

SIEMENS

SIMATIC

PC Monitoring DiagMonitor

Manual

Contents	
Introduction	1
DiagMonitor	2
Software Components	3
Quick-Start Guide	4
Requirements	5
Installation	6
Configuration	7
User Guide	8
Setting the Properties of a Station	9
Diag Management API	10
Troubleshooting	11
Glossary	12
Index	

Safety Guidelines

This manual contains notices intended to ensure personal safety, as well as to protect the products and connected equipment against damage. These notices are highlighted by the symbols shown below and graded according to severity by the following texts:



Danger

indicates that death, severe personal injury or substantial property damage will result if proper precautions are not taken.



Warning

indicates that death, severe personal injury or substantial property damage can result if proper precautions are not taken.



Caution

indicates that minor personal injury can result if proper precautions are not taken.

Caution

indicates that property damage can result if proper precautions are not taken.

Notice

draws your attention to particularly important information on the product, handling the product, or to a particular part of the documentation.

Qualified Personnel

Only **qualified personnel** should be allowed to install and work on this equipment. Qualified persons are defined as persons who are authorized to commission, to ground and to tag circuits, equipment, and systems in accordance with established safety practices and standards.

Correct Usage

Note the following:



Warning

This device and its components may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.

This product can only function correctly and safely if it is transported, stored, set up, and installed correctly, and operated and maintained as recommended.

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Disclaimer of Liability

We have checked the contents of this manual for agreement with the hardware and software described. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the data in this manual are reviewed regularly and any necessary corrections included in subsequent editions. Suggestions for improvement are welcomed.

Contents

1	Introduction	1-1
2	DiagMonitor	2-1
2.1	DiagMonitor Network.....	2-2
3	Software Components	3-1
3.1	DiagMonitor Software Components	3-1
4	Quick-Start Guide	4-1
5	Requirements	5-1
5.1	Hardware Requirements	5-1
5.2	Software Requirements.....	5-1
6	Installation	6-1
6.1	Uninstall	6-2
7	Configuration	7-1
7.1	DiagMonitor Agent	7-1
8	User Guide	8-1
8.1	Remote Control with the DiagMonitor Application	8-1
8.2	Program Start.....	8-2
8.3	The Station Explorer	8-2
8.4	Overview and Management of Stations	8-2
8.5	"Add Station" Dialog Box.....	8-3
8.6	Specifying the OPC Data Block	8-3
8.7	Removing a Station.....	8-4
8.8	Modifying the Configuration of a Station	8-4
8.9	Viewing Station Properties	8-4
8.10	Reading Status Information	8-5
8.11	Detailed View	8-5
8.11.1	"Thermometers" Tab	8-6
8.11.2	"Fans" Tab.....	8-8
8.11.3	"Drives" Tab	8-9
8.11.4	"System" Tab	8-11
8.12	Events	8-13
8.12.1	"Logging" Tab ("Settings" Dialog Box)	8-13
8.12.2	"E-Mail" Tab ("Settings" Dialog Box).....	8-15
8.12.3	"SMS" Tab ("Settings" Dialog Box)	8-16
8.12.4	Composing E-Mail and SMS Notification Texts	8-17
8.12.5	Text Variables	8-18
8.12.6	"Execute" Tab ("Settings" Dialog Box).....	8-19
8.12.7	"OPC" Tab ("Settings" Dialog Box)	8-19
8.12.8	"Options" Tab ("Settings" Dialog Box)	8-20

8.13	Polling.....	8-21
8.14	Heartbeat.....	8-22
8.15	Traps	8-23
9	Setting the Properties of a Station	9-1
9.1	DiagMonitor Applet.....	9-1
9.2	"Shared Stations" Tab.....	9-2
9.3	"Operating Hours" Tab.....	9-3
9.4	"File Versions" Tab.....	9-4
10	DiagMonitor-Management API	10-1
10.1	The DiagMonitor Management API User Interface.....	10-1
10.2	Development	10-1
10.3	Functional Scope	10-2
11	Troubleshooting	11-1
12	Glossary	12-1

Index

1 Introduction

Even in their basic versions, SIMATIC Industrie PCs come with optional monitoring functions. When used in combination with the appropriate software, the following functions for displaying, monitoring and controlling are available:

- Temperature monitoring (over-temperature, under-temperature or cable break at a temperature sensor)
- Fan monitoring (fan speed too low, fan failure, or a break in a tachometer line)
- Monitoring of S.M.A.R.T-capable hard disks and S.M.A.R.T hard disks in a RAID system
- Heartbeat (heartbeat signal request)
- Watchdog (hardware reset of the computer)
- Run-time meter
- OPC functionality

With SIMATIC PC DiagMonitor software, you can use these functions for local or remote monitoring. To do this, you can use the *DiagMonitor*, included in this package, or create your own customized applications by using the application interface that is also included.

The run-time meter will inform you whenever certain system times are exceeded so that you can then perform the necessary maintenance work.

In addition, Industrie PCs can use the OPC functionality of the DiagMonitor to transmit monitoring data to SIMATIC applications such as WinAC, WinCC or Pro/Tool.

This documentation describes the functionality of SIMATIC PC DiagMonitor software and how to use it with the included applications or with your own applications.

2 DiagMonitor

DiagMonitor allows you to use the monitoring functions on your SIMATIC PC for local and remote monitoring of one or more stations.

The following monitoring functions are available:

- Cyclic monitoring (polling) of monitored stations.
- Error interrupts (see the section Traps).
- Cyclic messages on the management station (see the section Heartbeat).

SNMP capability:

DiagMonitor provides access to monitoring functions of your SIMATIC PC via SNMP (**S**imple **N**etwork **M**anagement **P**rotocol – a simple protocol for the management of network components). A corresponding SNMP service, the DiagMonitor agent, handles the protocol. You can also use any SNMP-capable monitoring application for remote monitoring. Details on the DiagMonitor agent are found in the sections DiagMonitor Software Components and Configuration.

OPC client functionality

OPC client functionality lets you transmit data from the DiagMonitor to another OPC application such as the following:

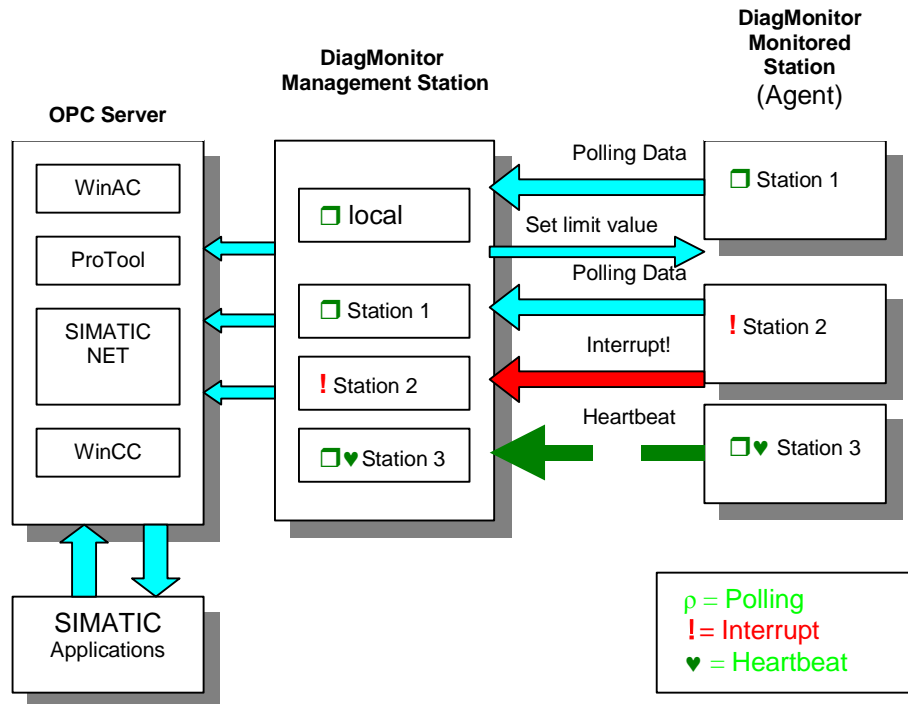
- ProTool/Pro
- WinAC
- WinCC
- SIMATIC NET

This programs will let you display the data for the specific application.

After the software is installed, you will find application examples in "DiagMonitor" folder (subfolder "OPCSamples").

2.1 DiagMonitor Network

The illustration below shows a practical example of a DiagMonitor network and the data flow between the partner stations. It shows the management station and three monitored stations. In conformance with commonly used network management terminology, from now on in this documentation monitored stations are referred to simply as *Stations*.



