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Founded in 1985 and known worldwide for AMIBIOS®, American Megatrends Inc. (AMI) supplies state-of-the-art hardware, software and utilities to top-tier manufacturers of desktop, server, mobile and embedded systems. AMI’s industry leading Aptio® V UEFI BIOS firmware, MegaRAc® BMC firmware and remote server management solutions and class-leading development and debug utilities continue to garner industry acclaim and awards around the world. In line with the diversity of its technology and product line, AMI is a member of a number of industry associations and standards groups, such as the Unified EFI Forum (UEFI), DMTF and the Trusted Computing Group (TCG). Headquartered in Norcross, Georgia, AMI has locations in the U.S., China, Germany, India, Japan, Korea and Taiwan to better serve its customers.
AMI creates and manufactures key hardware and software solutions for the global computer marketplace, providing the highest quality and compatibility to build today's advanced computing systems.

Established by S. Shankar, AMI's mission is to design state-of-the-art computer solutions and develop advanced technology for the best computing solutions in the world.

AMI's extensive product line includes UEFI BIOS firmware, BMC firmware, diagnostic software, remote management solutions, backplane control chips, driver and firmware development, engineering services and much more.

With these product groups, AMI is uniquely positioned to provide all of the fundamental components necessary for the system performance, manageability, and availability required in enterprise computing. AMI is the only company in the industry today offering all of these core technologies.

Founded in 1985, AMI has been a consistent leader in the technology industry, accomplishing a number of firsts which include:

- First to build motherboards based on the Intel® 386 and 486 processor platforms
- First to use on-board external cache designs for these boards - significantly improving their performance
- First in the world to build and ship a Quad-Xeon® processor system: the MegaPlex®
- As a recognized leader in the BIOS market, AMI was:
  - First to support USB
  - First to create a GUI BIOS interface with mouse support
  - First to integrate diagnostics
  - First to support ACPI
- First to develop a diagnostic product for the Extensible Firmware Interface (EFI) in 2001, and first to market a native diagnostic for the Unified Extensible Firmware Interface (UEFI), AMIDiag® for UEFI in 2008
- AMI's MegaRAC® G2 remote server management card was named as a finalist at the 2002 NetWorld+Interop trade show for outstanding design and superior performance
- AMI's MegaRAC® G2 was named a 2003 Ultimate Custom Solutions award winner by CRN magazine
- AMI was first to provide 100% remote manageability and KVM for multiple ASICs with its MegaRAC® SP service processor firmware
- AMI was also the first remote management company to create a service processor stack that merged IPMI with Linux-based management features
- AMI was first to introduce in 2008 a Serial GPIO enclosure controller chip compliant with the International Blinking Pattern Interpretation (IBPI) specification, the MG9082, which extends the use of SGPIO chips to high-end storage servers
- For over 25 years, AMI has been deeply committed to maintaining its leadership position in the computer industry, with the majority of its employees worldwide directly engaged in the design and development of cutting-edge computer technologies.
MEGARAC® SP-X BMC FIRMWARE

MegaRAC® SP-X is a powerful BMC firmware solution for responsive, high-quality remote management of server systems from anywhere in the world. With MegaRAC SP-X, administrators enjoy complete out-of-band, OS-independent server control including power management, KVM redirection and virtual media.

The latest generation of MegaRAC SP-X provides an even greater level of modularity than previous versions. Core firmware functionality, portability and ease of use are also significantly enhanced. Instead of acquiring just a monolithic software package, developers are now able to easily configure the software by selecting specific features and provide packages to their ODM partners with increased differentiation.

The new Feature Pack architecture allows developers to independently evaluate recently-added or upcoming features, contained in an optional module separate from the main SP-X core. This empowers them to choose the best time to enable these new features in the existing management solution. Since licensing and intellectual property information can be limited to a package, this modular approach ensures intellectual property protection.

MegaRAC SP-X is widely used by the world’s leading server OEMs and ODMs. It supports Baseboard Management Controllers (BMCs) from all major silicon manufacturers, including ASPEED (Emulex), as well as non-x86 server architectures such as IBM POWER8®, Marvell ThunderX/X2®, Applied Micro X-Gene™ and similar 64-bit ARM processors.

