

Pigeon Point™ BMR-H8S-AMCm Reference Design Board Management Reference Design for AdvancedMC™ Modules

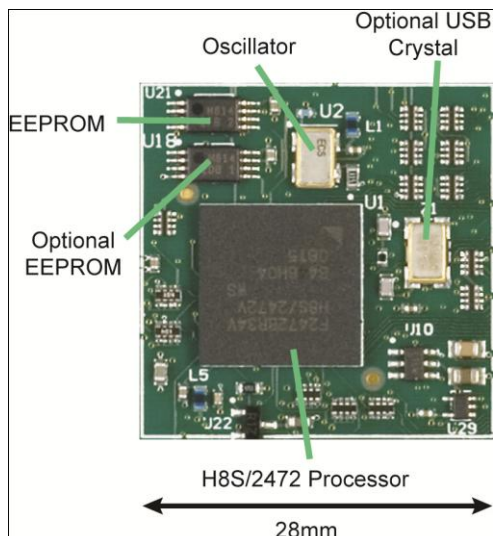
The BMR-H8S-AMCm design is one of a series of Pigeon Point Systems (PPS) Board Management Reference designs. This member of the series provides a Module Management Controller (MMC) for Advanced Mezzanine Cards (AdvancedMCs or AMC)s and is based on the H8S/2472 micro controller from Renesas Technology.

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

- Schematics for a complete MMC subsystem, ready for integration into the design of your AMC, with adaptation as necessary.
- Firmware for that subsystem, delivered in source form and with development tools—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 MMC.

The photo below shows the core of a BMR-H8S-AMCm MMC. The required active components are:

- A Renesas H8S/2472 highly integrated micro controller.
- An external oscillator to provide the H8S reference clock.
- An external 64 Kbit EEPROM



Specification compliant and interoperability tested

- AMC.0 R2.0, the AdvancedMC base specification, which covers AdvancedTCA carriers
- MTCA.0 R1.0, the μ TCA base specification, which covers μ TCA carriers
- PICMG 3.0 R3.0, the AdvancedTCA specification
- HPM.1 R1.0, the PICMG Firmware Upgrade specification
- IPMI v1.5, document revision 1.1, plus relevant errata
- Selected IPMI 2.0 extensions, mainly LAN access features
- Thoroughly tested with other ATCA and μ TCA management components at PICMG (μ)TCA-IWs (Interoperability Workshops)

Full support for core hardware requirements

- AMC hot swap interfaces (handle and blue LED)
- Geographic address detection from carrier
- Control of E-Keying governed interfaces (for both fabric and clock E-Keying)
- Optional persistence of above controls across MMC resets
- Managed by on-carrier IPMB-L
- UART- or LPC/KCS-based¹ payload interface
- UART-based serial debug interface
- Thermal sensors (LM60 analog and/or DS75 digital)
- FRU LED management
- EEPROM for persistent data and FRU Information storage

Small footprint and low power

- Core MMC can fit in 28mm x 28mm footprint
- Required active components consume a maximum of 78 mA from management power

¹ LPC/KCS implements the IPMI-defined Keyboard Controller Style interface using the Low Pin Count version of the Peripheral Component Interconnect (PCI) bus that is used for access to low speed peripherals such as management controllers.

Usable on non-AMC intelligent subsidiary FRUs

- An intelligent subsidiary FRU is represented to an ATCA Shelf Manager by an IPM controller
- Support for such FRUs consistent with requirements in PICMG 3.0 R3.0
- Example FRU in this category: MMC-equipped Rear Transition Module (RTM)

Comprehensive, readily adaptable firmware

- All mandatory and many optional IPMI/AMC commands supported over IPMB-L
- Numerous PPS extension commands, primarily used over the payload and debug serial interfaces
- Serial interface protocol based on IPMI Terminal Mode
- Payload alert notifications over payload interface for sensor events and receipt of reset/shutdown commands
- PICMG HPM.1 firmware upgrade support
- Simple—but highly flexible—configuration of firmware features

ASCII-based serial interface protocol supported via UARTs to payload processor and serial debug interface

- Based on IPMI-defined Terminal Mode of the Serial/Modem Interface (and referenced as Serial Interface Protocol Lite—SIPL)
- Same protocol used for both serial interfaces
- Uses ASCII-encoded raw IPMI messages, which are handled by the IPM Controller essentially like IPMB messages
- PPS extension commands implemented as IPMI-compliant OEM messages

