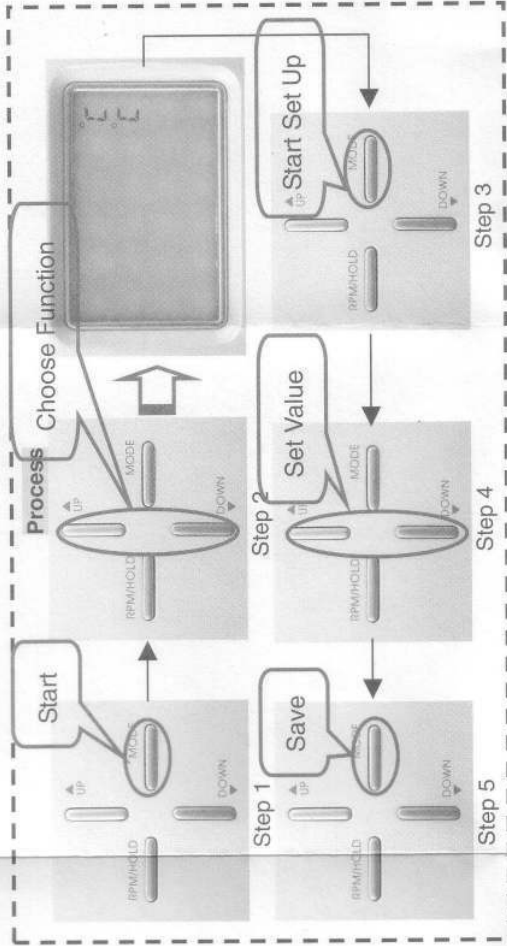


Quick Guide

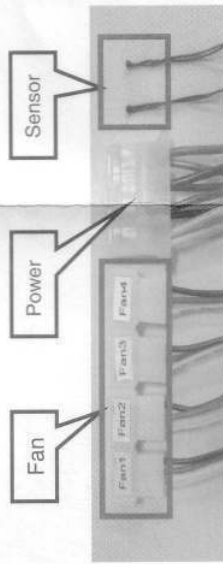
4. Setting up your ComboSpY



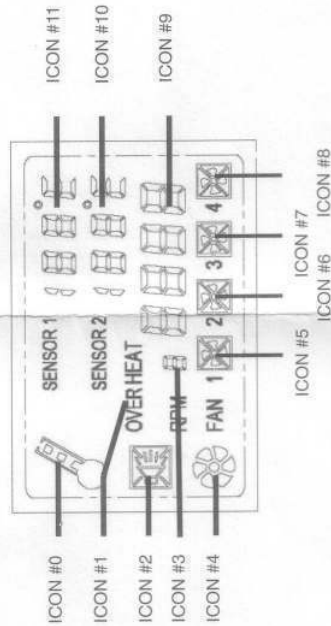
1. Technical Specifications

Power Source: Standard 4-pin connector of FC's power
 Number of Temperature Sensor: 4
 Monitoring Temperature Range: 0°C - 90°C (32°F-194°F)
 Maximum Number of Fans: 4 Fans
 Monitoring Fans Speed Ranges: 0 - 9999 RPM
 Maximum Fan Power: 1000mA/1 Amp or 12 Watts per fan
 Dimension (WxHxD): 150mm x 41mm x 155mm (5.9" x 1.6" x 6.1")
 Weight: 360g

2. Connection diagram



3. LCD Panel Overview



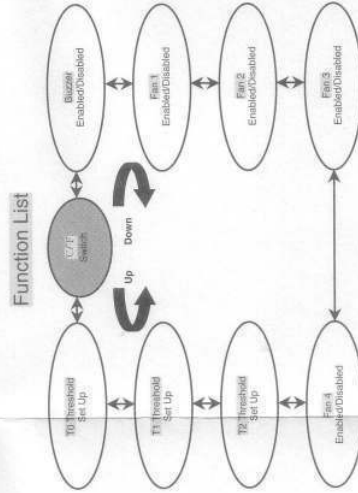
ICON No.	Description	ICON No.	Description
0	Chassis Temperature Status	6	Fan #2 Status
1	Over Heat Status	7	Fan #3 Status
2	Buzzer State	8	Fan #4 Status
3	RPM Display Fan Number	9	Fan RPM Value
4	Chassis Fan Speed Control State	10	Thermal Sensor #2 Value
5	Fan #1 Status	11	Thermal Sensor #1 Value

