

# Ensemble MPQ-101 Serial RapidIO® PowerQUICC™ III AMC Module

## Exceptionally Powerful Processing and Serial RapidIO® Connectivity

- High processing density and bandwidth with 4 modules per slot
- Ideal for compute- and communication-intensive applications
- Efficient application development
- Easy to control, monitor, and maintain



The Ensemble™ MPQ-101 Serial RapidIO® PowerQUICC™ III AdvancedMC™ (AMC) module from Mercury Computer Systems is an exceptionally powerful serial RapidIO AMC card. The onboard Freescale™ MPC8548 PowerQUICC™ III processor, running at up to 1.3 GHz. and with on-chip floating-point unit, allows stateful packet inspection and manipulation, as well as policy/QoS enforcement. The integrated MAC for the TSEC (triple-speed Ethernet controller) provides granular and deterministic control over data flow. These critical features make the MPQ-101 ideal for a wide variety of network, telecom, medical, industrial control, test and measurement, and defense applications.

The MPQ-101 connects via single x or 1x/4x serial RapidIO links to the switch fabric. These links provide a peak data transfer rate of either 2.5 Gbps or 10 Gbps, respectively. Each x connection can run at up to 3.125 Gbps, providing a peak data transfer rate of 10 Gbps for the 4x link after 8/10 encoding.

### Powerful and Flexible Configurations

The MPQ-101 is a single-width, full-height or mid-height AMC, which allows four of these cards to be packed into a single ATCA slot on an Ensemble BCC-101 Carrier Blade. These dense configurations provide a large amount of processing power and bandwidth for compute- and communication-intensive applications.

The front-panel USB and Gigabit Ethernet connector provide easy access for configuration, maintenance, monitoring, and control connectivity. Front-panel LEDs enable easy readout of status, and built-in hot-swap support allows for quick maintenance.

The MPQ-101 includes an IPMI controller, firmware, and IPMB links for chassis management-based control and configuration. The module can be plugged into AMC B+ bays. It has 128 MB of flash memory and 512 MB of DDR2 SDRAM.

Application development is easy. The MPQ-101 AMC module supports Linux®, but also has an onboard JTAG software debug and development port, which can be connected to an emulator/debugger such as the Abatron™ BDI2000 debugger.

### Ensemble Platform

The MPQ-101 AMC module is part of the Mercury Ensemble Serial RapidIO ATCA Platform. The Ensemble Platform is a standards-based solution built around the power, functionality, and scalability of serial RapidIO, AdvancedTCA® (ATCA), and AMC. The platform supports a variety of I/O sources and heterogeneous processing, thereby reducing integration costs, improving efficiency, and minimizing risks in design of next-generation applications.

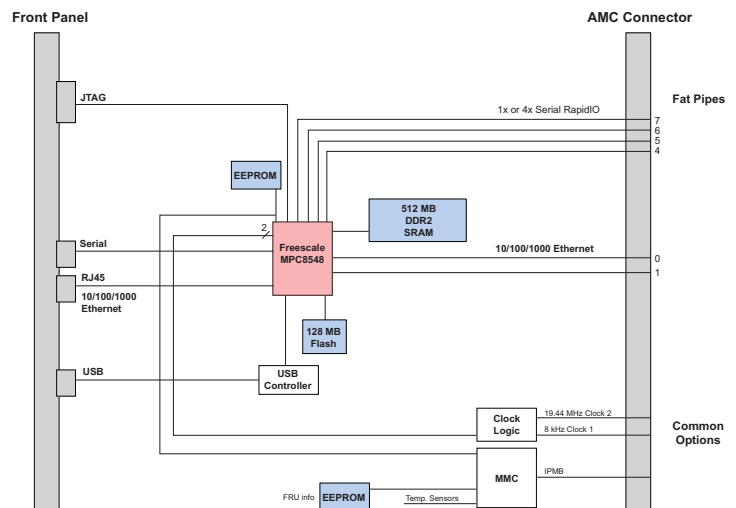


Figure 1. MPQ-101 AMC module block diagram

## Ensemble Configuration Options

The Ensemble Platform has many advantages that accelerate application development activities:

