
# nVENTIV Mach II
## USER MANUAL

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## Disclaimer

Although every effort has been made to insure that the content of this manual is up to date and accurate in every way, no responsibility neither implied nor direct or indirect is granted.

nVENTIV A/S reserves the right to alter product specifications and raw materials at will, without prior notification, in order to provide the best possible product at all times.

Although it is possible to thermally accelerate the processor far beyond specifications, under no circumstances can nVENTIV A/S be held responsible for any damage caused by inappropriate or incorrect mounting, utilizing of excessive operating parameters, or negligence to the use of common sense.

# CONTENTS

# 1. INTRODUCTION

**The Mach II** cooling system utilizes state of the art proven technologies in a genuine high performance quality product. The flexibility and performance surpasses everything else seen so far. Nevertheless we continuously work to enhance current products and develop new products to provide the best and leading technology at all times.

**nVENTIV A/S** sets very high standards for product quality and long life stability.

Please take the time to read this manual thoroughly. It explains in detail how to assemble and operate the Mach II Cooling System correctly.

## CHECKLIST

Before starting to assemble the system, please check that everything is included, as ordered from nVENTIV.

The **Mach II** Cooling System consists of the following components:

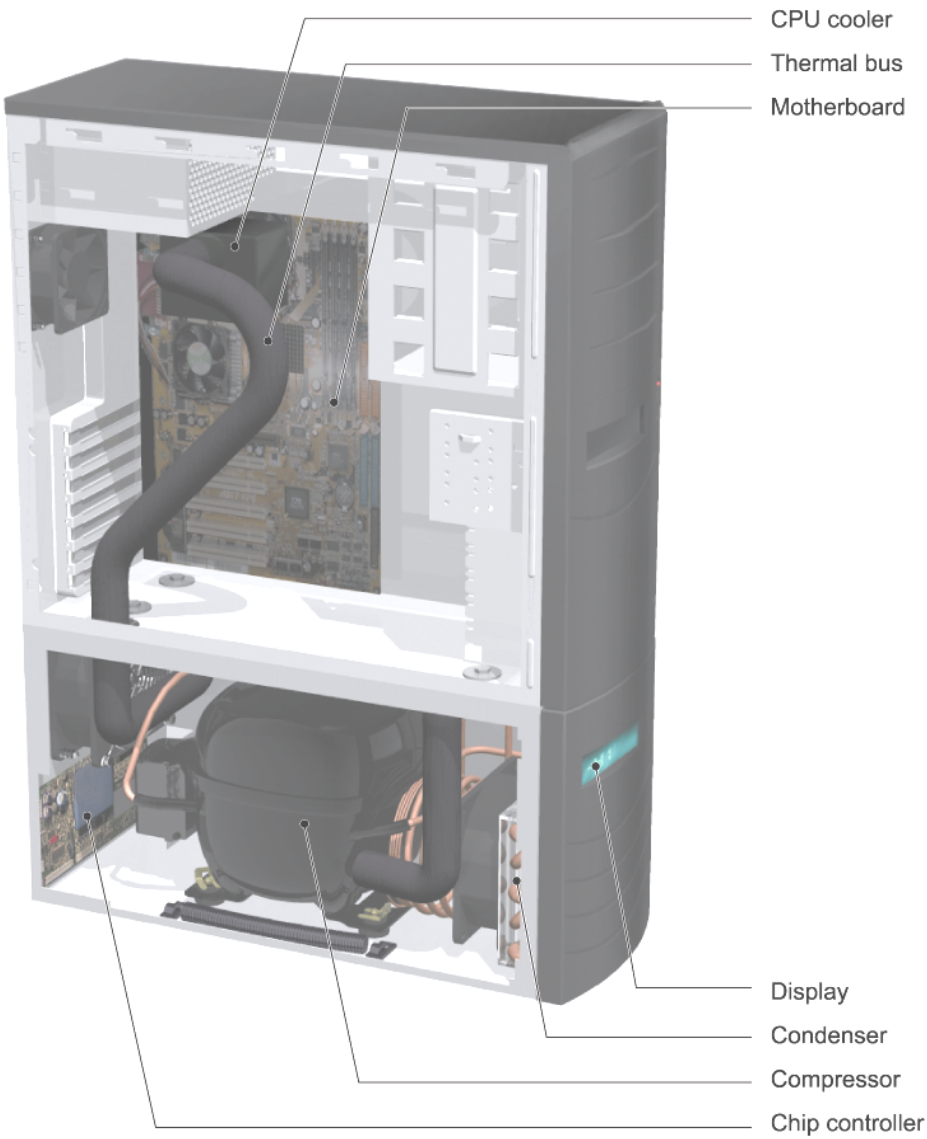
- **The Mach II** Cooling Unit including 4 screws for attaching top-chassis to the Mach II chassis.
- **Processor kit** - AMD or Intel: For list of kit contents, please refer to checklist on the kit's plastic bag.
- **Driver** for nVENTIV Control Center.

Use a wall-outlet IEC-mains power-cord suitable for the local requirements.

**NOTE:** The approval of IEC-mains power cord is granted under the assumption that it operates with a Ground (Earth) connection. As the type of IEC-mains power cord varies, we are not able to supply such.

**Caution:** Do not under any circumstances take off the side panels. The Cooling unit contains mains circuitry which is accessible when the side panels are removed.