HIGHLY MODULAR ARCHITECTURE

- Each feature built as a separate package, source or binary

HTML5 SUPPORT

- Features new, streamlined web interface
- HTML5-based KVM and vMedia; no Java™ applet required

SUPPORT FOR KEY INDUSTRY STANDARDS

- Compliant with DMTF CIM Profiles
- CIM Object Manager (CIMOM)
- Virtual KVM and Virtual Media
- IPMI 2.0, version 1.1 compliant
- DDCI / APML
- Power Management Support
- SMASH/CLP
- WSMAN
- Web 2.0
- IPv6 Support
- SSI Compute Blade Support
- Redfish™ (RESTful API) Support
- MCTP (over I2C) Support
- HPM Support
MEGARAC® PM-X IPMI FIRMWARE SOLUTION

MegaRAC PM-X is a highly compact IPMI 2.0 and DCMI 1.5 firmware designed to support the Innovation Engine (IE) from Intel®. This firmware solution enables hardware manufacturers that leverage Innovation Engine to create a comprehensive yet essential manageability solution without adding any glue-logic, SDRAM or other hardware components other than a NIC on the server board.

MegaRAC PM-X is the next generation of compact firmware, which leverages MegaRAC’s well-vetted IPMI stack used by OEMs and ODMs for over a decade. MegaRAC PM-X is fully compliant with the IPMI 2.0 and the DCMI 1.5 specifications. DCMI 1.5 defines a simplified superset of frequently used management commands which introduces powerful management features. By offering support for these specifications, MegaRAC PM-X meets the needs of high density datacenters with large deployments in the order of ten thousand or more volume servers.

INDUSTRY STANDARDS

- Compact code requires minimum RAM
- Side-band manageability over NIC
- Support for IPMI 2.0 specification
- Support for DCMI 1.5 specification
- Support for Node Manager 4.0
- Partial out-of-band via NIC

SYSTEM INTERFACE SUPPORT

- Event Log (SEL)
- Sensor Support
- Detailed System Information, including SDR Repository and FRU Information
- Health Monitoring, Watchdog
- Timer, LAN Alerting, Event Generation, Serial over LAN

REMOTE MANAGEMENT

- Remote Power Control: Reset, Power On/Off, Power Cycle, Graceful Shutdown
- Remote Management Control Protocol with Encryption and Enhanced Authentication

CUSTOMIZATION

- Supports MegaRAC® DS Development Studio with “Drag and Drop” Interface for Sensors

CONFIGURATION

- PDK (Platform Development Kit) for OEM Extensions and Customization
MEGARAC® CM-X CHASSIS MANAGEMENT SOLUTION

The MegaRAC CM-X Chassis Management Firmware Solution implements and is fully compliant with the Open Blade Architecture System Management Specification from the Server System Infrastructure (SSI) Forum, an industry organization promoting design guidelines for blade chassis components and interfaces. This group, which aims to expand the product offering available in the market at a price point that appeals to small and medium-sized businesses (SMBs), gathers support from major industry players such as Asus, Dell, Intel, Quanta and SuperMicro, among others.

MegaRAC CM-X is a robust Linux®-based management stack, including an embedded web server. This solution enables the discovery, health monitoring and management of all modules inside the blade chassis, including compute blades, Baseboard Management Controllers (BMCs), I/O modules, power supplies and cooling devices.

Discovery is based on universal, standard protocols, such as UPnP, RMCP Ping, SNMP, SLP and WS-Discovery. Management of the chassis components is based on AMI’s own MegaRAC Service Processor (SP-X) firmware stack and the IPMI 2.0 protocol. MegaRAC CM-X supports the Distributed Management Task Force (DMTF) management standards for interoperability, such as the Common Information Model, WS-MAN for management through web services and SMASH-CLP for text line console and scripting.

MegaRAC CM-X relies on a robust 10/1000 Ethernet vLAN, a private network internal to the chassis for communication between the CMCs and the IMC/BMC within each blade. Virtual BMC technology provides the chassis manager with faster access to blade FRU information. MegaRAC CM-X also features optional support for two redundant chassis management modules in an active-passive fail-over configuration.

This means that one management unit is active all the time, while the second unit, in stand-by, is ready to take service in case of failure of the primary CMC. A Consolidated Chassis Event Log (CEL) registers events for all processor blades and other modules.

MegaRAC CM can be easily customized and extended with AMI’s Integrated Development Environment (IDE) for management, MegaRAC Development Studio (DS), based on the widely-used Eclipse® IDE. MegaRAC DS includes Visual Web Developer (VWD), Software Development Kits for CIM, SMASH and WS-MAN software development and an IPMI PDK for the graphical layout of platform sensors.