Optional use of LPC/KCS for payload interface

- Enabled in lieu of UART-based payload interface
- Based on IPMI-defined KCS variant of IPMI System Interface, implemented over LPC
- Facilitates use of existing IPMI software on payload processor, which often interfaces with management controller via KCS

Sophisticated, HPM.1-compliant support for firmware upgrades

- Firmware upgrades over any IPMI interface to the MMC, with redundant copies and automatic fallback after failed upgrade
- MMC is fully functional during upgrade
- Bootloader can be upgraded without using JTAG
- Open source `ipmitool` supplied as upgrade agent
- HPM.1 compliance means that any compliant upgrade agent can upgrade any compliant MMC or other type of IPM Controller

Optional Serial over LAN (SoL) support with specific Network Controllers (NCs)

- Overall support for IPMI 2.0-defined SoL, covering serial traffic through a SoL-focused UART in the MMC, connected to a payload processor
- Current release supports SMBus sideband interface of a payload Intel 82575 or 82571 Network Controller (NC) to share access to Ethernet with the payload, using Intel-proprietary pass-through mode
- Sideband interface usable for MMC firmware upgrades as well as for SoL

Optional support for persistent modifications to Sensor Data Records

- Non-volatile copy of SDR Repository can be configured in on-board EEPROM
- Sensor threshold and hysteresis values can be configured dynamically via PPS extension commands, and are thereafter persistent across power cycles and resets of the board

Simple, but powerful, firmware configuration mechanisms

- Configuration variables in a single `config.h` source file parameterize and determine inclusion/exclusion of subsystems during firmware image build
- Binary configuration files for FRU Information and Sensor Data Records (SDR) merged into firmware image
- FRU Information and SDR files produced from textual representations by special supplied compilers

Comprehensive H8S development environment included

- Cross GNU C compiler and binary utilities for H8S architecture
- JTAG-based firmware download using Renesas JTAG emulator tool (the latter purchased separately)
- Supported under both Linux and Windows on x86 hosts
- Alternate firmware download approach via H8S SCI_1 serial interface (typically assigned to serial debug interface) uses built-in functionality of H8S controller
- SCI_1-based firmware download utility `h8sprg` supplied in source code form, with compiled binary for Windows
- Additional alternate firmware download approach via USB interface that is built into the H8S/2472, using Flash Development Toolkit (FDT) software acquired separately from Renesas.

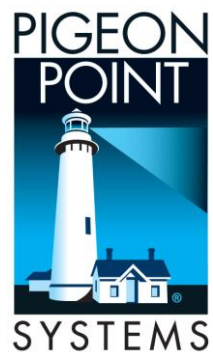
Key extensions beyond required IPMI/ATCA/AMC/HPM.1 commands and functionality

- Graceful Reboot and Issue Diagnostic Interrupt options in FRU Control command
- Send Message
- Get Channel Authentication Capabilities
- Get System GUID
- Get Session Challenge
- Activate Session
- Set Session Privilege Level
- Close Session
- Get Session Info
- Get/Set Channel Access
- Get Channel Info
- Get/Set User Access
- Get/Set User Name
- Set User Password
- Activate/Deactivate Payload
- Get/Set User Payload Access
- Set Channel Security Keys
- Get/Set LAN Configuration Parameters
- Get/Set SoL Configuration Parameters
- Get Sensor Reading Factors
- Get/Set Sensor Hysteresis
- Get/Set Sensor Thresholds
- Get/Set Sensor Event Enable
- Re-arm Sensor Events
- Get Sensor Event Status
- Abort Firmware Upgrade
- Initiate Upgrade Action
- Get Upgrade Status
- Query Self-test Results
- Query Rollback Status
- Initiate Manual Rollback

Rich set of PPS extension commands

- Get Status
- Get/Set Serial Interface Properties
- Get/Set Debug Level
- Get/Set Handle Switch
- Get/Set Payload Communication Timeout
- Disable/Enable Payload Control
- Reset MMC
- Hang MMC²
- Graceful Reset
- Diagnostic Interrupt Results
- Get/Set Payload Shutdown Timer
- Get/Set Geographic Address
- Get/Set Payload Shutdown Timeout
- Set Test Flags
- Set EEPROM SDR Data
- Set EEPROM SDR Hysteresis
- Set EEPROM SDR Thresholds
- Reset EEPROM SDR Repository
- Backend Power Control

² This function is used to test the MMC watchdog.



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

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