## 2. SYSTEM OVERVIEW



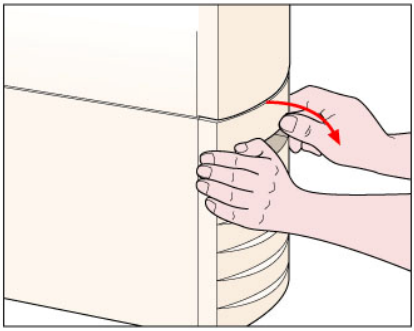
## 3. ASSEMBLY INSTRUCTIONS

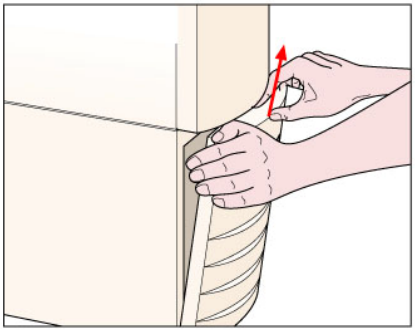
Assembling your PC with the **Mach II** Cooling system is straight forward. When attaching the **Mach II** cooling system to the PC for the first time, be sure to follow this manual step by step.
The only extra work compared to assembling a standard PC, is to isolate the processor from the surroundings. This may take extra time in the beginning, but please take care and be patient with your initial assembly.



## A. How to deal with the Mach II chassis

1. Place entire unit on the edge of a table.
2. First, pull off the bottom front bezel by prying it off at each side at the top of the Mach II chassis.
3. Lift the bottom bezel out carefully, see illustration below.





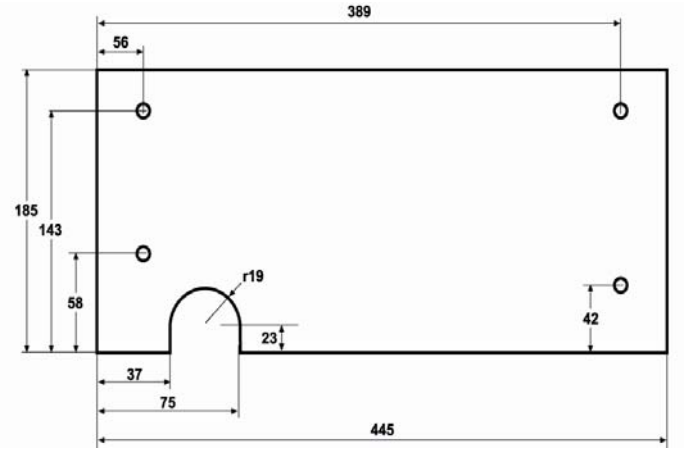
## B. How to mount the top-chassis

When mounting the Mach II cooling system to hardware, the hardware has to be mounted in a top-chassis which is attached above the Mach II chassis.

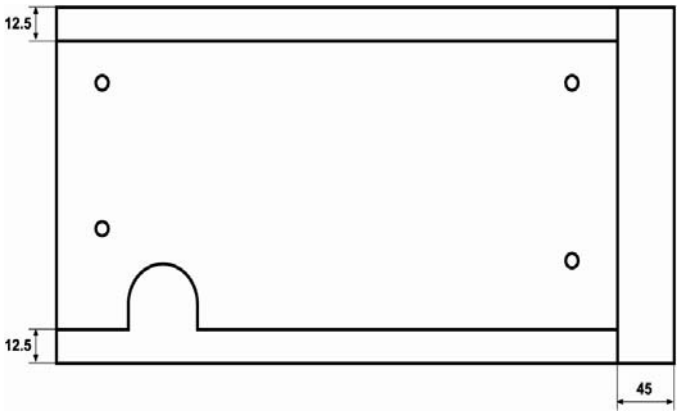
The top of the Mach II chassis has 4 holes with threads (6mm) for mounting the top-chassis (see illustration below).

Please refer to the illustrations below for making the modifications for the 4 screws and for the thermal bus in the top-chassis.

**(Matching Enlight EN-7238)**




**(Matching Lian Li PC-60)**



The black Mach II chassis is designed to match the black Enlight EN-7238 chassis. The black Enlight top-chassis is available at nVENTIV´s resellers – check out the reseller list at www.nventiv.com.

## Specifications:

| | |
|---|---|
| **Case size** | ATX Tower |
| **Main board size** | ATX |
| **Drive Bays** | 4 x 5-1/4" (Half height)<br>2 x 3-1/2" (1" height)<br>1 x 3-1/2" (hidden) |
| **Expansion Slots** | 7 Full Size |
| **Dimensions (w x h x D)** | 196 x 425 x 480 mm<br>(7,7" x 16,7" x 18,9") |
| **Weight (G.W.)** | 8,4 kg (18,5 lbs) |
| **Chassis** | 1,0mm thick SECC rustproof & galvanized JIS steel |

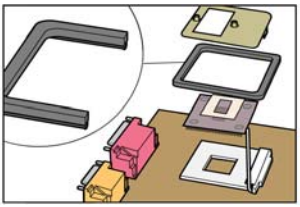
## Key features:

- Snap-on front bezel for quick and easy FDD/HDD installation.
- Slide guides for quick FDD/HDD installation.
- Interchangeable M/B stakes for fast installation of various main boards size.
- New EMI construction for high speed CPU from AMD and Intel.
- Unique cover and chassis construction for easy, accurate assembly.
- Optional cooling fan for better ventilation.
- EMI and thermal ready for Intel and AMD high speed CPU.

