**BuiltSAFE™ RIO6-8096**

Freescale® QorIQ® P2 6U VME64x Single Board Computer (SBC)

- Freescale® QorIQ® P2010 processor
- Xilinx Spartan®-6 LXT user-programmable FPGA
- Board Management Controller (BMC)
- Static routing module (FlexIO™)
- 2x PMC/XMC sites
- Rugged conduction-cooled packaging

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.

The BuiltSAFE RIO6-8096 is a 6U, conduction-cooled VME64x Single Board Computer for airborne applications. It is specifically designed for the most demanding applications, combining very high compute and flight-worthiness capabilities within harsh environments.

The BuiltSAFE RIO family is a sixth generation 6U VME64x PowerPC compute platform combining a fast dual-core processor with modern interconnect high-speed links and bridges (PCIe, Gigabit Ethernet).

The BuiltSAFE RIO6-8096 provides a PCIe x4 connection over the VME-P0 connection, allowing the insertion of modern interconnect technology into any system based on a VME64x backplane with a P0 connector.

For an easy configuration of the I/O pinout and support of legacy pinouts a static routing module (FlexIO) is placed between the different I/O sources and the backplane. Combined with the onboard FPGA-based PCIe to VME bridge FlexIO makes the RIO6-8096 a versatile fit for legacy placements requiring additional compute performance.

**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.

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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.
Technical Specifications

Compliance
Conduction-cooled 6U VME64x

Power Consumption
25 Watts (typical)

Processor
Freescale QorIQ P2010 (1 core)

Memory
1/4 Gb DDR3 SDRAM at 6.4 GB/s peak with ECC protection
2 GB Flash (NAND)
128 MB Flash (NOR)
256 KB NVRAM

FPGA/User-Programmable/User I/O Lines
Xilinx, Spartan-6 LX100T user-programmable FPGA with dual 128 MB DDR3 SDRAM and 8 MB Flash (SPI)
32 user-specific I/O lines on PMC-J14 to VME-P2
48 user-specific I/O lines on PMC-J24 to VME-P2
64 user-specific I/O lines on FPGA to CES FlexIO

I/O Customization
1x CES FlexIO static routing module (interconnect between PMCs/XMCs, VME-P2 and user FPGA)

Buses
1x 64-bit VME64x 2xSST bus on VME-P1/P2
1x 64-bit PCI 3.0 bus at 33/66 MHz on PMC-J11/J12/J13/J21/J22/J23
High-Speed Links/Connections
1x PCIe x4 on VME-P0
3x PCIe x4 on XMC-J15/J25/J26 (1x each) (VITA 42.3)
3x 10/100Base-TX/1000Base-T on VME-P2
1x USB 2.0 host on VME-P2
2x RS-232 on VME-P2
4 high-speed links on FPGA to XMC-J16

Sites
2x PMC/XMC sites (VITA 42.3)

Board Management Controller
Power management
Board start-up and voltage monitoring
Temperature monitoring (thermal sensors on critical positions)
Development/Debug
Onboard JTAG test port
Rear I/O transition module
Xilinx ChipScope Pro FPGA debugging tool

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>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>

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>
<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>
<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>
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<tr>
<td>Flammability</td>
<td>UL 94 Class V-0</td>
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<tr>
<td>Quality</td>
<td>EN 9100:2008</td>
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</tbody>
</table>

Product Ordering

- RIO6-8096AF: Conduction-cooled 6U VME SBC with QorIQ P2010 @ 1.0 GHz, 512 KB L2, 1 GB DDR3, 2 GB NAND, 128 MB NOR, 256 KB NVRAM, Spartan-6 LXT
- RIO6-8096EF: Conduction-cooled 6U VME SBC with QorIQ P2010 @ 1.0GHz, 512 KB L2, 4 GB DDR3, 2 GB NAND, 128 MB NOR, 256 KB NVRAM, Spartan-6 LXT
- OWW-30920B: VxWorks® BSP for RIO6-809x
- OWW-30930E: VxWorks 653 BSP for RIO6-809x
- OWX-30930D: Linux® Toolbox for RIO6-809x

Related Hardware Products

- BPA-6513A0: Passive backplane adapter for high-speed links (3 slots)
- ISC-8422R0: Low-power, conduction-cooled 6U VME PMC/XMC carrier board for RIO6-8096
- RTM-6290A0: Rear I/O Transition Module for RIO6-8096/97 (3x RJ45: 3x GbE, 2x µDB9: 2x RS-232, 6x µDB9: 6x RS-422/485, 1x DB9: service interface, 1x USB Type A: 1x USB 2.0, 5x Harting: 5x 16x GPIO)

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