

Product Facts

We make sure



Silent Fan

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Product Silent Fan

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Positioning and target groups

Integrators & end customers

Customer benefits

The fan control function integrated on Fujitsu Siemens Computers mainboards enables customers to build quiet and fault-tolerant PC systems. This reduces maintenance times and makes for a more pleasant working environment.

Product description

Fujitsu Siemens Computers Premium mainboards feature a hardware controller with the capability to monitor the fans in the system and control them in accordance with prevailing temperatures. It can also be used to slow down (throttle) the CPU in order to achieve an additional cooling effect. As the Silent Fan controller is independent of both processor and operating system, continuity of function is guaranteed.

Technical data

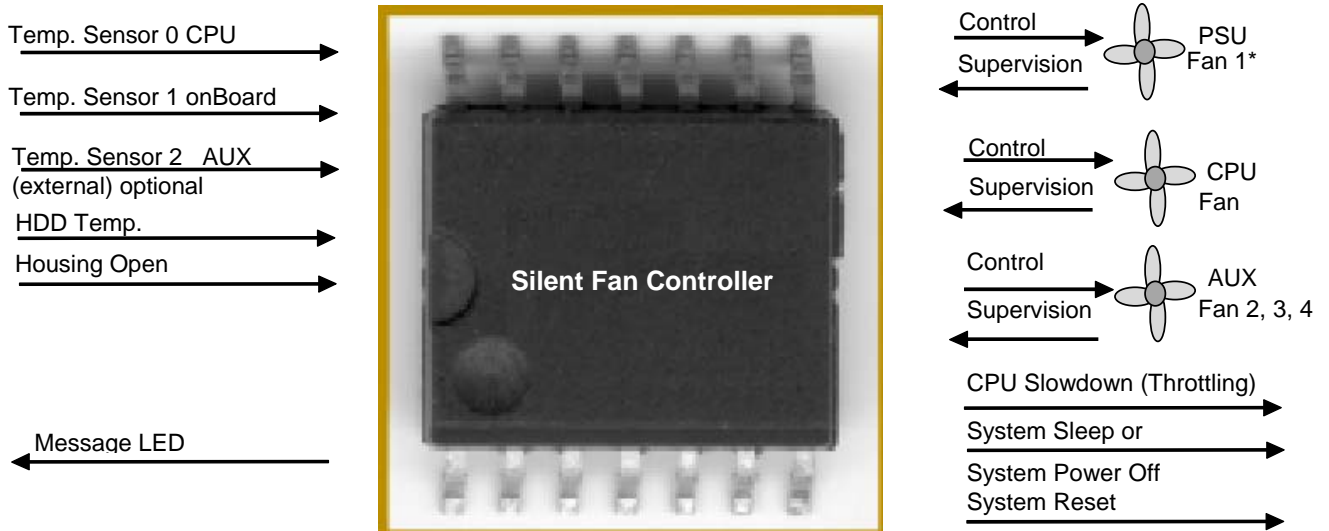
Controller

Premium mainboards include a Fujitsu Siemens Computers-developed microcontroller which constantly records temperatures from up to four sensors: CPU, two internal sensors (optional one external), HDD. These measurements are used to control and monitor the speeds of the CPU fan, power supply fan (special power supplies with controllable fans only) and up to three optional fans. If necessary, the CPU is also throttled, which, though adversely affecting the performance of the system, leads to lower heat dissipation as a result of the reduced power consumption. This, in turn, means that the fans can operate at slower speeds, thus making the system quieter.

The CPU temperature is measured directly on the processor die by means of a diode measurement. This measuring method is unique and requires no additional sensor on the heat sink or under the processor. The advantage of this type of measurement is the higher precision, thus ensuring that the speed of the fans and the throttling of the CPU can be reduced to a minimum. The user is thus provided with a fully optimized PC system: as fast as necessary, as quiet as possible.