Temperature Range

Temperature	Icon	Bottom	Upper
T0	🌡️	18°C (64°F)	25°C (77°F)
T1	🌡️	38°C (100°F)	42°C (108°F)
T2	🌡️	45°C (107°F)	85°C (185°F)

System Alert and Suggestion

Error No.	Alert	Condition	Buzzer Action	Suggestion
1	🔊 : Blinking	Fan 1 Fail	Change Fan	Change Fan
2	🔊 : Blinking	Fan 2 Fail	Change Fan	Change Fan
3	🔊 : Blinking	Fan 3 Fail	Change Fan	Change Fan
4	🔊 : Blinking	Fan 4 Fail	Change Fan	Change Fan
5	🌡️	Temperature over T0	Pre-Alert	Check Fan
6	🌡️	Temperature over T1	Alert	Check System
7	🌡️	Temperature over T2	Alert	Check System



Warning: The "ComboSpY" device is designed to control for System ambient temperature. So never put a temperature sensor between a processor or silicon chip and a heat sink. Also never connect Fan tachometer to CPU-cooler fan. If fan tachometers connect to CPU-cooler fan, it will decrease the performances of the heat sink to cool processor or chip. In the condition the electronic equipment will be damaged by high temperature.

ComboSpy

Computer Cooler & Silencer

ENlight

www.ENlightcorp.com

FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/television technician for help.

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Shielded interface cables, if any, must be used in order to comply with the emission limits.

CE Mark

This equipment is in conformity with the EMC directive

Warning

The "ComboSpy" device is designed to control for System ambient temperature. So never put a temperature sensor between a processor or silicon chip and a heat sink. Also never connect Fan tachometer to CPU-cooler fan. If fan tachometers connect to CPU-cooler fan, it will decrease the performances of the heat sink to cool processor or chip. In the condition the "ComboSpy"'s electronic equipment will be damaged by high temperature.

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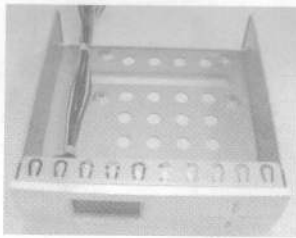
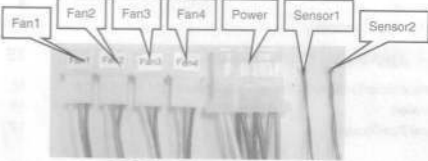
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Chapter 1 Introduction

1.1 Feature Overview

- Automatically get the balance between system temperature and noise.
- Support 2 thermal sensors to detect ambient temperature.
- Support 4 Fan tachometers and speed control.
- No batteries required: connects directly to your PC's power source.
- Provides 4 push buttons to set board configuration easily.
- Unit quickly installs in 5.25" bay and provides an option for hard drives fixing.
- Build-in an LCD panel to display temperature and fan speed immediately.
- Graphic to show system ambient status and fan speed status.
- Provide a buzzer and graphic blinking for system alert, if any error is occurred or system temperature higher than your setting.
- Get more system thermal budget to protect system.
- Reduce adjusting times when the season or temperature change.
- Keep the electronic equipment life and performances.

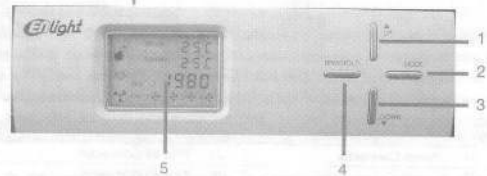
1.1.1 Figure and Accessories



User Manual *1
Screw *4
Sensor Tape *4

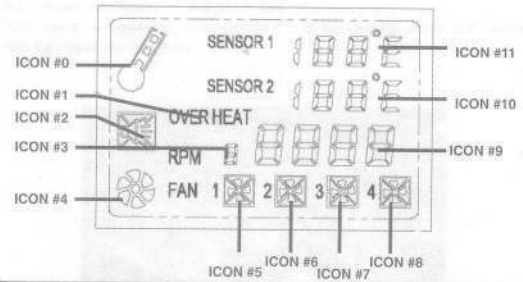
1.2 Board Overview

1.2.1 Front View



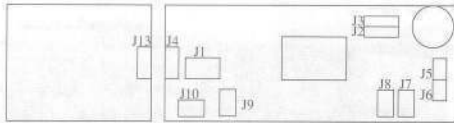
Part No.	Description	Part No.	Description
1	UP Button	4	RPM/HOLD Button
2	Mode Button	5	LCD Display
3	Down Button		

