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-8557 is a DAL C (other upon request) certifiable XMC 2.0 Single Board Computer (SBC) engineered for the most stringent aerospace and defense applications that require certification to DO-178C/DO-254. The MFCC-8557 can be delivered with all documentation, certification evidence and supporting artifacts required to prove compliance for avionics certification. Leveraging the MFCC-8557 ensures a smooth development process supported by Mercury’s safety engineering team and their deep domain expertise. The BuiltSAFE MFCC-8557 has been engineered with DAL safety certification in mind from the top down, with DO-178C/DO-254 best design practices systematically applied throughout all phases of development.

The BuiltSAFE MFCC-8557 features a comprehensive set of Power-On, Continuous and Initiated Built-In-Tests and hardware components that physically disconnect maintenance interfaces during missions for built in reliability.

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.
Pre-integration

The MFCC-8557 is engineered for seamless integration feature complementary building blocks with XMC 2.0 compatible mezzanine sites. Pre-integrated with our BuiltSAFE VGP-2870 or AVIO-2353, the MFCC-8557 becomes a powerful DAL-C (DO-178C/DO-254) certifiable subsystem that is packaged in a single 3U OpenVPX™ slot. This approach is ideally suitable for computation intensive video/graphics or I/O intense avionic applications.

Technical Specifications

**Compliance**

- XMC (VITA-42) XMC 2.0 (VITA-61), XMC PCIe (VITA-42.3)
- Certifiable up to DAL-C (DO-178C/DO-254)
- Certifiable board support package: VxWorks®653 (partitioned)

**Power Consumption**

<table>
<thead>
<tr>
<th>minimum</th>
<th>typical</th>
<th>maximum</th>
<th>units</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>18</td>
<td></td>
<td>Watts</td>
</tr>
</tbody>
</table>

**Processor**

- Freescale QorIQ P3041 @ 1.5 GHz

**Memory**

- 2/4 GB DDR3L @ 10.6 GB/s peak with ECC protection
- 2 GB Flash EPROM (NAND)
- 256 MB Flash EPROM (NOR) for mission
- 256 MB Flash EPROM (NOR) for maintenance
- 256 MB FRAM NVRAM
- 32 MB EEPROM SPI

**Links/Connections**

- 3x PCIe Gen2 x1 on XMC-P6
- 1x PCIe Gen2 x4 on XMC-P5
- 1x SGMII interface on XMC-P6 (1)
- 2x UARTs on XMC-P6 (2)
- Maintenance or DAL-E only interfaces (disabled when on mission)
  - 1x 1000BASE-8X interface on XMC-P6
  - 1x SGMII interface on XMC-P6
  - 1x USB 2.0 OTG on XMC-P6
  - 1x USB 2.0 HOST on XMC-P6
  - 4x UARTs over USB on XMC-P6 (2)
  - 1x SATA 2.0 on XMC-P6

(1) DAL-C certifiable in Fast Ethernet mode
(2) Mutually exclusive

**Safety Optimized Board Management**

- Voltage monitoring
- Temperature monitoring (thermal sensors on critical positions)
- Elapsed time and real-time counter
- Watchdog (short and long period)
- Error reporting
- Reset management
- Certifiable board support package
- Initialization sequence
- Built-in tests

**Product Ordering**

- MFCC-8557
  - Freescale QorIQ P3041 processor XMC
- Memory
  - 2 GB
  - 4 GB
- Connector
  - XMC (VITA-42)
  - XMC 2.0 (VITA-61)
- Environmental
  - A1 : 0°C to 55°C
  - C4 : -40°C to 85°C
- Software
  - Green Hills INTEGRITY-178 tuMP
  - Linux (3)
  - WindRiver VxWorks® 6.x and 653 3.x
  - SYSGO PikeOS
  - DDC-I Deos

(3) Contact factory for more information

**Safety Artifacts**

- DO-178C certification kit (consult factory for more information)
- DO-254 certification kit (consult factory for more information)

Note: If the MFCC-8557 is used on a VME/CPCI carrier, please contact factory

**Related Hardware Products**

- AVIO-2353 3U OpenVPX™ avionic I/O board
- VGP-2870 3U OpenVPX video I/O and graphic processor
- ROCK-2 3U OpenVPX, low-SWaP, rugged, modular, pre-qualified subsystems
- CB3P-6357 3U OpenVPX carrier board for MFCC-8557/8
- RTM-8557A0 Rear Transition Module for pre-integration CB3P-6357A0 + MFCC-8557/8
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 g^2/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-610 class 3</td>
<td></td>
</tr>
<tr>
<td>Soldering</td>
<td>IPC J-STD-001 class 3</td>
<td></td>
</tr>
<tr>
<td>PCB Manufacturing</td>
<td>IPC-A-600 class 3</td>
<td></td>
</tr>
<tr>
<td>Conformal coating</td>
<td>IPC-CC-830 Optional</td>
<td></td>
</tr>
<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>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td>EN 9100:2008</td>
<td></td>
</tr>
</tbody>
</table>

Less space for more functions

Mission computer featuring stacked XMCs for low-SWaP

Front Panel
I/O Board
CPU
Graphics
Spare
Spare
Backplane

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INNOVATION THAT MATTERS™

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