DigitalDOC5+

EXTRA SENSORY PROTECTION

User Manual

& Installation Guide

Index

CHAPTER 1 INTRODUCTION 3

About This Manual 3
The DigitalDoc5+ 3
Features 4
What's Included 5

CHAPTER 2 INSTALLATION 6

Planning Your Setup 6
Installing the DigitalDoc5+ 7
The Temperature Sensors 7
Connecting the Fans 8
Connecting the USB/Firewire Extension 8
The Power Cable 8
Installing the DigitalDoc5+ in an open 5 1/ 4" Bay 8

CHAPTER 3 SETTING UP YOUR DIGITALDOC5+ 9

The Main Display Area 9
Button Functions 9
Factory Presets 10
Getting Started 10
Step-By-Step Instructions 11
Step 1: Changing Temp Units from Celsius (°C) to Fahrenheit (°F) 11
Step 2: Temperature Set-Points 11
Step 3: Fan Monitoring and Rotation Settings 12
Step 4: Power Tolerance Settings 13

CHAPTER 4 USING YOUR DIGITALDOC5+ 14

Button Functions 15
Three Modes of Operation 16
Normal Operating Mode 16
Scan Mode 16
Alarms and Warnings 17
Excessive Temperature Warning 17
Fan Problem Indicator 17
Power Tolerance Warning 18

CHAPTER 5 ADDITIONAL DOCUMENTATION 19

Technical Specifications 19
DigitalDoc5+ Thermal Sensor Worksheet 20

Chapter 1 Introduction

About This Manual

Throughout this manual you will see icons on the left margin that denote either Notes or Cautions as outlined below.

Denotes a Caution or Warning. Pay particular attention to these, as they will prevent you from harming your system or DigitalDoc5+.

Denotes a Note or Tip. These will give you Tips, Notes or Good Ideas on how to use and set up your DigitalDoc5+ more effectively.

The DigitalDoc5+

The new generation DigitalDoc5+ thermal sensor is the only automatic monitor of system temperature, fans, and voltage, simultaneously scanning eight temperature settings and eight fans, as well as the stability of the DC +5V or +12V power supply. In addition, you can set the cycle time to automatically scan each channel's temperature, fan speed and rotation status (Scan). If the temperature rises to the adjustable set-point value, the fan for that channel will automatically switch on to pull cool air in or hot air out, effectively lowering the temperature. In the event that the temperature continues to rise (exceeding 3 C above the set-point), a warning beeper will be activated. This alerts the user or MIS, to use this additional time to decrease the loading of the computer equipment that is causing the excessive temperature problem, thus preventing valuable data loss and system damage.

This manual is arranged in a logical progression from installing your DigitalDoc5+ to setting it up and finally using it.

Features

- **Monitoring temperature range:** 0°-90° degrees C (32°-194° F). User can adjust the set-point value. If the temperature reaches the set-point, the fan for that channel is automatically activated; after the fan has been turned on, if the temperature continues to rise an additional 3°C above the set-point, the unit will issue a warning signal.
- **Monitors both DC +5V and +12V power sources:** the power tolerance warning can be set to any of four values: 5%, 10%, 15%, and 20%. If this tolerance is broken either by a voltage slump or a voltage spike the unit will warn the user.
- **No batteries required:** connects directly to your equipment's DC +12V power source. You do not need additional batteries to operate this unit.
- **LCD back-lighting function:** convenient for diagnostic work and for adjusting the settings. The back-lighting function can be set to be “always on”, or to just be on when in use (Scan Mode), reducing electricity use and environmental energy needs.
- **Uses EEPROM memory chip** to save all settings. When equipment is turned on, there is no need to re-enter settings.
- **Unit easily installs** in any 5.25" opening; takes up minimal space and still provides enough room for an additional hard drive.
- **Supports eight fans** while simultaneously monitoring fan speed (RPM). Can be used with any DC +12V fan with maximum start-up current requirement of up to 1000 mA per channel.
- **All connected fans can be turned on** when the power is turned on, or only a portion of them. This reduces energy consumption and creates a quieter work environment.
- **Comes with override fan control function.** User can turn on fan at any time with the FORCE function, without having to wait for the temperature to rise.
- **Front Extension for USB and Firewire;** for connection to user's motherboard or PCI Host Card.
- **Facilitates objective scientific analysis** or MIS investigation; quickly clarifies problem source in equipment or system.
- **Especially suitable for DIY applications,** the DigitalDoc5+ can be used with RAID towers, servers, industrial PCs, and personal computers.