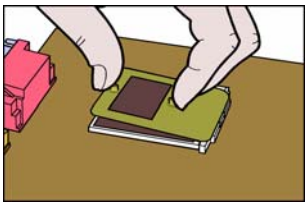
## C1. Assembly with AMD processor

To ensure proper operation, please follow these instructions carefully. It is important that the instructions are carried out exactly as described and shown on the illustrations.

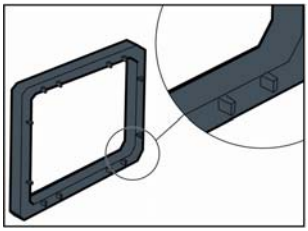
Install the CPU in the Socket and place a shim plate which protects the CPU when mounting the micro freezer. Make sure that the shim plate does not interfere with any SMD components located around the CPU, otherwise make a cut-out in the shim plate, thus the shim plate is placed correctly.
Remember to peel off the brown paper that protects the adhesive side of the shim plate.



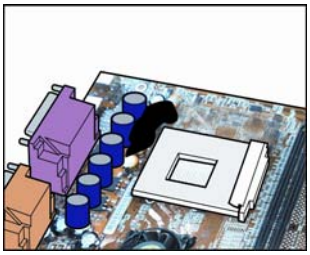
Mount the Clips on the socket by pressing the stands towards each other in order to “open” the Clips slightly, making it easier to slide it over the socket taps. The Clips should be oriented so the opening is centered over the CPU – this makes sure that the micro freezer is mounted correctly.



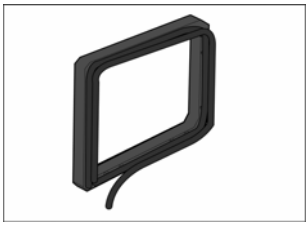
The upper bracket has thin 2.5mm legs on the bottom of the Upper bracket. This allows the bracket to stand straight on the Mainboard, even if a few small components are located around the socket underneath the bracket. In case one or more of the supporting legs conflict with such a component, just cut off that leg with a sharp knife. Make sure that the Upper bracket can lie against the PCB; this will insure optimal contact between the CPU and Micro freezer.



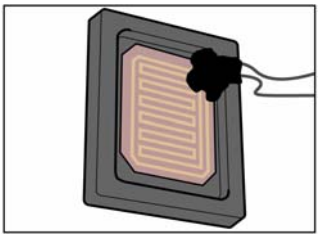
Place extra seal string around all components that are caught going in under the bracket, to prevent any false air to find its way underneath such components into the hermetic Cell.



Place 2 rounds of seal string on the bottom side of the upper bracket (the side with the 2,5mm legs), in order to insure proper sealing. Mount the Upper Bracket, so it surrounds the CPU socket, with the seal string **against** the Mainboard. Make sure to press the bracket firmly against the Mainboard, so all the legs touch on the PCB. Before moving further, make sure that there is a tight sealing between the PCB and the Upper Bracket



Mount the heating element inside the rear cover. The heating element is self-adhesive, so remember to take off the protective paper protecting the glue before installing it. Place seal string on the edge of the rear cover where the wires come out and inside the rear cover around and above where the where the wires are attached to the heating element, before sealing the entire edge this prevents any gap in forming between the wires and the rear cover.

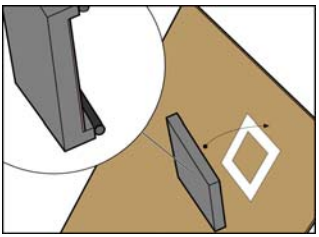


Place seal string on the perimeter of the rear cover.

Firmly press the rear cover onto the back of the Mainboard. Place it so that it will match the position of the Upper bracket that is installed on the other side of the Mainboard. It is imperative that they become aligned.

Install the Mainboard on the PC- mounting plate.

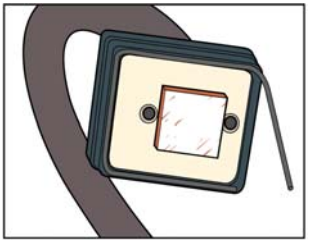
Make sure that the stands on the back plate are placed correctly when mounting the Mainboard to the back plate.



The surface of the Micro freezer has a small plastic orientation pellet. This pellet must always be located **upside** in the right or left corner to make sure that the Micro freezer is mounted correctly. If it is not possible to attach the micro freezer correctly to the mounting bracket – the clips is turned the wrong way.

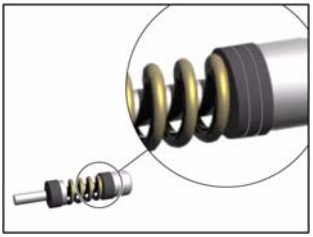
Put a thin layer of thermal compound on the evaporator. Press the Microfreezer down over the CPU until they have physical contact, and lift it carefully off again to inspect that the Microfreezer makes a full surface contact with the CPU Core.
It is of utmost importance that the Micro freezer obtains good contact with the CPU core**.**

Place 1 round of Seal-string on the Micro freezer and gently press the Microfreezer against the upper mounting bracket.



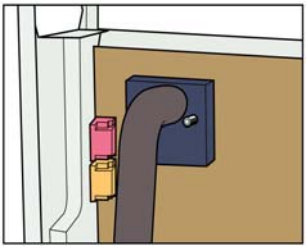
The Microfreezer is secured in place with two screws into the Clips. The screws must be tightened evenly and almost simultaneously, but only to the bottom of the threaded brass stands – do not over-tighten the screws!