Management functions of MegaRAC CM-X include:
- Power and cooling management
- Chassis initialization
- Blade authentication
- Blade presence hardware detection
- Blade state management
- New blade discovery events
- New Chassis Management Controller(CMC) initialization
- Failover support (optional)
MEGARAC® SOLUTIONS FOR INTEL® RSD

Intel® Rack Scale Design is an open framework that defines the standards for composing logical servers from disaggregated pools of storage, network and compute resources. MegaRAC Rack Scale Design Solutions enable high efficiency for building, managing and improving cloud infrastructure in a software-defined data center. These solutions are fully compliant with Intel Rack Scale Design and DMTF Redfish standards. Included are the fully integrated Pooled System Management Engine (PSME) firmware solutions and the MegaRAC® Composer™ Pod Management Software.

MegaRAC PSME firmware solutions are hardened, production worthy and tightly integrated to function with the MegaRAC manageability firmware stack used by nearly every ODM and within most hyper-scale data centers. These solutions can be deployed in a single image to the popular (BMC) service processors, but are also configurable to run stand-alone on x86 or other architectures, and with custom OEM manageability firmware stacks.

MegaRAC PSME solutions can not only run on compute nodes integrated with the server BMC, but also on Chassis or Rack Management Modules or they can run as a Container under the Pod Manager. These solutions all work under a Redfish Framework, making it easy to add extensions, such as Fabric Management.

KEY FEATURES

• Integrated design within management controller firmware on RSD hardware unit
• Rack Scale intelligence built out of OXm server hardware
• Out-of-band manageability
• Fail-safe architecture with failover design
• Lower TCO in the datacenter
• Flexible rack design due to compliance with industry standards

A Proven Approach

AMI has built a unique value proposition for OEMs and ODMs with its Intel® Rack Scale Design (RSD) solution offerings. The MegaRAC RSD product line enables OEMs and ODMs to build fully integrated, out-of-the-box, out-of-band, fail-safe Rack Scale solutions. Through its state-of-the-art, industry-leading MegaRAC product line, AMI can offer the best in class, most robust RSD solution - together with a solid support model, one that our OXm customers have relied on for decades.
MEGARAC® FP-X FABRIC MANAGEMENT SOLUTION

MegaRAC FP-X Fabric Management Firmware from American Megatrends (AMI) is a powerful firmware/software solution combining the complete functionality to support fabric management, like PCIe switch management and NVMe/drive management, with that of a baseboard management controller (BMC).

A key aspect of MegaRAC FP-X is its inclusion all of the BMC management tasks as defined by Redfish™ and IPMI 2.0, along with Serial over LAN (SOL), complete out-of-band (OOB) connectivity, an extensive web UI and an advanced component management framework to support PCIe Switch based management, NVMe support, RAID/IT support and support for industry-standard drivers.

For remote access to fabric management tasks, MegaRAC FP-X provides a secure embedded web server. It also features Secure-Shell (SSH)-based SOL for remote access, in addition to standard IPMI-based SOL. MegaRAC FP-X support is available on all of the advanced System-On-Chip (SoC) devices from the industry’s leading manufacturers.

MegaRAC FP-X firmware provides a high level of modularity, with the ability to easily configure the complete firmware / software stack by selecting and deselecting features that are available in package form. Many stack components and OEM-level changes can be completely customized and enhanced using MegaRAC® Development Studio (DS), an Eclipse™-based Integrated Development Environment (IDE) for server management that gives developers the ability to customize the stack, build and debug all at once.

KEY FEATURES

- Linux® Development Kit (LDK)
- Support for IPMI, including LAN and serial interface support
- Component Manager: features RAID, SAS/IT support and complete PCI switch management API
- NVMe with I2C and MCTP/I2C
- PCI Root Complex support
- Admin-level NVMe drive management via PCI-Express (PCIe) standard
- Web UI now updated with PCI Switch Management, NVMeMI and drive management capabilities
- Remote update capability for BMC and drive firmware

FP-X TECHNOLOGY PACK

- Redfish™ 1.1 support
- Intel® RSD 2.1 support
- MegaRAC® Composer™ Pod Management Software
MEGARAC® COMPOSER POD MANAGEMENT SOFTWARE

Developed to be fully compliant with Intel® Rack Scale Design, MegaRAC Composer™ is a hyperscale pod management software solution that allows users to browse physical configurations of compute, network and storage resources at the rack, chassis, and system level through an intuitive web-based user interface. Administrators can then assign and compose those physical resources to create a logical node, which provides the advantage of demand-driven dynamic scaling to optimize datacenter resource utilization.

MegaRAC Composer also allows for the composition of physical resources based on templates, which can then be stored and reused as a time-saving feature. In addition, MegaRAC Composer gives users the ability to power on, force off, and gracefully shutdown composed nodes.