1.2.2 LCD Panel Overview



ICON No.	Description	ICON No.	Description
0	Chassis Temperature Status	6	Fan #2 Status
1	Over Heat Status	7	Fan #3 Status
2	Buzzer State	8	Fan #4 Status
3	RPM Display Fan Number	9	Fan RPM Value
4	Chassis Fan Speed Control State	10	Thermal Sensor #2 Value
5	Fan #1 Status	11	Thermal Sensor #1 Value

1.2.3 Back View



Part No.	Description	Part No.	Description
J1	Power Connector	J7	Fan #4 Connector
J2	J8	Fan #3 Connector
J3	J9	Fan #2 Connector
J4	Switch Daughter Board Plug	J10	Fan #1 Connector
J5	Thermal Sensor Connector #1	J13	Switch Daughter Board Receptacle
J6	Thermal Sensor Connector #2		

Chapter 2 Installation

2.1 Planning Your Setup

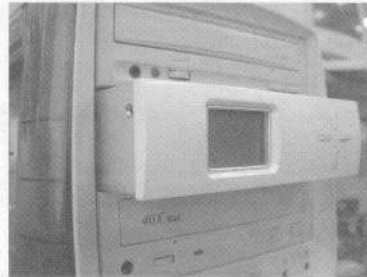
Warning : The "ComboSpy" device is designed to control for System ambient temperature. So never put a temperature sensor between a processor or silicon chip and a heat sink. Also never connect Fan tachometer to CPU-cooler fan. If fan tachometers connect to CPU-cooler fan, it will decrease the performances of the heat sink to cool processor or chip. In the condition the electronic equipment will be damaged by high temperature.

The Device comes with up to 2 Temperature Sensors (Thermistors) and can control and monitor the speed (RPM) of up to 4 fans. The Device can control +12 VDC fans whose current requirements do not exceed 1000mA or 1 Amp. In order to use the Fan Speed (RPM) Monitoring function, your fan must have an RPM pin, usually identifiable by a RPM wire on a 3-pin connector.

2.2 Installing Your ComboSpy

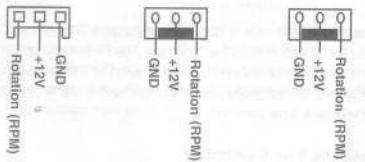
2.2.1 Install The ComboSpy In a 5 1/4" Bay

First, mount the **ComboSpy** in an external 5 1/4" Bay. Install it as in 5 1/4" device with the screws provided in the package.



2.2.2 Connecting The Fans

Each Fan Connector has three wires, GND, +12VDC and RPM Speed. The default color is red for the power (+ 12VDC), black for the ground (GND) and the yellow for the RPM Speed. Each **ComboSpy** comes with a fan, designated at the factory as Fan 1. All other Fan Connectors are clearly marked as Fan 2, Fan 3, Fan 4. Although there should be only one way to attach each Fan Connector to each Fan, make sure the wires are matched up correctly. If you are using a 2-pin fan the RPM wire will not be used.



Fan Cable Fan Control Board Motherboard

Pin explain

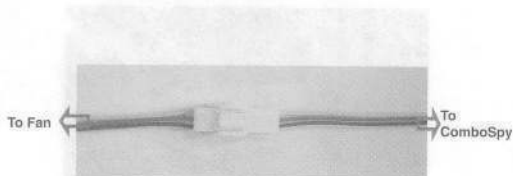


Fig. 2-1

2.2.3 Connecting Power Cable

The **ComboSpy** is designed to connect to one standard 4-pin female connector of PC's power source. This **ComboSpy** just work normally that be connected the correct way. Following is a drawing of the power cable installation with **ComboSpy**.

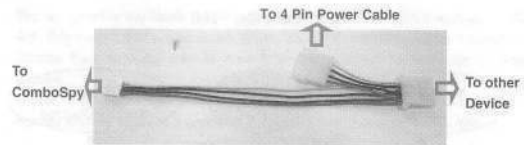


Fig. 2-2

2.2.4 Install The Temperature Sensors

There are two types of Temperature Sensors included in your **ComboSpy**. Suggest you can attach one of them above the CPU cooler, leave it in an open area to monitor the surrounding ambient temperature, or also attach the other one to a flat surface such as the rear of your hard drive. The position is as following.

