

# Intel® Platform Instrumentation Control Console User's Guide

Version 2.2

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# Using Platform Instrumentation Control

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## What Is Platform Instrumentation Control?

Platform Instrumentation Control (PIC) uses the Desktop Management Interface (DMI) 2.0 framework to manage Windows NT<sup>†</sup>, Windows 2000, NetWare<sup>†</sup>, Solaris, Linux, and UnixWare<sup>†</sup> server hardware components. PIC provides real-time monitoring and alerting for server hardware sensors.

PIC has two main software components:

- The managed server: PIC Server Instrumentation (called Platform Instrumentation [PI]) is installed on the NetWare, Windows NT, Windows 2000, Solaris, Linux, or UnixWare server that is going to be managed by the PIC Console software.
- The managing console: PIC Console software is installed on the user console that will manage the server.

On a Windows NT or Windows 2000 network, it is possible to install both parts of the software on the same server. It is also possible to install both the Server Instrumentation and the Console software on multiple systems.

## Features

The following list summarizes the features of PIC:

- Graphical user interface
- Consolidated server health information
- Interchassis management via the Intelligent Chassis Management Bus (ICMB)
- Enterprise console integration (PIC runs under HP Network Node Manager; LANDesk® Server Manager; and CA-Unicenter† TNG, as well as under the Intel Server Control Console)
- Remote installation
- RPC-based transport mechanisms
- DMI 2.0 service providers

System administrators can use PIC to:

- Remotely monitor server hardware sensors
- Configure sensor thresholds
- Update the server's LCD display (if available)
- Configure, receive, and act upon alert events in the system event log (SEL)
- Configure audio or visual notifications in response to an event
- Configure options to shut down, reboot, or power-off the system automatically in response to an event

## Tracking System Status

Using PIC, you are able to track system status and manage hardware conditions such as:

- Temperature
- Voltage
- Cooling fan status
- Chassis intrusion
- ECC memory
- Processor status
- Power supply status
- PCI Hot Plug (PHP) slot status

Some of these conditions have a threshold or range of acceptable values. Default values are configured during system manufacturing. These values, along with the current readings, error status, and timer settings, can be configured and monitored through PIC. An event occurs when a parameter crosses a defined threshold. At the time an event occurs, PIC initiates the action you have configured.

For example, if the temperature reaches a level that is outside of the user-defined threshold, an event has occurred. You can configure PIC to respond to this event in multiple ways, such as:

- Display a message or sound an alert
- Shut down the server

- Record the event in a system log

You can also use PIC to view:

- System hardware inventory
- BIOS and system slot information
- Onboard Adaptec SCSI controller status
- Onboard LSI (Symbios) SCSI controller status
- Onboard Intel® LAN adapter status

## Managing Third-Party Components, DMI, and MIF Files

PIC uses the Desktop Management Interface (DMI) to monitor components, such as hardware sensors, inventory information, and third-party instrumentation on server systems. PIC monitors the motherboard, chassis, onboard Adaptec<sup>†</sup> and LSI<sup>†</sup> (Symbios) SCSI controllers, and onboard Intel LAN adapters.

To provide these capabilities, each DMI-enabled component must provide a Management Information Format (MIF) file, which describes the manageable attributes of that component. For example, the current reading of a temperature sensor is an attribute that could be listed in a MIF file.

The PIC Console GUI running on a local management console (Windows NT or Windows<sup>†</sup> 98) can manage components on a remote managed server (Windows NT, NetWare, or UnixWare). PIC also includes a translator to allow management of the DMI-enabled component instrumentation from a remote SNMP application.

For more information on DMI, see the Desktop Management Task Force (<http://www.dmtf.org>) on the World Wide Web.

## Getting the Latest Information and Support

PIC is frequently enhanced and updated to support new features and platforms, and to address issues discovered within the application. For updated information on such changes, see the PIC

release note files (ENUREADME.TXT and ENUERRATA.TXT). If you have questions or need help using PIC, contact your service representative.



## Glossary

The following terms and abbreviations are used in this document:

<b>Term</b>	<b>Description</b>
DIMM	Dual In-line Memory Module
DMI	Desktop Management Interface
DPC	Direct Platform Control
ISC	Intel Server Control
LDSM	LANDesk Server Manager
MIF	Management Information File, used by DMI for describing component instrumentation
MMC	Microsoft Management Console
NMI	Non-Maskable Interrupt
ONC	Open Network Computing
PHP	PCI Hot Plug
PIC	Platform Instrumentation Control
RAID	Redundant Array of Inexpensive Disks
RPC	Remote Procedure Call
SBE	Single-Bit Error

SEL	System Event Log
SMI	System Management Interrupt
SNMP	Simple Network Management Protocol, a standard network protocol for management information
SSU	System Setup Utility

# System Requirements

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PIC has two main software components:

- PIC Server Instrumentation software is installed on the NetWare, Windows NT, Windows 2000, Solaris, Linux, or UnixWare server to be managed by the PIC Console software.
- PIC Console software is installed on a Windows NT/Windows 2000 server or workstation, or on a Windows 98 workstation, that will manage the server.

Both the managing console(s) and the managed server(s) must meet the minimum system requirements listed below.

## Managed Server Requirements

PIC supports several Intel motherboards. For a complete list of supported server motherboards and qualified BIOS revision levels, see the PIC release note files (ENUREADME.TXT and ENUERRATA.TXT). The following are requirements for the supported operating systems.

## NetWare Requirements

If you intend to manage a NetWare server, you must have an account with supervisor- or administrator-equivalent rights available to you. The server must also meet the following minimum requirements:

- NetWare 4.2 or 5.0 symmetric multiprocessing (SMP)
- One of the Intel® motherboards specified in the release notes
- At least 24 MB of RAM
- At least 60 MB of available disk space
- NetWare SNMP NLM installed (required only for connectivity to an SNMP management console)
- ONC RPC

## Windows NT Requirements

If you intend to manage a Windows NT server, you must have an account with administrative rights available to you. The server must also meet the following minimum requirements:

- Windows NT Server 4.0 (SP 5), or Enterprise Edition
- One of the Intel motherboards as specified in the release notes
- 32 MB of RAM
- 60 MB of available disk space
- Windows NT SNMP or SNMP service installed (required only for connectivity to an SNMP management console)
- The RPC service must be set to interact with the desktop

## Windows 2000 Requirements

If you intend to manage a Windows 2000 server, you must have an account with administrative rights available to you. The server must also meet the following minimum requirements:

- Windows 2000
- One of the Intel motherboards as specified in the release notes
- 64 MB of RAM
- 60 MB of available disk space

## Sun Solaris Requirements

If you intend to manage a Solaris file server, you must have an account with root privileges available to you. The server must also meet the following minimum requirements:

- Solaris 7.0
- One of the Intel motherboards supported under Solaris as specified in the release notes
- 32 MB of RAM
- 60 MB of available disk space

## Linux Requirements

If you intend to manage a Linux file server, it must meet the following minimum requirements:

- Red Hat Linux 6.1
- One of the Intel motherboards supported under Linux as specified in the release notes
- 32 MB of RAM
- 60 MB of available disk space

## SCO<sup>†</sup> UnixWare Requirements

If you intend to manage a UnixWare file server, you must have an account with root privileges available to you. The server must also meet the following minimum requirements:

- SCO UnixWare 7.01

- One of the Intel motherboards supported under UNIX† as specified in the release notes
- 32 MB of RAM
- 60 MB of available disk space
- UNIX SNMP and ONC RPC installed

## **Additional Requirements for DMI-SNMP Translation**

SNMP support must be installed if you want to integrate PIC with an SNMP-based management framework. For SNMP installation information, see your Windows NT, NetWare, or UnixWare documentation.

On the managed server, you should consider the following issues when configuring SNMP:

- Community string names for SNMP Get and Set operations and for sending traps
- The destination address for the management console receiving the traps

On the management console, you should consider the following issues when configuring SNMP:

- Compiling the MIBs into the SNMP management consoles
- Integration of PIC traps into SNMP management consoles

## Console Requirements

Console System requirements may change when snapping into one of the supported management applications. Please refer to their installation requirements for additional information.

The PIC Console software integrates into HP Network Node Manager, Intel LANDesk Server Manager, or CA Unicenter-TNG consoles. See PIC release notes for supported versions of these software packages. PIC also runs under the Intel Server Control Console.

### Windows 98

- Intel® Pentium® microprocessor or higher
- At least 32 MB of RAM
- At least 10 MB of available disk space
- A remote registry service

### Windows NT

- Windows NT Server or Workstation 4.0 (SP4)
- Intel Pentium microprocessor or higher
- At least 64 MB of RAM
- At least 10 MB of available disk space
- The RPC service must be set to interact with the desktop



## **Windows 2000**

- Windows 2000
- Intel Pentium microprocessor or higher
- At least 64 MB of RAM
- At least 10 MB of available disk space
- The RPC service must be set to interact with the desktop

## Preparing Managed Servers

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Platform Instrumentation Control uses the event-logging feature of the BIOS for system management status and information. To enable this feature for each server to be managed with PIC, you must boot the server(s) using the System Configuration Utility (SCU) or System Setup Utility (SSU) and set the appropriate options under System Management Options. For motherboard-specific settings and values, see the PIC release note files (ENUREADME.TXT and ENUERRATA.TXT).

⇒ **NOTE**

It is possible to configure temperature and voltage thresholds on the server system using the SCU or SSU. However, the thresholds set with the SCU or SSU are in effect only for a short time during the system boot process. PIC overwrites these thresholds when the OS loads. We therefore recommend that all threshold changes be made using PIC.

## Compatibility and Upgrade Issues

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If you have earlier versions of LSC or LDSM on your network, be aware of the following:

- Versions of LDSM with LSC prior to and including 2.8 are not supported under PIC.
- The PIC-managed server installation will not upgrade the DMI service provider or any DMI database that is already installed on the managed server. However, if a service provider is not found, PIC installs a DMI 2.0 service provider.
- The PIC server installation process installs the remote procedure call (RPC) transports (DCE and ONC) if they are not available on the managed server.
- The PIC GUI uses RPC transports (DCE and ONC) and DMI 2.0 commands to communicate with DMI 2.0-based managed servers.
- ISC 2.x is shipped with the DMI 2.0s Service Provider for Windows NT and Windows 2000. The 2.0s version is an extension of the Service Provider that supports security. PIC does not use those features, but they are available under Windows NT for possible use by other DMI 2.0s-compliant software.

### Customizing NetWare Servers After Setup

While installing PIC, the configuration and Setup program installs Adaptec and LSI (Symbios) SCSI, and Intel LAN Adapter instrumentation on the NetWare server but does **not** enable the instrumentation support.

To enable support for any or all instrumentation, you must edit the PIC\_ON.NCF file in the SYS:SYSTEM directory.

To enable the Adaptec SCSI instrumentation, remove the word REM from these lines in the PIC\_ON.NCF file:

```
REM load iomgr  
REM load dmishim
```

To enable the Intel LAN Adapter instrumentation, remove the word REM from these lines in the PIC\_ON.NCF file:

```
REM load e100bdmi.nlm /auto
```

To enable the LSI (Symbios) SCSI instrumentation, remove the word REM from these lines in the PIC\_ON.NCF file:

```
REM load simcinw.nlm
```

# Launching Platform Instrumentation Control

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PIC can be launched from and can manage servers from one of these management environments:

- LANDesk Server Manager (LDSM)
- HP Network Node Manager
- CA-Unicenter TNG
- Intel Server Control Console

Once the PIC GUI application is launched from a management console, the management console application can terminate, and PIC will continue to operate normally.