Increased pressure is regulated with the use of extra spacer rings between the screw head and the spring.



To be sure that there is an optimal contact against the CPU, detach the Micro freezer, and inspect the imprint on the Micro freezer.

Finally press two small lumps of seal string down on the screws to seal them off properly and close the last possible entry into the Cell.



If your MB has a protective piece of plastic around the socket, be sure to either seal this or remove it.

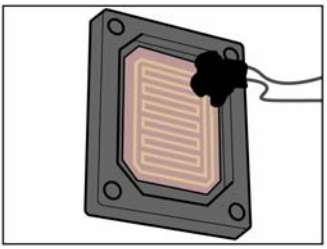
**NOTE!** When you want to change processor, unscrew the Cooling Head, and pull it off slowly, but forcefully, while holding the Mainboard.

Always be carefully when detaching the attach mechanism – nVENTIV cannot be held responsible for any destroyed hardware.

## C2. Assembly with Intel - P4 processor

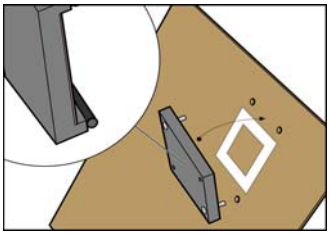
To ensure proper operation please follow these instructions carefully. It is important that the instructions are carried out exactly as described and shown on the illustrations.

Mount the heating element inside the rear cover. The heating element is self-adhesive, so remember to take off the protective paper protecting the glue before installing it. Place some seal string on the edge of the rear cover where the wires come out and inside the rear cover around and above where the where the wires are attached to the heating element, before sealing the entire edge. This prevents any gap from forming between the wires and the rear cover.



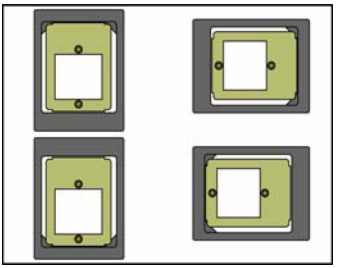
Place seal string onto the perimeter of the rear cover.

Use 2 of the Cover screws as guides in diagonally opposite holes around the CPU socket, firmly press the rear cover onto the back of the Mainboard.



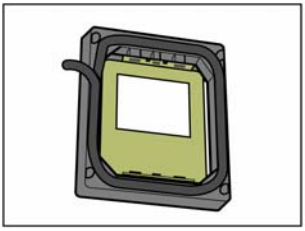
Install the CPU in the Socket.

Place the metal Clips in the upper asymmetric bracket. Note that the Clips have 2 asymmetric positioned threaded brass stands. The outermost brass stand must always point either towards the rear or the bottom of the Mainboard, but the mounting bracket may turn either way. This way you can shift the position of the hole over the CPU Core for the best fit.



It has no influence that the evaporator does not cover the head spreader 100%; the evaporator will always cover the CPU100%!

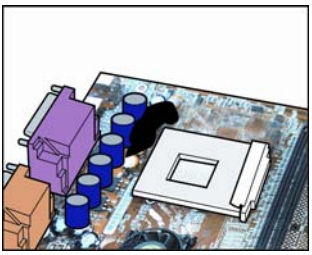
Place seal string on the inside perimeter on the bottom of the upper bracket. The upper bracket can now be mounted in place with the 4 screws entering from the rear cover.



Place extra seal string around all components that are caught going in under the bracket, to prevent any false air to find its way underneath such components into the hermetic Cell.

Install the Mainboard on the PC-mounting metal plate.

Make sure that the stands on the back plate are placed correctly when mounting the Mainboard to the back plate.

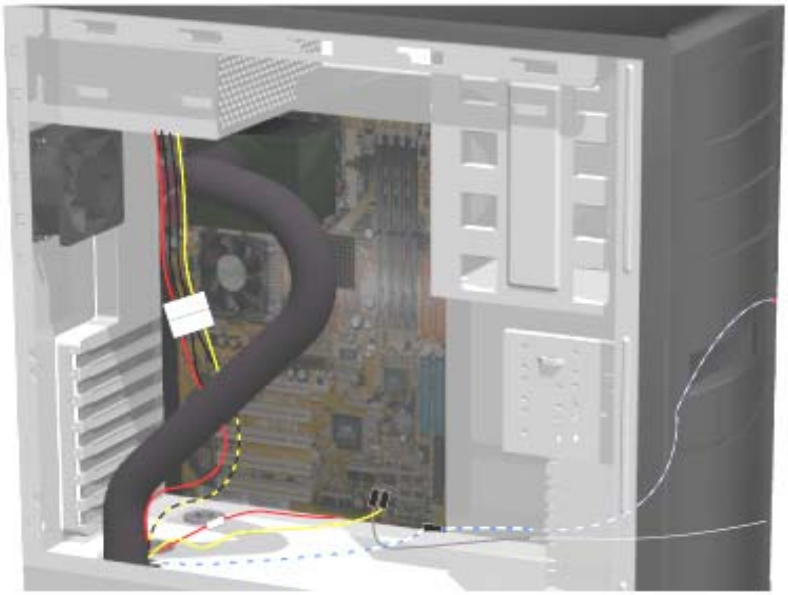


**NOTE:** Mount the Micro freezer to the CPU as described on page 9 and 10.

**NOTE:** As the Chip manufactures launch new standards for their CPUs, nVENTIV will supply new CPU kits. For mounting CPU kits, which is not listed in this manual please refer to nVENTIV´s homepage under support.

