



MegaRAC[®]
Hardware Guide

MAN-780
9/09/01

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Revision History

2/4/99	Initial release.
6/7/99	Added information about the Hobbes connector.
9/3/99	Added information about MegaRAC installation for SCO UnixWare 7.
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9/9/01	Removed Solaris UnixWare and Linux Version support.

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Preface

The MegaRAC™ (Remote Access Companion) provides server management capabilities. You can use the card to manage and monitor non storage components in your servers through a modem or direct serial connection, even when your network is down. MegaRAC offers hardware and software solutions to server management.

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Preface, Continued

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<http://www.ami.com>

FTP Site **The address of the American Megatrends FTP site is:**

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1 Overview

The American Megatrends® MegaRAC™ Remote Access Companion provides additional server management capabilities. You can use MegaRAC to manage and monitor non-storage components in your servers through a modem or direct serial connection, even when your network is down.

MegaRAC offers a hardware and software solution through the Dead Server Management (DSM) function. A major feature of MegaRAC is the ability to manage a “dead” server and get the server up and running as quickly as possible. MegaRAC provides alert notification when the server is down and gives full access to the dead server. In addition, MegaRAC logs the probable cause of the server crash and saves the current error display.

The MegaRAC is a PCI card, with its own processor and memory. The card is powered by the bus when the server has power or it can operate with a battery backup.

MegaRAC is used by the software modules, such as the on-board intelligent firmware. In addition, MegaRAC comes with a user interface program. The user interface is known as the MegaRAC Management Console. The firmware is based on a multitasking RTOS. The primary tasks of the firmware are:

- initialize the hardware at startup
- run a quick self test
- provide services to the user interface application

The MegaRAC card can alert you before a probable server crash. Its processor can sense voltages, temperatures, and fan speeds from the surrounding environment, and the MegaRAC contains its own firmware with battery backup. The basic input/output system (BIOS) supports MegaRAC initialization and the drivers that interface with the operating systems.

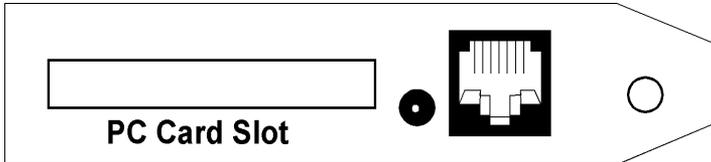
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Overview, Continued

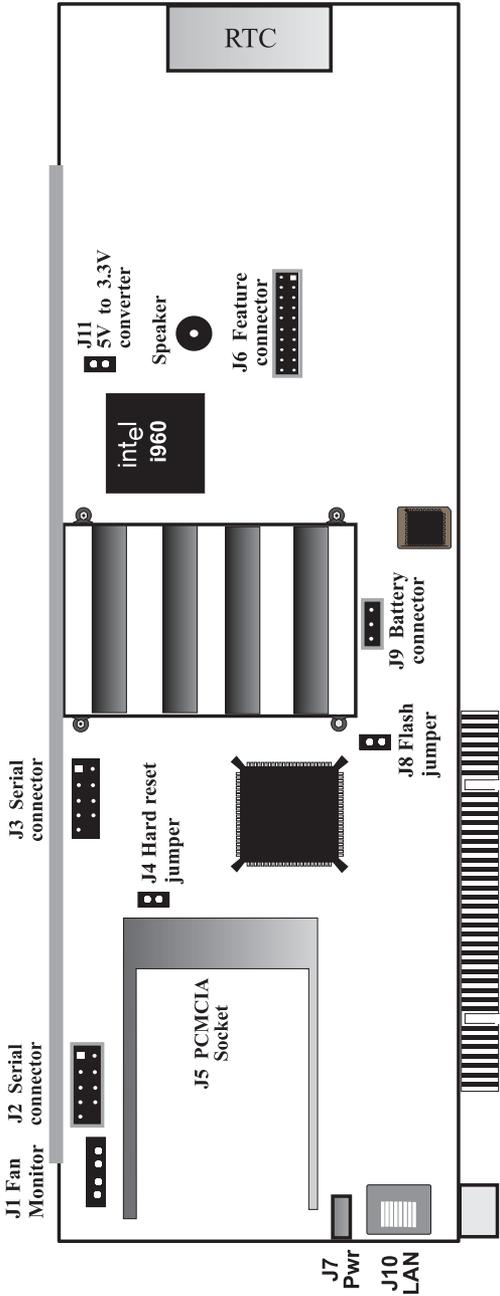
This guide contains information about the MegaRAC product, including the following topics:

- MegaRAC operation, and
- MegaRAC installation.