BENEFITS

Developing with Intel® Rack Scale Design makes it possible to configure hardware to closely match the needs of the software. The MegaRAC Composer interface simplifies the process of configuring hardware workflows by presenting a visual representation of the available hardware. MegaRAC Composer also sends alerts to the operator when it detects poor resource allocation, based on usage and slowdowns. It can also offer alternate recommendations for the allocation of resources.

MAIN FEATURES

- Compliant with Intel® Rack Scale Design v1.2
- WebUI dashboard for hierarchal view
- Logical node composition based on payload templates
- Node provisioning through PXE server

POWER OPERATIONS

- Restore composed node resources on PSME power cycle

WEB USER INTERFACE DASHBOARD

- Composed nodes summary
- Chassis collection summary
- Systems summary
- Critical alerts
- Critical events

PROVISIONING PROCESS

- Physical resource allocation
- Logical node assembly
- Node provisioning
MEGARAC® PM-X IPMI FIRMWARE SOLUTION

MegaRAC PM-X is a highly compact IPMI 2.0 and DCMI 1.5 firmware designed to support the Innovation Engine (IE) from Intel®. This firmware solution enables hardware manufacturers that leverage Innovation Engine to create a comprehensive yet essential manageability solution without adding any glue-logic, SDRAM or other hardware components other than a NIC on the server board.

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REMOTE MANAGEMENT

- Remote Power Control: Reset, Power On/Off, Power Cycle, Graceful Shutdown
- Remote Management Control Protocol with Encryption and Enhanced Authentication

CUSTOMIZATION

- Supports MegaRAC® DS Development Studio with "Drag and Drop" Interface for Sensors

CONFIGURATION

- PDK (Platform Development Kit) for OEM Extensions and Customization

Firmware Expertise

The strength of AMI's IPMI offering comes from the availability of superior tools for platform development and customization. More than 20 years of experience in BIOS / firmware development help AMI customers minimize platform compatibility issues.
MEGARAC® DS DEVELOPMENT STUDIO

AMI is strongly focused on providing OEMs with best-in-class tools that empower them to design high performance, IP-rich solutions that deliver a clear difference to end-users, while minimizing time to market (TTM). Leveraging MegaRAC® modular architecture, AMI designs tools maximize code reuse, while intuitive graphical interfaces and rich libraries speed up the work of porting engineers, for reduced development cost and duration.

The MegaRAC DS Development Studio is a graphical Integrated Development Environment (IDE) specifically designed to develop and customize the management structure and visual interface for servers integrating the latest generation of MegaRAC Service Processors.

MegaRAC DS offers a number of tools and innovations designed to facilitate platform porting, to provide developers a number of important benefits.

SUSTAINED RETURN ON INVESTMENT

The plug-in structure enables easy addition of tools supporting future technologies and standards. Developers benefit from familiarity with the interface and development methods in MegaRAC DS.

EASE-OF-USE AND FUNCTIONALITY TO IMPROVE TTM

A wealth of purpose-designed tools and wizards support developers in the coding of complex management structures, including CIM and SMASH, which all contribute to the single goal of speeding Time to Market (TTM).

HIGH DEGREE OF CODE RE-USABILITY

All platform information is stored in Device Description and Configuration files and can be easily retrieved and edited for reuse with different platforms.

WIDE USE OF STANDARDS SUCH AS ECLIPSE AND XML

XML is employed to enable a flexible hierarchical representation of data, which is suitable for describing complex structures in a nested fashion.

USES PLUG-INS FOR FEATURE-BASED LICENSING

MegaRAC DS boasts an extensive repertoire of plug-ins that enable a robust feature-based licensing model, including:

- Web Development (WDP)
- Sensor porting and customization (PMCP)
- Sensor Simulation - PMCP Simulator
- CIM Profiles Development - CIM SDK
- SMASH Profiles - SMASH SDK
- MegaRAC SP-X Project Configurator
- MegaRAC SP-X Builder
- MegaRAC SP-X Package Creator

Universal Customization

AMI customization tools are available for AMI or third party IPMI firmware.
The Backplane Controller series from AMI provides LED and sensor control for SAS/SATA/NVMe drives. They provide exceptional flexibility and require minimal board real estate, making them a perfect fit for numerous applications.

A wide choice of reference designs and development tools are available, along with development boards to speed integration in specific OEM designs. AMI’s Backplane Enclosure chips work with any HBA supporting SGPIO (SFF-8485) and/or SES-2 protocol over I2C. These Backplane Controllers can be flashed or upgraded via SMBus from the motherboard BMC, or USB, depending on the model.