## LANDesk® Server Manager

The LDSM console dynamically builds its feature set when communication is established with a managed server. If the managed server is running the Platform Instrumentation software, the LDSM console adds an option for “Platform Instrumentation Control” as a launch point in the Tools branch of the LDSM navigation tree. Select this option to launch the PIC applet.

## HP Network Node Manager

The HP Network Node Manager Console autodetects servers running the PIC Component Instrumentation software. The Console updates the server bitmap with an PIC server icon for those servers.

To launch the PIC applet, select an PIC-enabled server on the HP Console network map, and then select the "Platform Instrumentation Control Applet" option from the Tools Menu. Alternatively, you can launch the PIC applet by selecting an PIC-enabled server on the HP console network map, clicking the right mouse button, and then selecting the "Platform Instrumentation Control" option from the popup menu.

## CA-Unicenter TNG

The CA-Unicenter TNG Console autodetects servers running the PIC Component Instrumentation software if you have enabled the PIC to CA discovery service. To enable discovery, you must start the "Intel Tng-PIC AutoDiscovery" service. You can start this service from either the TNG Unicenter "Auto Discovery" dialog or from the Windows NT "Services" applet.

The "Intel Tng-PIC AutoDiscovery" service creates a new "Platform Instrumentation Control" TNG object for each server having the PIC Component Instrumentation software. That TNG object displays on the map as a child of the "PIC World View" and as a child of the PIC-enabled server. You can view all PIC-enabled servers under the "PIC World View."

To launch the PIC applet, right-click on a "Platform Instrumentation Control" icon, and select the "Launch PIC" option from the popup menu.

## Intel Server Control Console

The Intel Server Control Console is a lightweight management console that provides basic server management without having to use an enterprise management console (such as HP OpenView) or a workgroup management console (such as LANDesk Server Manager).

To launch PIC from within the Intel Server Control Console, click the PIC icon in the Tool Pane.

# Using the Platform Instrumentation Control Console

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When you start PIC, the main window displays a tree view. You can expand the view to show the sensor types supported on the managed server and further expand it to display detailed sensor information.

A presentation area on the main PIC window displays current readings, threshold configurations, inventory, and other related information for selections made in the tree view. The main window also displays the server's LCD (if available) and a picture of the PIC bitmap.

Most of the PIC sensors have associated thresholds that trigger alert actions when the thresholds are crossed. You can:

- Specify which alert actions you want to occur.
- Modify the default thresholds.
- Configure the default actions and notifications for each threshold.

When a parameter crosses a threshold, you can have PIC:

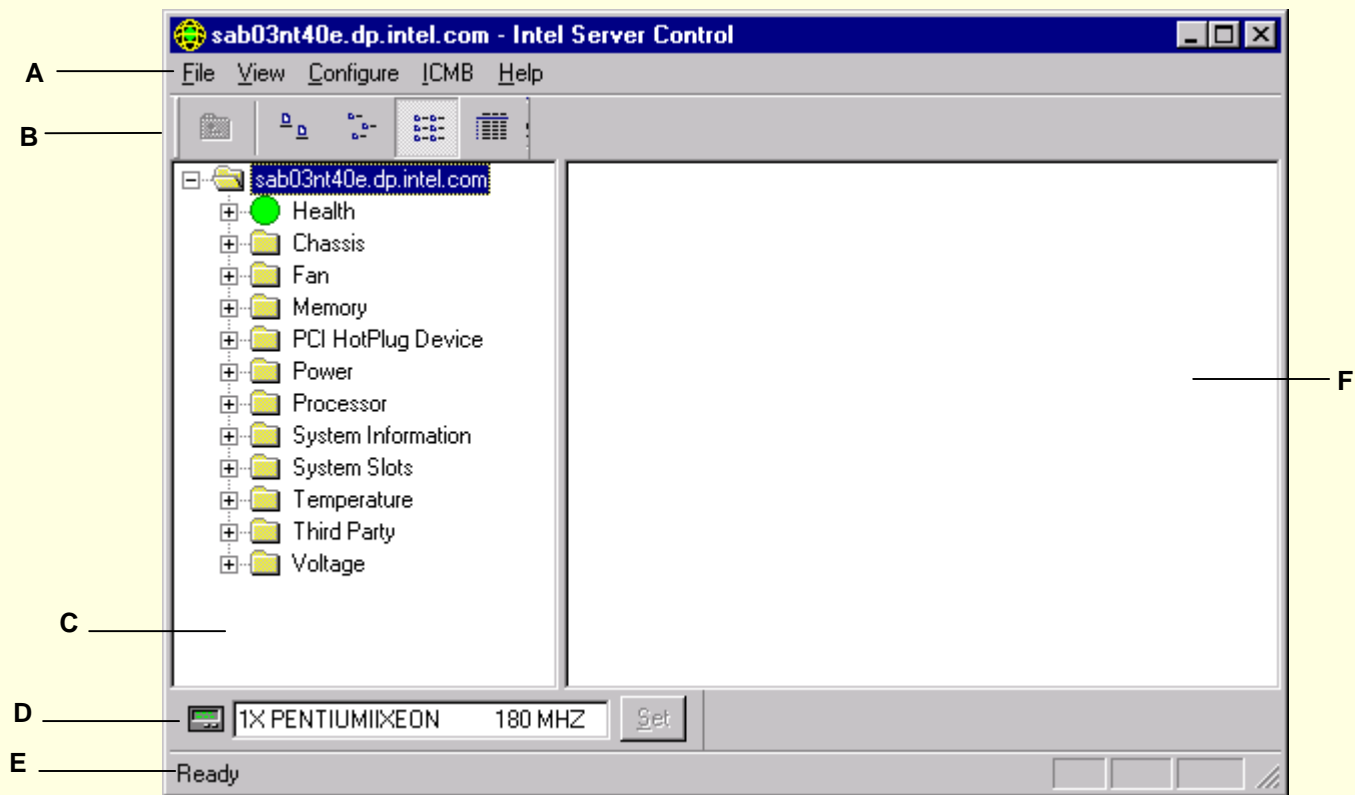
- Beep the speaker on the managed server.
- Display an alert on the managed server.
- Log the event to disk on the managed server.



- Broadcast a message.
- Write a message to the LCD on the managed server.
- Page an administrator.
- Use one of the shutdown/power control options to shutdown the OS, do a hardware reset, or power-off the server.
- Run any LANDesk Alert Management System (AMS<sup>2</sup>) alert action if LANDesk Server Manager is installed on the managed server and managing console. For more information on AMS<sup>2</sup>, see the Intel LANDesk Server Manager Administrator's Guide.

## The PIC Console Main Screen

PIC uses a Windows Explorer-like model, with a navigation pane (tree view) and a presentation pane (list view). When you select a sensor from the tree, the presentation pane shows a set of tabbed pages with sensor-specific information.



- A Main Menu bar
- B Icon Toolbar
- C Navigation Pane)
- D LCD Display Pane
- E Status Bar
- F Presentation Pane

The main screen of the PIC application is continually updated to show current sensor status. Specific PIC sensor dialogs (such as temperature and voltage sensors) show the current sensor reading when displayed but are not dynamically updated.

## Main Menu Bar

The Main Menu Bar includes the following options:







Item	Options
File Menu	<b>Exit:</b> Exits the application
View Menu	<p><b>Toolbar:</b> Toggles the toolbar on or off.</p> <p><b>Status Bar:</b> Toggles the status bar on or off.</p> <p><b>PIC Bitmap:</b> Toggles the PIC bitmap pane on and off.</p> <p><b>Large Icons:</b> Displays list using large icons.</p> <p><b>Small Icons:</b> Displays list using small icons.</p> <p><b>List:</b> Displays items in list format.</p> <p><b>Details:</b> Displays items in detail format.</p> <p><b>Arrange Icons:</b> Arranges icons by name or status.</p> <p><b>Refresh:</b> Triggers an immediate screen and data refresh.</p> <p><b>Options:</b> Displays the view options dialog so you can configure viewing preferences, such as temperature format and display refresh rate.</p>
Configure Menu	<p><b>Enable Front Panel Power &amp; Reset:</b> Toggles the front panel power and reset option.</p> <p><b>Enable Watchdog Timer:</b> Toggles the watchdog timer option. When this option is enabled, you can set the timer value.</p> <p><b>Watchdog Timer Value:</b> When the watchdog timer option is enabled, the timeout dialog appears so you can set the timeout value. When the timer is disabled, the dialog does not appear.</p> <p><b>Restore Factory Defaults:</b> Restores factory default values for threshold sensors, console refresh interval, and the Watchdog Timer.</p> <p><b>Paging Configuration</b> - This command takes you to the paging Configuration dialog</p>

	box.
ICMB Menu	<b>View Managing Server:</b> Enables the default local managing server view. <b>View Managed Server(s):</b> Accesses the ICMB-managed server view(s). <b>Reclaim Inactive Resources:</b> Reclaims inactive ICMB resources on the managing server.
Help Menu	<b>Help Topics:</b> Accesses PIC help topics. <b>About PIC:</b> Displays PIC version information.

## Icon Toolbar

Table 3 lists the items in the Icon Toolbar. The order of the items in the table, top to bottom, reflects the order of the icons on the main screen, left to right. To hide the icon toolbar, click the right mouse button over the toolbar, and then click on the “Hide” popup menu that appears.

**Table 3. Icon Toolbar Items**

Icon	Name	Options
	Up One Level	Takes you up one level in the tree (navigation) view
	PIC Bitmap	Toggles the PIC bitmap pane on or off
	Large Icons	Displays list using large icons
	Small Icons	Displays list using small icons
	List	Displays items in list format
	Details	Displays items in detail format

## Navigation Pane

The Navigation Pane shows a tree view of server components that can be monitored. Many branches of the tree represent group components that have subbranches (nodes). These group items are identified by the tree expansion icons (“+” or “-”) appearing to the left of the component name. These branches can be expanded to list nodes (detail sensor list) or collapsed to hide nodes.

## Server Bitmap

The Server Bitmap shows a picture of the server splash screen. To hide the picture, click the right mouse button over the picture, and then click on the “Hide” popup menu that appears or click on the PIC Bitmap icon on the toolbar.

## LCD Display

The LCD Display Pane shows the actual server LCD contents and a button to set the LCD contents on the server. If the server hardware does not support LCD, the pane does not display.



## Status Bar

The Status Bar displays status messages. To hide the status bar, click the right mouse button over the status bar, and then click on the “Hide” popup menu that appears.

## Presentation Pane

When you select a branch (group component) in the navigation pane, the presentation pane displays a set of icons (list view) representing each group node (detail sensor list). The detail view provides more information on each node item. You can arrange these list view items by name (sorted alphabetically) or by status (sorted by current status: critical, noncritical, and OK). To change the presentation pane, click the right mouse button over the pane, and then select from the popup menu that appears. This popup menu has two items:

- **View**— Changes between large icons, small icons, list, or detail view
- **Arrange Icons**— Arranges the list view icons by name or status

When you select a node in the navigation pane, the presentation pane displays a set of tab pages representing the detail sensor information. Depending on the node selected in the navigation pane, one of the following four pages is displayed:

- **Sensor Settings**— Displays the sensor’s current status and current value, threshold values and error counts.

Use this screen to configure new threshold values (such as Upper Critical Threshold, Upper Noncritical Threshold).

The sensor status is also represented as a colored “Health” icon: Red is critical, Yellow is noncritical, Green is OK, and Blue is an unsupported sensor.

- **Alert Actions**— Displays the currently configured alert actions for each threshold type (such as Voltage-Status Changed to Upper Critical, Voltage-Status Changed to Lower Critical).

Use this screen to change the alert actions for each supported threshold. The factory default alert actions are Log the Event to Disk and Write a Message to the LCD. The AMS Alert configuration option is available only when PIC is integrated with LDSM; when this feature is not available, the AMS Alert option is disabled.