What's Included

The DigitalDoc5+ should come with the following:

DigitalDoc5+ Unit Screws (2 types)..... 15pcs

Thermal Tape..... 8pcs

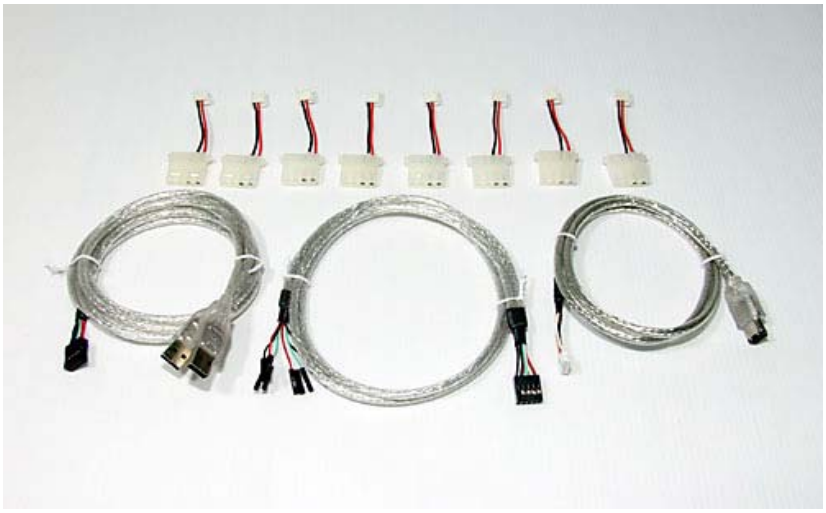
Sensors (2 types - 6 flat and 2 round)..... 8pcs

Fan Cables (labelled and colour coded).....8pcs

Converter (fan connector 4pin to 3pin).....8pcs

USB extension cable (2 types)..... 2pcs

Firewire extension cable..... 1pc



Tip: *It is a good idea to mark each end of all your Temperature Sensors with the number of that Sensor's Channel. This way if you ever have to disconnect either side, you will know which Sensor goes with which Channel. To help you following the lines through your system, each cable is colour coded and fits with the colour of the according fan cable.*

Chapter 2 Installation

Planning Your Setup

The DigitalDoc5+ comes with 8 Temperature Sensors (Thermistors) and can monitor the speed (RPM) of up to 8 fans. The DigitalDoc5+ can control all kinds of DC +12V fans whose current requirements do not exceed 1000mA or 1 Amp, regardless of whether the fan has a 3-pin or 4-pin connector. In order to use the Fan Speed (RPM) Monitoring function, your fan must have an RPM Sensing Control, usually identifiable by a Yellow wire on a 3-pin connector. **Please take note if you are hooking up a fan which has no RPM Sensing (2-pin or 4-pin), as you will have to Disable that fan's monitoring function in the DigitalDoc's Set-Up Mode** (Described later in Chapter 3). You can use the *Worksheet* at the end of this manual to record which fans have RPM Sensing and which do not.

The fans are controlled by either Temperature Set-Points (a temperature you set at which the fan will come on) or manually, by setting the fan to always be on. A Temperature Set-Point is reached when its' Temperature Sensor (Thermistor) hits the Temperature you set for that Sensor. This is all done through the Set-Up Mode, which will be explained in detail in Chapter 3 **Setting Up Your DigitalDoc5+**.

Before you begin installing your DigitalDoc5+ you may want to plan how you are going to set up your system. Since each Temperature Sensor has a corresponding fan, you will want to match them up (colour), so if a Temperature Sensor hits your Temperature Set-Point, the corresponding fan will come on. Here is an example of how you would set up one of your fans and Temperature Sensor:

Example: Assume you have a Video Card Cooler (a fan that sits on top of your Video Card to cool down its' chipset). You attach the Number 2 Temperature Sensor to your Video Card's Heatsink to monitor the Heatsink's Temperature. You would then plug your Video Card Cooler's fan into the Number 2 fan Connector on the DigitalDoc5+ and set the DigitalDoc5+ to turn that fan on when the Number 2 Temperature Sensor hits, say 40 degrees Celsius.

You would repeat this for as many fans and Temperature Sensors as you are going to use. You may want to route one Temperature Sensor outside your case to record the room's ambient temperature. This will give you a good idea of your cooling setup's effectiveness. There is a Table at the end of this manual in which you can record where you put your Temperature Sensors and which fans are connected to which DigitalDoc5+ fan connectors. This will be useful once you close up your computer case, as you will not be able to see where everything is. It is highly recommended that you fill out the worksheet, even before you install the DigitalDoc5+ as noted above.

Installing the DigitalDoc5+

The Temperature Sensors

There are two types of Temperature Sensors included with your DigitalDoc5+. The flat type, ***Fig. 2-1,*** is good for attaching to any flat surfaces, such as the motherboard chip set, *See* ***Fig. 2-4.*** The bulb type, ***Fig. 2-2,*** can be used in many ways. You can insert it in between the fins of a heat sink, leave it in an open area to monitor the surrounding ambient temperature, or also attach it to a flat surface such as the top of your hard drive. Use the included Thermal Tape, ***Fig. 2-3,*** to attach the sensors to heat sources.

Fig. 2-1

Fig. 2-2

Fig. 2-3

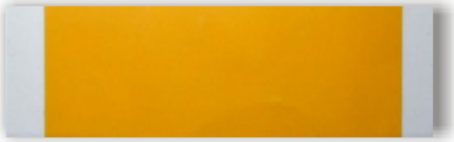
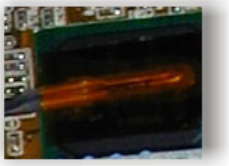


Fig. 2-4



If you followed the tip of marking each sensor's channel, attach it to the corresponding **Two-Pin Connector** on the back of the DigitalDoc5+ Shown in ***Fig. 2-5.*** ***Note:*** Either orientation can be used when connecting the sensors.