The following graphics show a side view of the MegaRAC card, and an overhead view of the card.



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How MegaRAC Works

MegaRAC comes with software modules that provide operating system-specific services. These services interface with the MegaRAC hardware and provide access to the server from the hardware. The on-board firmware allows the Management Console to access the server using the server side services.

MegaRAC Software Modules

The MegaRAC software architecture is built upon several independent software modules that run under a specific operating system. The modules include hardware services, application services, management services, and user interfaces. The following table displays the software modules for MegaRAC:

Software Module	Description
Hardware Services	MegaRAC™ card interface driver under Microsoft® Windows NT4.0, Windows 2000, Novell® NetWare 4.11, 5.X, and Linux
Application Services	Graphics capture service under Windows NT 4.0 and Windows 2000 only Virtual mouse service under Windows NT 4.0 and Windows 2000 only Health Agent Communication
Management Services	SNMP agent under Windows NT, Novell NetWare, and Linux.
User Interface	GUI based under Windows NT 4.0, W2000, Windows 95 and Windows 98

Hardware services are the drivers running under each operating system. The drivers allow applications and other system-level services to access the MegaRAC hardware. These services are operating system specific and differ from one operating system to another.

Application services are the drivers that work between the hardware services and the upper-level user interface. One example is the driver that captures the graphics screen content. Application services maintain the MegaRAC features and the implementation of the console services.

Cont'd

MegaRAC Software Modules, Continued

The operating system-specific management services support the standard management protocols. An enterprise network system is typically run by a management application. This application is based upon certain management standards such as Simple Network Management Protocol (SNMP.) Management through SNMP uses the in-band network.

The user interface is the interaction between MegaRAC and the user. The interface is an intuitive GUI-based application. This 32-bit application runs under Windows 2000, windows NT 4.0, Windows 95 and windows 98. The user interface for MegaRAC is the Management Console. The management console lets the user access the MegaRAC card and use the Console Redirection Service, and Console Command Service.

Communication

The communication layer of the Management Console is socket based. The MegaRAC firmware supports standard BSD sockets, which the Management Console uses to communicate with a management station. The management station in turn communicates with the MegaRAC hardware. The management station makes the decisions about all management events.

The features that the management station offers are collectively known as event services. The MegaRAC software architecture allows the event services to be distributed; they can reside with the management console or in any separate management station.

When the Server is Up and Running

You can access any remote server using the MegaRAC card in it via Management console. The Management Console lets you see the remote server's graphics as well as send commands to the server. This gives you full control over the remote server to perform other administrative tasks on the server.

You can also perform periodic maintenance on the server. Using a feature known as Console Redirection Service (CRS), you can do the following:

- reboot the system (a graceful shutdown),
 - watch the boot process,
 - boot to a separate system partition to load the diagnostic environment, and
 - run special diagnostic programs
 - File Transfer
 - Remote Flash upgrade
 - Floppy Redirection
-

When the Server is Dead

An important task for MegaRAC is getting a dead server up and running through the DSM feature. To do this, MegaRAC sends an alert notification to its supervisor. Once the supervisor receives the alert, MegaRAC puts itself into a server mode. It receives the commands from the supervisor and performs them.

Using a feature known as Console Command Service (CCS), MegaRAC provides a set of services to get the server running again. These services include server reset and complete power cycle (with the proper hardware support) of the server. MegaRAC also captures the screen at the time of the crash so that the supervisor can watch and analyze the cause of the crash.