DiagMonitor network

This illustration shows how the management station receives cyclic data from stations 1 and 2 (requested by polling). Polling of the third station is switched off in order to reduce network traffic. Polling operations always provide the management station with an image of the monitored stations. Here, the polling cycle - that is, the time between polling requests - determines how up-to-date the images are.

Limit values can also be set from the management station (see the "Set limit values" arrow).

Station 2 reports an error to the management station ("Interrupt!" arrow). The management station can now respond to this error indication by requesting an acknowledgement from the user. The user can then acknowledge the error message after having remedied the error.

The heartbeat mechanism at station 3 continuously indicates that it is ready for operation (dashed arrow).

The data collected by the management station can also be transmitted to an OPC server. The SIMATIC applications installed on the OPC server process this information and enable it to be displayed.

The OPC server can be located on the same computer as the management station or on a separate computer.

3 Software Components

3.1 DiagMonitor Software Components

The following components are included in the scope of delivery:

SOM driver	Driver software for the supported operating systems The SOM driver allows the DiagMonitor user interface to access the monitoring hardware (fans, temperature sensors, etc.).
SOM API	Application interface to the SOM driver
DiagMonitor agent	SNMP Agent MIB - Management Information Base DiagMonitor also comes with the "SOLAgent.mib" Management Information Base, which lets you use the DiagMonitor agent with other SNMP applications. Many SNMP applications contain an MIB compiler that can automatically read information from the MIB.
DiagMonitor application	The DiagMonitor application monitors DiagMonitor-capable stations.
DiagMonitor API	The DiagMonitor API (application interface) lets you develop your own applications for DiagMonitor.
OPC	OLE for Process Control OPC Client The OPC client makes the connections to SIMATIC applications or the OPC server. OPC examples This contains simple examples for using ProTool/Pro, WinAC and WinCC with the data collected by the DiagMonitor. These examples are located in the OPCSamples folder.

During installation, these components are copied to the hard disk and are available for startup in the system.

4 Quick-Start Guide

The following steps must be completed before using DiagMonitor monitoring:

1. Check all your hardware and software to be sure that they meet the requirements for using DiagMonitor (see the section Requirements).
2. To use DiagMonitor, you must install it on every station (see the section Installation).
3. Network the stations with the Microsoft TCP/IP protocol.
4. Configure the stations for DiagMonitor operation by using the DiagMonitor applet in the Windows Control Panel:
For every station, enter the name of the management station on which you want to receive traps. At the management station, also specify the stations to be monitored. After completing these steps, the DiagMonitor will be ready for operation.
5. Next, start the DiagMonitor application on the management station - if it was not already automatically started at system startup. The services required are automatically started on the stations at system startup.
6. To be able to further process the data gathered in the DiagMonitor in a SIMATIC application, you now have to install this application (i.e. WinAC or ProTool/Pro) on the corresponding OPC server - if this has not yet been done (see also the installation notes for the relevant applications).
7. In the DiagMonitor, select the OPC server to which the data are to be transmitted (see the section Overview and Management of Stations and the "OPC" tab ("Settings" dialog box)).

5 Requirements

The following sections describe the hardware and software requirements for the operation of SIMATIC PC DiagMonitor.

5.1 Hardware Requirements

Hardware requirements for the stations:

- SIMATIC PC with on-board monitoring hardware (watchdog timer, temperature sensors, fans with tachometer signal) on the main board (i.e. SIMATIC Box PC 620, Box PC 840, Rack PC 840, Panel PC 670/870).

The management station does not require monitoring hardware for operation.

5.2 Software Requirements

DiagMonitor software is compatible with following operating systems:

- Microsoft Windows NT WS 4.0 SP or higher (in the following referred to as *Windows NT*)
- Microsoft Windows 2000 Professional (in the following referred to as *Windows 2000 Pro*)
- Microsoft Windows XP (in the following referred to as *Windows XP*)

An OPC connection will also require one of the following applications: WinAC, WinCC or ProTool/Pro.

In addition, the network installation must be based on TCP/IP.

Restrictions:

Remote monitoring is only possible via the TCP/IP Internet protocol.

6 Installation

Note

Please check your system for any existing SOM/SOL application. If necessary, uninstall this application (**Control Panel --> Software**, see also the uninstall notes in the SOM/SOL application manual).

Since this installation places entries in the Windows registry and the system folder, it can only be performed by someone with administrative rights.

1. Insert the CD in the CD ROM drive.
2. Start the **Setup.exe** file on the CD.
3. Select the setup language to be used during the installation.

4. The "SIMATIC PC DiagMonitor Setup" screen is displayed.
5. Follow the instructions displayed on the screen.

If you do not want to install the DiagMonitor software in the specified default folder, you can select another folder by clicking the "Browse" button.

In the "Setup type" window, you can choose from the following three kinds of installations:

- **Selection**
A "Selection" installation installs only those software components that you specifically select during setup.
 - **Development**
A "Development" installation installs only those software components that you need to develop your own monitoring applications.
 - **Full setup**
A "full" installation installs all software components. It includes the components installed in the "Selection" as well as the "Development" setups.
6. To cancel the installation, click "Exit".

Before you can work with the program, you have to restart Windows or restart your computer.

SNMP

The SNMP service required by DiagMonitor is automatically set up during the installation process.

OPC

An OPC server is required to provide DiagMonitor data to a SIMATIC application.

6.1 Uninstall

As usual in Windows, you uninstall an application via the Control Panel. This DiagMonitor name is entered in the software installation list as follows:

SIMATIC PC DiagMonitor

The uninstall routine removes all DiagMonitor components from your system. Your configuration settings are maintained. If required, you can remove the SNMP service from your system with the help of the "Network" applet in the Control Panel.

Note

Please note that you always need administrator rights to install or uninstall an application.

7 Configuration

Although the installation routine has already set the defaults for your DiagMonitor configuration, additional settings might be still required. The section DiagMonitor Agent describes how to set up a station and the management station.

7.1 DiagMonitor Agent

The DiagMonitor Agent is an SNMP agent built on the SOM driver stack and enables access to data from this driver for DiagMonitor remote control. In order for the management station to receive data from the monitored station, the name of the management station must be made known to the DiagMonitor Agent. It must be either entered at the DiagMonitor Agent or the agent must be enabled for all stations. For further information, see the section The DiagMonitor Applet.

8 User Guide

8.1 Remote Control with the DiagMonitor Application

This section contains operating instructions for the included DiagMonitor application. It describes how to use this application for remote control.

DiagMonitor provides all operating elements required for the management, control and (remote) monitoring of DiagMonitor stations. These include the following:

- An overview of all monitored stations
- A detailed view for seeing and setting the station status
- Operating elements for station management

Help

The operating elements are also described in the DiagMonitor help. You can get help by selecting the *Help* menu item or pressing the F1 key.

Procedure

To monitor one or several stations using the DiagMonitor application, proceed as follows (prerequisite: the stations are networked via TCP/IP and that SIMATIC PC DiagMonitor is installed on all stations):

Procedure

To monitor one or several stations using the DiagMonitor application, proceed as follows (prerequisite: the stations are networked via TCP/IP and that SIMATIC PC DiagMonitor is installed on all stations):

1. Each station to be monitored must be first enabled for use with the management station. To do this, select it in the enabling list, which is located in the Windows Control Panel under "SIMATIC PC DiagMonitor".
2. At the management station, add the name of each station to be monitored to the list of stations being monitored (see section Overview and Management of Stations).

8.2 Program Start

The installation routine links DiagMonitor to the startup menu of your system so that it is automatically started when the system is started. If you want to start DiagMonitor manually, delete it from the startup folder.

You can only open one DiagMonitor instance per application.

Note

Services required are started automatically on the stations.

Program window

The size and setting of the program window is maintained across runtime. For example, if you exit a minimized program window it will be displayed in minimized form after restart. The program icon of a window entered in the system tray is found at this location again after restart.

The program window is automatically restored to full size on the arrival of specific events (interrupts, messages).

8.3 The Station Explorer

DiagMonitor offers a split-window explorer view similar to that of Windows Explorer. The left section provides an overview of the monitored stations. It does not contain any entries when you first start the application. However, you can enter new stations at any time. Entries are maintained after program runtime.

The right section contains a detailed view (with a number of tabs) that provides an overview of the selected station.

8.4 Overview and Management of Stations

Stations are managed via "Station" menu. This menu can be accessed from the main menu in the program or via the context-sensitive menu in the overview (right-click an existing station in the overview). This menu provides access to following functions:

- Adding and deleting stations
- Modifying station configurations
- Viewing station properties
- Removing an interrupt for a station
- Specifying an OPC data block

8.5 "Add Station" Dialog Box

To add a new station to the list of stations being monitored, proceed as follows:

1. In the "Station" menu, click on the "Add..." menu item. A dialog is displayed in which you can enter the station name.
2. Enter the name or IP address in the "Name or IP address" input box. To select a computer name from your network, click the "Search..." button. If you select the "Local station" option, the name of the local computer is automatically entered by default.
3. Confirm your entry with "OK".
4. You have now integrated the DiagMonitor agent for the given computer. This computer is now ready to send and receive monitored data.
5. Please note that you can only specify unique names in the list. A message will be displayed if the name you selected is not unique.
6. After you have entered a computer's name, its IP address is determined. You will be informed of failure to do so.