### MG SERIES BACKPLANE CONTROLLER FEATURES

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<th>MG9094</th>
<th>MG9081</th>
<th>MG9085A</th>
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<tr>
<td>UBM Channels</td>
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<td>PCIe Hot-plug SMBus Support</td>
<td>Yes</td>
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<td>No</td>
<td>No</td>
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<td>VPP/SHP Platform Support</td>
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<td>Yes</td>
<td>No</td>
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<td>SAS Power Disable</td>
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<td>NVMe/SAS Drive Detect</td>
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<td>SGPIO Channels</td>
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<td>32</td>
<td>44</td>
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<td>BMC Access through SMBus</td>
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<td>Ready LED Support</td>
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<td>Global Act &amp; Fail LED</td>
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<td>TQFP-48</td>
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<td>LQFP-32</td>
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</table>

### MG9100 CONTROLLER

- Manage single and dual ported NVMe SSD and traditional SAS/SATA backplanes through Universal Backplane Management (UBM) protocol
- A single controller supports up to 8 drives; cascade four controllers to support a maximum of 32 drives
- Supports legacy protocols such as SGPIO (SFF-8485), BMC & VPP/SHP
- Supports Activity and Status LEDs for each drive; separate LEDs for Activity, Locate & Fail drive states
- SMBUS Firmware Upgrade capability
**MG9098 CONTROLLER**

- Ultra-compact ASIC design for high performance, low latency NVM Express™ backplanes
- Low cost, true single-chip solution supports up to 32 NVMe/SAS/SATA drives with small QFN-64 package (9mm x 9mm pin outline)
- Hot-plug support with Host Hot-Plug SMBUS aka VPP
- Firmware Upgradable through SMBUS
- Diagnostics and FW upgrade tools for most OSes

**MG9094 CONTROLLER**

- Ultra-compact ASIC design with the latest features
- SGPIO, IBPI and BMC SMBUS support
- Drives 2 LEDs for up to 8 slots
- SMBUS Firmware Upgrade capability
- Cascade Support for up to 32 drives

**MG9081 CONTROLLER**

- Supports eight SAS/SATA drives - Scalable configuration up to four chips per bus
- 2 SGPIO / 1 SES-2 channel(s), for up to 8 drives
- IPMI Support
- USB/IPMI Firmware Upgrade
- Cascade Support - up to 32 drives

**MG9085A CONTROLLER**

- SGPIO and SES-2 over SMBUS support
- Manage 2 LEDs for up to 6 slots / 3 LEDs for 4 slots
- Improve TTM with AMI’s 996 development board
- Provides drive activity, fail/rebuild and locate signals
- Compact, space-efficient TQFP-48 package (9mm x 9mm)
APTIO® V UEFI FIRMWARE SOLUTION - BEYOND BIOS

A complete Unified EFI (UEFI) solution representing the future of platform firmware, calling on over two decades BIOS experience.

FIRMWARE COMPONENTS

Aptio core drivers and modules conform to the UEFI specification and beyond, providing support for key industry standards and technologies. The Compatibility Support Module (CSM) enables full software compatibility with legacy BIOS.

DEVELOPMENT AND SUPPORT TOOLS

- AMI Firmware Update (AFU) is a scriptable command line utility for DOS, Microsoft Windows®, Linux®, FreeBSD and the UEFI shell. It programs the main BIOS image, boot block or OEM configurable ROM regions.
- ChangeLogo allows developers to easily change and extract logos displayed by Aptio at boot, via the GUI or CLI.
- DMIEdit is a scriptable command line utility for DOS, Microsoft Windows®, Linux® and the UEFI shell that enables customers to embed platform serial numbers, UUID and license keys into the SMBIOS table.
- MMTool allows developers to manipulate Option ROMs and the UEFI DXE drivers embedded in an Aptio ROM image to extract, replace and insert these binary components via the GUI or CLI.
- AMIBCP enables customers to modify parameters in a BIOS ROM without rebuilding from source, including default values for BIOS setup, default boot order, sign-on/setup strings, and SMBIOS string data.
- AMISDE is a CLI tool for exporting BIOS setup parameters and default values from an Aptio ROM image to enhance productivity in testing and manufacturing.
- AMISLP allows the insertion of Microsoft System Locked Pre-Installation (SLP) key files into the BIOS image. SLP keys are used for OEM activation of Microsoft Windows®.
- AMISCE is a command line tool which provides an easy way to extract and update NVRAM variables, allowing for their modification via a text editor or setup program.
- AMIUCP is used to pre-configure the Aptio Flash Utility by exchanging the default command string and ROM image in AFU to create a custom version.