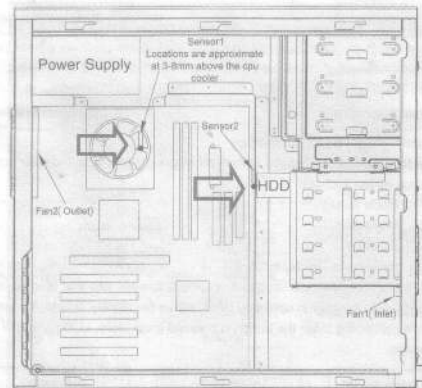
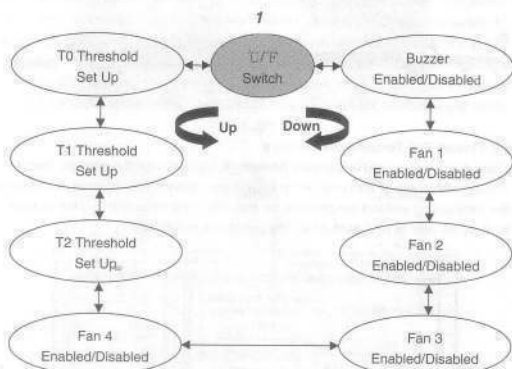


Fig. 2-3

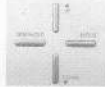
2.3 Function List



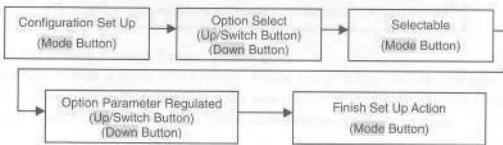
2.4 Setting Up Your ComboSpy

There are four buttons that located at front panel board to provide end-user to operate configuration option such as:

- Mode Select
- Up/Switch
- Down
- Fan Speed Display Hold



The "Fan Speed Display Hold" button is a special function key that is used to pause the display every chassis fan speed by RPM. When the display is held, the fan speed detection is continuing. After the button is pressed once more, LCD panel will back to original mode.



The first press of the **Mode Button** will present you with the following display - **Fig. 4-1**. This means that temperatures shown on the **ComboSpy** will be measured in Celsius. Each time you want to move to the next function press the **Up or Down Button**.

In your re-configure operation, after you finish the setting, system returned to normal display mode in 5 seconds and saved the setting automatically.



Fig. 4-1

Set 1 : Changing Temp Units (Celsius(°C) or Fahrenheit(°F)) (Default °C)

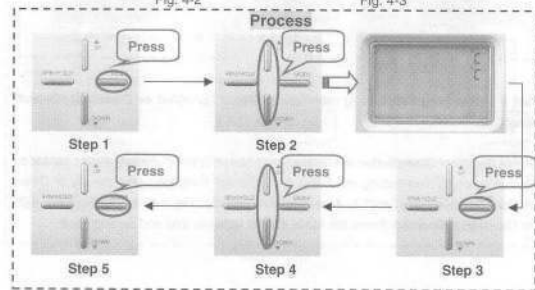
Press the Up or Down Button to choose Units Function. Press the Mode Button again to start setting the Units value. Use the Up or Down Button to change the units value (°C Fig. 4-2 or °F Fig. 4-3). Press the Mode Button again to End and Saving.



Fig. 4-2



Fig. 4-3



Set 2 : Changing Buzzer status (Enabled or Disabled) (Default Enabled)

Press the Up or Down Button to choose Buzzer Control Function, Press the Mode Button again to start setting the Buzzer Control Function, Use the Up or Down Button to change the Buzzer setting from Enabled(Fig. 4-4) to Disabled(Fig. 4-5) or Disabled to Enabled, Press the Mode Button again to End and Saving.