8.6 Specifying the OPC Data Block

To use the OPC functionality, proceed as follows:

1. Right-click to open a pop-up context menu for the station whose data is supposed to be sent.
2. If you have correctly configured the OPC functionality in the OPC tab of the "Settings" dialog, you will be able to select the "OPC..." item in the context menu.
3. Select the "OPC..." menu item. The window for entering the data block is displayed.
4. Enter the name of the data block (such as "DB1" for WinAC). Confirm your entry by selecting "Next".

The data are now sent to the corresponding OPC server (see also the section "Options" Tab ("Settings" Dialog Box)).

Note

Data can only be sent if the OPC functionality is correctly configured in the settings for the DiagMonitor (see the section "Options" Tab ("Settings" Dialog Box)).

8.7 Removing a Station

To remove a station, proceed as follows:

1. Select a station from the overview.
2. Click on "Delete" menu item. A security prompt is displayed.
3. Confirm the prompt to delete the station.

8.8 Modifying the Configuration of a Station

To modify the configuration of an existing station, proceed as follows:

1. Select an existing station from the station overview.
2. Click "Edit...". The station is placed in edit mode and polling of this station is terminated.

You can now edit certain station settings. For more information, please refer to the sections below. Click on "Edit..." once again to return to polling mode (after you are prompted to choose whether or not to cancel your modifications).

Note

Polling is switched off for the station you are currently modifying.

8.9 Viewing Station Properties

To view the properties of a station, proceed as follows:

1. Select an existing station from the station overview.
2. Now right-click. A context menu is displayed in which you can select the "Properties..." menu item to display the station properties.

The "Properties" options (run-time counter and file versions) are the same as the options for the system control applets (for more information on "Station Properties", see The DiagMonitor Applet).

8.10 Reading Status Information

Each station is in one of the following statuses:

- No error, no maintenance required. The computer icon of the station is displayed in the overview.
- Error, maintenance work is required on the respective computer. The station is highlighted by a clearly visible exclamation mark. Disrupted function groups are also marked. Click on one of these groups to open the detailed view in the right-hand program window, or select the corresponding tab in the detail view. The tabs are also marked in the case of errors.

Example: excess CPU temperature in the station --> Error. Click on the "Thermometer" group for this station. The detailed view provides an overview of all thermal sensors in this station.

- Modification. You are currently modifying station properties (i.e. the upper limit of the CPU temperature) and you have not yet applied the changes or canceled the operation. This status is indicated by a pencil icon. Active polling is interrupted for the time the station remains in this status.

8.11 Detailed View

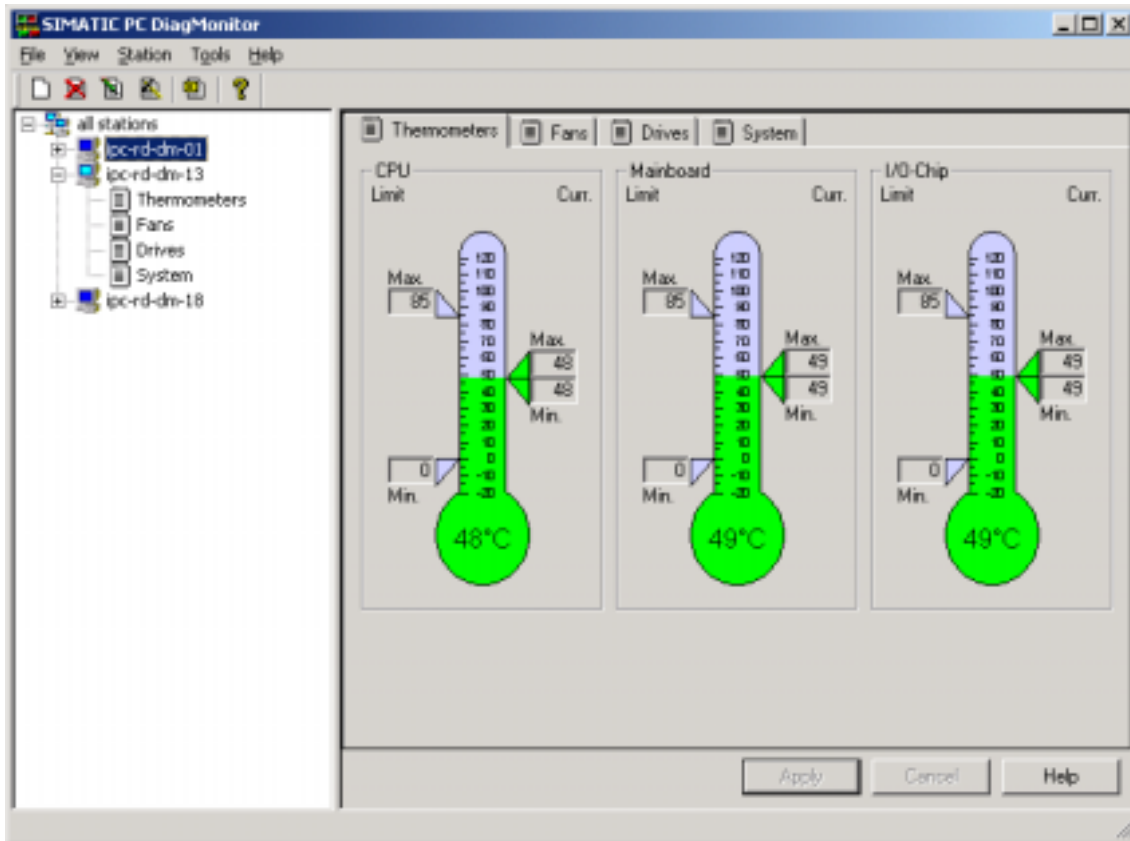
The station you have selected in the overview is displayed in the corresponding detail view in the right section of the program window. The station properties are grouped in various tabs which correspond with the sublevel groups arranged in the station's overview. Select one of the tabs (i.e. "Thermometer") to view the current values. You are shown the current values for the last polling cycle. For example, if you have configured a polling interval of 10 seconds and if no error has occurred, the maximum age of displayed values is 10 seconds (for information on configuring polling intervals, see the section Polling).

You can modify some of the station settings, such as specific temperature limit values and system settings (i.e. heartbeat interval). For more information, refer to the "Thermometer" and "System" sections.

8.11.1 "Thermometers" Tab

The "Thermometers" tab displays the status of existing thermometers (depending on the device). See the illustration below:

- CPU temperature
- Mainboard temperature
- I/O chip temperature



The "Thermometers" tab

The thermometer displays the last measured temperature in metric °C units, or with the US setting, in °F units. To modify this configuration, proceed as follows:

1. In the Control Panel, open the country settings.
2. Go to "Measurement system" and select the "Numerals" tab
3. Restart the DiagMonitor application.

Permissible min./max. values are displayed to the left of the thermometer. An interrupt is triggered if the temperature values are out of range. Previously measured min./max. values are displayed at the left of the thermometer.

Interrupts

The temperature column is displayed in red if the temperature is out of limits, otherwise it is green color.

When the station triggers a limit value interrupt, the min./max. markers are displayed in red.

If the measured min./max. values are out of limits, the corresponding markers are also clearly displayed in red.

If temperature values could not be obtained, the thermometer's display remains neutral (without temperature indication) .

Modifying limit values

To edit the permissible maximum mainboard and I/O chip temperature, proceed as follows:

1. Select the respective station from the overview.
2. Click on menu item **Station > Edit**. The station changes to edit mode and allows write access to the input fields for the two limit values.
3. Enter your limit values.
4. Click on "Apply" to accept the new values. The values are now transferred to the station and immediately polled again. This method verifies that your changes were applied.

