

Chapter 6

Fault Management

6.1. Overview

One of the most important functions of ASM Pro is fault management through early error detection. This is accomplished through the use of threshold settings and hardware error detection.

The ASM-Agent performs two task when it encounters an error:

1. Sends a trap to the ASM-Station.
2. Broadcasts a message to all users on the server about the error condition.



The Broadcast Message check box must be checked before the Agent can broadcast error messages. See the screen shown in Event Notification and Threshold Setup later in this chapter.

After the ASM-Station receives a trap from the Agent, the Station also performs two tasks:

1. Logs the trap information into a log file. This log file may then be reviewed at a later time. See the Trap Events Log section later in this chapter for information about event logs.

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2. Sends a message to the system administrator. ASM has several ways of alerting the system administrator. See the Event Notification and Threshold Setup section later in this chapter for more information.

6.1.1 Threshold Settings

All threshold settings are preset to the factory-recommended values. The following threshold values are user-configurable:

- PCI Bus Utilization (for some models only)
- Memory Utilization
- File System Utilization
- BIOS Event Log Utilization (for some models only)

All other threshold values are internally preset and cannot be changed. The non-configurable threshold values are:

- Temperature warning
- Temperature critical
- Voltage exceeds safe range



See the Trap Handler Set up dialog box explained in Event Notification and Threshold Setup for definitions of each threshold.

An example of non-configurable threshold values is the internally-preset *temperature warning* and *temperature critical*. For example, the manufacturer-suggested threshold value for some types of Pentium CPUs is between 131°F - 167°F (55°C - 75°C). (131°F (55°C) is the temperature warning threshold; 167°F (75°C) is the temperature critical threshold.) ASM reads and checks the manufacturer's preset temperature warning and temperature critical range whenever this type of Pentium CPU is detected.

6.1.2 Hardware Errors

The following hardware errors are detected by ASM Pro:

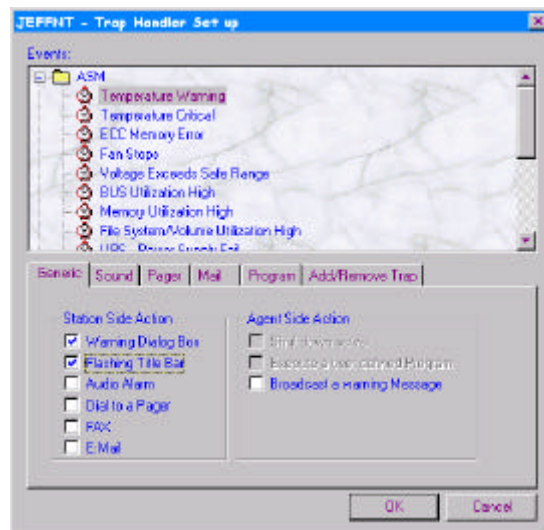
- ECC memory error
- Fan stoppage
- UPS related errors (power supply, AC power, power supply fan) (applies only to certain systems)
- Redundant Power Supply related errors (power supply, power supply fan) (applies only to certain systems)
- Fuse
- Chassis

6.2. Event Notification and Threshold Setup

This section describes how the ASM-Station handles a trap and what action it will take to correct the error condition.

Once the ASM-Station has established a connection with the monitored server for the first time, you must run Event Notification and Threshold Setup in order to set up the event handling action methods. Otherwise, the ASM-Station will not take the appropriate action in the event of a server system failure.

Select **Event Notification and Threshold Setup** from the Setup menu. The Trap Handler Set up dialog box appears. A typical screen is shown below.



This dialog box allows you to set different event handling methods for each event type.

When the check box in the Agent Side Action frame is grayed out it indicates that you can only enable this action at the agent side.

6.2.1 Event Types

When the ASM-Agent detects an error condition on the server, it (Agent) sends a trap (interrupt signal) to the ASM-Station. Any exceeded threshold value, whether user-configurable or internally preset, will cause the agent to send a trap to the ASM-Station. A trap is also sent when a hardware error is detected by the agent.

The following list describes the event types and what they mean:

- Traps Other Than ASM

The agent will send a trap to the station when the ASM-Agent detects a system trap that is not listed in the ASM event type listing.