- **Sensor Information**— Displays individual sensor information (such as Sensor Tolerance, Maximum Reading, Minimum Reading).
- **Inventory Information**— Displays inventory information for the sensor (such as Description, Manufacturer). The information varies based on the sensor type.

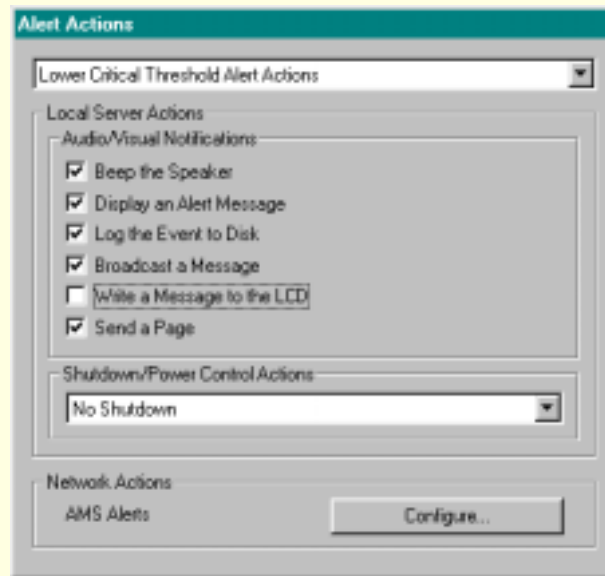
# Sensor Dialogs

## Alert Actions

All of the sensor dialogs have an Alert Actions tabs with them. Use the Alert Actions tab to specify the actions to be taken in the event of an alert on the associated sensor.

The factory default alert actions are to log the event to disk and to write a message to the server's front-panel LCD.

The AMS alert configuration is only available when PIC is integrated with LANDesk® Server Manager (LDSM). When this feature is not available, the corresponding GUI controls will be disabled.



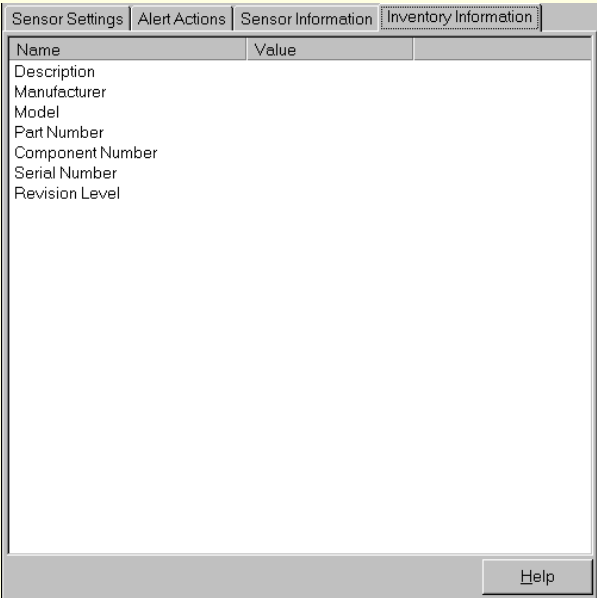
## Sensor Information

Each sensor has a sensor information tab that displays individual sensor information, such as specifications and reading extremes.

Name	Value
Sensor Accuracy	
Sensor Tolerance	
Sensor Resolution	
Nominal Reading	
Maximum Reading	
Minimum Reading	
Lowest Normal Reading	
Highest Normal Reading	

# Inventory

Each sensor as an inventory information tab that shows information about the characteristics of the sensor.



The screenshot shows a software window with four tabs: "Sensor Settings", "Alert Actions", "Sensor Information", and "Inventory Information". The "Inventory Information" tab is active and displays a table with two columns: "Name" and "Value". The table lists the following items:

Name	Value
Description	
Manufacturer	
Model	
Part Number	
Component Number	
Serial Number	
Revision Level	

A "Help" button is located in the bottom right corner of the window.

## Health

Information about all unhealthy sensors is copied under the Health branch. Select the Health branch of the server tree in the navigation pane to get a quick and simple view of the current server health. If, for example, a 12V voltage sensor indicates that the current status is not OK, then data about that 12V sensor is added to the Health branch of the tree. You can select the 12V entry in either the Health or Voltage branch of the tree to display information about the sensor.

All sensors in either a critical or noncritical condition will appear in the Health branch of the tree in addition to their normal location in other areas of the navigation tree. In this way, you can get a quick summary of problem areas on your server and begin corrective actions.

Colored icons in the Health branch of the server tree indicate individual sensor status and overall server status:

- **Green:** healthy server
- **Yellow:** noncritical conditions
- **Red:** critical failures
- **Blue Question Mark:** unsupported sensors

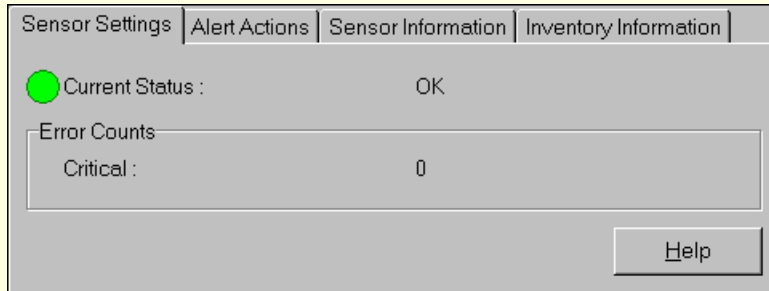
The color of the overall server health icon will display the state of the most severe sensor status. If any sensor is in a critical condition (regardless of other sensors being in a noncritical condition), the server health status will be shown as critical (red). If there are only noncritical sensors, the server health status will be shown as noncritical (yellow). If all sensors report normal conditions, the server health status will be shown as OK (green).



## Chassis

PIC monitors chassis door open/closed switches for managed servers that support this feature. The number of sensors monitored depends on the server chassis.

The chassis intrusion sensor screen displays the current security status. Not all servers support this component.



**Figure 5. Chassis**

When a chassis door that includes an open/close switch is opened, the vulnerable state is indicated as a critical condition in the health branch of the PIC Console, and the requested event actions are carried out. When all chassis doors that include an open/close switch are closed, PIC indicates the chassis is secure and carries out the requested event actions.

For systems that do not support chassis open/closed switches, this portion of the PIC Console will either not display or the chassis status will be reported as “Unknown.”

## Fan

The fan sensor screen displays actual fan RPM for systems that support this feature. The threshold appears in terms of the RPM value. If the current fan RPM value falls below the specified threshold value, then the sensor status changes and an event generates. For the systems that do not support fan RPM threshold, the threshold setting is 0 and read-only. If the fan stops, then the sensor status changes and an event generates.

The screenshot shows a software interface for fan sensor settings. It has a tabbed header with four tabs: "Sensor Settings" (selected), "Alert Actions", "Sensor Information", and "Inventory Information". Below the tabs, there is a green status indicator and the text "Current Status : OK". Underneath, it says "Current Value : 1655 RPM". A section titled "Thresholds" contains four rows of settings, each with a text input field and a "RPM" label: "Upper Critical Threshold" (empty), "Upper Non-Critical Threshold" (empty), "Lower Non-Critical Threshold" (1200), and "Lower Critical Threshold" (900). Below this is an "Error Counts" section with two rows: "Non-Critical : 0" and "Critical : 0". At the bottom right, there are two buttons: "Apply" and "Help".

Threshold Type	Value	Unit
Upper Critical Threshold		RPM
Upper Non-Critical Threshold		RPM
Lower Non-Critical Threshold	1200	RPM
Lower Critical Threshold	900	RPM

Error Count Type	Count
Non-Critical	0
Critical	0

PIC monitors two types of fans:

- Rotation-sensing fans—PIC can detect whether a fan has stopped but is not able to indicate which fan has failed. These fans, together, are treated as a single fan unit. Therefore, event actions must be configured for all fans together, rather than separately.
- RPM-sensing fans—PIC can detect whether an individual fan has either slowed or stopped and will display the actual fan RPM value for systems that support this feature. Each RPM-sensing fan is independently configurable with its own threshold and event actions.

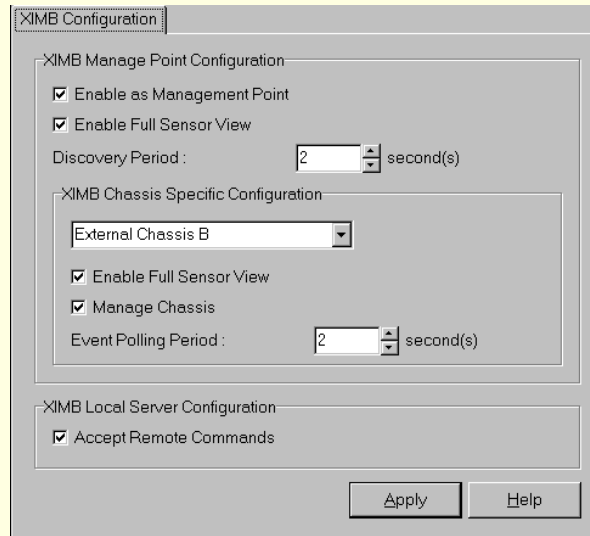
If a rotation-sensing fan fails or an RPM-sensing fan crosses a threshold, the PIC Console displays the event as a critical condition via the health branch of the software, and the requested event actions are carried out.

For systems that do not support a fan RPM threshold, the threshold setting displays a “0” and is read-only in the PIC Console display.

## ICMB

The ICMB dialog allows you to configure options for the Intelligent Chassis Management Bus (ICMB).

The ICMB feature allows multiple remote devices to be interconnected and management information shared among them. For example, your managed server could be configured to be an ICMB primary server and report management information on other ICMB devices connected to it. Using ICMB, PIC can manage the power state of remote ICMB devices and view FRU information about those devices. The amount of FRU information available depends on the type of ICMB device you are trying to manage.



The image shows a dialog box titled "XIMB Configuration" with three main sections:

- XIMB Manage Point Configuration:**
  - Enable as Management Point
  - Enable Full Sensor View
  - Discovery Period: 2 second(s)
- XIMB Chassis Specific Configuration:**
  - External Chassis B (dropdown menu)
  - Enable Full Sensor View
  - Manage Chassis
  - Event Polling Period: 2 second(s)
- XIMB Local Server Configuration:**
  - Accept Remote Commands

Buttons for "Apply" and "Help" are located at the bottom right of the dialog.

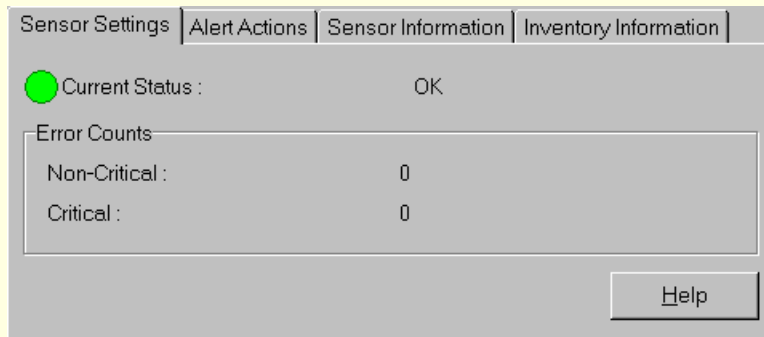
Through the PIC Console, you can switch your view of the primary managed server to one of the ICMB-managed devices and view the available information on that device without losing the connection with the primary server. You can change your view back to the primary server or any other ICMB-managed device at any time. Through the PIC Console, you can configure the ICMB management features of the primary managed server and the remote ICMB-managed devices.