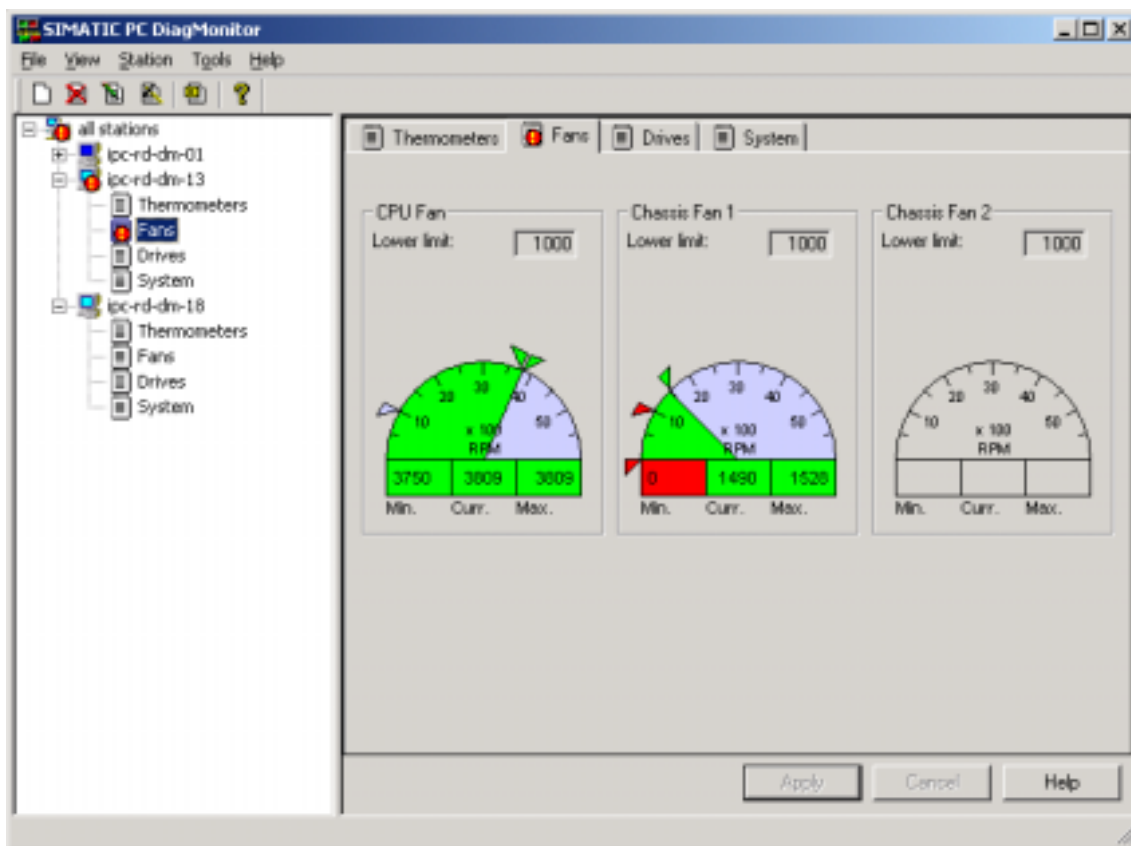
Please note that the permissible min./max. limit values can differ, depending on the system. The maximum permissible value is input automatically if you enter out-of-range values.

8.11.2 "Fans" Tab

This tab provides a well arranged view of the statuses of the tachometers. The display supports up to three fans. The first fan displayed is that of the CPU; the second one is the cubicle fan and the third one is an additional fan (depends on the device).

The fan speed is displayed on a tachometer symbol; all speed values are specified in rpm units. The pointer indicates the last measured speed. In the lower section, you can read the last measured speed as well as the min./max. speed that has occurred since station startup. These min./max. values are also indicated on the tachometer.

The low speed limit can be viewed the "Lower limit" text box. It is also indicated on the tachometer.



The "Fans" tab

Interrupts

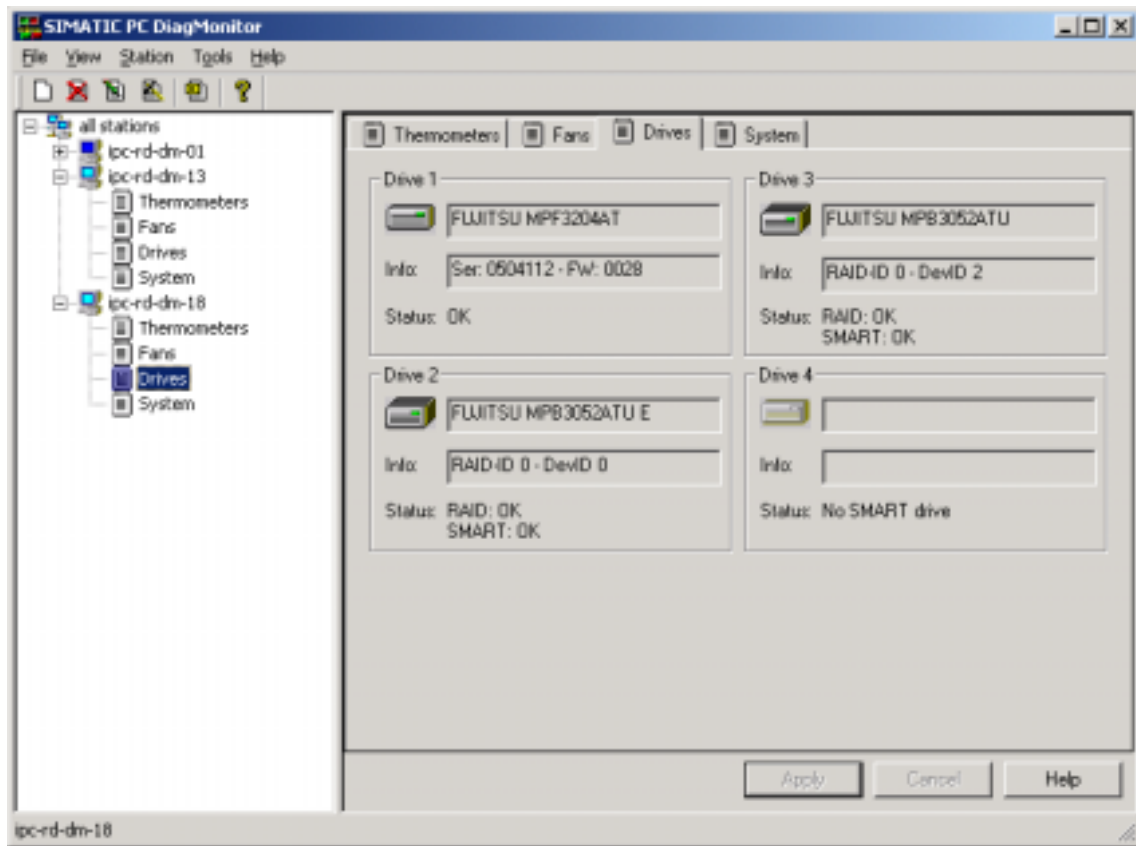
As soon as the speed drops below minimum, the pointer is displayed in red.

When the previously measured speed drops below minimum, the respective marker is displayed in red.

The illustration above shows an interrupt event for the second fan, indicating that the fan speed has dropped below minimum at least once. Although this short event could not be measured (min./max. value in the green range), the interrupt is registered for this station and requires acknowledgement.

8.11.3 "Drives" Tab

The DiagMonitor application can display up to four IDE drives. It also indicates whether or not a drive is capable of S.M.A.R.T. mode and/or is a RAID drive. If so, the drive icon is active, displayed by a symbolic LED. Also shown in the respective text boxes is the drive type, serial number and firmware version. The illustration below shows that the station is equipped with a drive capable of S.M.A.R.T. mode and that its status is "OK".



The "Drives" tab

SMART (Self-Monitoring, Analysis and Reporting Technology):

All hard drives in the Industrie PC support SMART technology.

In special routines, the DiagMonitor requests a status report from the hard drive. During operation, the SMART hard drive keeps a list of all errors that have occurred when reading to or writing from sectors. If the number of errors exceeds a given threshold value, this is often evidence indicating that the drive will soon become defective.

At this time the data on the hard drive should definitely be backed up (if it has not been done already) and the hard drive should be replaced.

An example of hard drive problems are small particles present in the drive housing that generally do not immediately lead to a "head crash" but initially only cause scratches in the surface of the magnetic disk. This condition results in more small particles accumulating within the housing. As their number increases, so does the number of drive errors, ultimately resulting in a head crash.

In such as case, the SMART system detects a rapid increase in the error rate and triggers an alarm.

However, errors, such as those originating in the electronics, that could lead to immediate failure of the hard drive cannot be detected by the SMART system.