Two-Pin Sensor Connector

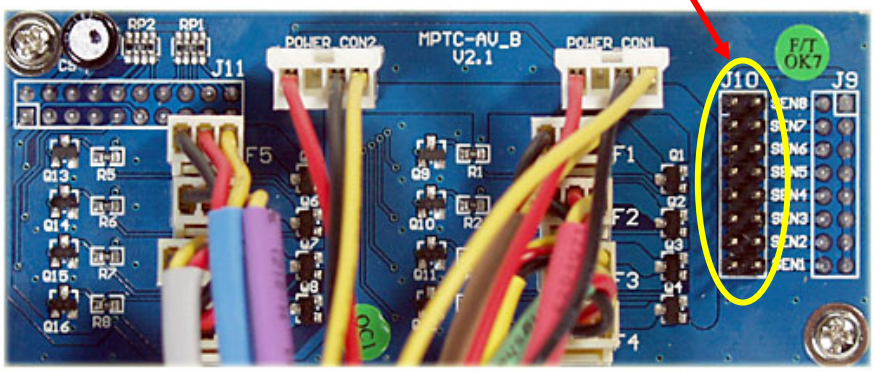


Fig. 2-5

Tip*: It is recommended to first attach your sensors to their pins* ***Fig. 2-5,*** *feed them through the external bay, put the DigitalDoc5+ temporarily in the bay, hook the fans and power cable up, install it in the bay using the screws that came in the box and then finally to attach the sensors to their heat sources and/ or locations.*

Warning*: Never put a temperature sensor in between a processor or silicon chip and a heat sink. While this may give you a more accurate temperature, it will decrease the ability of the heat sink to cool down your chip.*

Tip*: Your DigitalDoc5+ also acts as a Front Extension for your USB and Firewire port. You can easily connect and disconnect your peripherals. If not in use, close the door to cover it up. Cool!*

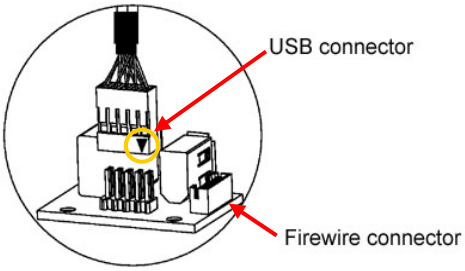
Connecting the Fans

Each Fan Connector has three wires, red, black and yellow. The red wire is the power (DC +12V), black is the ground (GND) and yellow is the RPM Speed.

All Fan Connectors are clearly marked as Fan 1, Fan 2, Fan 3... Although there should be only one way to attach each Fan Connector to each Fan, make sure the wires are matched up correctly. Unless you are connecting a 2-pin fan, red should match with red, black with black and yellow with yellow. If you are using a 2-pin or 4-pin fan the yellow wire will not be used.

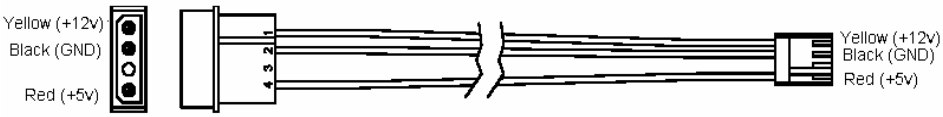
Connecting the USB/Firewire Extension

Attach the cables you want to use for the front extension to your motherboard or PCI Host Card. For USB, if you don't use the connectors for the PCI Host Card, connect it to your motherboard according to the labels on each pin. For Firewire, either use your internal port on the 1394a PCI Host Card or plug it into to the ports at the back of your PC.



The Power Cable

The DigitalDoc5+ Thermal Sensor is designed to connect to a DC +12V power source, no batteries are required. One end of the power source cable supplied with the unit is a standard 4-pin female connector; it is designed so that there is no way to incorrectly insert it. The connector at the other end connects to the DigitalDoc5+ PCB at location marked PWR_CON. This connector is also designed so that it can only be connected the correct way. Following is a drawing of the power cable:



Installing the DigitalDoc5+ in an open 5 1/ 4" Bay

After you attach the power cable you can now mount the DigitalDoc5+ in any open External 5 1/ 4" Bay. Install it as you would any 5 1/ 4" device with the screws provided in the package.