- System Up/Down Alert

Every time the server system is booted up or shut down the agent will send a trap to the ASM-Station. The station notifies the administrator by the method selected in the Station Side Action boxes.

- Temperature Warning

The CPU temperature has exceeded the first threshold level setting. A typical default threshold setting is 131°F (55°C). When the threshold is exceeded, the ASM-agent broadcasts a "Temperature Warning" message to all users on the server. The Agent also sends a "Temperature Warning" event trap signal to the ASM-Station. The Station handles the event by the method selected in the Station Side Action frame in the above figure.

A trap is sent every minute thereafter as long as the temperature remains above the threshold. Each one of these traps is recorded by the station in the event log file.

You can check the temperature of a server by clicking on the **Hardware Environment** toolbar button on the ASM-Station.

- Temperature Critical

Indicates a CPU temperature has exceeded the second threshold level setting. A typical default threshold setting is 167°F (75°C). This value is not user-configurable.

When the Temperature Critical threshold is exceeded, the ASM-Agent sends a broadcast and a trap, after which the server is shut down to prevent loss of data and possible damage to the hardware. The *asmconfig* utility may also be used to disable the auto shut down feature. See the ASM-Agent Utilities section of the ASM Pro Utilities chapter.

Click on the **Hardware Environment** toolbar button on the ASM-Station to check the temperature of a server.

- ECC Memory Error

An ECC memory error has been detected. The ASM-Agent sends a broadcast and a trap. Immediately back up your data files. The memory should be replaced immediately to protect the data integrity.

- Fan Stops

A system fan has stopped rotating. The ASM-Agent sends a broadcast and a trap when this occurs. Replace the defective fan to ensure that the system stays within the heat tolerances for that server. You can verify that the fan is functional by clicking on the **Hardware Environment** toolbar button on the ASM-Station

- Voltage Exceeds Safe Range

The voltage reading is over the safe operating range. The ASM-Agent sends a broadcast and a trap when this occurs. You can check the voltage by clicking on the **Hardware Environment** toolbar button on the ASM-Station.

- **Memory Utilization High**

The percentage utilization of the system memory has exceeded the threshold setting. The ASM-Agent sends a trap when this occurs.

Add more memory to the server if possible. Refer to your system's User's Guide.

- **File System Utilization High**

The percentage utilization of the server volume has exceeded the threshold setting. The ASM-Agent sends a broadcast and a trap when this occurs.

Perform system maintenance on the disk. Add another hard disk if the threshold is still exceeded after performing disk maintenance.

The following event types apply only to certain systems.

- **Bus Utilization High**

The percentage utilization of the PCI bus has exceeded the threshold setting. The ASM-Agent sends a trap when this occurs.

Rearrange your PCI add-ins to even out bandwidth distribution, if possible.

- **UPS Power Supply Fail**

The server's uninterruptible power supply has failed. The ASM-Station sends a trap when this occurs.

- **UPS Battery Fail**

The server's UPS battery has failed. The ASM-Station sends a trap when this occurs.

- **UPS Power Supply Fan Stops**

The server's UPS fan has stopped. The ASM-Agent sends a broadcast and a trap when this occurs.

- **AC Power Fails**

The server's AC power has failed. The ASM-Agent sends a broadcast and a trap when this occurs, then the server is shut down. The `asmconfig` utility may also be used to disable the auto shut down feature. See "ASM-Agent Utilities" in chapter 7, ASM Pro Utilities.

- **Chassis Intrusion**

The server's system cover is open. The ASM-Agent sends a broadcast and a trap when this occurs.

- **Fuse Fail**

The Keyboard/Mouse, USB or SCSI fuse fails. The ASM-Agent sends a broadcast and a trap when this occurs.

- **Redundant Power Supply Fail**

The server's Redundant Power Supply has failed. The ASM-Agent sends a broadcast and a trap when this occurs.

- **Redundant Power Supply Fan Fail**

The ASM-Agent sends a trap when this occurs. How the ASM-Station handles the trap is determined by the event notification method selected by the administrator at the Trap Handler Set up window.

- **BIOS Event Log Utilization High**

When the BIOS event log exceeds the allocated threshold, ASM sends a trap. Please refer to section 5.10. for more information.