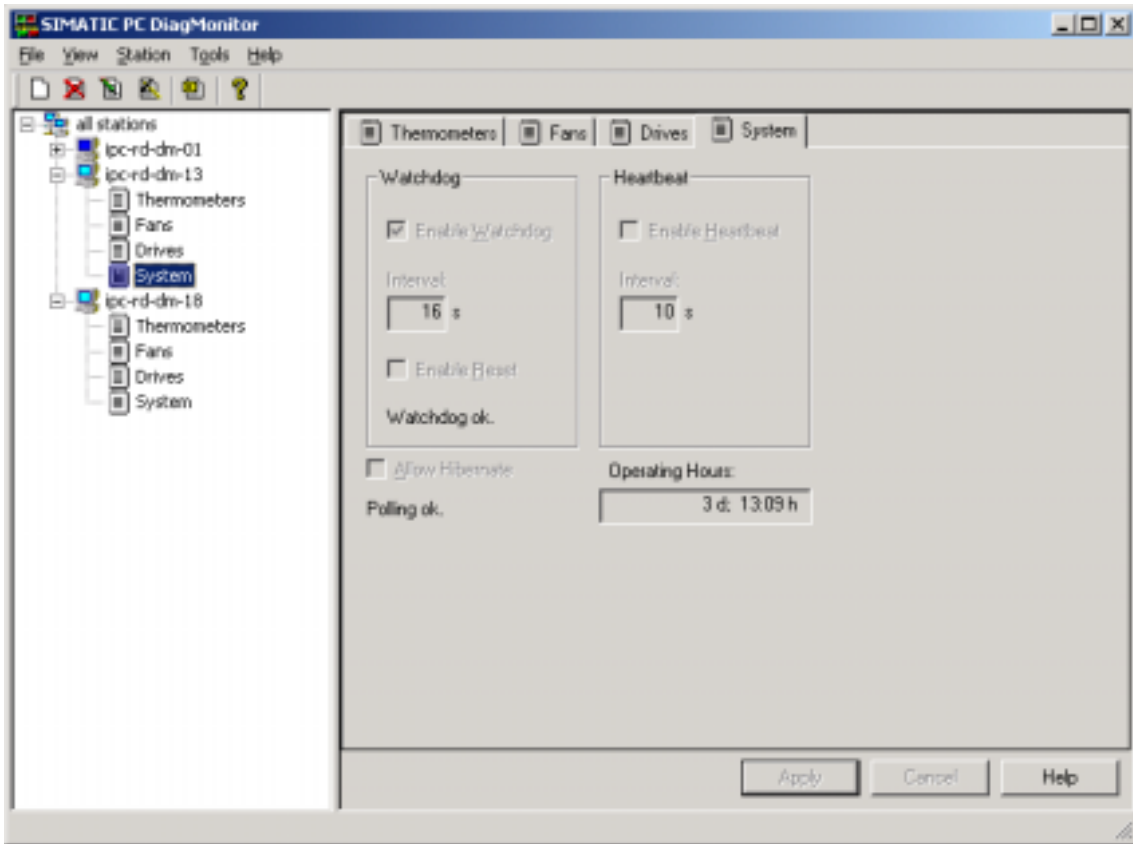
Drive status

If the drive operates without error, the LED is displayed in green color and status reports "OK". In case of cumulative drive errors (while the drive is still functioning) or pending drive failure, the LED is displayed in red color, the status reports "Replacement required", and an interrupt is triggered (for information on interrupts refer to Chapter Events).

Additional information is displayed if you have installed a PROMISE (FastTrak) RAID subsystem. The field "Info" contains the ID number of the monitored RAID adapter and the connected hard disk drives, instead of the serial and firmware number. Information regarding the functional status of the RAID system appears in addition to the SMART-status display.

8.11.4 "System" Tab

The "System" tab combines the watchdog, heartbeat, run-time and rest mode configuration for the station. You can edit the Watchdog and Heartbeat settings (see below).



The "System" tab

Configuring the watchdog

You can enable or disable the watchdog ("Enable Watchdog" check box). Once active, the watchdog is continuously reset within the configured "Interval" time. The "Enable Reset" check box indicates a hardware reset on watchdog timeout (such as resulting from an operating system crash or an inoperable PC). This condition will lead to a restart of the computer.

Configuring the heartbeat

Like the Watchdog, you can enable or disable the Heartbeat. The heartbeat signals are sent out at the intervals indicated the "Interval" field (see also the section Polling). In this way, the connections between the management station and the monitored station can be checked. The Heartbeat is sent from the monitored station to the management station. If this signal is not received, an interrupt is triggered.

Configuring the rest mode

The Windows hibernate state can be set (enabled or disabled) independently of the settings in Windows itself (Option "Allow Hibernate"). The option "Deny Hibernate" in the system settings prevents it. To change this setting, select the appropriate option.

Modifying the configuration

You can always edit the watchdog, rest mode and heartbeat configuration. To do so, proceed as follows:

1. Select the desired station from the overview.
2. In the "Station" menu, click "Edit". The station is set to edit mode, and you can access the corresponding fields.
3. Make your settings.
You can specify a watchdog interval value ranging from 3 to 255 seconds; set the heartbeat interval value within a range of 1 to 60 seconds.
4. Confirm your settings by clicking "Apply". The new settings are transferred to the station and immediately polled again. This is how you can verify your modifications.

8.12 Events

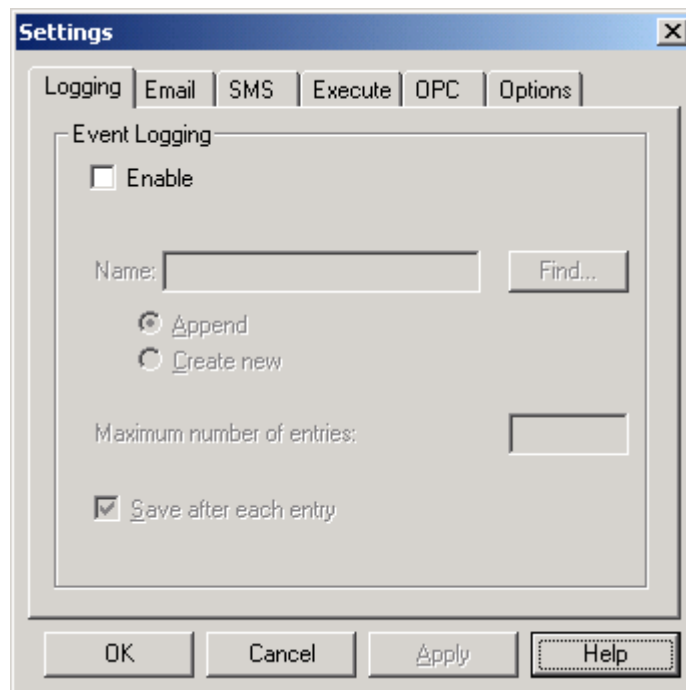
DiagMonitor captures following events:

- Application events (start-up and shut-down of an application)
- Interrupts (sensor interrupts, polling interrupts, watchdog interrupts, heartbeat errors, disk drive errors, revision interrupts)
Until it is acknowledged, only the first instance of an interrupt/heartbeat error will represent an event.
- Changes in station settings

8.12.1 "Logging" Tab ("Settings" Dialog Box)

If enabled, all events are written to the log file, including the date and time. You can specify the following options for the log file:

- Enable
- Name and path for the text file. "C:\Temp\DiagMonitor_Log.txt"
- Maximum number of entries
- Response when entries are written to the log file



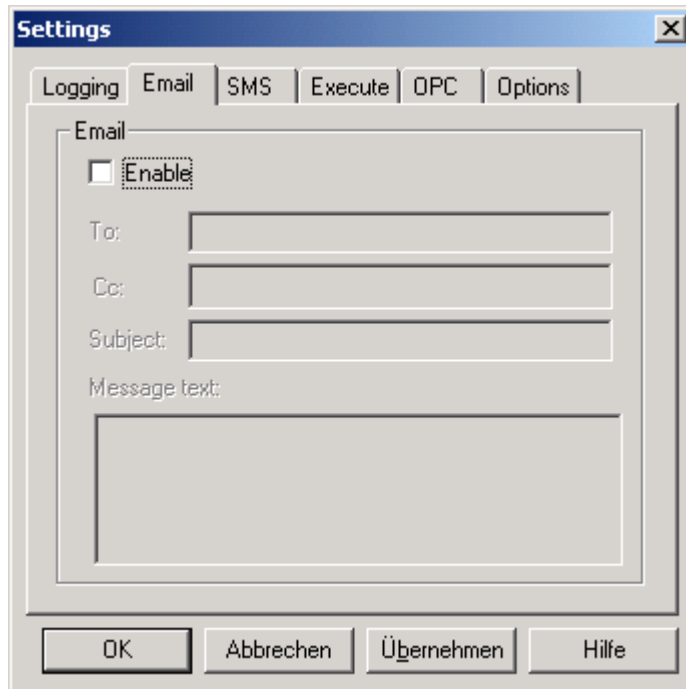
The "Logging" tab

To configure event logging, proceed as follows:

1. Click on menu item **Tools > Settings**. The "Settings" dialog box is displayed. You can make all the settings under "Event Logging".
2. The "Enable" option allows you to switch logging on or off.
3. In the "Name" field, enter a file name and the path, or click the "Find..." button to select a file name.
You will be notified if you do not specify a file name after having enabled logging.
4. Usually, the specified file is not deleted prior the next logging. However, you can select the "Create new" option. In this case the log file is deleted once and then rewritten.
5. Specify whether you want to save the file after each entry ("Save after each entry").
6. You can also specify the maximum number of entries ("Maximum number of entries"). If you do not enter a value in this field, the number of entries is unlimited. In this case, however, make sure that the respective disk drive will always provide sufficient space.
Logging is terminated when reaching the maximum number of events is reached.
7. Confirm your entries with "OK". You have completed the log configuration.