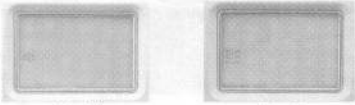
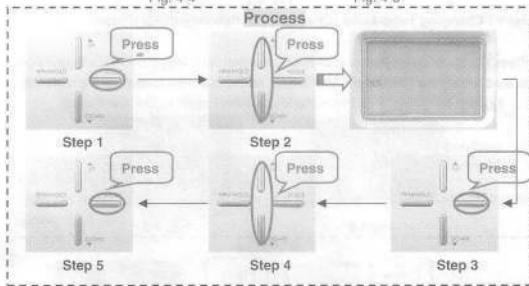


Fig. 4-4

Fig. 4-5



Set 3 : Changing Fan(1 to 4) monitoring Status (Enabled or Disabled) (Default Enabled)

Press the Up or Down Button to choose Fan(1 to 4) Control Function . Press the Mode Button again to start setting the Fan(1 to 4) Control Function . Use the Up or Down Button to Change the Fan(1 to 4) setting from Enabled(Fig. 4-6) to Disabled(Fig. 4-7) or Disabled to Enabled, Press the Mode Button again to End and Saving.

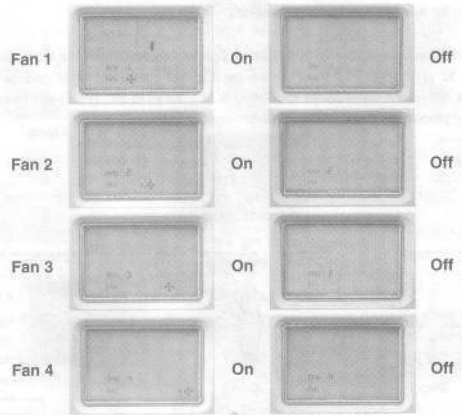
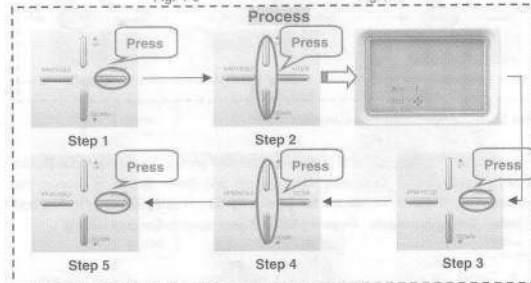


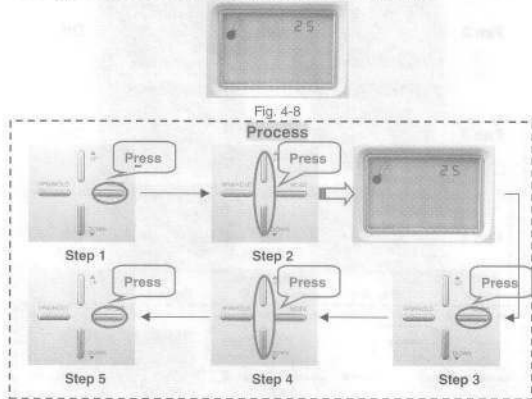
Fig. 4-6

Fig. 4-7



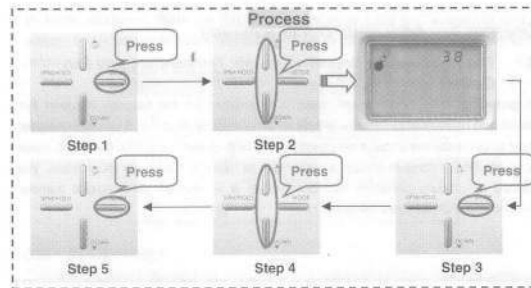
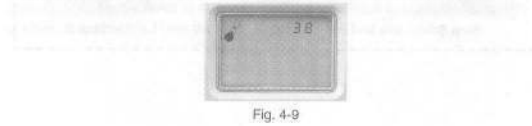
Set 4 : T0 Temperature Value Adjustment

Press the Up or Down Button to choose T0 Control Function. Press the Mode Button again to start setting T0 Values. Use the Up and Down Button to change the values .The range of T0 values for Celsius is 18°C (64°F) to 25°C (77°F) and Rotation Setting procedure . Press the Mode Button again to End and Saving.