The figure shows the inputs and outputs of the microcontroller, which operates totally independently of processor, memory and operating system. The system components continue to be protected even if the memory or CPU crashes.

Silent Fan



* with special, controllable power supply fans only

Silent Fan Controller messages

The Silent Fan controller itself has only one means of reporting faults and events: the Message LED. This LED can be connected to the front panel and flashes at approx. 2 Hz as soon as the Silent Fan controller reports an event (independently of the operating system). The following events are indicated:

- Fan failure
(The microcontroller detects a stationary fan after two seconds, attempts to restart it by pulsing for approx. ten seconds and if this fails, then issues an alarm.)
- Sensor failure
(Defective sensors are reported immediately.)
- Overheating
The individual faults can only be differentiated using one of the software tools described below (see Software).

Location of the components on the mainboard

A Fujitsu Siemens Computers Premium mainboard contains the following relevant components:

- Silent Fan Controller
- Onboard temperature sensor
- Connector for controllable power supply
- Connector for CPU fan
- Connector for additional fan (optional)
- Connector for external temperature sensor (optional)
- Connector for case open switch (intrusion)

Please check the datasheet and short description (manual) to find the position of the components on each mainboard.

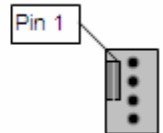
Supported hardware

4-pin fans

All newer main boards support fans with four connecting lines. In this case three of the lines are connected identically to the 3-pin fan (upwards compatibility), the fourth pin is used here for speed control. Since 12 V is always present at the voltage pin here 3-pin fans always rotate at full speed unless the fan has a separate control system.

The speed of a 4-pin fan is controlled via a pulse width modulated (PWM) signal at pin 4. This does not ensure that a fan actually switches off if the silent fan controller arranges this since the assignment of the speed happens in the fan. In simple terms the Silent Fan Controller specifies the speed in percent. Ideally the fan should rotate at full speed at 100%, at around half speed at 50% and should be stopped at 0%. This is unfortunately not the case with each fan. Please refer to the specification of the relevant fan for more details.

Pin	Signal
1	GND
2	+12V
3	FAN Sense
4	FAN Control



3-pin fans

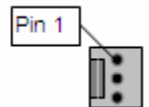
Commercially available uncontrolled fans with three connecting leads are required for older mainboards. Two of the connecting leads are used for the voltage supply, while the third transmits the current fan speed (Sense Pin).

Some manufacturers also offer independently controlled fans. This form of control is then based on a separate temperature measurement (mostly in the heat sink of the CPU) and requires a 12 V supply voltage. Since the Fujitsu Siemens Computers fan control function (for 3 pin fans) regulates the fan voltage between 6 V and 12 V, there can be problems with temperature-controlled fans. Usually the fan stops, is driven at full voltage by the Silent Fan controller, starts operating again, and is then slowed down again. This results in a pulsing of the fan, which causes unpleasant noises and has almost no cooling effect.

One exception is the temperature-controlled fan of the Intel Boxed heat sink. Exhaustive tests have revealed that the control function for this fan continues to work even at low voltages.

Fans with only two leads are not detected by the Silent Fan controller and are therefore not suitable for Premium mainboards.

Pin	Signal
1	GND
2	Controlled FAN voltage (0V, +6V...+12V)
3	FAN Sense



Temperature sensors

Only the sensor offered by Fujitsu Siemens Computers (see fig. right) can be used as an external temperature sensor. This is connected to the SMBus connector on the mainboard and is detected by the system without the need for further settings. The external sensor is supported by some older Premium mainboards. (see data sheets)

Because the sensor can be positioned freely, it is left to the integrator to decide which areas are to be subject to thermal monitoring. A possible position would be, for example, on the hard disk cage in order to monitor the temperature of fast-spinning drives. Accordingly, an additional controlled fan can be directed at this area and linked with the external sensor (see software).