8.12.2 "E-Mail" Tab ("Settings" Dialog Box)

If you like, the application will send notification of DiagMonitor events to a specified e-mail address. This function is only available if a mail service has been installed. Please ask your network or e-mail administrator how to install this service. It is important to configure it as standard service in order to prevent system requests to the user during transmission. To verify that the e-mail service is correctly installed, enable event messaging and then close the dialog. Without any user interaction, a message should now be delivered to the specified recipient.



The "E-mail" tab

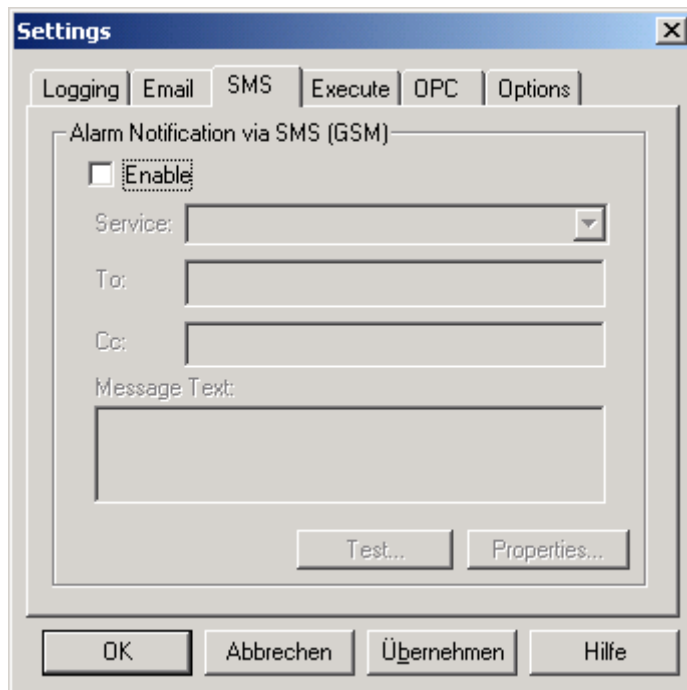
To configure event messaging for events, proceed as follows:

1. Select the **Tools > Settings** menu command to open the "Settings" dialog. You can make all settings in the "Event Notification" area.
2. The "Enable" check box lets you switch e-mail notification on or off.
3. Enter the recipient address in the "To:" field. This can be an entry from an address book, an Internet e-mail address or any other address. Ask your network or mail administrator how to properly enter e-mail addresses. To send a copy of the e-mail, enter the appropriate address in the "Cc" field. If you enter more than one e-mail address in a field, be sure to separate them with a semicolon.
4. If you like, you can enter an optional entry in the "Message text:" field. This text is included when the text describing the event is delivered. If you want to create this text by using specified variables as building blocks, refer to the section Composing E-Mail and SMS Event Notification Texts.

5. Confirm your entries with "OK". You have now completed the setup of event notification by e-mail.
6. When you first enable this function, a test e-mail will be sent.

8.12.3 "SMS" Tab ("Settings" Dialog Box)

You can also receive notification of DiagMonitor events by SMS in addition to e-mail. To enable this function, the mobile phone service provider must be entered in the setup, and hardware for sending SMS messages must also be installed.



The "SMS" tab

To configure notification of events by SMS, proceed as follows:

1. Select the **Tools > Settings** menu command to open the "Settings" dialog. You can make all settings in the "Event Notification" area in the "SMS" tab. In the SMS tab, you can make further settings in the "Properties" dialog.
2. The "Enable" check box lets you switch the SMS notification on or off.
3. In the "Service" field, enter the name of the appropriate mobile phone service provider.
4. Enter the mobile phone number of the recipient in the "To:" field. To send a copy of the SMS to another recipient, enter the recipient's number in the "Cc" field.

5. If you like, you can enter an optional entry in the "Message Text:" field. If you want to create this text by using specified variables as building blocks, refer to the section Composing E-Mail and SMS Event Notification Texts.
6. If you like, you can test this service by clicking the "Test" button. If your settings are correct and the hardware for sending SMS messages is installed, the recipient should receive an SMS very shortly.
7. If the settings are correct, confirm you entries with "OK". You have now completed the setup of event notification by SMS.

8.12.4 Composing E-Mail and SMS Notification Texts

You can enter an individualized text to accompany event reports transmitted by E-Mail/SMS. Such a report can only consist of text such as

"Management station reports error!"

However, in such case would be better to have more specific information about the event. To provide this, DiagMonitor has fixed variables (placeholders). You can make settings to add these variables to the text message. Then whenever an event report is transmitted, DiagMonitor will replace these variables with the specified supplementary information.

Example of a text created by the user:

On %DATE% at %TIME% the station %STATION% output the following error code %ERRNO%. The reason: %REASON%

Variables in DiagMonitor are always entered between two "%" signs and must be written in capital letters.

In our example, the transmitted event text would read as follows:

On **07/23/03** at **09:45 PM** the station **ipc-pc1-1g** output error code **00000010**. The reason: **CPU temperature error at station ipc-pc1-1g**

8.12.5 Text Variables

The following variables can be added to the transmitted text:

- **%REASON%**
Contains the cause of error as text. It is stored in the file DiagERROR.msg, and is only to be used within the specific text to be sent.
- **%DATE%**
Date of the error message
- **%TIME%**
Time of the error message
- **%STATION%**
Name of the station reporting the error
- **%VALUE%**
The value applying to the error message. This value depends on the cause of the error. Such a value may not be able to be determined for every error and may not apply.
- **%ERRNO%**
Error code of the error message
- **%NOMSG%**
Suppresses an error that the user considers to have no priority. This message will only be logged in the file DiagERROR. In the file DiagERROR.msg, this variable is entered in the line whose content should be suppressed and not reported by SMS.

8.12.6 "Execute" Tab ("Settings" Dialog Box)

You specify whether and for which application should be started in the case of a interrupts.

To do this, proceed as follows:

1. In the "Execute" tab, select the "Enable" check box.
2. Enter the appropriate program path in the test field. If you need to search for it, click the "Find" button.
3. You can also assign various optional parameters to the program to be started.

Note

The parameters are transmitted in the following order:

- Time
- Date
- Cause
- Station

If you omit a parameter, the following ones will move up a step in the sequence.

4. Confirm your entries with "OK".

8.12.7 "OPC" Tab ("Settings" Dialog Box)

You also have the option of sending data to an OPC server. To be able to do this, the OPC functionality must be configured in the "OPC" tab.

To enable the OPC functionality, proceed as follows:

5. Select the "Enable" check box.
1. Enter the name of the PC that you know has an installed and active OPC server. If necessary, you can search for the PC by clicking the "Find" button.
2. Select the correct server type from the list.
3. Apply your settings and confirm them with "OK".

8.12.8 "Options" Tab ("Settings" Dialog Box)

The "Options" tab provides various additional settings:

- **Deny Hibernate**
Determines whether the sleep mode will be prevented from occurring in the monitoring computer (management station) in order to ensure that the information on its display is always current.
- **Confirm Exit**
Determines whether a confirmation prompt will be displayed for the user to acknowledge before exiting DiagMonitor.
- **Beep on Alert**
Determines whether your PC will give an acoustic signal in the event of an alert.

8.13 Polling

Another option that can be set is the polling interval.

The DiagMonitor application periodically queries the status of the stations; that is, it "polls" the stations. This section shows you how to configure the polling interval as well as the network traffic a specified polling interval will generate depending on the number of stations to be polled.

Polling interval

The polling interval represents the delay in seconds units between polling requests. This is how you can adapt the polling interval to meet your requirements:

1. Click on menu item **Tools > Settings** to open the "Settings" dialog.
2. Under "Polling interval", enter the desired interval (from 1 to 600 seconds).
Default setting is 10 seconds.
3. Confirm with "OK".

The DiagMonitor application will immediately start polling, using the new settings.

Network traffic as a result of polling

The table below helps you to calculate network load that will arise as a result of polling of a given number of stations.