- **Local ICMB Server Configuration**— With this option it is possible to enable the local server as a management point, enable the full sensor view of remote devices, and change the discovery period for remote devices.
- **Remote ICMB Chassis Configuration**— With this option it is possible to configure each remote device discovered via ICMB. You can decide whether to manage the remote device, enable full sensor view for the remote device, and set the event polling rate for the remote device.

You can reclaim inactive ICMB system resources on the primary server. Doing so frees the memory taken up by the SDR and FRU information on the primary server for any remote device that is no longer visible on the network (via ICMB).

## Memory Array

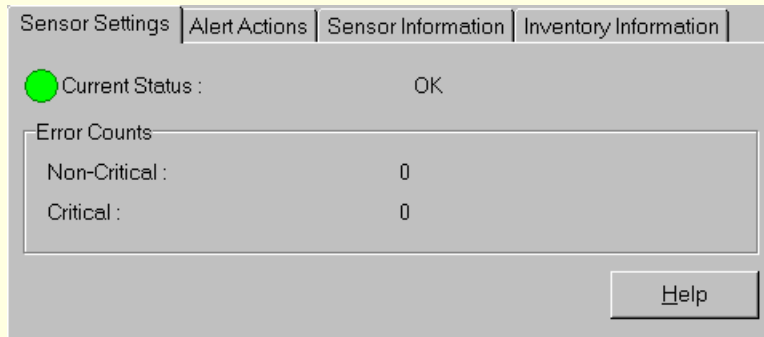
The memory array sensor screen displays information and status about each memory array. Sensor-specific information is displayed in the Sensor Information tabbed page. Not all servers support this component.





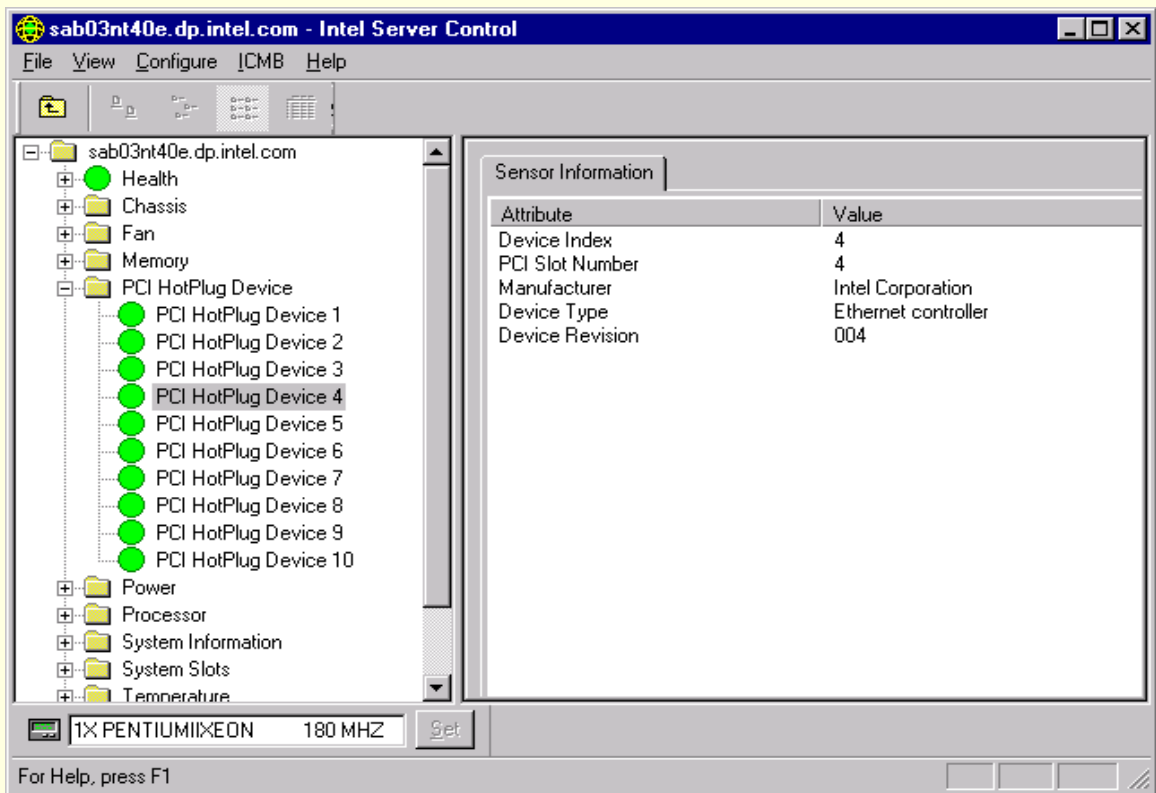
## Memory Device

The memory device sensor screen displays information and status about each memory device. Sensor-specific information is displayed in the Sensor Information tabbed page. Not all servers support this component.



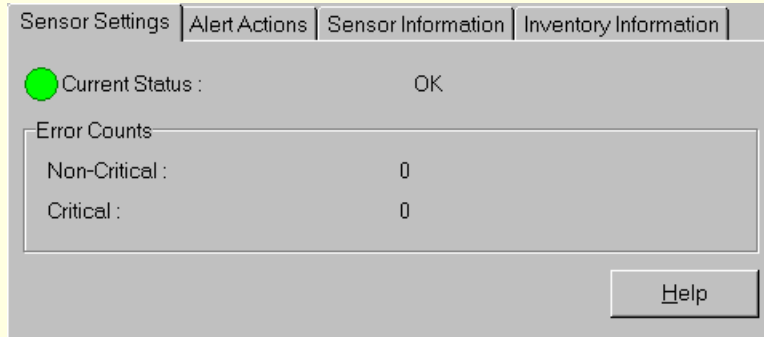
## PCI HotPlug Device

The PCI HotPlug Device sensor screen displays information about each PCI Hot Plug device installed in a PHP slot. If the server hardware does not support PCI HotPlug it will not appear in the navigation pane and the screen will not be available.



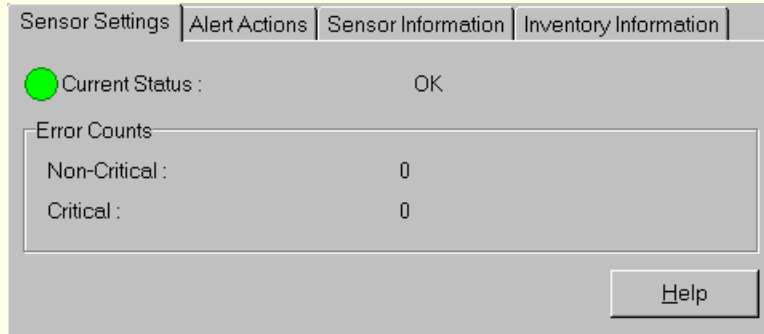
## Power Supply

The power supply sensor screen displays information and status about each power supply. The information displayed includes power supply type, maximum current output, and etc. Sensor-specific information is displayed in the Sensor Information tabbed page. Not all servers support this function.



## Power Unit

For systems that support it, PIC monitors the status of the power supplies in the managed server. Each power supply is independently configurable for event actions upon failure. The power unit sensor screen displays information and status about each power unit. Not all servers support this component.



If a power supply reports a predictive failure condition, then PIC reports the status as a non-critical condition in the health branch of the PIC Console software, and the requested event actions are carried out.

If a power supply fails, the failure is reported as a critical condition in the health branch of the PIC Console software, and the requested event actions are carried out. PIC also reports the system power as nonredundant and as a noncritical condition in the health branch of the PIC Console software, and the requested event actions are carried out.

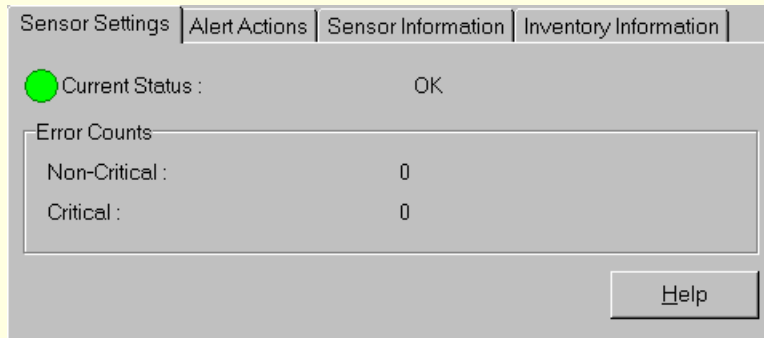
For systems that do not support power supply sensors, this portion of the PIC Console software will not display.

For those systems that support it, PIC monitors the managed server's system power redundancy status.

If a power supply fails or if the surplus power on the system is less than the amount provided by one power supply, PIC reports that the system power is nonredundant. This condition is indicated with a noncritical status in the health branch of the PIC Console software and the requested event actions are carried out.

## Processor

The processor sensor screen displays information and status about each processor. From this screen, you can find out the type and speed of the processor. Sensor-specific information is displayed in the Sensor Information tabbed page. Not all servers support this function.



For motherboards that support it, PIC monitors processor failures during runtime and system boot on the managed server. If a supported motherboard includes multiple processors, each processor can be configured and monitored separately through PIC. If a processor failure is detected, the failure is reported as a critical condition in the health branch of the PIC Console software, and the requested event actions are carried out.

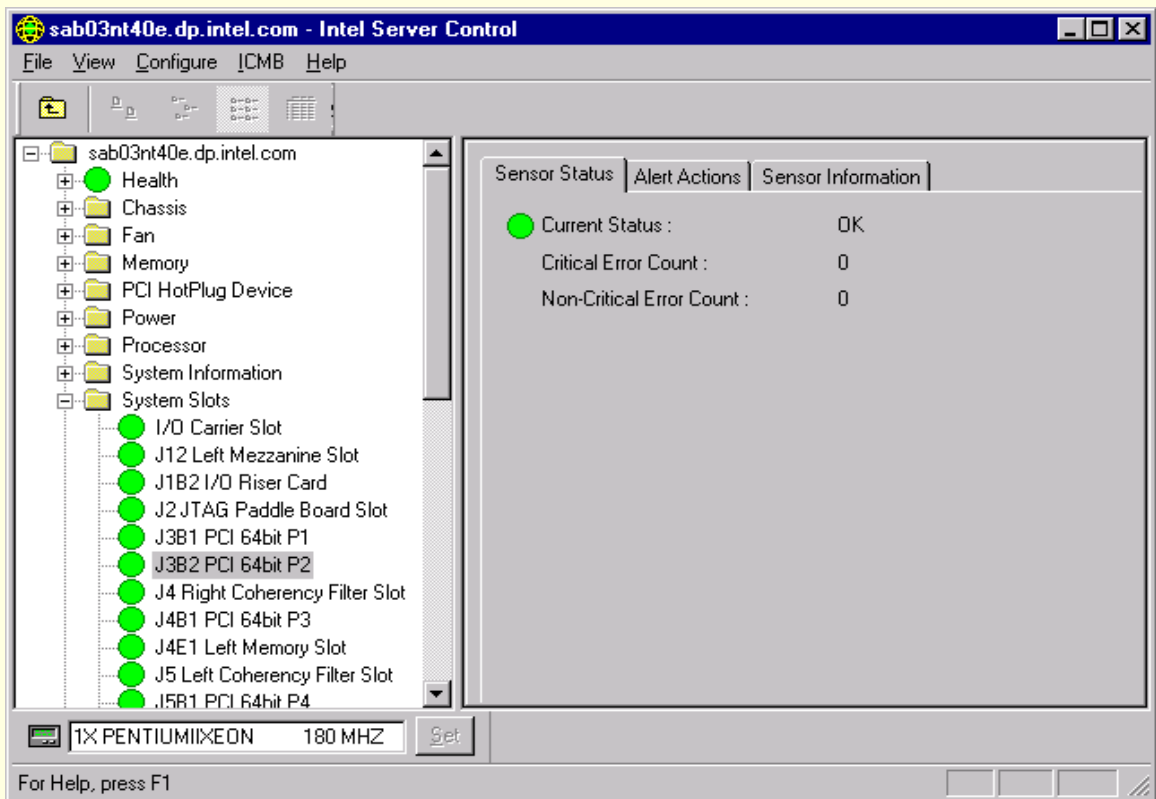
If processor sensors are not available on the motherboard, this portion of the PIC Console does not display.