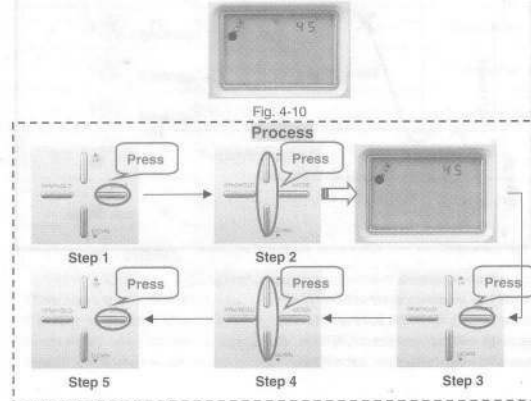
Set 5 : T1 Temperature Value Adjustment

Press the Up or Down Button to choose T1 Control Function, Press the Mode Button again to start setting T1 Values. Use the Up and Down Button to change the values .The range of T1 values for Celsius is 38°C (100°F) to 42°C (107°F) and Rotation Setting procedure . Press the Mode Button again to End and Saving.



Set 6 : T2 Temperature Over-Heat Value Adjustment

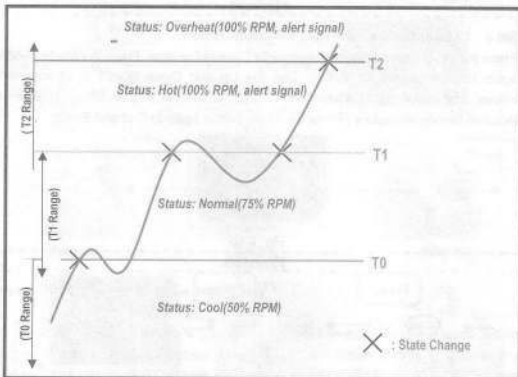
Press the Up or Down Button to choose T2 Control Function. Press the Mode Button again to start setting T2 Values. Use the Up and Down Button to change the values .The range of T2 values for Celsius is 45°C (113°F) to 55°C (131°F) and Rotation Setting procedure . Press the Mode Button again to End and Saving.



Chapter 3 Additional Documentation

3.1 The Relationship Between Chassis Temperature and Fan Control

In general chassis environment, there is a question for the balance between fan speed and noise. Because there is a direct proportion relation. I.e. If chassis designer want to decrease the chassis temperature, the high-speed fan will be used and noise is rising. So we must to design an algorithm to balance those two parameters. We divided all chassis condition into four states. It is classed with chassis thermal threshold and contains as following:



This is the temperature threshold set to control fan speed:

Below T0 – fan rotate at 50% RPM

Below T0 – T1 fan rotate at 75% RPM

Below T1 – T2 fan rotate at 100% RPM , alert signal

Above T2 – overheat, alert, 100% RPM

In above illustration, there are three thresholds to be used and opened to user to adjust. Every threshold value adjustment has its range restriction and shows as below:

Temperature	Icon	Bottom	Upper
T0		18°C (64°F)	25°C (77°F)
T1		38°C (100°F)	42°C (107°F)
T2		45°C (113°F)	55°C (131°F)

3.2 System Alert

This control board also provides a subroutine to handle all the system error messages and delivered it via various mediums. When any condition is occurred, its corresponding actions and condition are activated immediately and lists as following:

Error No.	Actions	Condition	Buzzer action	Action
1	: Blinking	Fan 1 Fail.	-----	Change Fan
2	: Blinking	Fan 2 Fail.	-----	Change Fan
3	: Blinking	Fan 3 Fail.	-----	Change Fan
4	: Blinking	Fan 4 Fail.	-----	Change Fan
5		Temperature over T0	-----	-----
6		Temperature over T1	Pre-Alert	Check Fan
7	OVERHEAT	Temperature over T2	Alert	Check System

There has a special design for buzzer action when some error conditions are triggered. If buzzer is disabled when chassis temperature is over T1, then it is turned on automatically when chassis temperature is over T2. But if it is disabled again and chassis temperature is decreased continuously, then buzzer should stay at prior state.

3.3 Technical Specifications

Power Source : Standard 4-pin connector of PC's power
Number of Temperature Sensors : 2 Sensors
Monitoring Temperature Ranges : 0°C - 90°C (32°F-194°F)
Maximum Number of Fans: 4 Fans
Monitoring Fans Speed Ranges: 0 - 9999 RPM
Maximum Fan Power: 1000mA(1 Amp) or 12 Watts per fan
Dimension(WxHxD) : 150mm x41mm x155mm.(5.9"x1.6"x6.1")
Weight : 360g

(ComboSpy just can operate during 0°C - 60°C temperature range)