Chapter 3 Setting Up Your DigitalDoc5+

Note*: The display area shown in Fig. 1 features a back-light LCD. The backlight can be set to turn off when not in use to conserve energy or you can have it lit all the time.*

The Main Display Area

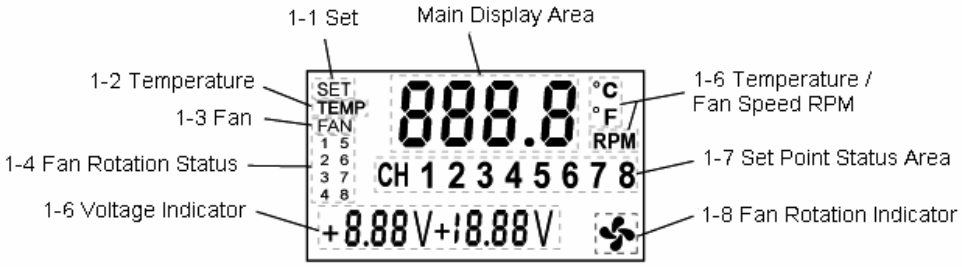


Fig. 1 LCD Display

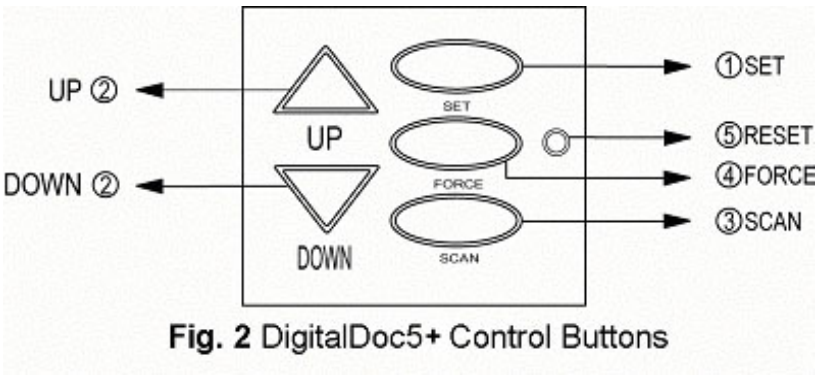


Fig. 2 DigitalDoc5+ Control Buttons

Button Functions

We are now going to set up the DigitalDoc5+ and get it ready for use. But first let's go over the Button Functions as displayed in **Fig. 2**, as they relate to Set Up:

2-1 **Up Button:** The Up button will change the Temperature Set-Points and Voltage Tolerance settings as well as, let you choose different options.

2-2 **Down Button:** Same as Up only Down.

2-3 **Set Button:** This is the button we need to use now to set up the DigitalDoc5+.

2-4 **Force Button:** This will force all your fans to come on.

2-5 **Reset Button:** This will set all the settings back to the default factory values.

2-6 **Scan Button:** Used to go into Scan Mode. More on that later. Figures 1 & 2 will be fully explained in Chapter 4 Using Your DigitalDoc5+.

Factory Presets

Before the DigitalDoc5+ leaves the factory the values are set to the following:

- All Temperature Set-Points are set to 50° C.
- All Fans have been "turned off" and its' RPM monitoring disabled. We will set all the fans during this set up procedure.
- The power tolerance warning range is set at +5% (or +0.25V) for DC +5V, and for DC +12V, the range is +0.6V.

If you make a mistake when setting the system values, you can change all the values back to those of the factory settings. This is accomplished by pressing and holding the SET button before the power is turned on. After turning the power on, wait until you hear two short beeps and release the button, the resetting is completed.

Tip*: You can leave Set-Up Mode at any time by not pressing any button for 5 seconds. All values will automatically be saved.*

Getting Started

To begin the set up procedure you need to press the **Set Button** on your DigitalDoc5+. This will bring you into Set-Up mode and will allow you to change all the settings according to your setup. At any time, if you do not press a button within 5 seconds, the DigitalDoc5+ will return to Normal Operating Mode and you will have to restart the set up procedure by pressing the **Set Button** again.

Here is a basic flow chart outlining the steps involved in setting up your DigitalDoc5+. Later in this chapter we will go through these Step-By-Step. Each time you press the **Set Button** you will continue on to the next setting. You will use the **Up** and **Down Buttons** to change the settings such as Fan On-Off, RPM Sensing Enabled or Disabled, Temperature Levels and Power Tolerance Levels.

Note*: Have your Worksheet in front of you when you go through the set up procedure. It will help you throughout the set up procedure by showing you which fans are RPM Sensing or not.*

A) Celsius (C) or Fahrenheit (F) temperature unit selection.

B) Individual channel set-point selection, starting with the temperature setting for channel 1 (CH1) and proceeding through the set-points of all channels.

C) Fan rotation monitoring and rotation control setting, starting from fan 1 (FAN1). When initially setting the fan rotation control function, the screen will display either [En] or [diS].

Note: [En] indicates that the fan speed monitoring function is on, i.e. *enabled*; [diS] indicates that it is off for this fan, i.e. *disabled*.

Next is the override fan control, with the display showing either [On] or [Off]. [On] indicates that the override function is on (i.e., the fan is turned on whenever the power is turned on to the unit).

Tip: *If you hold down a button and do not release it, the value quickly increases or decreases. When you reach the desired set-point value, release the button.*

Tip: *Pressing the **Scan Button** during Set-Up Mode toggles the Back-light Function On and Off. When it is set to off it will only turn on when in use (Scan Mode).*

D) Four levels of DC +5V power tolerance range settings: 0.25, 0.5, 0.75, and 1.0V.

E) Four levels of DC +12V power tolerance range settings: 0.6, 1.2, 1.8, and 2.4V.