APTIO® TEXT SETUP ENVIRONMENT (TSE)

- Configurable setup look and feel with OEM hot key capability
- POST message display with OEM boot logo support
- Save/restore user configuration, optimal/failsafe default configuration
- Complete remote console support (using standard UEFI console).

APTIO® GRAPHICAL SETUP ENVIRONMENT (GSE)

- Drop-in replacement for the Aptio Text Setup Environment (TSE)
- Supports keyboard, mouse and touch screen interfaces
- Equivalent to standard BIOS setup with full UEFI compatibility
VISUAL EBIOS (VEB) FOR WINDOWS® AND LINUX®

Visual eBIOS (VeB) is an Eclipse-based porting and project management application specifically created for product-strength firmware development. VeB provides an advanced graphical environment to speed firmware development, based on its ability to manage, group, and graphically represent logically-related drivers and modules as components. It features tools such as its PCI Wizard to make PCI device configuration and IRQ routing simple.

- Built-in editor with context-sensitive help
- Graphical representation of PCI IRQ routing
- Project management and source control integration
- Integrated Help builder
- Integrated Development Environment (IDE) designed specifically for firmware development

AMIDebug™ FOR UEFI

AMIDebug™ for UEFI eases software development by enabling precise debugging of UEFI source code through a graphical interface. Performs many of the functions of an expensive in-circuit emulator for a fraction of the cost. AMI Debug for UEFI works with Aptio firmware or UEFI drivers and applications to address the two main phases of the Framework: Pre-EFI Initialization (PEI) and Driver Execution Environment (DXE).

- Source-level UEFI code debugging
- Modular, easily included in any project
- UEFI compliant
- IA32 and x64 support
- Works as a standalone program, or integrates with VeB
- Host/Target configuration via serial or USB 2.0 port
- Functionality similar to hardware-based development tools
- PEI and DXE debugging
- SMI Debugging
- Serial and USB interface support
- Also works with AMI’s innovative USB debug product, AMIDebug™ Rx
- Improved target ROM footprint
- Supports Aptio UEFI applications and UEFI drivers

AMI PRE-BOOT APPLICATIONS

A set of graphical UEFI pre-boot applications (PBA) that simplify system maintenance and configuration

- Replaces the “recovery DVD” included with the computer system
- Launches system diagnostics when the OS cannot boot (for field service or RMA)
- Updates platform firmware from a web or FTP image without booting to the OS
- Supports keyboard, mouse, pen and touch-based input
AMIDiag® for UEFI is the only comprehensive diagnostic program for UEFI on the market that does not require any dependence on legacy BIOS. AMIDiag for UEFI supports Aptio or Tiano environments, as well as BIOS environments with EDK DUET support. Because all diagnostics are performed directly on the hardware, without the interference of device drivers or interfaces that may alter or hide certain hardware, UEFI-based diagnostic testing provides more reliable and secure test results than OS-based alternatives.

- Supports the latest CPUs from Intel® and AMD, including Intel Core™ i3, i5 and i7, Xeon™, and Atom™ products
- Comprehensive and complete set of hardware diagnostics, including:
  - System CPU and Memory (including multiprocessor systems)
  - Hard Disk Drive and Mass Storage Devices
  - CD / DVD and other Peripherals
  - Keyboard, Video and Mouse
  - Network Interface
  - Standard Protocols such as SCSI, PCI, USB, ACPI and TCP/IP
- Run integrated with BIOS ROM or as a standalone program
- Support for IA32 and x64 platforms
- Support for UEFI-compliant AMI firmware and third-party hardware drivers for device-specific testing
- Fully integrated with Visual eBIOS
- Condensed, Scripted, and Batch mode testing
- Single and Multiple Cycle Batch testing
- Test Progress Status - Test results logged to viewable / exportable file
- Customizable log file
- Exportable configuration summary

AMIDiag for UEFI is based on AMI’s award-winning AMIDiag diagnostics, highly regarded in manufacturing, development, testing and repair. AMIDiag for UEFI benefits computer manufacturers, design engineers, technical support personnel, repair technicians and end users alike. AMIDiag is an unbeatable tool for automating the testing process in manufacturing and burn-in, with a variety of execution options.

Innovative features in AMIDiag for UEFI includes a batch mode for cycles of repeated testing to implement robust burn-in procedures. The user can also specify the ordering of test execution, set a “wait on error” option that requires user intervention, or instruct the program to stop on an error, along with configurable interactive flags. The Quick Test Mode allows for abbreviated versions of tests, for complete system testing in shorter time. AMIDiag for UEFI includes scripting capability and all errors can be logged and analyzed.