## D. Connecting the wires from the Cooling system

Before powering up the cooling system, be sure to connect all necessary wires from the Mach II chassis to the motherboard, heating element in the rear cover, PSU and the Power switch at the front panel.



Make sure that the thermal bus will not be pressed against the side panel. This could cause the side panel to deform the isolation of the thermal bus when attached. Deformed isolation may reduce the capability of the isolation, resulting in possible risk of condensation.

When fitting the thermal bus in place, be sure not to make any sharp bends, as this may damage the thermal bus' soldering and flexible tube.

Always be very carefully when removing the thermal bus!

**NOTE:** If the Mach II cooling unit is to be used on a lot of different hardware without the side panel attached to the top chassis, then do not bend the thermal bus!

There are 5 wires coming from the Chip-controller in the Mach II chassis. These must be connected before powering up the system.

**1.** Connect the blue/white wire to the On/Off switch at the Front panel. When pressing the On/Off switch at the Front panel, the cooling system starts running - but the computer is NOT turned on.

**2.** Connect the yellow/yellow wire to Power Pin (PWR) on the Mainboard. The yellow/yellow wire from the Chip-controller will boot the computer when the desired boot temperature is reached. The yellow/yellow wire will also shut down the system when pressing the On/Off switch at the front panel for more than 4 sec. or if any failure occurs.

**3.** Connect the power cable (yellow black, black and red) to an unused power connector – just like connecting a hard drive.

**4.** Connect the heating element to the connector from the Chip-controller.

**5.** **Wait** to connect the USB cable to the Mainboard, until the computer is up and running in Windows. Then connect the USB cable to one of the inside USB 2.0 adaptors on the Mainboard – Be sure to connect it to correct pins – refer to the Mainboard´s manual for more information.


Install the Mach II USB driver (see software installation on page 21 for more information on this).

Before connecting the Mains Power Cords, complete the installation of all the other PC hardware in your PC.

Finally attach a wall-outlet Power Cord to the IEC Power inlet in the bottom of the Cooling Unit.

This completes the installation of the system.

**Note:** Before starting the PC, make sure that all wires are connected securely and correctly (except the USB-cable).

# 4. STARTING UP AND RUNNING YOUR PC

On the backside of the Mach II chassis there are located 4 light diodes – green (1), yellow (2), yellow (3) and a red diode (4) - the red diode will blink in the event of an alarm – see page 16.

When the Power Cord to the IEC Power inlet in the Cooling Unit is connected and the wall outlet is turned on, the green diode will blink – indicating that there is high voltage available to the cooling unit.

Once the On/Off switch on the PC is pressed, the Cooling Unit starts up and begins to cool, and the first yellow diode will light up – indicating that the compressor is running.
The fans in the Cooling Unit will run at high speed until the desired boot temperature is reached.
When the boot temperature is reached, the Chip-Controller will start the PC and the fans will run at normal speed, the green diode and the two yellow diodes will light up – indicating that the PC is started (12volt).

After shutting down the PC in Windows, the cooling unit will run for a short period before stopping.

If it is necessary to shut down the PC by pressing the On/Off switch at the front panel – hold the On/Off switch for 4sec, then the PC will shut down and after a short period the cooling unit stops.

**CAUTION:** If the Power switch is not connected properly to the Mainboard, then your hardware might get damaged by powering up the system via keyboard/mouse.

## Restarting the PC

**Note!** The Chip-controller has a restart delay which ensures that the cooling system cannot be restarted until after 2 minutes (the countdown will be shown in the display if connected).

If the built-in protection circuit cuts-off the power to the compressor, you need to wait 15-20 minutes before you can restart the Cooling system.

## Maintaining your System

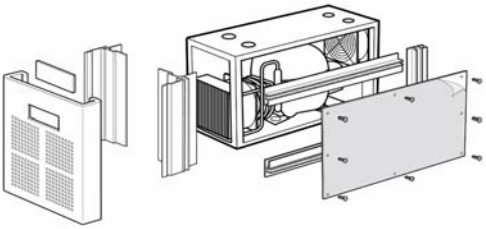
Depending on the environment it is recommended to clean the condenser at least once a month in order to continue cooling your PC properly.

## 5. ADD-ON PRODUCTS

nVENTIV A/S has different add-on products for the Mach II cooling system. At the moment 4 add-on products are available at nVENTIV's resellers around the world.

1. **Enlight top-chassis** – for matching the Mach II chassis. For more details, turn to page 7 and 8.

2. **Lian Li Kit**. This Kit is developed thus the Mach II chassis can match the Lian Li PC-60 and similar.



3. **Display**. The display is not standard when ordering a Mach II cooling system. nVENTIV has developed a Windows application that provides an easy way of reading and monitoring facilities. The highly advanced Windows application allows customization of the display – which consist of two lines.


Line 1 allows customization of a primary text and secondary text and the interval between changing of the texts.
Line 2 allows choosing different settings – speed, load, evaporator temperature and other temperatures, if additional probes are attached.
If the display is connected to the chip-controller, it is always possible to see the status.
If an alarm occurs and the display is NOT connected, you will have to check the alarm code visualized by the 4 diodes on the back of chassis (described on page 18). The display will describe the problem.
The colour of the display is available in green and orange.