## System Slots

ISC gathers sensor information and slot status on all slots in your managed server. The slots are categorized into two groups:

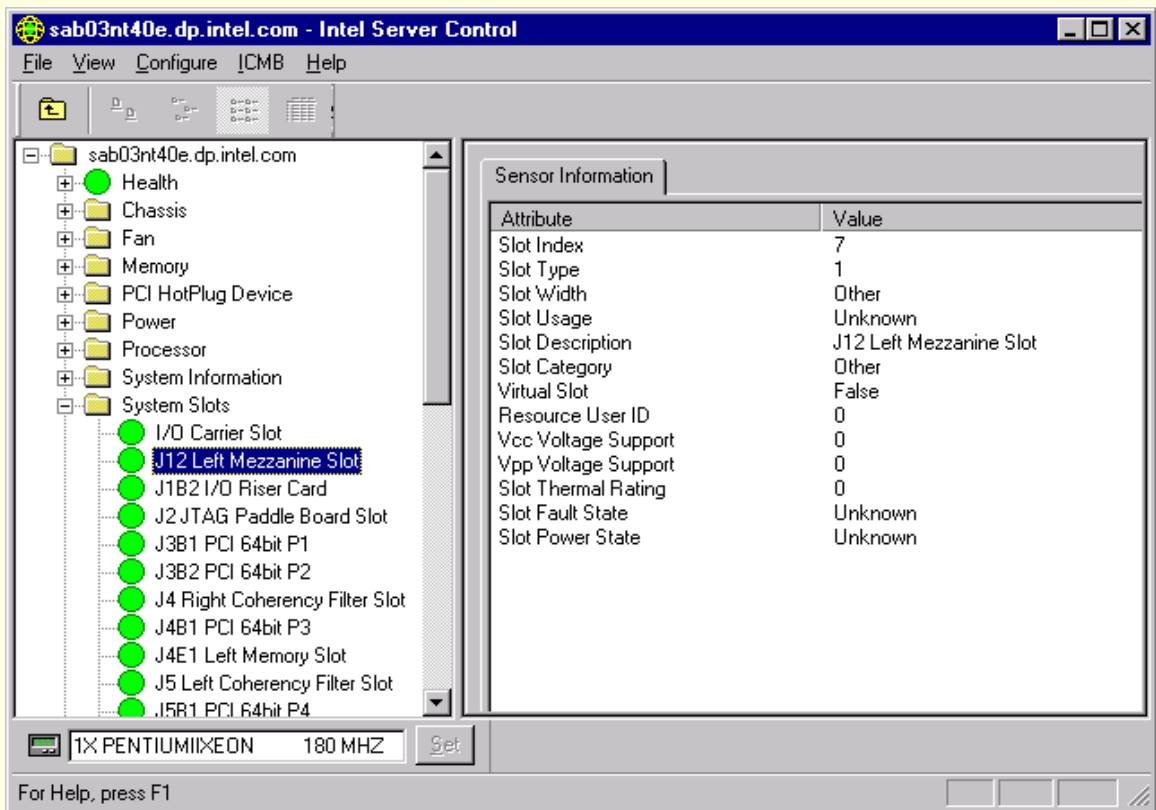
- PCI Hot Plug (PHP) slots (if the server hardware supports PCI HotPlug)
- All other non-PHP system slots.

Slot names containing “PCI 64bit” identify PHP slots. For PHP slots, there are three pages available in the presentation pane: Sensor Information page, Sensor Status page, and Alert Action page.





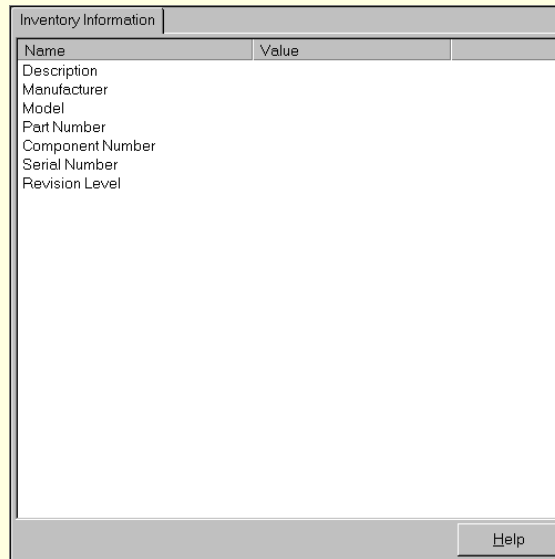
For non-PHP slots, only the Sensor Information pages displays.



## System Information

PIC gathers information on field replaceable unit (FRU) components installed in your managed server. This information includes a component description, manufacturer, model, part number, component number, serial number, and revision level. PIC also gathers information on other system resources including Operating System, BIOS, and the System Event Log.

The inventory screen displays a list of components within the system. The inventory list shows the description, manufacturer, model number, part number, serial number, and revision level of baseboard components. The inventory list will include information on the baseboard, processor board, chassis, power share board, hot-swap backplane, and memory devices.








Name	Value
Description	
Manufacturer	
Model	
Part Number	
Component Number	
Serial Number	
Revision Level	

If your server does not support one or more of these features, these portions of the PIC Console will not display.

## Temperature

The temperature dialog contains all temperature sensors. You can see individual sensor information in the presentation pane by selecting the corresponding sensor node from the navigation tree. You can monitor current temperature readings, current status, sensor error counts, and set sensor thresholds. Depending on the individual temperature sensor and the server platform, some thresholds are unsupported and they appear disabled, grayed out, in the control. The status indicator in the upper left-hand corner shows the current status: a red stop sign means “Critical,” a yellow caution sign means “Non-Critical,” and a green traffic light means “OK.”

Sensor Settings		Alert Actions		Sensor Information		Inventory Information	
	Current Status :			OK			
	Current Value :			25.9 Celsius			
Thresholds							
	Upper Critical Threshold	<input type="text" value="65.0"/>		Celsius			
	Upper Non-Critical Threshold	<input type="text" value="55.0"/>		Celsius			
	Lower Non-Critical Threshold	<input type="text" value="0.0"/>		Celsius			
	Lower Critical Threshold	<input type="text" value="-10.0"/>		Celsius			
Error Counts							
	Non-Critical :			3			
	Critical :			2			
				<input type="button" value="Apply"/>		<input type="button" value="Help"/>	

This table displays the information available for the temperature sensors.

<b>Item</b>	<b>Description</b>
Maximum Reading	The highest reading supported on this sensor.
Minimum Reading	The lowest reading supported on this sensor.
Sensor Accuracy	The sensor's accuracy in +/- hundredths of a percent.
Sensor Tolerance (plus)	The amount of variation over the actual value that can be reported.
Sensor Tolerance (minus)	The amount of variation under the actual value that can be reported.
Sensor Resolution	The smallest unit of measurement reported by the sensor.
Nominal Reading	The expected normal reading for this sensor.
Lowest Normal Reading	The lowest normal reading of this sensor. Readings below this value indicate an abnormal condition.
Highest Normal Reading	The highest normal reading of this sensor. Readings above this value indicate an abnormal condition.

## Third-Party

You can configure event actions for DMI indications generated by third-party Server Instrumentation installed with PIC. You can also monitor third-party instrumentation via the DMI Explorer Interface. PIC supports event configuration for Adaptec SCSI, LSI (Symbios) SCSI, and Intel LAN Adapter Server Instrumentation.

## Voltage


In a managed server, PIC monitors many types of voltage sensors; the number and type depend on the server hardware configuration. Each monitored voltage sensor has independently configurable thresholds and event actions. Example voltage sensors are:

- 12V, 5V, 3.5V, 3.3V, -5V, -12V
- Processors 1.5V and 2.5V
- SCSI A Termination 1, 2, and 3

The voltage dialog contains all voltage sensors. You can see individual sensor information in the presentation pane by selecting the corresponding sensor node from the navigation tree. With this control, you can monitor current readings, current status, sensor error counts, and set sensor thresholds. Depending on the individual voltage sensor and the server platform, some thresholds are unsupported and they appear disabled (grayed out) in the control. The indicator in the left-hand corner shows the current status: a red stop sign means “Critical,” a yellow caution sign means “Non-Critical,” and a green traffic light means “OK.”



Sensor Settings | Alert Actions | Sensor Information | Inventory Information

 Current Status : OK  
Current Value : 12.33 Volts

Thresholds

Upper Critical Threshold	14.52	Volts
Upper Non-Critical Threshold	13.37	Volts
Lower Non-Critical Threshold	10.77	Volts
Lower Critical Threshold	9.46	Volts

Error Counts

Non-Critical :	0
Critical :	0

Apply Help

This table displays the information available for the voltage sensors.

<b>Item</b>	<b>Description</b>
Maximum Reading	The highest reading supported on this sensor.
Minimum Reading	The lowest reading supported on this sensor.
Sensor Accuracy	The sensor's accuracy in +/- hundredths of a percent.
Sensor Tolerance (plus)	The amount of variation over the actual value that can be reported.
Sensor Tolerance (minus)	The amount of variation under the actual value that can be reported.
Sensor Resolution	The smallest unit of measurement reported by the sensor.
Nominal Reading	The expected normal reading for this sensor.
Lowest Normal Reading	The lowest normal reading of this sensor. Readings below this value indicate an abnormal condition.
Highest Normal Reading	The highest normal reading of this sensor. Readings above this value indicate an abnormal condition.

# Managing Servers with PIC

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## Viewing / Configuring Sensor Information

To view or configure a sensor (such as voltage, temperature), do the following steps:

1. On the PIC main window, click beside a sensor name in the navigation pane to see the list of available sensors.
2. Select an entry from the list.
3. Switch between the available tab pages (**Sensor Settings**, **Alert Actions**, **Sensor Information** or **Inventory Information**) to view or update the information.
4. Click <Apply> for any changes made to the sensor configuration.

At any time you can change views to another sensor by selecting another component in the navigation pane.

If you try to change your view and you have not saved any configuration changes using the Apply button in the presentation pane, PIC prompts you to save or discard the changes before switching to a new view.

## Viewing System Information

To view system information (such as FRU, Operating System, BIOS, SEL) on the managed server (or managed ICMB device), do the following steps:

1. On the PIC main window, click beside the System Information name in the PIC navigation pane to see the list of options.
2. Select an entry from the list.
3. View the information in the corresponding tab page in the presentation pane.

At any time you can change views to another sensor by selecting another component in the navigation pane.

On components that support FRU data, this inventory information is also displayed on the Inventory Information tab page associated with that component.

## System Event Log

The PIC Console software displays the System Event Log (SEL) maintained by the managed server's platform hardware. The SEL is a collection of log entries stored in nonvolatile flash memory. The entries are reported by the BIOS SMI handler when an event condition occurs at the server.

The Platform Instrumentation automatically extracts event information from the SEL and triggers any user-configured actions associated with that event. The Platform Instrumentation clears the

SEL when it is near an out-of-space condition. The PIC Console software also displays the SEL logging status (whether the SEL is Active or Inactive).