MegaRAC Technical Specifications

The technical specifications for the MegaRAC card and other technical information are:

Item	Description
Processor	The MegaRAC card has an Intel 80L960JA 3.3V embedded 32-bit processor running at 16 MHz. This processor includes 2 KB of instruction cache and 1 KB of data cache with write-through operation. The MegaRAC card has an AMI MG9063 ASIC that interfaces between the host PCI bus and the local i960JA processor.
Memory	MegaRAC includes 2 MB flash ROM that contains the firmware image and DRAM for operational memory. The MegaRAC card includes 16MB DRAM cache memory. The firmware will operate from this memory. The firmware will maintain adequate stack and heap for all internal processing. A 128 KB NVRAM area provides storage for configuration information, event logs, and captured text screens.
Out-of-band Access	Out-of-band access is established through a path other than the LAN or WAN, such as a telephone line or a separate network line. It requires an onboard 10 Mbps ISA LAN using an SMC 91C94 network controller chip, an onboard serial port, and a Fax/Modem PC Card. A Cirrus Logic CL-PD6710 socket controller supports the Fax/Modem PC Card.
Hardware Health Parameter Monitoring	Monitors hardware health parameters (voltages, temperatures, fan status, and chassis intrusion.)
Hard Reset and Power Cycle	Used to initiate an immediate server boot. The MegaRAC card can detect when the server has lost power or has been reset by a watchdog timer it provides to the firmware.
BIOS Functions	The BIOS on the server motherboards allows you to capture video text sequences the firmware stores in NVRAM. The boot sequences and I/O Port 0080h outputs are captured and stored in NVRAM. The BIOS contains descriptive strings that expand the captured codes.

HIP Functionality

The MegaRAC card extends HIP functionality by providing:

- out-of-band (via dial-up modem) status retrieval and management
 - remote power-cycling
 - access to the power-on self-test (POST)
-

MegaRAC Capabilities

MegaRAC server management capabilities include:

- monitoring the voltages (3.3 volt, 5 volt, and 12 volt), gunning transceiver logic (GTL) termination, central processing unit core voltage (CPU VCORE), and the system battery
 - monitoring both the microprocessor and ambient temperatures in the server
 - monitoring the revolutions per minute (rpm) and status of the main and auxiliary fans (via I²C device monitoring)
 - monitoring system errors
-

MegaRAC Features

The MegaRAC card answers a call-in from the modem (external, Hayes-compatible, 2-wire interface with no hardware hand-shaking implemented) or PC Card and sends back system status and error log information. The MegaRAC card has the following features:

- permits resetting or power-cycling the server from a remote console
 - dials out through a modem to a remote console, providing the system identification (ID), status, and error log information to the console when a failure occurs
 - downloads code from the host server and maintains the code in battery-backed MegaRAC SRAM (Static Random Access Memory), and provides a unique 64-bit hardware ID to the host server
-

Server Management Without MegaRAC and With MegaRAC

The following table lists the capabilities the Server Management offers without MegaRAC and with MegaRAC.

Feature	Without MegaRAC	With MegaRAC
Power cycle	No	Yes
Power off	No	Yes
System logs	No	Yes
Out-of-band	No	Yes
Temperature	Yes	Yes
Voltages	Yes	Yes
Fan status	No	Yes
Remote management	Yes	Yes
Reset	Yes	Yes

2 Installation

This chapter describes procedures for performing the following tasks:

- Installing the MegaRAC card in a server
- Updating server management software
- Connecting the Hobbes connector to the MegaRAC

Important

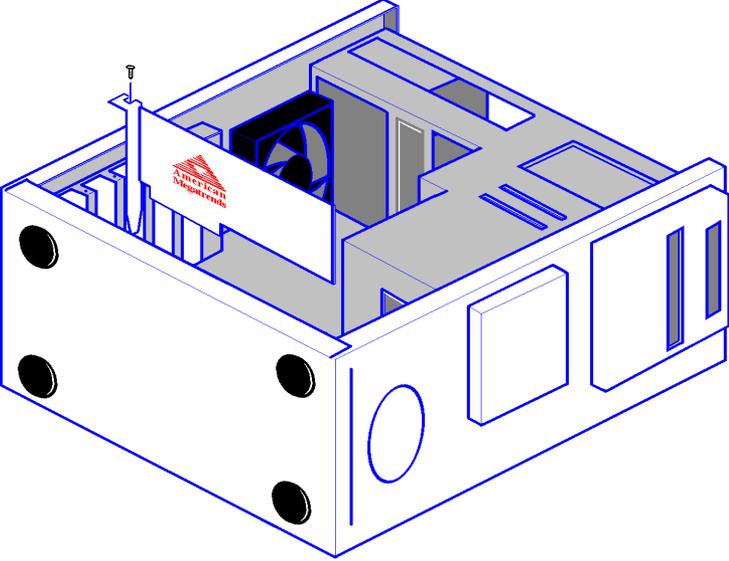
Read the installation instructions in this manual before installing your MegaRAC.