**4. Temperature probes.** It is possible to attach 4 extra probes to the Chip-controller for external temperature measuring.

## 6. TROUBLESHOOTING

If any problems occur during the operation of your **Mach II** cooled PC, please consult the troubleshooting guide below or the **FAQ section** on our website **www.nventiv.com**

| **Problem description** | **Check** |
|---|---|
| Nothing works: no reaction at all. | Check that the power cord from the wall outlet is plugged into the Cooling unit, and that the wall outlet is turned on. |
| The system does not start when pressing the power switch | Check that the blue/white wire for PC-Case front panel On/Off switch is connected properly to the Chip-controller. |
| The PC seemingly gets power, but the Cooling unit does not seem to start, i.e. neither the fans nor the compressor starts. | Contact **your reseller** for further assistance. |
| The PC starts booting immediately after pressing the PC-Case front panel On/Off switch (the temperature is below the chosen boot temperature). | Disconnect ATX-connector (20-pin) from the main board wait 5 sec. and connect the ATX-connector again. If the problem still occurs then contact **your reseller** for further assistance. |
| Computer does not auto boot | Check that the yellow/yellow wire is connected properly to the main board.<br>Check that the power cord is connected to the Power Supply Unit and the PSU is turned ON. |
| The compressor suddenly stops. | Turn off the PC (alternatively an automatic shutdown will occur). The compressor has a built-in overheating protection.<br>Contact **your reseller** for further assistance. |
| The computer boots properly but shuts down immediately. | Check that the power cable (4-pin) from the PSU is connected to the Chip-controller. |

If this section or our **FAQ** does not solve the problem, please contact **your reseller** for further assistance.

## 7. ALARM CONDITIONS, CAUSES AND REMEDIES

In the event of an alarm, the red diode (4) will start to blink and the function of the light diodes (1, 2 and 3) is altered. Light diodes 1, 2 and 3 can afterwards be coded binary to indicate the failure that has occurred – starting from diode 1 (1 binary), diode 2 (2 binary) and diode 3 (4 binary), thus a failure condition is given a number from 0 (no diode is lighting) to 7 (all diodes is lighting).

| Error code | Description (Indication in the Display) | Cause | Remedies |
|---|---|---|---|
| 0 | **To Slow.** | Check that the yellow/yellow wire is connected properly to the main board. | Contact **the local reseller for further assistance** |
| 1 | **N/A** | | |
| 2 | **To Hot.** | System failure | Contact **your reseller for further assistance** |
| 3 | **HOT STOP** | System failure | Contact **your reseller for further assistance** |
| 4 | **Fan failure**. If there is a Display connected, it will indicate which Fan is defect. | The fans cannot turn or bad connection to the Chip-controller. | Contact **your reseller for further assistance** |
| 5 | **Fail sensor.** If there is a display connected it will indicate which sensor is defect. | The sensor is broken or bad connection to the Chip-controller. | Contact **your reseller for further assistance** |
| 6 | **No Shut down** | The PC has not been shut down (dead lock). The compressor continues to cool. | Contact **your reseller for further assistance** |
| 7 | **Cooling fault** | The bimetal is open. To high condensation temperature. | Contact **your reseller for further assistance** |

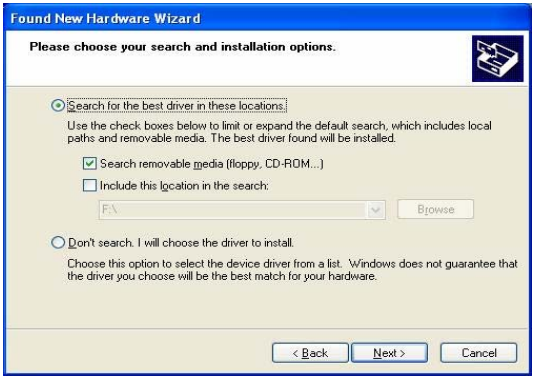
# 8. INSTALLING SOFTWARE.

The software for communication between the user interface in Windows and the Chip-controller is supported in Windows 98, Me, 2000 and XP.

## Installing the Mach II USB driver.

Once the USB Connector is plugged correctly onto the motherboard and Windows have found and recognised the Mach II Chip Controller, the “New Hardware Found” box will appear.


Click Next to get to the following page.




Insert the CD-ROM which came with the Mach II and click next to finish installing the Mach II USB Drivers.

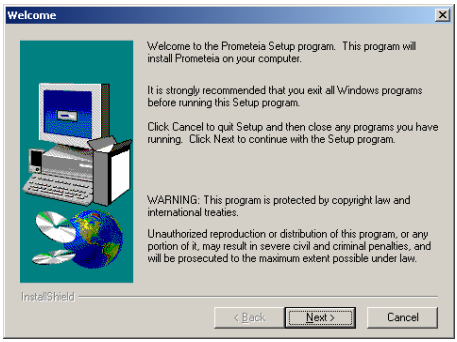
In case windows does not automatically detect the new hardware, open the control panel and select add new hardware.
Click next on the dialog to start searching for new hardware.

When new hardware is found - then follow the same procedure as above.