Polling data	Data length
6 sensors (3 thermometers, 3 fans)	6 * 400 bytes = 2400 bytes
Every SMART drive	560 bytes
Every non-SMART drive	240 bytes
System	488 bytes
Total (assumption: every station is equipped with exactly one SMART drive)	3688 bytes

Provided most stations are equipped with only one SMART drive, you can use the formula below to determine total network traffic (let x be the number of stations and B the total number of transferred bytes):

$$B = x * 3680 \text{ bytes}$$

Example:

Let us assume you have connected 100 stations. In this case, the total number of transmitted bytes for every polling cycle is:

$$B = 100 * 3680 \text{ bytes} = 368 \text{ Kbytes}$$

In order to avoid excess network traffic, we recommend that you increase the polling interval according to the number of stations in operation. A rough formula is (let x again be the number of stations and I the polling interval in seconds units):

$$I = x/10$$

The example above corresponds with a polling interval of 10 seconds and a network load of approx. 37 Kbytes/s.

8.14 Heartbeat

You can add a heartbeat mechanism to the polling function. In this case, the stations will periodically transmit a "heartbeat signal" to the monitoring application. An interrupt will be generated if no signal is transmitted (refer to the section Events).

Every heartbeat generates a trap which results in additional network traffic (refer to the section Traps).

8.15 Traps

Traps represent unrequested signals sent from a station to the monitoring application. The following events will trigger a trap:

- Heartbeat
- First occurrence of an interrupt in the station
- Errors when connecting to the SOM driver
- Revision interrupt

Trap Targets (enable monitoring)

A station transmits traps only to specified trap targets, which are the management stations that you specified. Thus, you should specify the name of the management station for every station. To specify the management station for a station, proceed as follows:

1. Open the DiagMonitor application on the management station.
2. Open the DiagMonitor application in the control Panel of the PC being monitored. In the dialog that is displayed you can enter the computer name.
3. Enter the name of the management station. You can also click on "Find ..." to select a computer name from your network neighborhood.
4. Confirm with "OK". The station will now transmit traps to the specified station.

Network Load

Every trap generates a network load of approx. 40 bytes. Only on their first occurrence will interrupts generate a trap. This means that heartbeat signals, in particular, generate increased network traffic! When monitoring a large number of stations, you should increase the heartbeat intervals accordingly.

9 Setting the Properties of a Station

9.1 DiagMonitor Applet

You can use the DiagMonitor applet to configure the monitored stations that meet the hardware requirements.

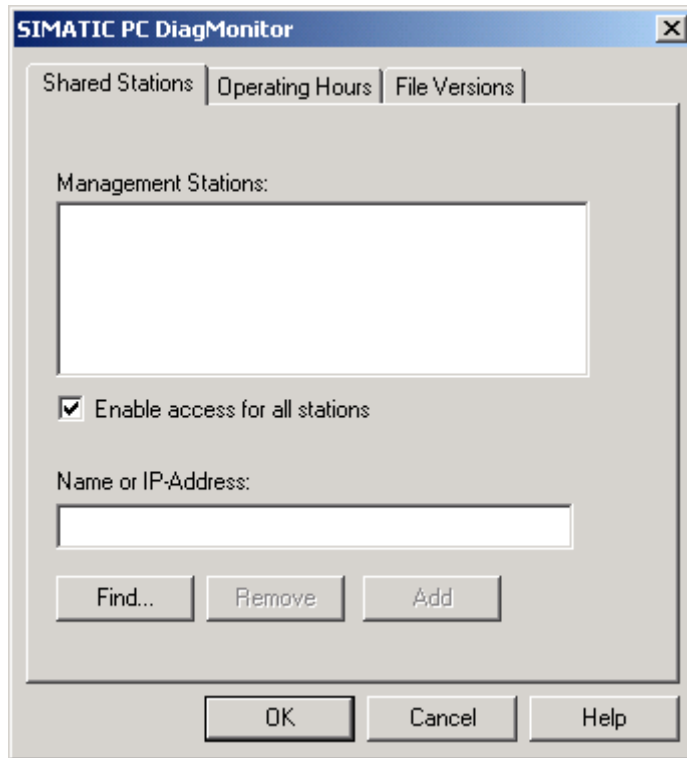
This applet lets you set access rights, the run-time meter and displays the software components installed on your computer along with information about them. This information only applies **locally**. The only difference between the DiagMonitor applet and the properties set for monitor station is the "Enable" tab".

To find the applet, go to either "**Tools**" > "**Control Panel**" on the management station in DiagMonitor or to "**Start**" > "**Settings**" > "**Control Panel**"> "**SIMATIC PC DiagMonitor**".

9.2 "Shared Stations" Tab

To monitor stations with the DiagMonitor, it must have access rights for the management stations.

To specify the access rights, go to the "Shared Stations" tab, and proceed as follows:



The "Shared Stations" tab

1. Go to the Control Panel and open the DiagMonitor applet.
2. Select the "Shared Stations" tab. In the "Name or IP Address" field, enter the name or the address of the management station. You can also select the stations from a list after clicking the "Find..." button.
3. After you have selected the management station to be enabled, confirm your choice by clicking "Add".
4. If you want to remove the access rights for a management station, select the station and click "Remove".

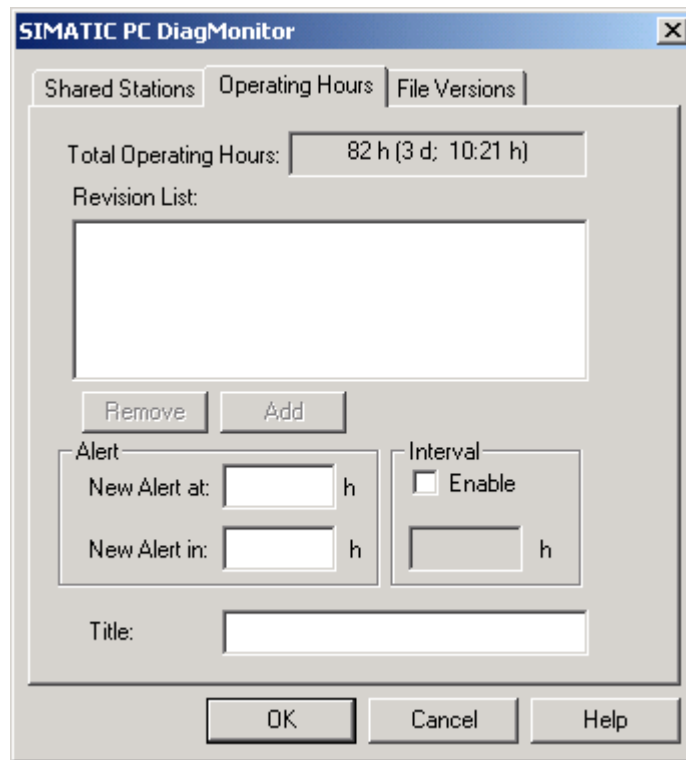
To enable all stations, just select the check box in front of "Enable access for all stations".

5. Confirm you entries with "OK".

9.3 "Operating Hours" Tab

In addition to displaying the total operating hours, the "Operating Hours" tab lets you set revision dates. A revision date similar to a "Reminder".

As soon as the specified amount of run-time hours are reached, an interrupt informing the user of a revision date is triggered. In addition, a message will be displayed the next time the tab is selected.



The "Operating Hours" tab

To specify a new date, proceed as follows:

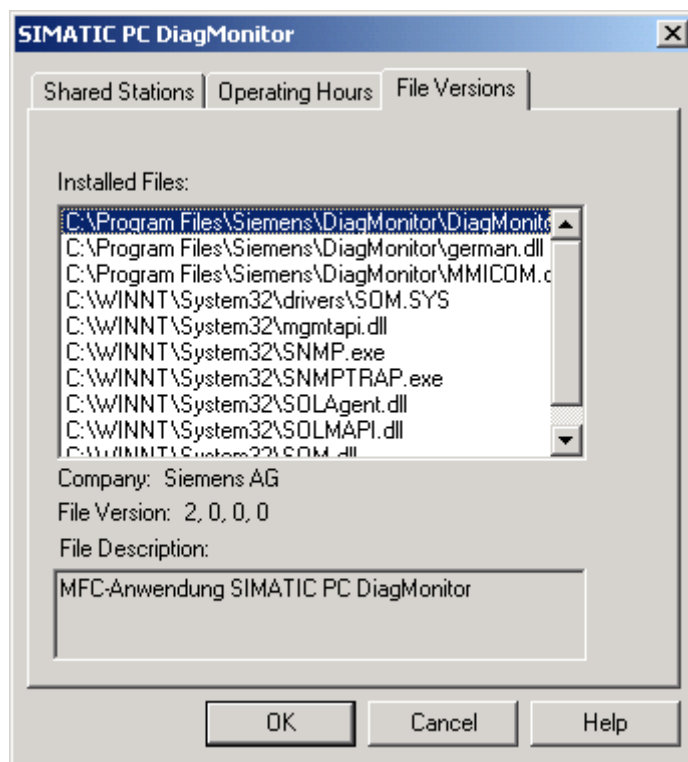
1. In the "New Alert at:" field, enter the amount of run-time hours that should trigger a revision interrupt.
2. In addition to entering a specific time, you can also enter a relative time. To do this, you have to enter the number of hours until the next interrupt (alert). This entry deletes the contents of the "New Alert at" field.
3. An interval can be entered for interrupts which occur at a constant rate. To do this, you have to select "Enable" for the "Interval" option. Then you can enter the repeat rate in hours in the field below it.
4. In the "Title" field you must enter a short name for the revision interrupt.
5. To add your new entry to the list, click "Add".
6. Confirm your entries with "OK".