6.2.2 Event Handling Method

The following list describes the event handling methods and the function of each method. You can check and uncheck as many of these boxes as desired. A check in the box enables the function; removing a check disables the function. Use your mouse pointer to check and uncheck these boxes.

When you click the **Generic Settings** folder, you will see a list of event notification methods in the Station Side Action box. Checking an event notification method will cause the ASM-Station to take the action indicated in the check box. Any changes to the Agent Side Action check boxes require the Agent password to be entered before changes are accepted if the agent password is enabled. See Installing ASM-Agent in Chapter 1 for more about the agent password.

Station Side Action

- Warning Dialog Box

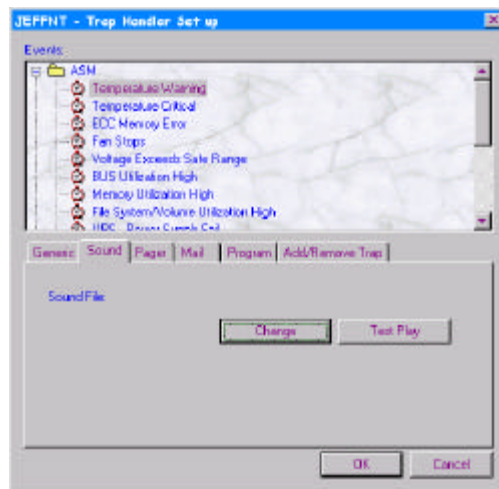
A warning dialog box appears on the ASM-Station screen when the ASM-Agent sends a trap to the station.

- Flash Title Bar

The title bar flashes on and off when the ASM-Agent sends a trap to the station.

- Audio Alarm

The system makes a sound whenever a trap is received from the ASM-Agent. The audio alarm box must be checked for this feature to work. You can change the sound the system makes by changing the sound file in the Sound File edit box. Select the Sound tab from the Trap Handler Setup screen. The following display appears:

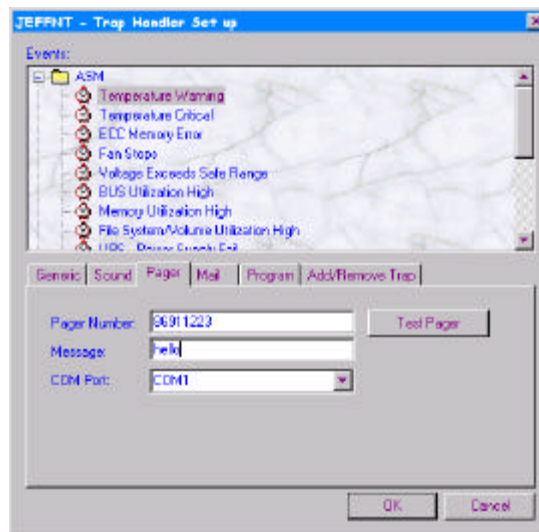


You must have a sound card for the sound file to work; otherwise, Audio Alarm won't work.

When you click on the **Change** button, you will see the Open Sound File screen from which you can choose a specified sound file to edit. The sound can be tested by clicking on the **Test Play** button.

- Dial to a Pager

The ASM-Station calls to a pager when the ASM-Agent sends a trap to the station. Select the **Pager** tab from the Trap Handler Setup screen. The following display appears.



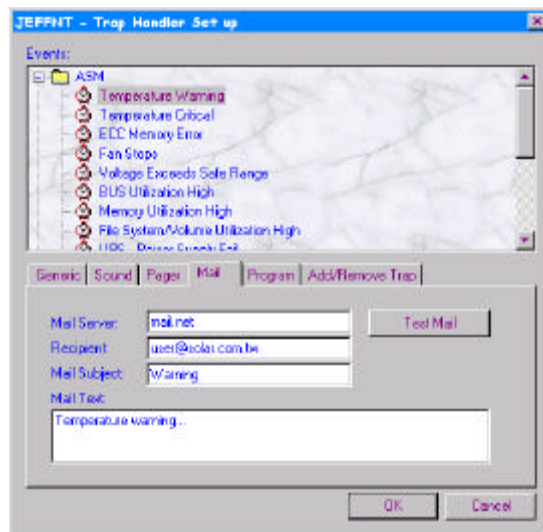
You must enter the pager number in the Pager Number box and a message in the Message box. You also must enter the modem port in the COM Port box for dialing out from the Station. The pager can be tested by clicking on the Test Pager button.