Step-By-Step Instructions

The first press of the **Set Button** will present you with the following display ***Fig. 3-1.*** This means that all temperatures shown on the DigitalDoc5+ will appear in Celsius. Each time you want to move to the next function press the **Set Button**.

Fig. 3-1

Step 1: Changing Temp Units from Celsius (°C) to Fahrenheit (°F)

The LCD will show a flashing °C ***Fig. 3-2*** or °F ***Fig. 3-3*** symbol. Press the **Up** or **Down Button** once to change the units.

Fig. 3-2

Fig. 3-3

Step 2: Temperature Set-Points

Press the **Set Button** again to start selecting the Temperature Set-Point values. These are the temperatures you set at which the fans will come on. The fans will turn off as soon as the temperature reaches 5% below that point. Each time you press the **Set Button** the next channel (CH1.... CH8) will be displayed. Use the **Up** and **Down Buttons** to change the temperature values.

Fig. 3-4 shows Channel 1's (CH 1) Temperature Set-Point is set to 50° Celsius. **Note:** *The range of temperature values for Celsius is 0° to 90° C; and for Fahrenheit is 32° to 194° F.*

Fig. 3-4

Warning: *The rotation monitoring function depends on the rotation signal put out by the fan. If you use common 2-pin or 4-pin fans or fans with the signal disabled, then you must turn off the rotation monitoring function by selecting [diS], or a warning alarm will sound.*

Step 3: Fan Monitoring and Rotation Settings

Pressing the **Set Button** again will take you through the Fan Monitoring and Rotation Settings procedure. Each fan's setting includes fan speed monitoring and fan override rotation control.

A) The fan speed monitoring function can be turned on with [En] ***Fig. 3-5,*** and off with [diS] ***Fig. 3-6.*** Use the **Up** and **Down buttons** to change the setting from Enabled [En] to Disabled [diS], and remember do not Enable a fan's monitoring function if it does not have an RPM Sensing Control **(check your worksheet).** Doing so will result in an alarm being set off because the DigitalDoc5+ thinks the fan is not working or its' RPM has dropped below 500.

Warning: *If you connect your main processor's fan to the DigitalDoc5+ you should set that fan's Rotation setting to [ON]. This way the fan will be forced on every time you use your computer. You may want to do this for all your vital fans.*

B) Pressing the **Set Button** again takes you to that fan's rotation or override setting. The LCD displaying [On] ***Fig. 3-7*** or [Off] ***Fig. 3-8*** indicates that you can set the fan's rotation control; [On] which forces the fan on all the time, while [Off] turns the fan off, allowing this fan to be controlled by your Temperature Set-Point. Again use the **Up** and **Down Buttons** to change the setting from [On] to [Off]. **Note***: If you want this fan to turn on every time you turn on the computer, then you must set this item to [On], forcing the fan to turn on.*

Fig. 3-5

Fig. 3-6

Fig. 3-7

Fig. 3-8

C) Pressing the **Set Button** again will move you to your next fan. Repeat steps **A** and **B** for as many fans as you have connected.

Step 4: Power Tolerance Settings

Pressing the **Set Button** again will now take you to the final procedure, the Power Tolerance Settings. There are two settings, the DC +5V Tolerance ***Fig. 3-9*** and DC +12V Tolerance ***Fig. 3-10.*** Use the **Up** and **Down Buttons** to cycle through the range of values.

A) Set the DC +5V tolerance to one of the four range values: +0.25, +0.5, +0.75, and +1.0V. **Note:** *For most electronic circuits using DC +5V working power with a highly stable source, we suggest that the tolerance be set at 0.25V (5%).*

B) Press the **Set Button** again to reach the DC +12V tolerance setting.

C) Set the DC +12V tolerance to one of the four range values: +0.60, +1.20, +1.80, and +2.40V.

Note: Most DC +12V sources are used for hard disk drive and CD drive motors, or for fans. When no devices are running, the power needs are not excessive, and surges in the power will not be too great. But when the loading is higher, the system can generate large changes in the power source, especially evident for example, when a CD drive spins-up. Outside a certain range in the power supply, your system may experience errors in operation, so you must pay attention to the power tolerance range setting.

Fig. 3-9

Fig. 3-10

Finally, pressing **Set Button** again will bring you out of Set-Up Mode and return you back to Normal Operating Mode.

Chapter 4 Using Your DigitalDoc5+

Overview

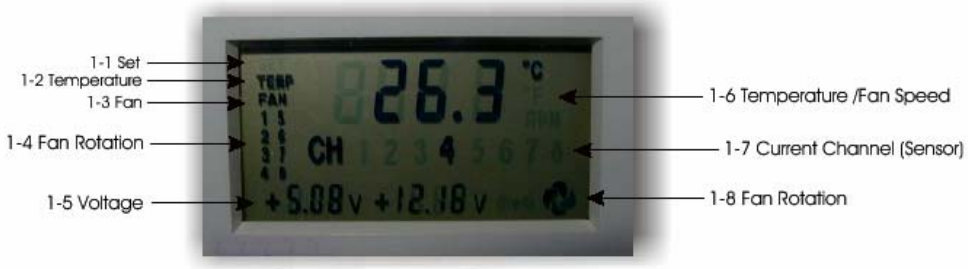


Fig.1 LCD Display (Back-light Off)

The Main Display Area

Fig. 1 shows the DigitalDoc5+'s Main Display Area. Depending on what mode you're in, certain indicators and icons will be visible or off. As an example Fig. 1 shows the following:

a) It is in Normal Operating Mode
b) All 8 Fans are currently running
c) Temperature Sensor 4 (CH 4) has a current temperature of 26.3 degrees Celsius
d) The DC +5V is currently at 5.08 Volts
e) The DC +12V is currently at 12.16 Volts

1-1 Set display: Indicates the DigitalDoc5+ is in Set-Up Mode.