Installing the MegaRAC Card

Important

The MegaRAC card must be placed in the primary PCI slot because of the VGA specification. VGA redirection is possible from the primary PCI slot only.

Step	Action
1	Power down the server and all attached external peripheral devices.
2	Disconnect your computer and peripherals from their power sources. Also disconnect any telephone or telecommunications lines from the computer. Doing so reduces the potential for personal injury or shock.
3	Touch an unpainted metal surface at the back of the computer chassis (such as the power supply) before touching anything inside your computer. While you work, periodically touch an unpainted metal surface on the computer chassis to dissipate any static electricity that might harm internal components.
4	Remove the computer cover.
5	Locate the primary PCI slot on the motherboard where you will install the MegaRAC card.

Step	Action
6	<p>Remove the metal bracket from the primary PCI slot in the back of the server. Insert the MegaRAC card in the primary PCI slot, as shown below:</p> 
7	<p>When the MegaRAC card is firmly seated in the connectors and the card mounting bracket is flush with the brackets on either side of it, secure the card mounting bracket with the screw you removed in the previous step.</p>
8	<p>Replace and secure the computer cover.</p>
9	<p>Connect the external modem to the MegaRAC serial port connector.</p>
10	<p>Power on the server and all associated external peripheral devices. Reboot the server.</p>

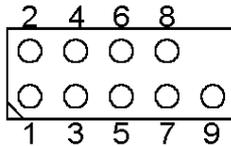
Jumpers

The jumpers and connectors for the MegaRAC card are:

Connector	Description	Type
J2, J3	Serial port connectors	Nine-pin connectors
J4	Hard reset jumper	Two-pin connector
J5	PCMCIA socket	68-pin connector
J6	Feature connector	20-pin connector
J7	Wall adapter power jack	Three-pin connector
J8	Flash jumper	Two-pin connector
J9	Battery connector	Three-pin connector
J10	RJ45, for LAN connector	Eight-pin connector
J11	5V to 3.3V converter	Two-pin connector

J2, J3 Serial Ports J2 and J3 are 9-pin bergs that attach to a serial cable.

Pin	Signal Description	Pin	Signal Description
1	Carrier Detect	2	Data Set Ready
3	Receive Data	4	Request to Send
5	Transmit Data	6	Clear to Send
7	Data Terminal Ready	8	Ring Indicator
9	Ground		



J4 Hard Reset Jumper J4 is a 2-pin connector for the hard reset jumper.

Pin	Description
1	GND
2	Reset

J5 PCMCIA Socket J5 is a 68-pin female connector inside a PCMCIA slot designed to hold the 68-pin male connector on a PC Card.

Cont'd

Jumpers, Continued

J6 Feature Connector J6 is a 20-pin feature connector.

Pin	Signal Description	Pin	Signal Description
1	SMI#	2	CCLK
3	CONP	4	KEY
5	PWROFF#	6	I2CDATA
7	LPOK	8	KEYUNLK
9	NMI	10	AUXV
11	RESET#	12	GND
13	GND	14	KEY
15	SECURE	16	GND
18	INTRUD#	17	SPARE
19	KEY	20	GND

J7 Wall Adapter Power Jack J7 is a three-pin jack for the wall adapter power unit.

Pin	Description
1	VCC
2	NC
3	GND

J8 Flash Jumper J8 is a two-pin connector for the flash jumper.

Pin	Description
1	VPP
2	VCC

J9 Battery Connector J9 is a five-pin connector for the battery backup power system for the MegaRAC.

Pin	Description
1	VBAT-
2	TSENSE
3	VBAT+
4	Ground
5	Ground

J11 5V to 3.3V Converter J11 is a two-pin connector used to select 5V or 3.3V.

Pin	Description
1	VCC (5V)
2	VCC (3.3V)

Installing the Server Manager Software

An updated version of the server manager software is included on the CD that accompanies the MegaRAC. Follow the installation instructions provided with the CD.

Connecting the Hobbes Connector to the AMI Series 780 MegaRAC

Do not unplug or plug in the Hobbes connector to a Series 780 Rev C boards while the system power is on or the system is in stand-by power mode.

You must first turn off the main power to the host system and then connect or disconnect the Hobbes connector from the MegaRAC board.

The Hobbes connector signals are still active even if the host system is in stand-by mode.

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