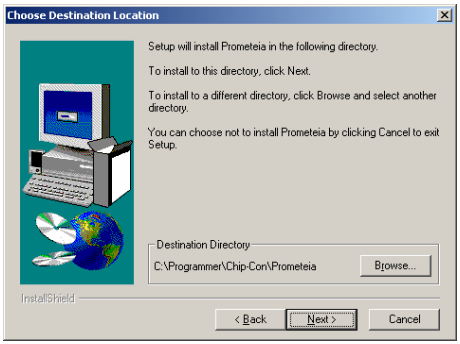
If no new hardware is found, open the device manager and find the Mach II device, then right click on it and chose update driver.
Should the Mach II device not be found in the device manager, recheck your USB connection on the motherboard or try use another USB motherboard connector.

## Installing the Mach II Control Center.

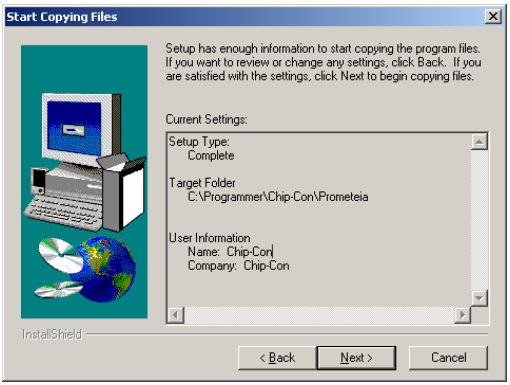
Insert the CD-ROM which came with the Mach II and open the setup file.



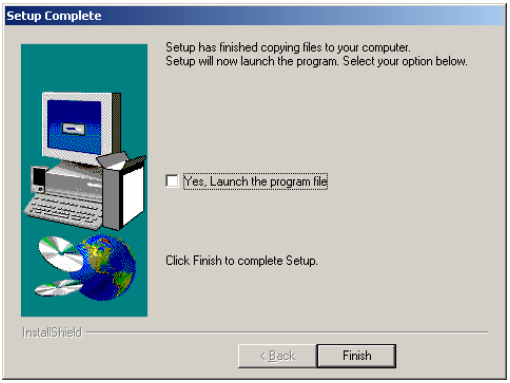

Click Next.




Choose the installation patch and click Next.




Click Install to start installing the software in the chosen directory.




The Mach II Control Center is now installed on the computer, click finish to close the install program.

Start the program by click on the Mach II Control Center (PCC) now located under programs in the start menu.

## 9. MACH II CONTROL CENTER.

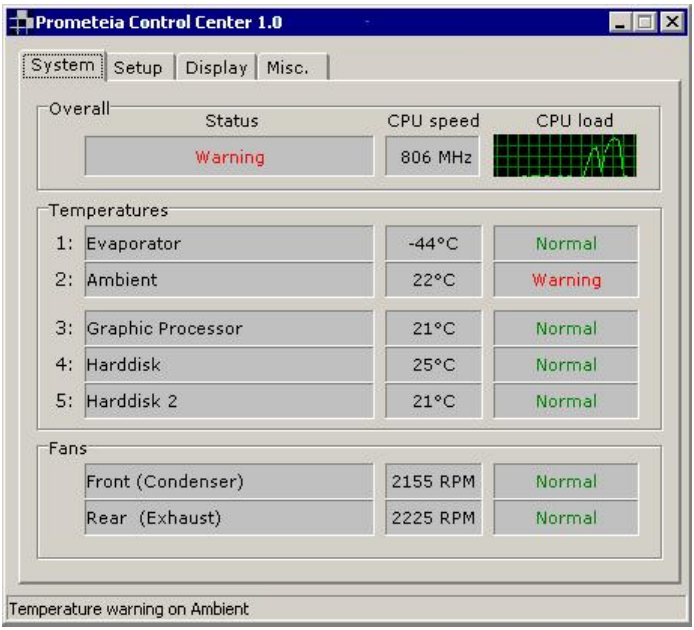
The Mach II Chip-Control Center is a Windows application that provides an easy way of reading and changing the different settings of the Mach II cooling system.

The Chip-Control Center also includes vital monitoring facilities, and allows customization of the display and warning/shutdown temperatures from several sources.

The Chip-Control Center has been divided into several sub-sections, each dealing with a particular category of settings and controls.

The system page shows status on the entire system.

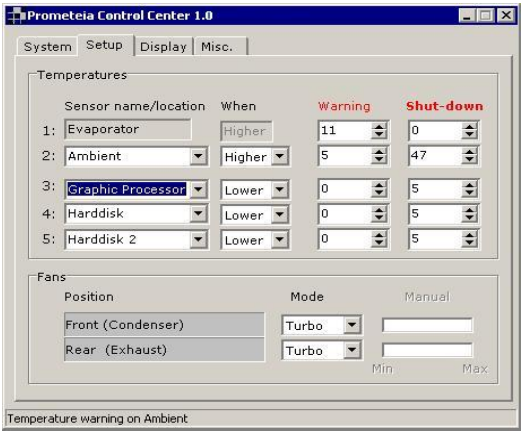
**NOTE:** If the status field indicates an Alarm situation, the system will shut down after 3 minutes. If the status field is restored to Normal, then shutting down the system is cancelled.



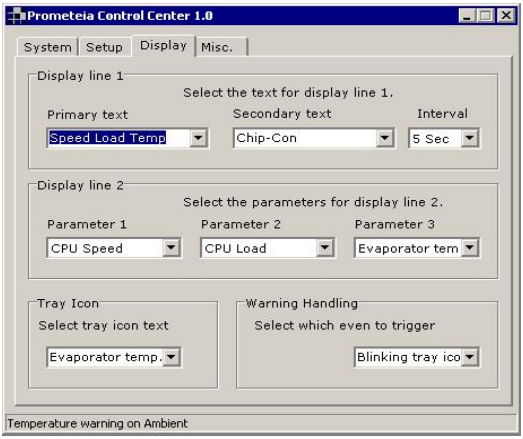
The Setup page enables the user to specify the description of the attached sensors, the different warning and shut down temperatures and to set the fan speed.