1-2 Temperature display: Indicates actual temperature or set-point temperature.

1-3 Fan display: Indicates situation with fan operation or fan speed.

1-4 Fan rotation status indicator area: Each number refers to a given monitoring channel, and indicates fan rotation status. A lit number indicates that the fan is currently turning; a flashing light indicates that the fan is possibly jammed.

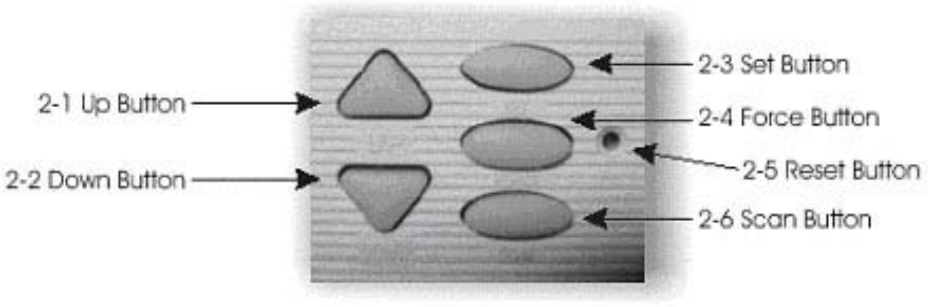
1-5 Voltage indicator area: Indicates the monitoring of the DC +5V or +12V power source. In the Set-Up mode, indicates the voltage tolerance range.

1-6 Temperature/ Fan Speed units: Shown in the main display area, and includes all units in use, degrees Celsius (C) or Fahrenheit (F), and fan speed (RPM).

1-7 Current Channel (Sensor): each number refers to a given monitoring channel, if a sensor is connected. A lit number indicates the current measured temperature of the sensor; a flashing light indicates that the temperature has exceeded the set-point.

1-8 Fan rotation indicator area: during normal operation or scanning, if the set-point temperature has been exceeded and the fan is turned on, the fan icon will then rotate.

Button Functions



The DigitalDoc5+ has 5 buttons and a reset pin hole. Outlined below are all the buttons functions.

2-1 **Up Button:** In Normal Operating Mode the **Up Button** is used to change the current Temperature Sensor (Channel). In Set-Up Mode the **Up button** will change the Temperature Set-Points and Voltage Tolerance settings, as well as, let you choose different options.

2-2 **Down Button:** Same as Up only Down.

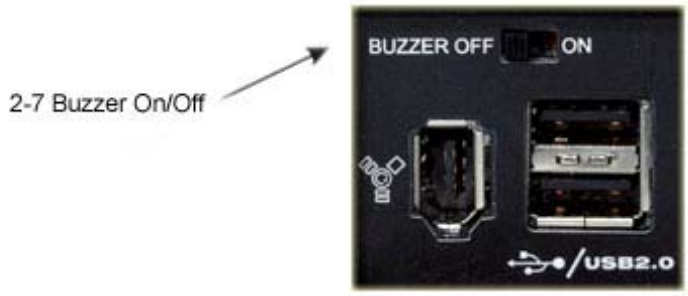
2-3 **Set Button:** While in Normal Operating Mode, press the **Set Button** to get into Set-Up Mode. In Set-Up Mode, each time the button is pressed it goes to the next function. When the final function is reached, the system will save the values, or if you do nothing for 5 seconds, as mentioned earlier, the system will automatically exit Set-Up Mode, saving the values at that time.

2-4 **Force Button:** This will force override your Temperature Set-Points and automatically turn all your fans on. If pressed again, it will return you to Normal Operating Mode.

2-5 **Reset Button:** This will set all the settings back to the default factory values.

2-6 **Scan Button:** Used for entering Scan Mode (press and release the button in less then 1s). If you're in Set-Up Mode, this button is used to turn on or off the continuous LCD back-lighting function.

2-7 **Buzzer On/Off:** OFF permanently turns the buzzer off, ON is set to automatic, details in the Chapter 4: **Alarms and Warnings**.



Three Modes of Operation

Your DigitalDoc5+ has three basic modes, Set-Up Mode, Normal Operating Mode, and Scan Mode.