## Configuring Thresholds

There are two basic types of threshold:

- **Range-based thresholds** for which a variety of values can be set. Example uses: for temperatures, voltages, and RPM-sensing fans.
- **State-based thresholds** that have fixed values like OK or Critical. Example uses: for rotation-sensing fan, chassis door, and memory array.

### To Configure a Range-Based Threshold

Most voltage and temperature sensors and RPM-sensing fans have either one, two, or four configurable thresholds, depending on the motherboard in your server. Example thresholds are:

- Upper Critical
- Upper Noncritical
- Lower Noncritical
- Lower Critical

Some special sensors do not have configurable thresholds and are displayed for monitoring purposes only.

You can customize the threshold value to suit your working environment.

You can specify what action should occur when the sensor detects that one of the threshold values has been crossed (i.e., the sensor state changes). Example state change conditions:

- Status Changed to OK
- Status Changed to Upper Critical
- Status Changed from OK to Upper Noncritical
- Status Changed from Critical to Upper Noncritical

These thresholds and sensor state changes let you configure progressive responses in PIC to increasingly serious hardware conditions. For example, noncritical thresholds might be configured to emit a beep from the speaker and send a broadcast message, while critical thresholds might require more serious actions, like a server shutdown.

To configure a range-based threshold:

1. On the PIC main window, click beside the sensor name in the navigation pane to see the list of available sensors.
2. Select an entry from the list.
3. Change the threshold values as needed on the Sensor Settings tab page.
4. Click <Apply> for any changes made to the threshold value configurations.
5. If you want to change the event actions associated with threshold state change conditions, make the changes on the Alert Actions tab page.
6. Click <Apply> for any changes made to the alert action configuration.

⇒ **NOTE**

After applying new threshold values that may cause an event indication, the sensor status icon displayed on the Sensor Settings tab page may not change.

The console refreshes the display before the new threshold value takes effect on the server, making it appear as though the sensor icon does not accurately reflect the current state of the sensor. Use the menu option, View->Refresh, or the F5 keyboard shortcut, to update the Sensor Settings tab page.

## To Configure a State-Based Threshold

The state-based thresholds for processor, power supply, rotation-sensing fans, chassis door, and memory arrays have a fixed set of values, not a range. Example state change conditions:

- Single Bit Memory Error
- Processor Thermal Trip
- Power Supply Failed

### ⇒ **NOTE**

For systems that support rotation-sensing fans, the fan RPM threshold setting displays a “0” and is read-only in the PIC Console software.

PIC generates an event whenever the state of these items changes. You can specify which actions should occur in response to changes. To configure a state-based threshold:

1. On the PIC main window, click beside a sensor name in the navigation pane to see a list of available sensors.
2. Select an entry from the list.



3. Select the Alert Actions tab. Change the event actions associated with a state change condition.
4. Click <Apply> to save your changes.

## Cautions in Setting Thresholds

### Threshold Values Rounded Off

When you are setting thresholds, the values you enter might not be the exact values set by the software. This behavior is caused by hardware rounding. Redisplay the Sensor Settings tab page to find the actual value set by the software.

### Avoiding a Power On/Off Loop

Improperly setting event actions can cause the server to enter a state that prevents the server from booting correctly. This can occur in the following scenario:

1. An event occurs. Example: a high-temperature threshold is exceeded.
2. While the condition causing the event still exists, you set a Shutdown/Power Control Action, like Immediate Power Off, to respond to this event.
3. Because the threshold has already been exceeded, no event is triggered to cause the Immediate Power Off action to occur.

4. If you reboot the system and the event condition has not been corrected (such as the temperature is still over threshold), the system detects the temperature condition, triggers the event, and the corresponding action is taken. In this example action, Immediate Power Off, the system is automatically and immediately powered off.

When the system is powered up, an infinite loop of power-up and power-down begins. To break this cycle, you have two options:

1. Clear the event condition (cool down the system in this example).
2. Create a file named C:\LRA.NOT (or insert a diskette with file \LRA.NOT in A: drive) before the OS boots. The existence of this file will disable the software component that responds to the event. The contents of the file are not important. This file can be created by booting DOS. You must then delete this file after the problem is fixed to allow the software to operate normally. On UnixWare systems, either create a LRA.NOT file in / (root) directory or use the diskette described above.

## Avoiding a Reboot-Fail Retry Loop

User-defined threshold values and other user-defined configuration attributes are written to disk (persistent storage) so they are available when the server reboots. These “remembered” values replace the PIC default values when PIC initializes.

When you change a threshold value or alert action in PIC, you can create an environment in which an event is immediately generated, such as setting the Upper Noncritical Threshold value below the current sensor reading. If the configured event actions on this threshold included a Shutdown

or Power Control action as described earlier, the server would trigger the Shutdown or Power Control action and could enter a reboot-fail-reboot-fail cycle using the new threshold value.

To help avoid this situation, PIC updates the server in two steps:

1. Any change you make is valid immediately in the active instrumentation, but PIC waits five minutes before writing user changes to disk. Thus, if the change causes the server to reboot, the previous value is restored from disk when the server reboots.
2. PIC then uses and displays the previous value, thus avoiding the immediate reboot-fail-reboot-fail cycle.

Any change you make will be successfully written to disk as long as the motherboard instrumentation continues running for five minutes after the change is saved.

## Configuring Threshold Event Actions

On the Alert Actions tab page, you can select actions that will take place when a sensor exceeds a threshold or changes state. Several options exist.

- Local actions:
  - Audio/visual notifications (you may select more than one)
  - Shutdown/power control actions (you may only select one)
- Network actions:
  - AMS<sup>2</sup> actions (if LANDesk Server Manager is installed on the server and console). Generally, audio/visual notifications and AMS<sup>2</sup> alerts are for noncritical thresholds; shutdown/power control actions are for critical thresholds.

AMS<sup>2</sup>-configurable alert actions include:

- Paging (disabled if the server hardware does not support Local Response Agent paging)
- Program execution
- SNMP trap generation
- Message box, broadcast, and others

For more information on AMS<sup>2</sup> and its alert actions, see “Configuring AMS<sup>2</sup> Alert Actions” in the Intel LANDesk Server Manager Administrator’s Guide.

**CAUTION**

If the OS is disabled by a non-critical event (such as a voltage surge), then critical actions will not be carried out because the OS has been shut down. It is best to use warnings (such as a speaker beep, a broadcast, etc.) for non-critical conditions.

The following tables list the available actions in PIC. You can specify multiple audio/visual notifications and AMS<sup>2</sup> alerts per event but only one shutdown/power control action.

Action	Description
Emit a beep from the managed server's speaker	Speaker emits a beep.
Display an alert message on the managed server	<p>Default action for noncritical and critical indications. The message box stays up until acknowledged.</p> <p>On UnixWare, Solaris, and Linux the alert message is displayed as a text message on the server console.</p>
Log the event to disk	<p>Default action for all indications. This option records the event in the standard system error log.</p> <p>On NetWare, PIC records the event in the System Log, which you can view with NetWare's Syscon utility.</p> <p>On Windows NT and Windows 2000, PIC records the event in the Windows NT System Event Log, which you can view with the Windows NT Event Viewer.</p> <p>On UnixWare, events are logged in the system log file: <code>/etc/osm</code>.</p> <p>On Solaris, events are logged in the system log file: <code>/var/adm/messages</code>.</p> <p>On Linux, events are logged in the system log file: <code>/var/log/messages</code>.</p>
Broadcast a message	<p>Default action for critical indications.</p> <p>On NetWare, the message goes to all users currently logged into the managed server with Administrator or Supervisor privileges.</p>

	<p>On Windows NT and Windows 2000, the message goes to all the users currently logged into the managed server.</p> <p>Note: Win98 cannot receive network broadcast messages from Windows NT. If you configure a broadcast message and it is triggered on an NT server, the message will not be received by any Win98 systems.</p> <p>On UnixWare, Solaris, and Linux a text message is sent to all users currently logged onto the UNIX server.</p>
Write a message to the managed server's LCD	Default action for all indications. If the LCD is not available on the managed server, this option is grayed out and disabled.
Page an administrator	A page is sent to a specified pager, with the phone number of the server, an ID number, or other numerical information.

<b>Action</b>	<b>Description</b>
No shutdown	Default action for all indications. Select this option if you do not want to shut down or reset the server when an event occurs.
Shutdown the OS	Select this option if you want to shut down the OS gracefully (controlled, closing files and applications). On NetWare, the server is returned to DOS. On Windows NT and Windows 2000, the server is set to a state ready for manual power-off or reset. On UnixWare, Solars, and Linux standard shutdown is completed and system prompts for reboot or power off.
Shutdown the OS and power off	Select this option if you want to shutdown the OS gracefully and turn off the system power.
Shutdown the OS and hardware reset	Select this option if you want to shutdown the OS gracefully and reset the server via hardware.
Immediate power off	Select this option if you want to immediately power down the server. This action is an immediate power-off without a shutdown of the OS; it might corrupt files.
Immediate hardware reset	Select this option if you want to immediately reset the server via hardware. This action is an immediate hard reset without a shutdown of the OS; it might corrupt files.
Immediate NMI	Select this option if you want to cause a hardware Non-Maskable Interrupt (NMI). If this feature is not supported on the managed server, this option is grayed out and disabled.





Procedure:

1. On the PIC main window, click beside a sensor name in the navigation pane to see the list of available sensors.
2. Select an entry from the list.
3. Select the Alert Actions tab.
4. Select the threshold type or state change condition.
5. Change the event actions associated with the selected threshold type or state change condition.
6. Click <Apply> to save your changes.

## Configuring Third-Party Event Actions

On the Alert Actions tab page, you can select actions that will take place when a third-party component exceeds a threshold or changes state.

You can configure event actions for the following third-party components:

- Adaptec SCSI
- LSI (Symbios) SCSI
- Intel LAN Adapter

To configure event actions for third-party indications:

1. On the PIC main window, click beside the third-party component name in the navigation pane.
2. Update the Alert Actions tab. Change the event actions associated with a threshold type or state change condition.
3. Click <Apply> to save your changes.

The following table provides event information for third-party component instrumentation supported by PIC.

Instrument (Notes)	Choices
Adaptec SCSI*	<p><b>Storage Device Events Group:</b>            Storage device state information            Storage device recovered error - Bad block repaired            Storage device member marked down</p> <p><b>Storage Controller Events Group:</b>            Storage Controller state information            Storage Controller SMART event            Storage Controller status unacceptable</p> <p><b>Volume Set Events Group:</b>            Volume set state information            Volume set recovered error            Volume set Array status - offline</p> <p><b>Spare Events Group:</b>            ARO spare not functional</p> <p><b>Enclosure Events Group:</b>            Enclosure state information</p>

LSI (Symbios) SCSI*	<b>Storage Devices Events Group</b> Device Error (not responding) Device Warning (predicted failure(S.M.A.R.T.)) <b>Storage Controller Events Group</b> Controller Error (not responding) <b>Mass Storage Association Events:</b> New Storage controller detected New device detected Existing controller changed Existing device changed
Intel LAN Adapter	<b>Indication Control Group:</b> Total transmit errors threshold Total receive errors threshold Total host errors threshold Total wire errors threshold

continued

**Configurable Third-Party Events (continued)**

Instrument (Notes)	Choices

\* Event actions do not distinguish between instances of the same group. This means that event actions are configured for a "class" of objects (i.e., host adapter) and not on individual instances of the group (i.e., host adapter 1, host adapter 2).

## Switching Views Between the Primary (Managing) Server and an ICMB Device

To view a different server (ICMB device) in the navigation pane of the PIC main window, do the following steps:

1. On the PIC Main Menu Bar, click the ICMB->View Managed Server(s) menu selection.
2. A list of ICMB devices is displayed. Select an entry from the list to view.
3. Click <OK>.