AMIDiag for UEFI also now has the ability to be embedded directly into the BIOS ROM - a powerful feature which can add value and increased functionality to the BIOS. This means that AMIDiag for UEFI can be launched from ROM rather than from external storage, making the diagnostic always available to technicians and end users - even when the system hard disk has failed.
AMDEBUG™ FOR UEFI

AMDEBUG™ for UEFI is a powerful solution for debugging UEFI projects, offering source-level debugging without the need for an expensive in-circuit emulator (ICE). Using standard RS-232 or USB 2.0 cables, developers have access to source-level debugging and control the debug target hardware through a GUI application for Microsoft Windows®. The latest version of AMDEBUG for UEFI is now directly integrated into the Visual eBIOS (VeB) development environment, allowing developers unprecedented flexibility and convenience to speed up debug and TTM.

AMDEBUG for UEFI works with AMI's Aptio V UEFI firmware, projects based on the "TianoCore" EFI Development Kit (EDK) or any UEFI Shell application. Aptio and "TianoCore" developers can debug at the firmware level, while application and driver developers can invoke debugging features at the shell without the need to embed modules in the ROM image. AMDEBUG for UEFI provides functionality similar to hardware-based development tools, including:

- Source-level symbolic debugging
- View and edit variables of all types
- Step into / over source or disassembled code
- Trace through code
- Command, Local and Global variables windows
- View and edit any CPU register
- Set, clear, enable and disable breakpoints
- Preserve breakpoints between executions
- View and edit target memory and I/O

Designed for UEFI

- Supports IA32 and x64 build targets
- Multi-function debug plug-in leveraging Microsoft WinDBG interface
- Modular, easily included in any project
- Can be embedded in target firmware or launched from EFI Shell
- Multiple host/target hardware interfaces, including serial and USB
- Debug DXE drivers over any interface
- Debug PEIM & SMM using RS-232 & USB 2.0 Debug Cable interfaces
- Optimized for smaller ROM footprints
- Support for Aptio & "TianoCore" EDK
- Functionality similar to hardware-based debug tools with no specialized hardware requirements
- Redirect remote text console and debug messages via debug transport
- Works with AMIDebug Rx
APTIO® 4

AMI provides scalable BIOS solutions for everything from embedded computing platforms to mission-critical servers. Aptio 4 utilizes Visual eBIOS (VeB), a Windows®-based development environment that dramatically reduces the engineering resources required to build a customized BIOS solution.

ARCHITECTURE

• eModules: true modular BIOS components
• Table driven post
• Single link architecture
• Simplified directory structure, organized by component type

VISUAL EBIOS (VEB)

• Integrated Development Environment (IDE) designed specifically for firmware development
• Built-in editor with context sensitive help
• Graphical representation of PCI IRQ routing
• Project management and source control integration
• Integrated help builder

PROCESSOR AND CHIPSET SUPPORT

Aptio CPU eModules are available for a variety of Intel, AMD and VIA processors. Chipset support is under development for manufacturers such as AMD, Intel, NVIDIA, SiS and VIA. Please contact an AMI sales representative for more information.

APTIO UTILITIES

Aptio source code comes with a complete set of customization utilities for optimum platform design, including the AMIDebug™ BIOS debugger, which provides economical functionality similar to an in-circuit emulator and connects over serial or USB cable for easy configuration.

AMIDEBUG™ FOR APTIO

AMIDebug enables developers to define breakpoints and viewpoints, debug interrupt hardware routines and SMI code, as well as eliminate errors in BIOS Run Services. The host/target configuration can be realized via serial or USB 2.0 debug port, while the addition of a MegaRAC® remote access controller enables all of these operations to be performed from anywhere.

APTIO CONFIGURATION PROGRAM (AMIBCP)

AMIBCP enables system manufacturers to customize BIOS parameters in the ROM image via hard disk or other storage media without rebuilding the BIOS.

Complete Versatility

Aptio is an ideal solution for consumer electronics, embedded systems, telecommunications servers, and mobile and desktop systems.

Faster TTM

The VeB Integrated Development Environment simplifies project management and speeds up the design process.
AMI PROVISIONING™

AMI Provisioning™ integrates firmware configuration and updates, hardware diagnostics and pre-OS applications in a Unified EFI (UEFI) environment. Combined with Aptio® firmware and AMIDiag™ diagnostics, it greatly simplifies system maintenance and setup. It also replaces the “recovery DVD” with an always available pre-boot management tool that can be executed from the BIOS flash ROM, NAND flash, on-board USB, protected disk partitions and proprietary storage. Additionally, AMI Provisioning allows for simple customization of the pre-OS environment, so developers can replace the standard BIOS look and feel with proprietary branding.