The fans will re-adjust to normal setting after starting and closing the Mach II Control Center. If an alarm value is set improperly, causing the system to shutdown, default settings will be used next time the program starts.

**NOTE:** Please have a little patience when adjusting the settings – the controller needs a few seconds to update the new settings.



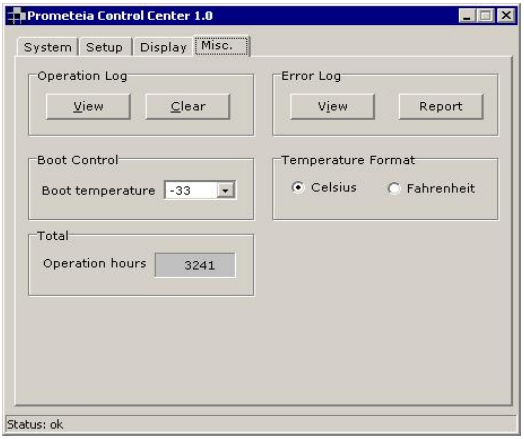

The Display page allows customization of the display (only possible if a Display is attached to the Chip-controller).



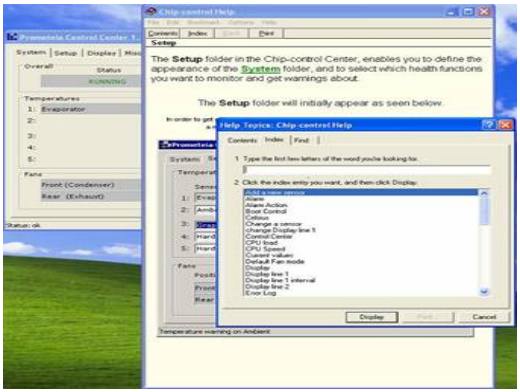
An operating log and On-line error reporting system are included in the software. This provides the best possible support and valuable information as well.

**NOTE:** Only use the Error reporting system when nVENTIV A/S asks for an error report.

The software includes a Boot Control. It is possible to specify at which temperature the computer will boot. Setting it to high might prevent a heavily overclocked system from starting.



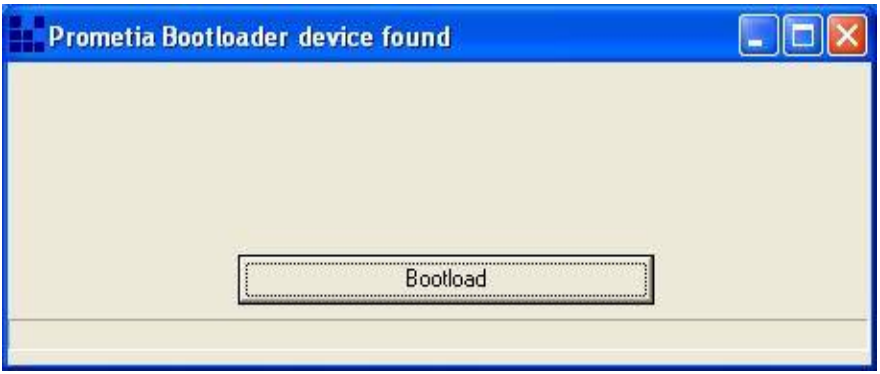

Pressing F1 while working in the Mach II Control Center will bring up the help dialog for the current page.
Information about specific windows fields and buttons used in the application is always accessible.



## 10. DOWNLOAD NEW FIRMWARE.

In order to keep the software compatible with new market trends and operative systems, or to add new exciting features, we have included a Bootloader in the software package.
This enables you to download new firmware into the Chip controller and upgrade the functionality of the Mach II.

Before using the Bootloader, then close all Windows applications. To initializing the Bootloader, open the directory where the Mach II software is installed and run the bootloader.exe file.




Click on the Bootload button and select the proper .ste file to replace the current program in the chip controller.

New updates will be available on our web-site.

Before Bootloading, verify that you have the newest software to download into the chip controller, or you might risk ending up with an unstable system.

Caution:
DO NOT turn off the computer (or close the Bootloading application) while upgrading the firmware, but wait until upgrading is finished.

## 11. TECHNICAL SPECIFICATIONS

| | |
|---|---|
| Model Name. | **Mach II** |
| Power requirements | 200 - 240VAC 50Hz<br>100 - 127VAC 50 - 60Hz |
| Cooling Capacity | 0 – 200 Watt @ -50 to -25ºC<br>(Evaporating temperatures) |
| Operating environment | 15º - 30º Celsius, max. 95% humidity |
| Noise-level | 33 db (A) under normal operation<br>40 db (A) during start-up |
| Cooling unit only | 280 x 590 x 430mm (W x L x H)<br>11,0" x 23,2" x 16,9" |
| Weight | (G.W.) 19,5 Kg. 43,3 lbs. |

**Standards**:
This equipment meets the requirements as set forth in the CE and DEMKO regulations for EU and FCC and UL.

Please note that the approvals require you to operate the equipment with a Ground (Earth) connection.

## 12. CONTACT

| | |
|---|---|
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