

Emulex Pilot 3

Integrated Baseboard Management Controller

Pilot 3 delivers faster speeds, support for more ports, additional sensors and reduced power requirements



Emulex Pilot 3 single-chip multi-function iBMC

Overview

With short time-to-market, increased complexity and competitive market requirements, Emulex has taken the lead in providing server manufacturers with state-of-the-art server technology such as the Emulex Pilot family of “integrated” BMC (iBMC) solutions. Emulex revolutionized the industry by integrating the BMC, Super I/O, Graphics controller and Remote Keyboard, Video, Mouse and Storage (KVMS) functionality into a single ASIC, providing significant cost savings to data center managers.

The Emulex Pilot 3 iBMC auto-discovers system problems and increases the availability of servers because it monitors all the internal sensors and instrumentation within the server, delivering warnings of platform problems. With patent-pending ClearKVM™ technology, the remote administrator’s management experience is just like being at the server. It is richer, faster and more efficient than traditional iBMC solutions.

Remote boot

The Pilot 3 iBMC allows administrators to remotely boot physical and virtual servers from a variety of storage devices (CD-ROM, DVD ROM, ISO image, floppy drive or USB flash disk). Operational efficiencies are further increased because administrators can remotely reboot a physical or virtual server following a firmware update, a basic input/output system (BIOS) update or even an operating system (OS) update. The Pilot 3 iBMC also delivers full control of the remote reset and powering of the server.

Triple-core architecture

The Emulex Pilot 3 iBMC triple-core architecture is composed of three service processors. The first service processor is used to run the embedded OS and application stacks, such as Linux and DCMI. The second service processor is available for offloading of key applications (e.g., powering up or responding to real-time events). The third service processor may be used for real-time monitoring of sensors like General Purpose I/Os (GPIOs). Additionally, the third processor is used for firmware self-test, emulating different firmware events to ensure the firmware is designed and running according to specifications. This helps OEM customers accelerate the back-end platform validation, minimizing their time-to-market.

Emulex is the demonstrated leader in management controllers with the Pilot 3 iBMC selected as the management controller by the industry’s largest server manufacturers.

Key benefits

- Simplified management of remote servers, systems and appliances, thereby reducing operational costs
- Auto-discovery of system problems, increasing availability
- Boot from storage device (CD-ROM, DVD ROM, ISO image, floppy disk or USB flash disk), increasing operational efficiency
- Control reset and power to the motherboard, as well as read status information through Intelligent Platform Management Interface (IPMI), allowing the remote server to fully manage and monitor the host system, thereby reducing operational costs

Key features

- Single-chip multi-function design with support for industry standard protocols
- High-performance secure remote KVM and remote storage using Emulex’s ClearKVM technology
- Integrated BMC (fully IPMI 2.0 and DCMI compliant), Matrox G200e graphics controller, security and encryption engine for SSL acceleration and Server Class Super I/O
- Support for concurrent local and remote displays, as well as for remote platform flash/BIOS updates
- Unique Programmable 8051 controller for self-test
- High-performance DDR2/3 memory controller
- Dual 10/100/1000 Ethernet MAC (RMII/RGMII)
- USB 2.0 and USB 1.1 interfaces
- 1x PCIe
- Enterprise-class BMC software available from AMI, Emerson-Avocent and Insyde Software

Target customers

The Emulex Pilot 3 iBMC is ideal for data center customers within the Enterprise, Scalable and Cloud Computing, Web2.0, HPC and SMB markets.

Target products for integration

You can find the Emulex Pilot 3 iBMC embedded in the following applications:

- General purpose servers
- Blade servers
- Storage systems
- Networking systems

Emulex Pilot 3 iBMC advantages

The Emulex Pilot 3 iBMC offers the following advantages:

- Industry's first single-chip iBMC controller designed for lights-out management
- Unique, high-performance Triple-Core architecture enhances the remote platform manageability experience with service processors for:
 - OS and Applications
 - Video processing CODEC
 - I/O Acceleration and Self-Test
- Patent-pending ClearKVM architecture enables the best network bandwidth conservation, while simultaneously providing high-resolution remote KVM and high-speed remote storage
- Power optimized for the data center

Security

Connection to the BMC over the LAN may or may not use encryption depending on the security concerns of the user. The Emulex Pilot 3 iBMC has a hardware-based security and encryption engine for SSL (Secure Socket Layer) acceleration. Also includes 32-bit hardware-based random number generator, unique chip ID, and SHA1 256 key generation module.