The tree in the navigation pane is replaced with information about the new device. At any time you can change views to another ICMB device by repeating the steps above.

To return your view to the primary server in the navigation pane of the PIC main window, click the ICMB->View Managing Server menu selection on the PIC Main Menu Bar.

## Configuring ICMB on the Primary (Managing) Server

To configure ICMB on the primary (managing) server, do the following steps:

1. On the PIC Main Menu Bar, click the ICMB->View Managing Server menu selection to switch to the primary server if you are viewing an ICMB device.
2. In the PIC navigation pane, click beside the ICMB component name in the navigation pane.
3. Update the ICMB tab page.
4. Click <Apply> for any changes made to the ICMB configuration.

## Configuring the Watchdog Timer Value

Each motherboard supported by PIC has a watchdog timer implemented in the hardware; the timer is disabled by default. When enabled, the timer continually decrements to test the response of the server operating system. Under normal operating conditions, the timer will be periodically reset by the PIC server instrumentation software to prevent it from reaching a value of zero. If the OS hangs, the timer will count down to zero.

If the timer reaches a value of zero, indicating an OS hang, the watchdog timer will reset the system. The default timer value is two minutes with minimum and maximum allowable settings of two to sixty minutes.

To configure the watchdog timer value, do the following steps:

1. On the PIC Main Menu Bar, click the Configure->Watchdog Timer Value menu selection.

2. Update the timer value.
3. Click <OK>.

## ECC Memory

PIC reports memory status information, both memory arrays and memory devices, for systems that support ECC memory. The ECC memory subsystems can detect and report both single-bit errors (SBE) and multiple-bit errors (MBE).

Depending on the managed server hardware, memory devices are either SIMMs or DIMMs. Memory device references use the appropriate device name in the PIC Console software.

## Single-Bit Error Handling

If an SBE occurs, the system generates an SMI that allows the BIOS to log information about the error in the System Event Log (SEL). This information identifies the exact SIMM or DIMM in which the error occurred. Because this condition is recoverable, the BIOS returns the system to normal operation after logging the error.

This error is indicated in the health branch of the PIC Console software as a noncritical condition, the requested event actions are carried out, and a noncritical error count is incremented on the Sensor Settings tab page of the software.

Also, the following actions occur in the PIC Console software:



- The Device Error Type is set to SBE on the Sensor Information tab page for the Memory Device
- The Last Error Update value is set to “During PIC Runtime,” indicating the update occurred while the system was operational.

The BIOS stops logging noncritical SBEs when the SBE error count reaches nine. This prevents the errors from filling the SEL. Upon system reboot, the OS uses the SEL records, along with the results from its own memory test, to map out bad memory by reducing the usable size of a memory bank to avoid using the bad memory element(s). This elimination of hard errors is a precaution that prevents SBEs from becoming MBEs after the system has booted, and also to prevent SBEs from being detected and logged each time the failed location(s) are accessed. Upon reboot, the SBE error count is set to zero in the SEL.

## Multiple-Bit Error Handling

If an MBE occurs, the system generates an SMI that allows the BIOS to log information about the error in the SEL, identifying the memory bank in which the error occurred. However, on some systems, it is not possible to determine the exact SIMM/DIMM that caused an MBE.

Because an MBE is a critical condition, upon logging the error the BIOS generates an NMI that halts the system. Upon rebooting the server, this error is indicated as a critical condition on the Memory Array and Memory Device in the health branch of the PIC Console software. The requested event actions are carried out, and the critical error count is incremented on the Sensor Settings tab page of the software.

Also, the following actions occur in the PIC Console software:

- The Device Error Type is set to MBE on the Sensor Information tab page for the Memory Device.
- The Last Error Update value is set to Previous Boot, indicating the last update occurred during the last system boot.

## Memory Tables

The following tables compare the steps taken with Single-bit and Multi-bit errors and provide the type of memory information available from the PIC Console software.

### SBE and MBE Comparison

Memory Error Handling	SBE	MBE
Generate SMI	Yes	Yes
Log information includes	Exact SIMM or DIMM	Memory bank only
Action after SEL logging	Continue operation	Stop the system
Indicated by PIC screen changes	Immediately	After the system reboots
Bad memory is mapped out at next reboot	Yes	Yes (immediately after the failure)

Information available on the Sensor Information tab page of the PIC Console software:

### Memory Array Dialog

Item	Description
Maximum Memory Capacity	The maximum memory capacity in bytes on this system
No. of Memory Device Sockets	The number of memory device (SIMM/DIMM) slots or sockets available in this memory array
No. of Memory Device Sockets Used	The number of slots or sockets populated by the memory devices in this memory array

Memory Error Correction	The hardware error correction or detection method supported by this memory array
Memory Array Location	The physical location of the memory array, whether on the motherboard or an add-on board

Information on the Sensor Information tab page of the PIC Console software:

### Memory Device Information

Item	Description
Size	Size of the memory device in bytes.
Memory Type	Type of memory used in the memory device.
Device Locator	A string identifying the socket location or board position of the memory device. Example: "SIMM 3" or "IC12."
Device Error Type	Most recent type of error that occurred on the memory device.
Last Error Update	System state during the last error update.
Total Width	Total width of the memory device (SIMM/DIMM including check bits), in bits.
Data Width	Data width of the memory device in bits.
Type Detail	More information about the memory device type.
Error Count	Summary of the error status for the memory device. This read-only attribute contains a count of all SBEs on the memory device.

## Local Response Agent (LRA) Paging

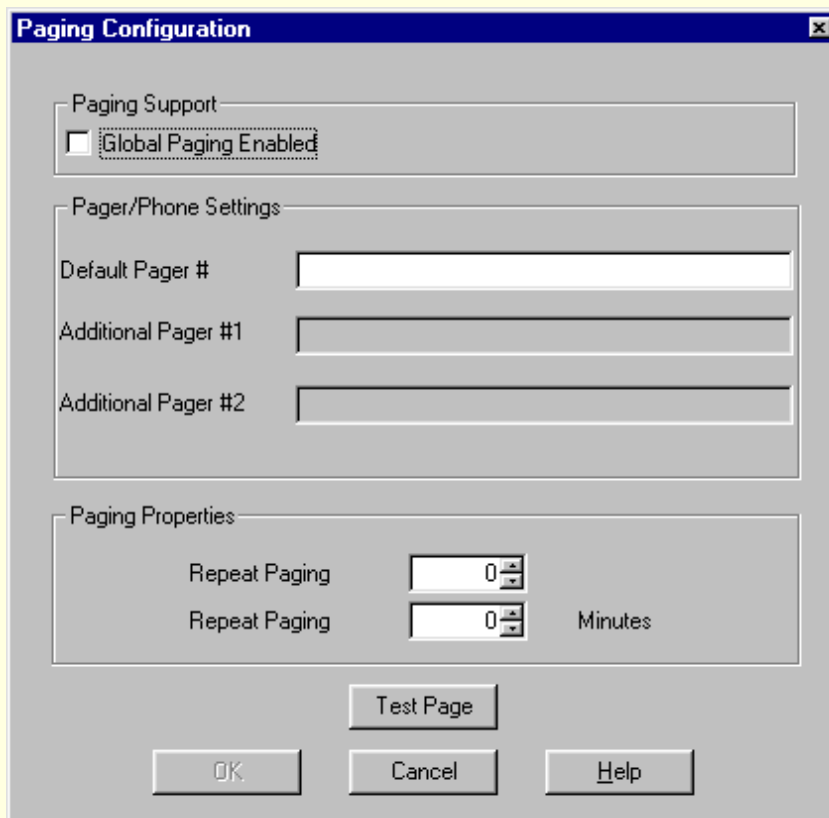
Platform Instrumentation Control lets you configure the paging features available with Baseboard Management Controllers (BMC) and Platform Instrumentation (PI). Actual paging activities are performed by the BMC. If the server hardware does not support LRA, the Paging Configuration menu item is greyed out.

### Initiating a Page

To specify that a page be sent in response to an alert, check the “Send a Page” box in the Alert Actions dialog for the event.

### Paging Configuration

Select Configure->Paging Configuration from the main menu in PIC. This configuration is global to the server and not sensor-specific—the same page will be sent in response to all events that have “Send a Page” specified.



The image shows a 'Paging Configuration' dialog box with a blue title bar and a close button. It is divided into three sections: 'Paging Support', 'Pager/Phone Settings', and 'Paging Properties'. The 'Paging Support' section contains a checkbox labeled 'Global Paging Enabled' which is currently unchecked. The 'Pager/Phone Settings' section contains three text input fields: 'Default Pager #', 'Additional Pager #1', and 'Additional Pager #2'. The 'Paging Properties' section contains two 'Repeat Paging' labels, each followed by a spin box set to '0' and the word 'Minutes'. At the bottom of the dialog are four buttons: 'Test Page', 'OK', 'Cancel', and 'Help'.

The Paging Configuration screen lets you configure the following information :

**Global Paging Enabled** : This checkbox specifies whether the paging feature is globally enabled or disabled. If disabled, enabling paging action in the Alert Actions dialog has no effect.

**Default Pager #** : This is the number paged when a paging action is triggered. If it is blank, no paging occurs.

The Test Page button calls this number.

**Additional Pager #1 and #2** : These are additional stored pager numbers. They are not called when a paging event occurs or the Test Page button is pressed.

To page one of these numbers, you must copy it to the Default Pager # field, then initiate a paging action or press the Test Page button.

**Repeat Paging** : The Repeat Paging feature pages the administrator multiple times in a critical situation. You may configure both the Repeat Paging Count and the Repeat Paging Interval. The Repeat Paging Count specifies how many times the pager numbers in the list (one default and two additional) should get paged. The Repeat Paging Interval specifies the interval in minutes between sets of paging processes (a minimum of one and a maximum of three pages). The Repeat Paging Count defaults to 1. If the Repeat Paging Count is 1, the Repeat Paging Interval value is not needed. The maximum value of Repeat Paging Count is 3. Once you set the value of Repeat

Paging Count greater than 1, the Repeat Paging Interval field is enabled. The minimum and default value of Repeat Paging Interval is 10 minutes. The maximum value is 60 minutes.

Enter the full pager number the way it should be dialed, including the initial number if any needs to be dialed to get dial tone, pause characters (‘,’), area code, etc. For example, “9,6903115.”

Before applying the number, you may press the Test Page button to verify if it is correct.

Click the OK button to save the information and exit from the screen.

Click the Cancel button to restore the previous information and exit from the screen.



## Customizing PIC Administrator Options

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The Platform Instrumentation Control console has several adjustable options. You can set the PIC console refresh rate, determining how PIC is updated with current information. You can specify whether temperatures display in Celsius or Fahrenheit, and whether you want to restore PIC settings to the factory defaults. These settings are global and affect all open PIC sessions.

PIC installs with the following defaults:

- PIC console refresh interval: 15 seconds
- Temperature display format: Celsius
- Watchdog feature: off
- Watchdog timer: two minutes
- Sensor threshold values as defined in the SDR file

To configure the refresh interval or temperature display format:

1. On the PIC Main Menu Bar, click the View->Options menu selection.
2. Change the refresh interval or temperature display format on the Options dialog.
3. Click <OK>.

**⇒ NOTE**

When configuring the console refresh interval, selecting a frequent refresh interval impacts system performance on both the console and the managed server because the ISC polls for the health status of each monitored sensor. Selecting a less frequent console refresh interval provides a reasonable information update, while minimizing the overhead on system performance. The console refresh interval does not impact how quickly the server system responds to event notifications (e.g., threshold crossings) only how quickly the ISC main screen display updates with server information. A value of 15 seconds or greater for console refresh value provides a reasonable compromise.

