

# Ensemble MXI-205 Xilinx® V5 FPGA AMC Module

High-Performance, High-Bandwidth, Low-Latency Processing and I/O

- For AdvancedTCA® and MicroTCA® platforms
- Integrated, powerful FPGA compute node
- Flexibility to support multiple switch fabrics
- I/O flexibility via VITA 57 FMC site



The Ensemble™ MXI-205 Xilinx V5 FPGA AMC Module from Mercury Computer Systems combines a powerful Virtex™-5 FPGA compute node (CN) with switch fabric flexibility and multiple FMC-based I/O options. Configurable for a variety of high-performance, high-bandwidth, and low-latency processing and I/O needs, this versatile module uses the power of FPGA processing to reduce system size, cost, and complexity in network, telecom, industrial control, defense, and other applications.

## Powerful FPGA Processing with Flexible Fabric and I/O Connectivity

The MXI-205 supports one Xilinx Virtex-5 FPGA, from either the LXT or SXT platform families. Both families are optimized for low-power serial connectivity, with the LXT delivering especially high performance logic, while the SXT family is more suitable for DSP and memory-intensive applications. The Virtex-5 FPGA provides support for two DDR-II (x16) SDRAM devices, as well as two QDRII/DDR-II (x36) SRAM devices.

The module’s flexibility extends to switch fabric support. Endpoint IP is available to enable a choice of switch fabrics, all capable of using the same set of physical connections to “Fat Pipe” AMC Ports 4-7 and 8-11 via the AMC connector. The connections are sourced by the RocketIO® transceivers on the Virtex-5 device and can be configured as either x4 RapidIO® or 10 Gigabit Ethernet (XAUI). PCI Express® is also an option on these connections.

I/O flexibility rounds out the capabilities of the MXI-205. An FPGA mezzanine card (FMC) site, adhering to the VITA 57 draft specification, enables a wide range of I/O protocols supported on FMCs. Connections from the Virtex-5 FPGA to the FMC site include 80 differential pairs (160 single-ended signals), as well as 8 high-speed serial links.

## Ensemble ATCA Platform

The Ensemble MXI-205 adds powerful FPGA processing to the Ensemble ATCA Platform, with the added benefit of flexible I/O options for RapidIO, 10 Gigabit Ethernet (XAUI), or PCI Express. The Ensemble Platform is a standards-based solution built around the power, functionality, and scalability of RapidIO®, AdvancedMC®, AdvancedTCA, and MicroTCA. The platform supports a variety of I/O sources and heterogeneous processing endpoints, thereby reducing integration costs, improving efficiency, and minimizing risks in design of next-generation applications.

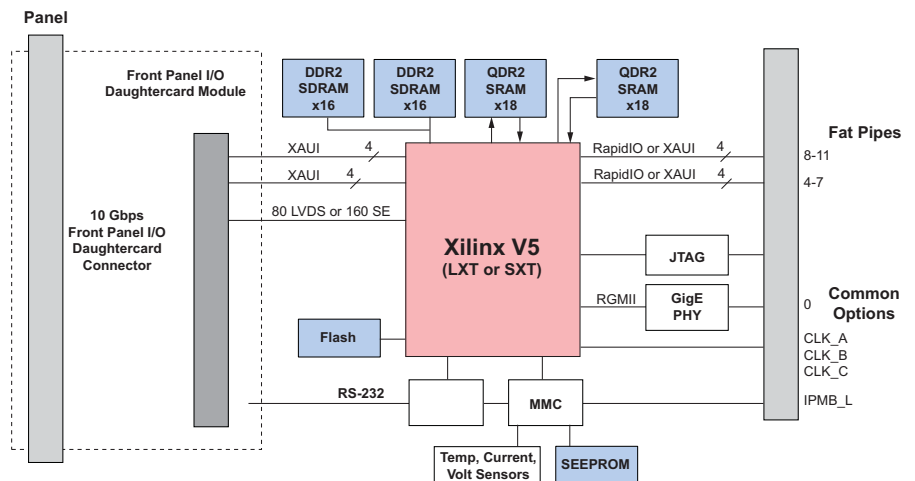


Figure 1. Ensemble MXI-205 functional block diagram

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 multisector, multi-antenna, multicarrier 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

### FPGA Compute Nodes

One Xilinx Virtex-5 (LXT/SXT) FPGA	
Two QDRII or DDR-II SRAM	16 MB
Two DDR2 SDRAM	256 MB
Reconfiguration CPLD manager	
FPGA functionality	
FPGA Explorer	
Mercury FDK development environment	
Mercury memory controller	

### Compliant with AMC B+ Bays

Mid-size, single-width AMC module  
B+ edge connector  
Supports hot swap

### AMC Connector

Two XAUI/RapidIO/PCIe/10 Gigabit Ethernet  
Gigabit Ethernet

### Front Panel

LEDs	
Out of service	Red
IPMI user-definable	Green
Hot swap indicator	Blue

### FMC (VITA 57) Front-Panel I/O Options

Dual SFP+ (XFP compatible)  
Quad Gigabit Ethernet, dual 10 Gigabit Ethernet  
A/D D/A modules

## IPMI Controller

Voltage monitor  
Geographical address monitor  
Temperature monitors  
Power/reset controller  
Support for serial port (RS-232)

## Mechanical

Full-height, single-width AMC  
Width 28.96 mm  
Depth 208.53 mm  
Height 73.81 mm  
Supports AMC B+ bays

## Test and Development

JTAG connector  
JTAG/programming header for IPMI controller  
ICT test points  
RS-232 connection to IPMI controller  
Jumper plugs for easy configuration changes  
LEDs

## Electrical

Input voltage 12V and 3.3V (IPMI)

## Power Consumption

Total power consumption <40W

## 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

## Standards Compliance

AdvancedTCA Base R2.0 (PICMG® 3.0) compliant  
AdvancedTCA RapidIO (PICMG 3.5) compliant

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