

Pigeon Point® BMR-P1AFS-AMC Reference Design Board Management Reference Design Add-on for AdvancedMC™ Carrier

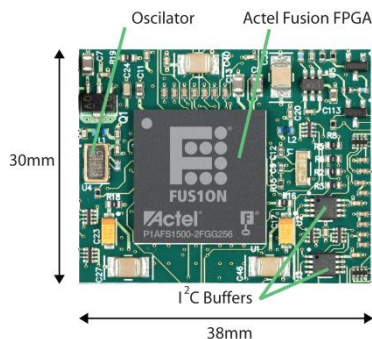
The BMR-AMC design is one of a series of Pigeon Point Board Management Reference designs. This member of the series augments the BMR-P1AFS-ATCA IPM Controller to enable it to manage and represent Advanced Mezzanine Cards (AdvancedMCs or AMCs) installed on an ATCA-based AMC carrier. This reference design is based on the Fusion mixed-signal FPGA from Microsemi Corporation and requires that the foundation BMR-P1AFS-ATCA be licensed separately.

This reference design is delivered in a Pigeon Point Board Management Starter Kit Add-on (which is detailed in a separate Product Brief). The kit includes:

- An augmented FPGA design that includes the Carrier IPMC additions. This design is ready to be adapted for your AMC carrier.
- Schematics for the Carrier IPMC additions, ready for integration into the schematics of your AMC carrier, with adaptation as necessary.
- Firmware for the Carrier IPMC, delivered in source form and ready for simple and quick adaptation to the specific requirements of your product.
- One-stop support for hardware, firmware and software used in developing and delivering your Pigeon Point BMR-based Carrier IPMC, with complementary support from Microsemi for the FPGA design.

The following photo shows the core of the P1AFS-based Carrier IPMC, essentially the same as a P1AFS-based ATCA IPM Controller. The active components are:

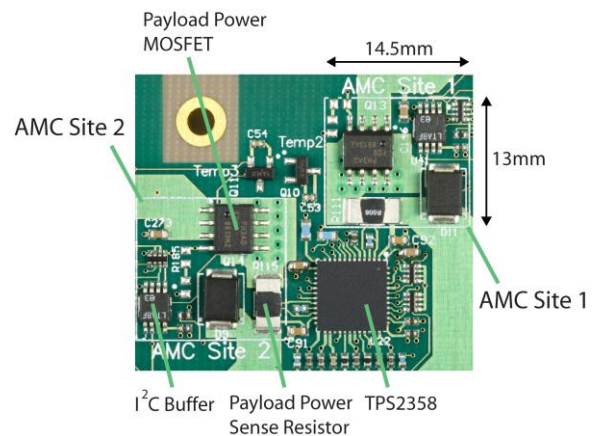
- The P1AFS1500 mixed-signal FPGA.
- Dual IPMB buffers to isolate the IPMC from the dual redundant IPMB-0 implemented on the backplane.
- An external oscillator to provide the operating frequency.



The next photo shows two instances of the carrier-based logic that hosts an AMC position. Each pair of sites is managed by

a special dual AMC slot controller, the Texas Instruments TPS2358. With the combined facilities of the Fusion FPGA and the TPS2358, only two additional active components are required for each AMC site:

- A MOSFET payload power switch
- The required IPMB buffer so that a malfunctioning AMC can be isolated from IPMB-L



Specification compliant and interoperability tested

- AMC.0 R2.0, the AdvancedMC base specification
- PICMG 3.0 R3.0, the AdvancedTCA base specification (which is the underlying foundation for AMC.0), plus HPM.1, the IPM Controller Firmware Upgrade specification
- IPMI v1.5, document revision 1.1 and the relevant subset of IPMI v2.0, document revision 1.0, plus relevant errata
- Thoroughly tested with other management components at PICMG TCA-IWs (Interoperability Workshops)
- Compliance tested with Polaris Networks' ATCA and AMC Testers

Full support for additional core hardware requirements of an AMC carrier

- Supports P1AFS600 with the FG484 package and external SRAM, plus P1AFS1500, including the FG256 and FG484 packages, with and without external SRAM
- AMC payload and management power control / monitoring for each particular site, including payload power current measurement
- Tight compliance with specification constraints on power control, including fast trip circuits for payload and management power to quickly respond to serious fault conditions, disabling power within 300 ns
- Control of fabric E-Keying governed interfaces, both for AMCs and for on-carrier switches terminating AMC links.
- Control of clock E-Keying governed interfaces, both for AMCs and for on-carrier clock-related devices
- Optional persistence of above controls across Carrier IPMC resets
- Management of on-carrier IPMB-L, the primary management communication path with the Module Management Controllers (MMCs) of installed AMCs

Small footprint and low power

- Carrier IPMC core can fit in 30mm x 38mm footprint for a P1AFS in the FG256 package and in a 49mm x 36mm footprint for a P1AFS in the FG484 package and external SRAM
- AMC site-specific logic can fit in 13mm x 14.5mm, plus about 8mm x 8mm for a TPS2358 supporting each pair of sites
- Maximum current consumption for the active components is about 200 mA, plus 18mA per pair of implemented AMC sites, assuming a P1AFS600 operating with the supplied FPGA design and using the default 25 MHz input clock

Adaptable and extendable FPGA design

- Initial FPGA design provided in several variants (e.g. for different package sizes), can be used directly or modified
- Potential modifications include adding or removing Microsemi IP blocks, adding custom logic and/or IP blocks, changing device pin assignments, if necessary

Comprehensive, readily adaptable firmware additions for carrier responsibilities

- All mandatory and many optional IPMI/ATCA/AMC commands supported over IPMB-L
- Carrier IPMC manages installed AMCs and represents them to the Shelf Manager as defined by AMC.0, with similar representation extended to the carrier payload
- Supplementary Pigeon Point extension commands, primarily used over the payload and serial debug interfaces
- Simple—but highly flexible—configuration of firmware features

Simple, but powerful, firmware configuration mechanisms

- Additional configuration variables in a single `config.h` source file parameterize and determine inclusion/exclusion of carrier-related subsystems during firmware image build
- Binary configuration files for FRU Information and Sensor Data Records (SDR), with carrier-related additions, merged into firmware image
- FRU Information and SDR files produced from textual representations by special compilers included with underlying BMR-P1AFS-ATCA Starter Kit

Comprehensive Cortex-M1 development environment

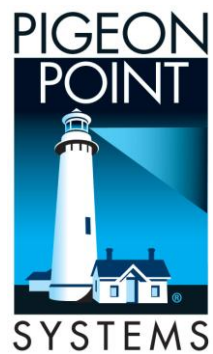
- Already provided in underlying BMR-P1AFS-ATCA Starter Kit, ready for use with the Carrier IPMC firmware

Enhancements to BMR-P1AFS-ATCA IPMC functionality

- Implicit bridging of IPMI/PICMG/SIPL commands referencing AMC resources, along with corresponding command replies
- Explicit bridging via IPMI Send Message commands, each containing an embedded command destined for an AMC, with appropriate forwarding of corresponding command replies
- Common sensor management framework for all sensors on the carrier, including those in installed AMCs
- Tracking the state of AMCs and notifying higher level entities (e.g., the Shelf Manager) of state changes
- Managing the hardware resources of the carrier, including power budget and E-Keying governed resources (including both fabric and clock E-Keying)
- Managing non-AMC modules equipped with MMCs, such as Rear Transition Modules

Additional Pigeon Point extension commands for AMC modules and sites

- Get Module State
- Enable AMC Site
- Disable AMC Site



For more information, visit our website at <http://www.pigeonpoint.com>

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