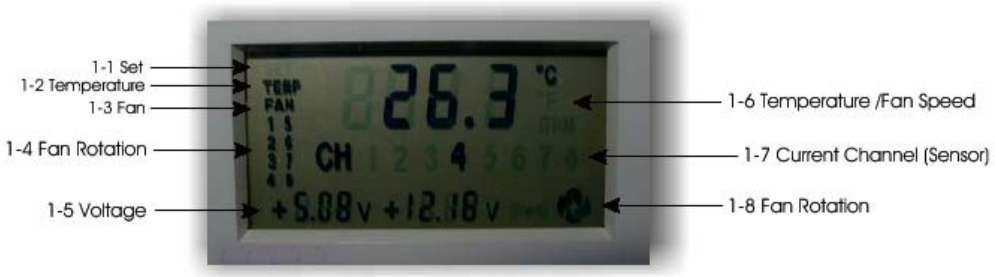


Fig.1 LCD Display (Back-light Off) - Normal Operating Mode

Set-Up Mode

Set-Up Mode can be reached any time by pressing the **Set Button**. Since we've already covered Set-Up Mode, we'll refer you back to Chapter 3, Setting Up Your DigitalDoc5+

Normal Operating Mode

Normal Operating Mode is the mode you will use most often and also the mode the DigitalDoc5+ reverts back to from Set-Up and Scan Modes. During normal operation your DigitalDoc5+ displays what fans are currently running (1-4) and the current Voltage readings (1-5). In Normal Operating Mode the DigitalDoc5+ scans each Temperature Sensor (Channel) and displays it for 2-3 seconds, completing a cycle every 20 seconds. If you press the **Up** or **Down Buttons** the DigitalDoc5+ will display the next Temperature Setting value. As it cycles through all 8 Temperature Sensors (Channels), the Fan Rotation (1-8) status icon will spin if the corresponding fan is currently running.

Scan Mode

Scan Mode **Fig. 3** is reached by pressing the **Scan Button** (press and release in less then 1s) on your DigitalDoc5+.

Fig. 3

Tip: *While in Normal Operating Mode, pressing the Up or Down Button will quickly take you to and display the next Channel.*

Note: *A "Channel" refers to both the Current Temperature Sensor and also its corresponding fan. For Example, in **Fig. 1,** it is currently displaying Channel 4 (CH 4) and the number 4 Temperature Sensor's reading is 26.3 degrees Celsius. It is also showing the current status of Fan number 4 (1-8).*

Tip: *Pressing the Scan button for more then 1s before releasing it, will stop the Normal Operating Mode from scanning all channels in a cycle and one certain channel can be monitored. Use the Up and Down buttons to choose the channel that you want to monitor.*

Note*: It takes approximately 40 seconds to scan all 8 Temperature Sensors and 8 Fan RPM Speed channels. If a fan is not running, then 0 RPM will show for that Channel.*

In Scan Mode the DigitalDoc5+ scans through all your Temperature Sensor values and Fan Speed (RPM) for each fan. *In **Fig. 3** it is currently displaying the RPM reading for Fan Number 2.* It will first cycle through all the temperatures of each Temperature Sensor (Channel). It displays each temperature reading for 2-3 seconds and then cycles to the next Channel. After it completes all 8 temperature readings (a 20 second cycle) it then begins showing your RPM Speed readings for each fan. It displays each fan's RPM speed for 2-3 seconds and then cycles to the next Channel. After it completes all 8 channels it returns the DigitalDoc5+ to Normal Operating Mode. To begin another Scan Cycle, press the **Scan Button** again.

If you press the **Scan Button** for more then 1s before you release it, the Normal Operating Mode will stop cycling through all the channels. You can then use the Up and Down buttons to choose the channel that you want to monitor the temperature.

Tip*:* If an Alarm is sounding you can press any button on the DigitalDoc5+ to turn it off at any time.

Alarms and Warnings

Excessive Temperature Warning

1) When the temperature exceeds 3 C above the set-point value, the system will activate a warning beeper and the corresponding channel number will flash.

2) Pressing any button turns off the warning beeper; at which time the system will record the warning temperature level.

3) After the warning beeper has been turned off, if the temperature in that channel continues to rise another 5 C, then the system will activate the warning beeper a second time.

4) If the warning beeper is turned off a second time, then the system will not issue another warning message for that channel, unless the temperature drops back below the set-point, at which time the function is again operable.

Warning*:* If the buzzer is turned off permanently using the On/Off switch above the USB/Firewire port, no warning signal can be heard at all!

Fan Problem Indicator

1) Fan problem monitoring is limited to the speed function of active fans.

2) When the fan is being monitored, and a discrepancy is discovered in the fan speed, or the speed drops below 500 RPM, the system will activate a warning beeper.

3) When the override fan control is in operation, if the fan monitor is not connected, or if the fan has a 2-pin or 4-pin connector, the system will issue a warning beeper. Therefore, if no fan is connected or you are using a 2-pin or 4-pin fan, please turn that fan's monitoring function to [Dis], and there will be no error in operation.

