Mercury Systems is a leading commercial provider of secure sensor and mission processing subsystems. Optimized for customer and mission success, Mercury's solutions power a wide variety of critical defense and intelligence programs.

*Intel Core i7 Gen5 processor*
*Intel Iris Pro Graphics 6200 GPU*
*Digital video capture (HD/SD-SDI)*
*PCIe Gen3 1x 8-lane, 2x 4-lane, 4x 2-lane with support for NTB port*
*PCIe Gen2 full mesh network for near-deterministic communication*
*Serial interfaces RS232/422/485*

Mercury's BuiltSAFE™ products bring the highest level of flight safety assurance to aerospace and defense applications. Our proven, reusable Design Assurance Level (DAL) certified artifacts for mission computing, avionics, networking and datalink comms processing save time and cost while decreasing risk.

Mercury's BuiltSAFE CIOV-2231 is a 3U OpenVPX Single Board Computer featuring an Intel Core i7 Gen5 processor with Quad-Core, dual-threaded (8-threads) over the Broadwell microarchitecture. Designed for extreme temperature range, shock and vibration, the CIOV-2231 is made for data and graphic intensive processing applications within conduction-cooled systems.

**Data and graphic processing power**

The Intel Iris™ Pro Graphics 6200 GPU embedded in the Core i7 processor delivers high-performance GPU capabilities and GPGPU programming options using OpenCL™. The BuiltSAFE CIOV-2231 has 16GB of DDR3 ECC memory (25.6GB/s throughput) and up to 32 GB of on-board SATA flash memory for intense data processing. The BuiltSAFE CIOV-2231 has two SATA III interfaces and Intel Rapid Storage Technology with support for RAID 0 and RAID 1 enabling the CIOV-2231 to deliver enhanced storage speed and reliability.

**Video capture and serial interfaces for ISR**

The BuiltSAFE CIOV-2231’s FPGA provides additional functionality including digital video capture, RS232/422/485 serial data links and GPIO for advanced ISR functionality.

**BuiltSAFE for Avionics**

Mercury’s expertise and experience in safety certifiable solutions has been built on successful execution of dozens of programs over three decades. This domain knowledge is the foundation of our BuiltSAFE portfolio of open architecture modules, systems and software for avionics, communications, video servers, and mission computing.
Flexible PCIe

With various PCIe Gen3 configurations (1x 8-lane, 2x 4-lane, 4x 2-lane) and support for Non-Transparent Bridge (NTB) port the CIOV-2231 supports multiple scenarios including communicating with similar HPEC SBCs, driving a BuiltSAFE VGP-2870 for additional GPGPU performance or interconnecting with an AVIO-2353 for avionics applications. The CIOV-2231 supports a 4x PCIe Gen2 configuration for full mesh PCIe network support, enabling near deterministic communication with up to three boards over the OpenVPX backplane.

Technical Specifications

Compliance
3U VPX (VITA 46)/OpenVPX (VITA 65 /VPX REDI (VITA 48)
OpenVPX (VITA 75): multiple peripheral slot profiles

Power Consumption
minimum typical maximum units
- 45 70 Watts

Processor
Intel Core i7 Gen5 (5850EQ) @ 2.7GHz (Turbo Boost to 3.4GHZ)

Memory
16GB of DDR3 ECC
16GB of on-board SSD

I/O
Expansion links
PCIe Gen3 1x8, 2x4, 4x2 from PCIe switch (with NTB port support) to OpenVPX-P1
4x PCIe Gen2 (full mesh PCIe network) to OpenVPX-P1

High speed links
2x GbE 1000Base-KX/BX on VPX-P1
3x USB 2.0 on VPX-P1
1x USB 3.0 on VPX-P2
2x SATA III on VPX-P2

Video Out
2x DisplayPort/HDMI on VPX-P2
1x VGA on VPX-P2

Video In
2x HD/SD-SDI on VPX-P1

Others
2x COM ports
6x user GPIO

(1) Please contact factory for more information
(2) Other sizes available upon request
(3) Please contact factory for other configurations
(AA) Applies to “AA” configuration
(BA) Applies to “BA” configuration

Board Management
Built-In-Test (BIOS and software)
Temperature monitoring
Watchdog
Error reporting
Reset management
Debug and maintenance mode
Distributed clock for system integration (ROCK-2)
Trusted Platform Module

Software
Linux® BSP
Windows® Embedded BSP

Product Ordering and Options
CIOV-2231 3U OpenVPX Intel Core i7 Gen5 Single Board Computer

Memory
- 16GB SSD
- 32GB SSD

Environmental
- A1: 0°C to 55°C
- C4: -40°C to 85°C

Development
Rear Transition Module capability

Slot profile
- Standard
- ROCK-2 compatible

Software
- Linux BSP
- Windows BSP

Related Hardware Products
ACS-6076 Forced air-cooled, 4-slot payload, 3U OpenVPX sealed conduction-cooled subsystem (0.8”, 0.85”, 1” pitch, 250 Watts) with MIL connectors
AVIO-2353 3U OpenVPX avionics I/O board
VGP-2870 3U OpenVPX video I/O and graphic processor
ROCK-2 3U OpenVPX, low-SWaP, rugged, modular, pre-qualified subsystems
### Ruggedization Levels

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
<th>Cooling Type</th>
<th>Operating Temperature</th>
<th>Vibration (1 hour per axis)</th>
<th>Operating Shocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Commercial AC</td>
<td>Forced air*</td>
<td>0°C to 55°C [AC1]</td>
<td>5-100 Hz: increase at 3 dB/octave, 100-1000 Hz: 0.04 g²/Hz, 1000-2000Hz: decrease at 6 dB/octave [V2]</td>
<td>20g, 11ms saw-tooth, three axes [OS1]</td>
</tr>
<tr>
<td>C4</td>
<td>Extended range CC</td>
<td>Conduction</td>
<td>-40°C to 85°C [CC4]</td>
<td>5-100 Hz: increase at 3 dB/octave, 100-1000 Hz: 0.1 g²/Hz, 1000-2000Hz: decrease at 6 dB/octave</td>
<td>40g, 11ms saw-tooth, three axes</td>
</tr>
</tbody>
</table>

* The required air-flow is defined separately for each product

### Environmental Specifications

<table>
<thead>
<tr>
<th>Condition</th>
<th>Limits, standards</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-operating temperature</td>
<td>-55°C to 105°C [C4]</td>
<td></td>
</tr>
<tr>
<td>Humidity</td>
<td>95%</td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>-1,500 to 60,000 feet</td>
<td>May require conformal coating</td>
</tr>
<tr>
<td>Fungus resistance</td>
<td>No nutrient materials</td>
<td></td>
</tr>
<tr>
<td>Workmanship</td>
<td>IPC-A-160 class 3</td>
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<tr>
<td>Soldering</td>
<td>IPC J-STD-001 class 3</td>
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<tr>
<td>PCB Manufacturing</td>
<td>IPC-A-600 class 3</td>
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<tr>
<td>Conformal coating</td>
<td>IPC-CC-830</td>
<td>Optional</td>
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<tr>
<td>Materials</td>
<td>REACH compliant</td>
<td>ROHS variants as an option</td>
</tr>
<tr>
<td>Flammability</td>
<td>UL 94 Class V-0</td>
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</tr>
<tr>
<td>Quality</td>
<td>EN 9100:2008</td>
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</tbody>
</table>