Note

The data from the run-time counter are stored in the system data for the operating system. If your device or the operating system are reinstalled, the runtime counter will be reset to "0".

9.4 "File Versions" Tab

The "File Versions" tab shows the current version of the files for the management station or the monitored station. To obtain a brief description of a file, click on the file path in the list.



The "File Versions" tab

10 DiagMonitor-Management API

10.1 The DiagMonitor Management API User Interface

The DiagMonitor Management API specifies the C++ classes "CSnmpSession" and "CSolSnmpSession", which contain the methods for remote querying of the DiagMonitor agent. All methods required for remote queries are described in this section.

You are also shown supported compilers/development environments and the header file and import library you must implement.

10.2 Development

Application development for DiagMonitor Management API requires Microsoft Visual C++-Compiler Version 6. Microsoft MFC classes are not required.

Supported operating system:

- Windows NT WS 4 SP5 or higher
- Windows 2000 SP1 or higher
- Windows XP

Files required for development (supplied with DiagMonitor):

File name	Description
SolSnmpSession.h	Declaration section for CSolSnmpSession
SnmpSession.h	Declaration section for the basic class
SOLMAPI.lib	Import library

Files required for development (from the SDK platform):

File name	Description
Snmp.h	SNMP declarations
MgmtAPI.h	SNMP management declarations
Winsock.h	Winsock2 declarations
SOLMAPI.lib	Import library
SNMPAPI.lib	SNMP functions library
MGMTAPI.lib	SNMP management functions library

Runtime files and functionality required (supplied with DiagMonitor):

File name	Description
SOM.dll	SOM user interface
SOLMAPI.dll	Implementation of the class and methods

Runtime files and functionality required (from SDK platform):

File name	Description
Mgmtapi.dll	SNMP management API
SNMPAPI.dll	SNMP API
Winsock32.dll	Windows TCP/IP functions

10.3 Functional Scope

DiagMonitor Management API is the user interface for DiagMonitor management functions. The functionality comprises:

- Query of read access data
- Setting of write access data
- Receiving of traps

A description of the DiagMonitor user classes is included in the online help.

11 Troubleshooting

When you come across unexpected problems during DiagMonitor operation, please first consult all available information sources. These are the following:

- This user manual and, in particular, this section. It may be that you have overlooked some information.
- The online help
- The "Getting Started" section

Also check your program for any settings which might have caused these unexpected effects.

This section provides support in troubleshooting such problems.

List of stations is empty

The overview does not contain any entries after initial installation. Enter your stations.

DiagMonitor agent outputs messages at startup

Only one application can be connected to the SOM driver. Thus, when a second application is connected (i.e. SOM.exe) to the driver, DiagMonitor agent cannot access the driver and returns a corresponding message at startup. Remedy: uninstall the other SOM application.

The application does not start

Check that the DiagMonitor application icon is in the system tray. Note that you cannot start a second instance of a running application.

After installation, the DiagMonitor application is entered in the startup folder and should therefore automatically be opened after user login. If not, you can either run setup once again or enter the application manually in your startup folder.

12 Glossary

API

Application interface

Heartbeat

Periodically transmitted "heartbeat signal" signal from a station. A monitoring ("listening") application can respond accordingly (i.e. interrupt) if this signal is missing over a longer period of time.

LAN

Local Area Network - the local network.

Management Station

A station that can monitor other **Stations**.

MIB

Management Information Base - description of the objects managed by an SNMP station.

OPC

OLE for Process Control (OLE object linking and embedding).

The linking and embedding of objects. This a technology enables data to be exchanged and used among different applications. When an object (such as a graphic) is linked to a composite document (such as a spreadsheet or a text document), the object actually just contains a link to the that object. All changes made in the content of a linked element also immediately take effect in the composite document in which the object is embedded. In contrast, when an object is embedded in a document, the composite document contains a complete copy of the object. All changes in the original object are applied to the document only after it has been updated.

Polling

Cyclic request.

Polling Interval

The polling interval is the time in seconds between each request.

RAID

Redundant Array of Independent Disks (a redundant array of hard disks). A method of storing data in which the data are distributed and stored along with error correction codes (such as parity bits) on at least two hard drives in order to increase performance and reliability. The hard drive array is monitored by management programs and a hard drive controller for errors that need to be corrected. RAID is primarily used for network servers.

SIMATIC Industrie PC

Industrial PCs. SIMATIC IPCs contain features such as those for monitoring temperature, fan speed, etc.

S.M.A.R.T.

Standard which features drive status monitoring and advance warning of pending drive failure.

SNMP

Simple Network Management Protocol.

An Internet standard that specifies objects to be managed as well as communication between **management stations** and **stations**.

SOL

Safecard On LAN.

Application function for local and remote control of SIMATIC PCs with monitoring functionality.

SOM

Safecard On Motherboard.

Application function for local control of SIMATIC PCs with monitoring functionality.

Station

A monitored station.

TCP/IP

Standard communication protocol. Widely distributed in computer networks (also in office networks).

Trap

Immediate notification of a predefined incoming event.

Watchdog

This function (mainly implemented in a hardware version) enables you to determine operability of a station. Under normal operating conditions, an enabled watchdog is periodically reset by the station. A watchdog alarm is generated in case of a watchdog timeout (i.e. an overload or operating system crash).

Index

"

"Add Station" Dialog Box.....	8-3
"Drives" Tab	8-9
"E-Mail" Tab ("Settings" Dialog Box)	8-15
"Execute" Tab ("Settings" Dialog Box)	8-19
"Fans" Tab	8-8
"File Versions" Tab.....	9-4
"Logging" Tab ("Settings" Dialog Box).....	8-13
"OPC" Tab ("Settings" Dialog Box).....	8-19
"Options" Tab ("Settings" Dialog Box)	8-20
"Shared Stations" Tab	9-2
"SMS" Tab ("Settings" Dialog Box).....	8-16
"System" Tab.....	8-11
"Thermometers" Tab	8-6

A

API	12-1
-----------	------

C

Composing E-Mail and SMS Notification	
Texts	8-17

D

Detailed View	8-2, 8-5
DiagMonitor Applet.....	9-1
Drivers.....	7-1
Drives	8-2

E

Events	8-13
--------------	------

F

Fans	5-1, 8-2
------------	----------

H

Heartbeat	8-2, 8-22, 12-1
-----------------	-----------------

I

Installation	6-1, 6-2
Instance.....	8-2

L

LAN.....	12-1
Log file	8-13

M

Management station	4-1
Management Station.....	12-1
MIB	12-1
Modifying the Configuration of a Station	8-4
Monitoring	
Fans.....	1-1
Hardware	5-1
Temperature	1-1

N

Network load.....	8-22, 8-23
Network traffic.....	8-21, 8-22, 8-23
Notification	8-13

O

OPC.....	12-1
Operating Hours" Tab.....	9-3
Overview.....	8-2
Overview and Management of Stations	8-2

P

Polling.....	8-21, 8-22, 12-1
Polling Interval	12-2

R

RAID	12-2
Reading Status Information	8-5
Registry	6-1
Remote monitoring	5-1
Removing a Station	8-4
Requirement	
Hardware	5-1
Software.....	5-1

S

S.M.A.R.T.	12-2
SIMATIC Industrie-PC	12-2
SNMP	2-1, 6-2, 7-1, 12-2
SOL.....	7-1, 8-2, 12-2
SOM.....	12-2
Specifying the OPC Data Block	8-3
Station.....	12-2
Status.....	8-2
System folder.....	6-1
System start.....	8-2
System startup.....	4-1

T

Tachometer	8-2
Tachometer signal.....	5-1
TCP/IP.....	12-3
Temperature	
CPU.....	8-2
I	8-2
Mainboard	8-2
Text Variables	8-18
Thermometer.....	8-2
Trap.....	12-3
Traps	8-23

U

Uninstall.....	6-1, 6-2
----------------	----------

V

Viewing Station Properties	8-4
----------------------------------	-----

W

Watchdog	1-1, 8-2, 12-3
----------------	----------------