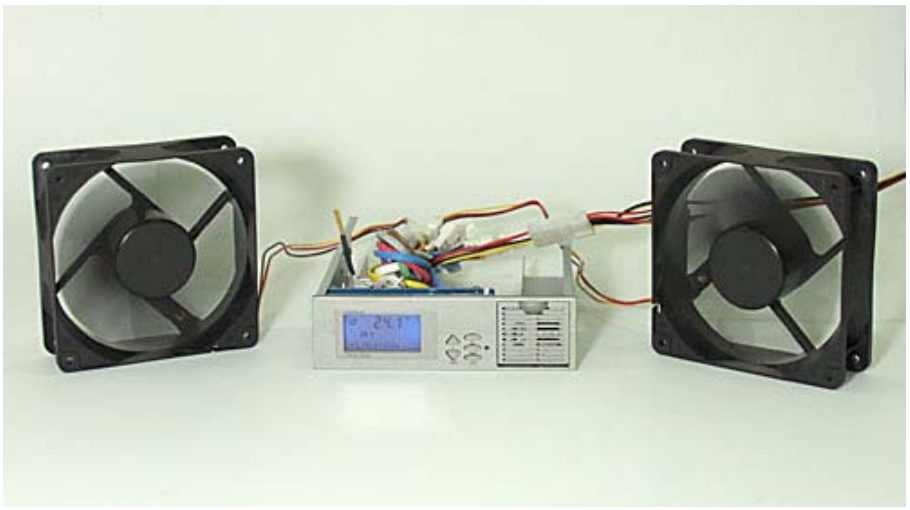
4) You can press any button to turn off the fan error warning beeper.

Power Tolerance Warning

1) When the DC +5V or +12V power source exceeds the setting for tolerance warning range.

2) For the DC +5V standard and a setting of 0.25V, if the power drops below 4.75V or exceeds 5.25V, a warning beeper will sound.

3) For the DC +12V standard and a setting of 0.6V, if the power drops below 11.4V or exceeds 12.6V, a warning beeper will sound.



Chapter 5 Additional Documentation

Technical Specifications

Power Source:	Any DC +12V power source (4-Pin Connector - See Page 8)
Power Sources Monitored:	Both DC +5V and +12V sources
Monitoring Temperature Ranges:	0° - 90° Celsius 32° - 194° Fahrenheit
Number of Temperature Sensors:	8 Sensors (2-Pin Connector)
Temperature Sensor Resistance:	Between 0 K Ω and 15 K Ω
Temperature Sensor Accuracy:	± 1 Degree
Maximum Fan Rating:	1000mA (1 Amp) or 12 Watts per fan connector/channel
Fan Voltage:	12V
Fan Size:	60mm-120mm
Maximum Number of Fans:	8pcs (3-Pin Connector)

Fig. 5-1 Standard 3pin Fan Cable

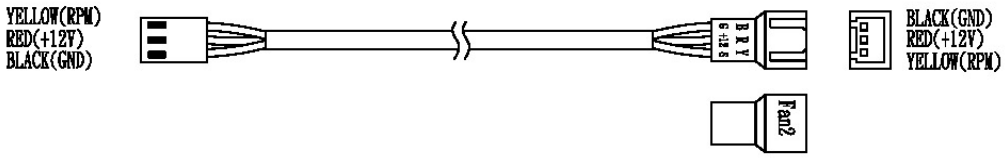
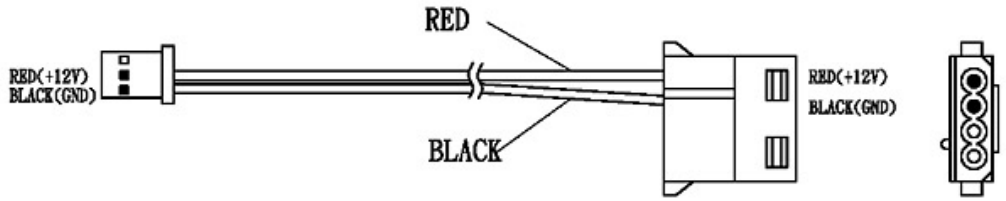


Fig. 5-2 4-3pin Fan Cable Converter (Note: No RPM sensing!)



Warning: Only use the fan cable converter if your fan's alignment of the power and grounding line is the same as seen on Fig. 5-2!

DigitalDoc5+ Thermal Sensor Worksheet

Sensor[1]	Placement[2]	DD5+ Fan[3]	Computer Fan[4]	RPM Sensing[5]
1				[ ]
2				[ ]
3				[ ]
4				[ ]
5				[ ]
6				[ ]
7				[ ]
8				[ ]

Notes:

1. This is the Digital Doc5+'s Temperature Sensor Channel.
2. Write down where you placed the Temperature Sensors. For Example; VGA Card.
3. These correspond to the DigitalDoc5+'s Fan Connectors.
4. Write down which fan is connected to the corresponding DigitalDoc5+ fan. For Example: DigitlaDoc5+ Fan 2 – Computer Fan: 120mm Front Case Fan 5) Check these boxes if you know the fan has RPM Sensing. This will help you when setting up your DigitalDoc5+ in **Chapter 3: Setting Up Your DigitalDoc5+**.
5. If the fan does not have RPM sensing then don't check the box. You would then disable [diS] this fan's RPM Sensing Option in Set-Up Mode.

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April 18, 2003 / PN: AP-BE0255