To restore default PIC settings for threshold values, console refresh interval, and the watchdog feature:

1. On the PIC Main Menu Bar, click the Configure->Restore Factory Defaults menu selection.
2. Click <OK> on the confirmation dialog.

**⇒ NOTE**

Event actions you have configured and the temperature display format are not affected by the Restore Factory Default option.

Default threshold values are stored in Sensor Data Records (SDR) in nonvolatile storage on the motherboard. These values are determined and

configured during motherboard manufacturing and are therefore not documented in this manual.



## CAUTIONS

Indications may be generated if the restore of the default threshold value crosses the current sensor value. For example:

User defined threshold limit 13.5 V

Current sensor value 13.0 V

Default threshold value 12.5 V

When you select the Restore Default Settings action, threshold restore may cause a threshold crossing. In the above example, PIC would detect a threshold crossing and generate an indication. The actions associated with that indication would occur. To avoid the possibility of unwanted indications when restoring default settings, Intel recommends, for each sensor where you do not want indications, that before you select the Restore Default Settings action, you adjust the user-defined threshold value so the current sensor value is NOT between the user-defined threshold value and the default threshold value.

# Platform Instrumentation Control

## Event Messages

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PIC allows you to configure event actions to be taken on the managed server when an event occurs. These actions include audio/visual notifications, such as:

- Display an alert message
- Write a message to the LCD
- Broadcast a message

The message text is based on the event information. This text contains the DMI MIF group and attribute information that caused the error.

## Alert Messages on the Server Console

The following table lists the alert messages that display on the server console. The general format of these messages is:

Event reported for <attribute\_name> attribute in the <group\_name> group.

**Server Console Alert Messages**

<b>Alert Message</b>	<b>Description</b>
Event reported for Upper Critical Threshold attribute in the Temperature Sensor group.	A temperature sensor on the system reported that the current value is above the upper critical range.
Event reported for Upper Noncritical Threshold attribute in the Temperature Sensor group.	A temperature sensor on the system reported that the current value is above the upper noncritical range but below the upper critical range. This message is also generated when the temperature returns to the acceptable range.
Event reported for Lower Noncritical Threshold attribute in the Temperature Sensor group.	A temperature sensor on the system reported that the current value is below the lower noncritical range but above the lower critical range. This message is also generated when the temperature returns to the acceptable range.
Event reported for Lower Critical Threshold attribute in the Temperature Sensor group.	A temperature sensor on the system reported that the current value is below the lower critical range.
Event reported for Upper Critical Threshold attribute in the Voltage Sensor group.	A voltage sensor on the system reported that the current value is above the upper critical range.
Event reported for Upper Noncritical Threshold attribute in the Voltage Sensor group.	A voltage sensor on the system reported that the current value is above the upper noncritical range but below the upper critical range. This message is also generated when the voltage returns to the acceptable range.

Continued

**Server Console Alert Messages** (continued)

<b>Alert Message</b>	<b>Description</b>
Event reported for Lower Noncritical Threshold attribute in the Voltage Sensor group.	A voltage sensor on the system reported that the current value is below the lower noncritical range but above the lower critical range. This message is also generated when the voltage returns to the acceptable range.
Event reported for Lower Critical Threshold attribute in the Voltage Sensor group.	A voltage sensor on the system reported that the current value is below the lower critical range.
Event reported for Current Status attribute in the Security Sensor group.	System chassis front panel or side panel has been opened (or it was open and has been closed).
Event reported for Current Status attribute in the Cooling Fan group.	System fan has stopped (or restarted).
Event reported for Array Error Type attribute in the Memory Array group.	A memory error has been reported on the system.
Event reported for Event Status attribute in the Logical Unit group.	A SCSI device reported a state change.
Event reported for Event Status attribute in the Host Adapter group.	A SCSI board reported a state change.
Event reported for Operational State attribute in the Controller Information group.	A RAID controller reported a state change.

Continued

**Server Console Alert Messages** (continued)

Event reported for Operational State attribute in the Physical Drive Information group.	A RAID drive reported a state change.
Event reported for Processor Status attribute in the Processor group.	A processor sensor on the system reported a processor error.
Event reported for Power Unit Redundancy Status attribute in the Power Unit Global Table group.	The power supply redundancy sensor on the system reported a power supply redundancy state change.
Event reported for Total Transmit Errors Threshold attribute in the Indication Control group.	The LAN Adapter reported that the number of transmit errors is above the threshold value.
Event reported for Total Receive Errors Threshold attribute in the Indication Control group.	The LAN Adapter reported that the number of receive errors is above the threshold value.
Event reported for Total Host Errors Threshold attribute in the Indication Control group.	The LAN Adapter reported that the number of host errors is above the threshold value.
Event reported for Total Wire Errors Threshold attribute in the Indication Control group.	The LAN Adapter reported that the number of wire errors is above the threshold value.
Event "Status Changed to OK" reported in the Voltage Probe group.	A Voltage probe changed its status to an OK state.

**Server Console Alert Messages** (continued)

Event "Status Changed to Lower Critical" reported in the Voltage Probe group.	A Voltage probe changed its status to Lower Critical state.
Event "Status Changed to Upper Critical" reported in the Voltage Probe group.	A Voltage probe changed its status to Upper Critical state.
Event "Status Changed from OK to Lower Noncritical" reported in the Voltage Probe group.	A Voltage probe changed its status from normal to Lower Noncritical state.
Event "Status Changed from OK to Upper Noncritical" reported in the Voltage Probe group.	A Voltage probe changed its status from normal to Upper Noncritical state.
Event "Status Changed from Lower Critical to Lower Noncritical" reported in the Voltage Probe group.	A Voltage probe changed its status from Lower Critical to Lower Noncritical state.
Event "Status Changed from Upper Critical to Upper Noncritical" reported in the Voltage Probe group.	A Voltage probe changed its status from Upper Critical to Upper Noncritical state.
Event "Status Changed to OK" reported in the Temperature Probe group.	A Temperature probe changed its status to an OK state.
Event "Status Changed to Lower Critical" reported in the Temperature Probe group.	A Temperature probe changed its status to Lower Critical state.

Continued



**Server Console Alert Messages** (continued)

Event "Status Changed to Upper Critical" reported in the Temperature Probe group.	A Temperature probe changed its status to Upper Critical state.
Event "Status Changed from OK to Lower Noncritical" reported in the Temperature Probe group.	A Temperature probe changed its status from normal to Lower Noncritical state.
Event "Status Changed from OK to Upper Noncritical" reported in the Temperature Probe group.	A Temperature probe changed its status from normal to Upper Noncritical state.
Event "Status Changed from Lower Critical to Lower Noncritical" reported in the Temperature Probe group.	A Temperature probe changed its status from Lower Critical to Lower Noncritical state.
Event "Status Changed from Upper Critical to Upper Noncritical" reported in the Temperature Probe group.	A Temperature probe changed its status from Upper Critical to Upper Noncritical state.
Event "Internal Error" reported in the Processor group.	A system processor reported an internal error.
Event "Thermal Trip Error" reported in the Processor group.	A system processor reported a Thermal Trip error.
Event "FRB Error" reported in the Processor group.	A system processor reported an error during the FRB (Fault Resilient Boot) sequence.

Continued

**Server Console Alert Messages** (continued)

Event "Redundancy Lost" reported in the Power Unit Global Table group.	A power unit on the system lost the redundancy state.
Event "Redundancy Regained" reported in the Power Unit Global Table group.	A power unit on the system regained the redundancy state.
Event reported on the Storage Device Event Type attribute in the Storage Device Events group.	A predictive failure noncritical on a SCSI device.
Event reported on the Storage Controller Event Type attribute in the Storage Controller Events group.	A SCSI controller reported a state change.
Event "Status Change to Ok" reported in the System Slot group.	A PHP slot changed its status to OK.
Event "Status Changed to Non-Critical" reported in the System Slot group.	A PHP slot changed its status to Non-Critical.
Event "Status Changed to Critical" reported in the System Slot group.	A PHP slot changed its status to Critical.
Event "Slot Power On" reported in the System Slot group.	A PHP slot changed its power state from Off to On.
Event "Slot Power Off" reported in the System Slot group.	A PHP slot changed its power state from On to Off.

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## Broadcast and LCD messages

The following table lists broadcast and LCD messages.

Broadcast messages are sent across the network to client computers. The general format of broadcast messages is:

Check <group\_name> at server <server\_name>

LCD messages are displayed on the managed server's LCD. These are limited to 32 characters; longer messages are truncated. The general format of LCD messages is:

Check: <group\_name>

**Table 19. Broadcast and LCD Messages**

Message	Description
Check: Temperature Sensor. Check: Temperature Probe.	A temperature sensor reported a change in state (OK/Noncritical/Critical).
Check: Voltage Sensor. Check: Voltage Probe.	A voltage sensor reported a change in state (OK/Noncritical/Critical).
Check: Security Sensor. Check: Physical Container Global Table.	System chassis front panel or side panel has been opened (or it was open and has been closed).

Check: Cooling Fan.	System fan has stopped (or restarted).
Check: Memory Array.	A memory error has been reported on the system.
Check: Host Adapter.	A SCSI board reported a state change.
Check: Logical Unit.	A SCSI device reported a state change.
Check: Controller Information.	A RAID controller reported a state change.
Check: Physical Drive Information.	A RAID drive reported a state change.
Check: Processor.	A processor error has been reported on the system.
Check: Power Unit Global Table.	A power unit redundancy state change has been reported on the system.
Check: Power Supply.	A power supply failed on the system.
Check: Indication Control Group.	The LAN Adapter reported a threshold crossing.
Check: Storage Device Events.	A SCSI device reported a state change.
Check: Storage Controller Events.	A SCSI controller reported a state change.
Check: System Slot.	A PHP slot reported a state change.



## Appendix A DMI to SNMP Translator

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You can use the DMI-SNMP Translator to integrate DMI management with SNMP. The translator attaches directly to the Network OS's SNMP agent and to the DMI Service Layer by registering as a management application. The translator translates management requests from SNMP to DMI and responses from DMI to SNMP. DMI events (indications generated by the component instrumentation when a threshold is crossed or a sensor changes state) are translated into enterprise-specific SNMP traps.

The translator translates these MIFs:

- Baseboard
- ICMB
- Local Response Agent
- Adaptec SCSI
- LSI (Symbios) SCSI
- Intel LAN Adapter

The translator raises a trap when a DMI indication is received. The DMI-SNMP Translator does not support configured actions. This alerting mechanism works independently of the Local Response Agent.

For the DMI-SNMP Translator to work correctly, the SNMP Agent on the managed server OS must be configured correctly. For example, the Windows NT, Windows 2000, NetWare, Solaris, Linux, or UnixWare SNMP Agents need some configuration to enable the server to send SNMP traps to specific SNMP management consoles. To configure the SNMP Agent on the server, see the documentation supplied by the OS vendor.

To manage the DMI information supplied by PIC software through the SNMP management workstation, the following MIBs must be compiled on the SNMP console:

- ADAPTEC.MIB
- BASEBRD.MIB
- BASEBRD2.MIB
- BASEBRD3.MIB
- CIO.MIB
- E100B.MIB
- ICMBFEAT.MIB
- INTELNIC.MIB
- LRA.MIB
- MAPBASE2.MIB
- MAPLRA.MIB
- MAPSHA.MIB
- RMTCHAS.MIB

- SHA.MIB
- SYMBIOS2.MIB
- SYMSDMS2.MIB

These MIB files are installed during the PIC Console and PIC Server installation. The files are copied to the %PIC\_PATH%\SNMPMIBS directory during installation. PIC\_PATH is the installation directory chosen during install.

The procedures for compiling these MIBs depend on the SNMP console being used. For more information, see the documentation supplied with your SNMP console software.