You must set up and configure MS Exchange before you can use the Fax and Mail function. For more information on MS Exchange, please refer to your MS Exchange User's Manual.

- Mail

The ASM-Station sends an E-mail when the ASM-Agent sends a trap to the station. Select the **Mail** tab from the Trap Handler Setup screen. Fill out the information in the display. E-mail can be tested by clicking on the **Test Mail** button.



You must set up and configure MS Exchange before you can use the Fax and Mail function. For more information on MS Exchange, please refer to your MS Exchange User's Manual.

Agent Side Action

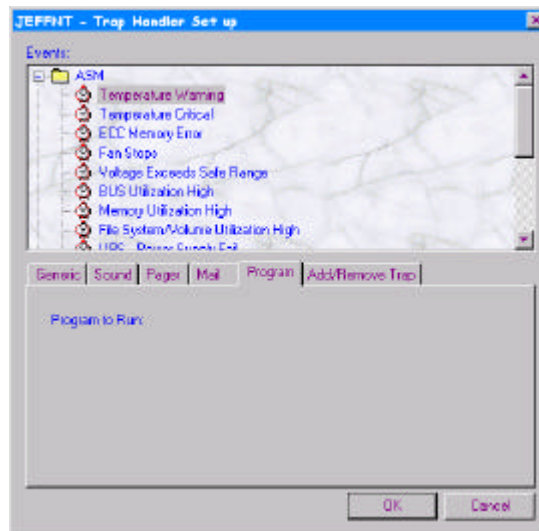
The following two options can only be set from the agent site and require the agent password to be entered before any changes are accepted (if the agent password is enabled). For details about the agent password, see "Installing ASM-Agent" in Chapter 1.

- Shut Down Server

The ASM-Agent shuts down the server when this event occurs. This option is only available for a Temperature Critical event and AC Power Fail event. This box appears grayed out and unchecked for all other event types.

- Execute a User Defined Program

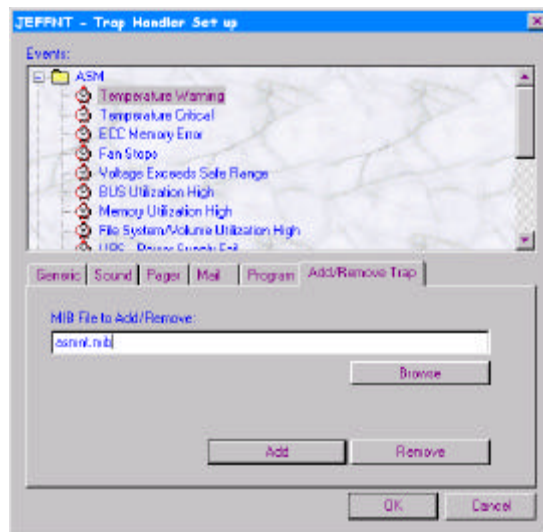
Executes a program when this event occurs. To enter the Program to Run display, select the **Program** tab from the Trap Handler Setup screen. The screen shown below displays.



The program to run may only be specified by using the *asmconfig* utility at the agent server (see Chapter 7, ASM Pro Utilities). The option appears grayed out from the ASM-Station. It only displays the program name if it is specified at the agent site.

- Add/Remove Trap

You can add or remove traps from other agents. This is useful if you have other agents other than ASM to manage your servers. To monitor an agents trap, browse for the file using the Browse button and then click Add. To remove an agent trap, click on the agent you want to remove and click the Remove button.



- Broadcast a Warning Message

The server sends a broadcast to all users logged on the server when this event occurs. Most events have this box checked.