Move away from text-based applications to an intuitive graphical interface and make system diagnostics readily available to the user. Take advantage of UEFI standards to create a framework for integrating new applications that leverage the same GUI and customized themes. Execute BIOS and firmware updates in pre-boot to eliminate OS compatibility issues and enable recovery and full system tests even when the OS cannot boot.

HIGHLIGHTS

• Runs from UEFI pre-boot or UEFI Shell
• Built on AMI Graphical Execution Environment (GEE) technology
• Replaces the “recovery DVD” included with the computer system
• Launches system diagnostics when the OS cannot boot (for field service or RMA)
• Updates and manages platform firmware from a web or FTP image without booting to the OS
• Integrate tests from AMIDiag™ for UEFI
• Can easily be expanded with AMI system recovery and rescue applications, as well as OEM and third-party applications

KEY FEATURES

• UEFI 2.x (IA32 & x64)
• Multiple options to customize the look and feel of the setup interface
• Multi language support
• Context sensitive help
• Network support: CIFS / NFS / FTP / HTTP
• Verify digital signatures to avoid using “tampered” updates
• Firmware Update for all firmware components
• Can update from local file, network share, HTTP or FTP
• Verify the authenticity and compatibility of firmware image
• Smart Battery Management: SMBUS interface for smart or control method batteries
• OEM Customizations
• Broad Hardware Support for all major manufacturers
BIOS UTILITIES FOR UEFI AND LEGACY BIOS

Aptio and AMIBIOS®8 source code come with a complete set of customization utilities for optimum platform design. The AMI Debug BIOS debugger provides functionality similar to an in-circuit emulator at a fraction of the cost, and connects over serial or USB cable for easy configuration.

CHANGELOG

ChangeLogo allows OEM customers to update an existing BIOS logo (splash and small logos) module with a new graphic file; supported formats include AMI, BMP, JPEG and PCX. The utility can also save the original logo in a separate file.

MMTOOL

The BIOS modules contained in an AMIBIOS8 ROM file can be easily managed with MMTool. Developers can insert or extract BIOS modules from the ROM image.

- Insert, Replace, Extract, Delete Module
- Display ROM and NCB Information, display and change ROM Hole content
- Edit CPU Micro Code Patches module

AMISCE

AMISCE is an editor utility for configuration migration and replication. It produces a script file listing all existing BIOS Setup Questions in the host, which can be modified and used to change the BIOS setup values.

- BIOS SETUP values can be edited under operation system by TEXT script file
- Display, save and restore current CMOS contents

AMIUCP

The AMIUCP utility enables developers to configure default behavior of the AMI Flash Utility (AFU), including default flash parameters, the addition of OEM strings, the ability to attach ROM files to the flash utility and more.
AMIDebug™ RX

AMIDebug™ Rx is a low-cost handheld debug tool that uses the debug port feature common to today’s USB 2.0 EHCI controllers. AMIDebug Rx is an economical and sensible replacement for the PCI “POST Checkpoint Card” which is becoming less useful in the PC market as newer systems omit the traditional PCI expansion slot.

Perfect for today’s embedded and netbook platforms, this product is targeted at BIOS developers, power users, quality assurance labs and service technicians. Diagnosing small form factor platforms with AMIDebug Rx is non-intrusive, allowing technicians to access checkpoints without opening the case.

AMIDebug™ Rx replaces the POST checkpoint card’s traditional 7-segment LED with a small LCD screen, providing the ability to display more descriptive debugging messages.

KEY FEATURES AND HIGHLIGHTS

• Provides a low-cost alternative to the PCI "POST Checkpoint Card"
• Very useful for platform development or field diagnostics
• Device records checkpoints, UEFI debug messages and timing data for measuring boot performance
• Session data can be captured and stored to one of four “sessions” for later review
• Display descriptive text for each checkpoint: based on AMIBIOS8, Aptio 4.x or a user-provided string table
• AMIDebug™ Rx protocol can be ported into existing AMIBIOS8 and Aptio 4.x BIOS projects
• Works with AMI Debug for UEFI™ to enable source-level BIOS debugging
• Designed for BIOS developers, quality assurance testing and field diagnostics

Handheld Debug via USB

• Low-cost device for development or field diagnostics
• Works with AMIBIOS®8 & Aptio® 4.x firmware
• Powerful debug tool based on USB 2.0 standards
• Features LCD display and simple user interface
• Supplement BIOS POST Codes & UEFI Status Codes with descriptive diagnostic strings
• Store debug data in onboard memory for later use
• Works with AMI Debug for UEFI™ for source level debugging
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