- The variety of heterogeneous Ensemble AMCs allows developers to customize applications with options to plug in host processors, radio cards, or a network interface card (NIC) AMC.
- AMCs can be combined with Ensemble carrier boards that provide RapidIO chip-to-chip and across-the-chassis connectivity, enabling seamless scaling from a single-sector system to multi-sector, multi-antenna, multi-carrier base-station implementations.
- Ensemble offers developers the flexibility to easily expand specific processing nodes to address application performance bottlenecks.
- Additional FPGA or DSP modules connected over RapidIO can be used to support specific application requirements.
- The homogeneous RapidIO interconnect among processing nodes enables ease of programming of DSPs, communication processors, and FPGAs.

## Specifications

### Processor

Freescale MPC8548 PowerQUICC III signal processor  
Up to 1.3 GHz

### High-speed interfaces

1x or 4x serial RapidIO connections

Data rate

1x connections	4, 8, and 10 Gbps max after 8/10 encoding
4x connections	10 Gbps max after 8/10 encoding

### Memory

Flash 128 MB  
DDR2 512 MB IPMI  
Lower ejector handle switch  
Hardware address

### AMC connector

1000BASE-X fiber SerDes interface over copper link Ethernet (Port 0)  
1x/4x serial RapidIO (Ports 4-7)  
IPMB-A and IPMB-B links

### Front panel

LEDs per AMC.0

Out of service	Red
User LED2	Green
User LED3	Yellow
Hot-Swap	Blue RJ45
Gigabit Ethernet	Reset button

USB 2.0 compliant (does not support 480 Mb speed)  
Serial port interface to MPC8548 and IPMI controller

### Test and development

16-pin JTAG/emulator connector  
14-pin JTAG/programming header for IPMI controller  
ICT test points

### Software support

Linux variant (2.6 kernel, 32- and 36-bit mode)

### Mechanical

Full-height	
Width	73.81 mm
Depth	180.6 mm
Height	28.96 mm
Mid-height	
Width	73.81 mm
Depth	180.6 mm
Height	18.96 mm

Supports AMC B+ bays

### Specification compliance

AMC.0 Rev 1.0 compliant  
Hot-swap support

### Environmental

Temperature	
Operating	0°C to 55°C
Storage	-40°C to +70°C
Humidity	
Operating	5-90% non-condensing
Vibration	0.003g <sup>2</sup> /Hz, 20-2000 Hz, 1 hr/axis
Shock	x/y axes: 32g; z axis: 20g; 11 ms, half-sine
Air flow	Chassis-dependent – consult factory.

### Power consumption

12V (payload)	20W typ, 25W max
3.3V (management)	0.25W typ, 0.5W max

Some of Mercury's products are subject to the jurisdiction of the U. S. International Traffic in Arms Regulations (ITAR). Please contact your Mercury sales representative for more information.

Ensemble and Challenges Drive Innovation are trademarks of Mercury Computer Systems, Inc. RapidIO is a registered trademark of the RapidIO Trade Association. Other products mentioned may be trademarks or registered trademarks of their respective holders. Mercury Computer Systems, Inc. believes this information is accurate as of its publication date and is not responsible for any inadvertent errors. The information contained herein is subject to change without notice.

Copyright © 2009 Mercury Computer Systems, Inc.

717.02E-0209-DS-ensem\_mpq101



### Corporate Headquarters

201 Riverneck Road  
Chelmsford, MA 01824-2820 USA  
+1 (978) 967-1401 • +1 (866) 627-6951  
Fax +1 (978) 256-3599  
www.mc.com

### Worldwide Locations

Mercury Computer Systems has R&D, support and sales locations in France, Germany, Japan, the United Kingdom and the United States.

For office locations and contact information, please call the corporate headquarters or visit our Web site at [www.mc.com](http://www.mc.com).

Challenges Drive Innovation™