Interfaces

The Low Pin Count (LPC) interface to the host is used for the Super I/O and BMC functionality. The BMC can communicate with the host through the KCS or BT interfaces. The Super I/O interface also integrates a LPC to SPI Flash Bridge which can be used to store multiple copies of the system ROM. The PCI Express interface is mainly used for the graphics controller interface to the host. The graphics controller is a fully compliant VGA controller with 2D hardware acceleration. The graphics controller can support up to 1920 x 1200 x 16bpp resolution at 60Hz. The USB 1.1 is used for the remote keyboard and mouse support and the USB2.0 is used for the remote storage support. Pilot 3 BMC, ClearKVM for remote management and graphics controller and Server Class Super I/O features are as follows:

BMC features

- Fully IPMI 2.0 and DCMI Compliant
- Integrated 32-bit 400MHz ARM9 processor with MMU and 16KB I/D caches
- Integrated 32-bit 200MHz RISC Second Service Processor (SSP) offloads real-time processing
- Integrated 200MHz 8051 processor for BMC test infrastructure or general purpose
- 16-bit DDR-2/3 memory interface (up to 800MHz)
- Three independent SPI interfaces, one with 3 Chip Selects on Boot SPI
- 8-bit NAND/Memory Address Data External bus interface supports up to three devices
- SD/MMC card controller with DMA support
- Direct PECEI 3.0 interface
- Two watchdog timers
- Dedicated RTC counter that can be synced with system RTC
- 16 direct, 108 shared GPIOs and 80 Serial GPIOs in and 80 Serial GPIOs out
- Eight independent I2C/SMBus controllers
- Two independent 10/100/1000 Ethernet Controllers with RMI/IGMII support
- Three UARTs, one for ICMB support
- 16 Mailbox Registers for communication between the host and BMC
- Six general purpose timers
- 16 10-bit analog-digital converters
- 18 independent Fan Tach Inputs
- Eight independent Pulse Width Modulators (PWM)
- Chassis Intrusion Logic with battery backed general purpose register
- Programmable second PCIe function for high speed Host to BMC communication
- LED support with programmable blink rate controls on GPIOs
- Programmable IO Port snooping, can be used to snoop on Port 80h
- 32-bit Random Number generator
- Unique Chip ID
- Hardware MCTP engine
- Hardware MCTP support on PCIe interface

ClearKVM for remote management features

- DMA supported USB2.0 device with 5 IN and 5 OUT end points for remote storage
- DMA supported USB1.1 device with 5 IN and 5 OUT end points for Remote Keyboard and Mouse
- Hardware Graphics Compression Engine
- Supports both text and graphics redirection
- Remote Video Acceleration Subsystem
- Direct interface to Graphics Controller registers and frame buffer
- Hardware Encryption Engine

ClearKVM for graphics controller features

- Integrated 2D graphics core with hardware acceleration
- DDR2/3 memory interface supports up to 16MB directly accessible from Host and entire DDR memory indirectly accessible from host processor
- Supports all display resolutions up to 1920 x 1200 x 16bpp resolution at 60Hz
- High speed Integrated 24-bit RAMDAC
- Single lane PCI-Express host interface

Server class super I/O features

- Keyboard Style/BT interface for BMC support
- Two fully functional serial ports, compatible with the 16C550
- Serial IRQ Support
- SMI/SCI/PME Support
- ACPI Compliant
- 16 GPIOs shared with BMC
- 80 Serial GPI and GPOs available to host
- Programmable wake-up event
- Plug and play register set
- Power supply control
- LPC to SPI bridge for system BIOS support
- LPC LDRQ support for upstream data read/write from BMC

Operating systems supported

- Windows® Server 2008 R2 and 2012 (and later)
- VMware® ESX 3.5 and 4.0 (and later)
- Red Hat® Enterprise Linux (RHEL) 6.6 and 7 or later
- SUSE Enterprise Linux Version 11 and 12 (and later)
- Oracle® Solaris 10
- Others Supported Using Native SVGA Drivers

ASIC specifications

- 457-pin PBGA Package
- 23mm x 23mm package size

Ordering information

- Avago Part Number 500006677
- Cross reference with prior Emulex Orderable Part Number SE-SM4310-P02 and Manufacturing Part Number P006022-01C



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