Fig.: Sensor T26139-Y3718-V3

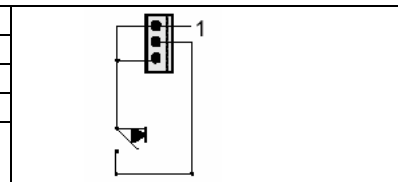
Power supplies

A special power supply with an 8 pin control input which is primarily installed in Fujitsu Siemens Computers PCs is required to control the power supply fan. In power supplies without control input, the power supply fan is indicated as “not present” and consequently is also not monitored or controlled. Nonetheless, this type of power supply does not restrict the remaining thermal management functions.

Case open switch (intrusion)

A switch that meets the following requirements is required in order to monitor opening of the case:

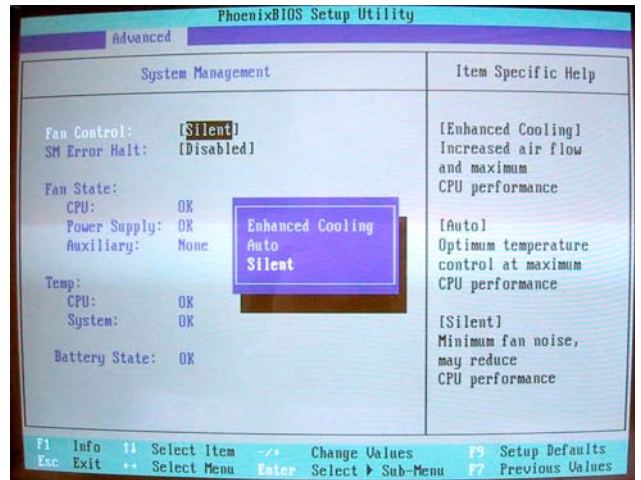
Pin	Signal
1	GND
2	Case open (low asserted)
3	Intrusion switch present (low asserted)



The status of the housing can be interrogated with the optional software (e.g. DeskView). In addition the BIOS allows monitoring of the housing opening. If it is established that the housing is open the BIOS password which may possibly have been assigned is requested when the system is next booted.

BIOS

Various settings can be selected in the BIOS in order to optimize cooling performance in line with the user’s requirements. The following alternatives are available under menu item “Advanced – System Management”.



Silent

If noise reduction is more important than the performance of the system, "Silent" is the right setting. In spite of the CPU being throttled, performance is entirely adequate for Office applications.

Features:

- Fans are allowed to switch off at low temperatures.
- The CPU is throttled before the CPU fan starts to operate.

Auto

This setting is appropriate for most standard systems and is set ex works. Performance and noise generation are weighted equally.

Features:

- Fans operate at minimum speed at low temperatures.
- The CPU is throttled as soon as the fans are speeded up.

Enhanced Cooling

This is the right setting for systems with high performance requirements where noise level is not so critical.

Features:

- Fans operate at minimum speed at low temperatures.
- The CPU is not throttled until shortly before the critical temperature is reached.

The setting selected in the BIOS is saved and automatically restored at each system start.

Software

Fujitsu Siemens Computers offer a software tool capable of interpreting Silent Fan controller data. Some device settings can also be changed.

SystemGuard (for Windows)

SystemGuard reads measured values directly from the Silent Fan controller and displays them in edited form. Temperatures and fan speeds are shown and presented graphically together with the corresponding numeric values.

SystemGuard also allows fan-sensor relationships to be changed and the throttling temperature to be set. Settings selected with SystemGuard are only valid until the next restart. When the PC is started up, the values are written from the BIOS into the controller. When SystemGuard is launched (e.g. via startup group within Windows), its settings are transferred again.

SystemGuard is freeware, is available for download on the Internet and is included on the OEM Driver & Utility CD.

For further information see ProductFacts SystemGuard.

Information and downloads

Information:

<http://www.fujitsu-siemens.com/mainboards>

Downloads (manuals, drivers, BIOS):

<http://www.fujitsu-siemens.com/support/>