Note: Processor performance and temperature are inter-dependent. For a given temperature, a maximum speed is achievable, and conversely for a given processor speed a maximum temperature is achievable. Consult the product manual for details.