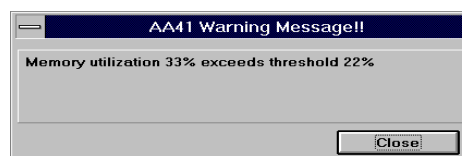
6.2.3 Setting Event Handling Methods

To set the event handling method:

1. Select the **Event Notification and Threshold Setup** submenu on the Setup menu to show the Trap Handler Setup display.
2. Highlight the event type using your mouse pointer.
3. Select one or more methods for the ASM-Station and/or ASM-Agent by checking the appropriate item boxes.
 - If the selected Event Handling Method is a Pager, a pager number must be entered in the Pager Number box. See the instructions in the Dial to a Pager section in this chapter.

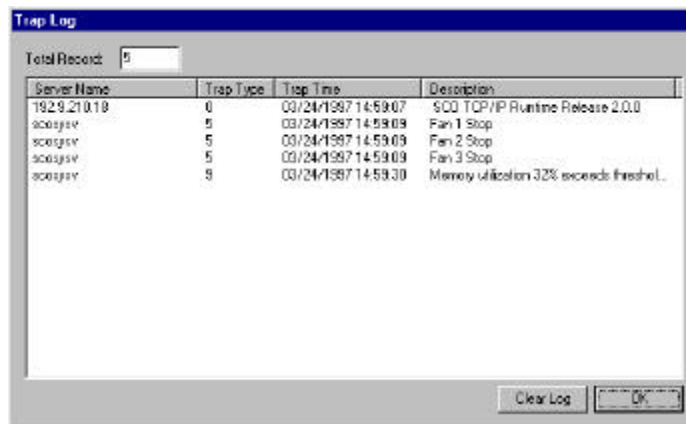
-
- If the selected Event Handling Method is Agent Side Action, you must make your selection at the agent site by using the *asmconfig* utility (except for the Broadcast a warning message action).

For example, in the screen shown below, the Memory Utilization High event type will display a warning dialog box at the ASM-Station when the agent's memory usage has exceeded its threshold value, if the Warning Dialog box is checked. The warning box appears, similar to this window:



6.3. Trap Events Log

Select **Tools | Trap Events Log** from the menu bar. You will see the Trap Log screen. This shows a list of all Trap events received by the ASM-Station.



The screenshot shows a window titled "Trap Log". At the top, there is a "Total Record:" label followed by a text box containing the number "5". Below this is a table with four columns: "Server Name", "Trap Type", "Trap Time", and "Description". The table contains five rows of data. At the bottom right of the window, there are two buttons: "Clear Log" and "OK".

Server Name	Trap Type	Trap Time	Description
192.9.210.19	0	03/24/1997 14:59:07	SDD TCP/IP Runtime Release 2.0.0
sddgsrv	5	03/24/1997 14:59:09	Fan 1 Stop
sddgsrv	5	03/24/1997 14:59:09	Fan 2 Stop
sddgsrv	5	03/24/1997 14:59:09	Fan 3 Stop
sddgsrv	5	03/24/1997 14:59:30	Memory utilization 32% exceeds thresho...

When a hardware error has occurred or a particular threshold setting has been exceeded, the ASM-Agent detects this condition and sends a trap to inform the ASM-Station. When the ASM-Station receives the trap, it logs the event in the Trap Log file. Trap.log is the ASM-Station installation directory. The Trap Log display shows the following information:

- **Server Name**

The name of the agent where the error or warning event occurred. This name is the name of the server displayed in the System Listing.

- Trap Type

The following event types are listed in the Trap Handler Set up window.

- Trap Other than ASM
- System Up/Down Alert
- Temperature Warning
- Temperature Critical
- ECC Memory Error
- Fan Stops
- Voltage Exceeds Safe Range
- Bus Utilization High (applies only to certain systems)
- Memory Utilization High
- File System Utilization High
- BIOS Event Log Utilization High (applies only to certain systems)
- UPS Power Supply Fail (applies only to certain systems)
- UPS AC Power Fail (applies only to certain systems)
- UPS Power Supply Fan Fail (applies only to certain systems)
- UPS Battery Fail (applies only to certain systems)
- Chassis Intrusion
- Fuse Fail (applies only to certain systems)
- Redundant Power Supply Fail (applies only to certain systems)
- Redundant Power Supply Fan Fail (applies only to certain systems)

- Trap Time

The time and date when the error or warning event occurred.

- Description

A brief description of the error or warning.

