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.

**BuiltSAFE™ MFCC-8556**

Freescale® QorIQ® P2 Conduction-cooled Single Board Computer PMC/XMC Module

- Designed for DAL-C (DO-178C/DO-254) certification
- Freescale® QorIQ® P2020 processor
- Xilinx Spartan®-6 LXT user-programmable FPGA (1)
- Mercury Advanced Board Management Controller
- 1x PCIe x2 on XMC (1), 2x GbE on PMC/XMC (1)
- 1x USB 2.0 on PMC/XMC (1), 3x UARTs on PMC/XMC (1)

(1) Optional

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 MFCC-8556 is a powerful processing solution packaged in a PMC/XMC form-factor for airborne conduction-cooled applications. The MFCC-8556 is designed for the most demanding missions, combining high compute power and flight-worthiness capabilities in harsh environments.

The MFCC-8556 is Mercury’s sixth generation PMC/XMC PowerPC multi-function processing solution, featuring a fast dual-core processor with high-speed links and bridges (PCIe, GbE) and an optional user-programmable FPGA for application development.

An Advanced Board Management Controller is implemented for configuration management, event logging and other supporting tasks. It monitors and controls the system continuously, ensuring reliability and safety even in the case of failure conditions.

**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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Technical Specifications

Compliance
PMC: VITA 20, VITA 32
XMC: VITA 42

Power Consumption
minimum typical maximum units
- 8 12 (1) Watts

Processor
Freescale QorIQ P2020 (2 cores) @ 1.0 GHz

Memory
512 MB/2 GB DDR3 SDRAM @ 6.4 GB/s peak with ECC protection
2 GB Flash (NAND)
128 MB Flash (NOR)
256 KB NVRAM

User Programmable FPGA I/O
Xilinx Spartan-6 LXT FPGA with 128 MB DDR3 SDRAM (B) (D) (G)
User-specific I/O lines on PMC-P4/XMC-P6 (B) (D) (G) (L)

Buses
1x 32-bit PCI 3.0 bus at 33/66 MHz on PMC-P1/P2 (B) (G) (L)

Links / Connections
1x PCIe x2 on XMC-P5 (VITA 42.3) (B) (G) (L)
3x high-speed links on user-programmable FPGA to XMC-P6 (B) (D) (G) (L)
2x 1000Base-T on PMC-P4/XMC-P6 (B) (D) (G) (L)
1x USB 2.0 host / device on PMC-P4/XMC-P6 (B) (D) (G) (L)
2x RS-232 on PMC-P4/XMC-P6 (B) (D) (G) (L)
1x RS-232 on XMC-P6 (B) (D) (G) (L)
1x selectable RS-422/485 on PMC-P4/XMC-P6 (B) (D) (G) (L)

(1) Without FPGA user functionality
(B), (C), (D), (G), (L) and (P) applies to B, C, D, G, L and P model options

Advanced Board Management Controller
CPU speed control logic
Advanced power management
Voltage and current monitoring
Temperature monitoring (thermal sensors on critical positions)
Advanced error reporting and logging

Development / Debug
Onboard JTAG test port

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>
<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>
<td></td>
</tr>
</tbody>
</table>

Product Ordering

MFCC-556BF Conduction-cooled PMC with QorIQ P2020 @ 1.0 GHz,
512 MB DDR3, 2 GB NAND, 128 MB NOR, 256 KB NVRAM,
Spartan-6 LXT 128 MB DDR3

MFCC-8556DF Conduction-Cooled XMC with QorIQ P2020 @ 1.0 GHz,
512 MB DDR3, 2 GB NAND, 128 MB NOR, 256 KB NVRAM,
Spartan-6 LXT with 128 MB DDR3

MFCC-8556LF Conduction-cooled PMC with QorIQ P2020 @ 1.0 GHz,
512 MB DDR3, 2 GB NAND, 128 MB NOR, 256 KB NVRAM
(pins-out: MFCC-8448 compatible)

MFCC-8556PF Conduction-cooled XMC with QorIQ P2020 @ 1.0 GHz,
512 MB DDR3, 2 GB NAND, 128 MB NOR, 256 KB NVRAM
(no XMC-P6)

MFCC-8556DH Conduction-cooled XMC with QorIQ P2020@1.0GHz
2GB DDR3, 2GB NAND, 128MB NOR, 256KB NVRAM,
Spartan-6 LXT with 120MB DDR3

Conformal coating versions of these boards are also available.

OWW-36410A VxWorks® BSP for MFCC-8550/56
OWW-36410E VxWorks 653 BSP for MFCC-8550/56
OWX-36410L Linux® Toolbox for MFCC-8550/56