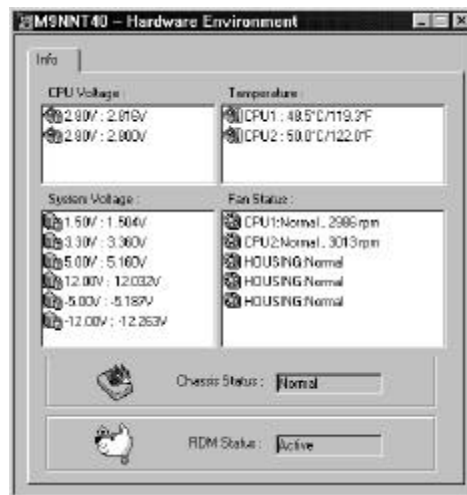
Data for the Trap Log display is stored in the ASM-Station directory Trap.log file. At some point this data may become outdated. To avoid long lists in the Trap Log, you can delete this file by using the **Clear Log** button. The Trap Log will then be empty until new trap or warning events are logged.



It is recommended that you make a backup of this file before deleting it.

6.4. Hardware Environment Information

The Hardware Environment Information toolbar button displays the current status of the CPU voltage, System voltage, Temperature, Fan status, Chassis status, and RDM status.



This screen is updated every polling interval in seconds by the ASM-Station (this interval may be changed by the system administrator. See Polling Interval).

The Chassis Status indicates whether the system housing is normal (intact) or abnormal (removed). If ASM Pro can not determine the status of the system housing it will display "Not supported."

All fields in this screen have a preset threshold setting. These preset threshold settings are not user definable; they are internally preset to manufacturer-recommended values. When the threshold is exceeded, the action predefined by the system administrator will be used to correct the problem or notify the system administrator.

6.4.1 CPU Voltage

The voltage for each CPU's power source is shown. The lightning bolt appears green when the voltage is within the normal range. The lightning bolt turns red when the voltage is not within this range. A trap is generated whenever the voltage is out of range. This trap is recorded in the trap log file. See Trap Events Log.

6.4.2 CPU Temperature

The CPU temperature is monitored in two stages. First is a warning, and then if the temperature continues to rise, a temperature critical trap is issued. The two stages of CPU temperature monitoring are:

- **Temperature Warning.** 131°F (55°C) is the threshold value for the temperature warning trap. When the temperature reaches this threshold, a trap is generated. This trap is recorded in the trap log file. See Trap Events Log. The light bulb appears green when the temperature is below 55°C. The light bulb turns yellow when the temperature is between 131°F and 167°F (55°C and 75°C).
- **Temperature Critical.** 167°F (75°C) is the threshold value for the temperature critical trap. When the temperature reaches this threshold, a trap is generated. This trap is recorded in the trap log file. See Trap Events Log. The light bulb turns red when the voltage reaches 167°F (75°C).

6.4.3 System Voltage

The system power sources are shown here. The lightning bolt appears green when the voltage is within the proper range. The lightning bolt turns red when the voltage is not within this range. A trap is generated whenever the voltage is out of range. This trap is recorded in the trap log file. See Trap Events Log.

6.4.4 Fan Status

The fan status is monitored through the hardware module of the server; no user configurable setting exists. Each fan is represented by a picture of a fan to the left of the fan name. The fan blade appears green when the fan is functioning properly. The fan blade turns red when the fan is not working. A trap is generated whenever the fan is not working. This trap is recorded in the trap log file. See Trap Events Log.

6.4.5 Chassis Status

The chassis status is monitored through the hardware module of the server; no user configurable setting exists. If the server can detect chassis status, the status will be normal if the cover is closed. Or the status will be abnormal if the cover is open. If the server doesn't have chassis status detecting capability, the status will be "Not support." A trap is generated whenever chassis intrusion is occurring. This trap is recorded in the trap log file. See Trap Events Log.



The above events are critical. If any of the above events occurs, correct the problem right away, as damage to your system may result if the problem is left unattended.

6.4.6 RDM Status

The RDM status is monitored through the hardware module of the server. If the server does not have RDM status detecting capability, the status will be indicated as "Unknown." The status will be indicated as "Active" if you have RDM installed on your server. The status is "Not Exist" if your server does not have the RDM module installed.