PEGASOS II

IBM G3/Motorola G4 Processor-based
DDR Mainboard

Pegasos II Instruction Manual, Revision 1.02

English

Copyright and Warranty Notice

The information in this document is subject to change without notice and does not represent a commitment on part of the vendor, who assumes no liability or responsibility for any errors that may appear in this manual.

No warranty or representation, either expressed or implied, is made with respect to the quality, accuracy or fitness for any particular part of this document. In no event shall the manufacturer be liable for direct, indirect, special incidental or consequential damages arising from any defect or error in this manual or product.

Product names appearing in this manual are for identification purposes only and trademarks and product names or brand names appearing in this document are the property of their respective owners.

This document contains materials protected both under National and International Copyright Laws. All rights reserved. No part of this manual may be reproduced, transmitted or transcribed without the express written permission of the manufacturer and authors of this manual.

Copyright © bPlan GmbH 2004. All Rights Reserved

Table of Contents

Item Check List — Page 3
Customer Information — Page 3
Technical Details — Page 4
Board Overview — Page 5

Hardware Installation — Page 6
- Step 1 - Installing the Processor Card — Page 6
- Step 2 - Installing DDR RAM System Memory — Page 7
- Step 3 - Installing Mainboard in a Case — Page 7
- Step 4 - Connecting Frontpanel Switches/LEDs/Speaker — Page 8
- Step 5 - Installing Internal Peripherals (IDE Devices) — Page 9
- Step 6 - Connecting Other Internal Peripherals — Page 10
- Step 7 - Connecting Power Supply — Page 10
- Step 8 - Installing Add-On Cards in Expansion Slots — Page 11
- Step 9 - Connecting External Peripherals to Back-Panel — Page 11
- Step 10 - Finishing Touches — Page 13

Software Installation
- Step 1 - Booting from CD — Page 14
- Step 2 - Configuring a Harddisk — Page 14
- Step 3 - Formatting all Partitions — Page 17
- Step 4 - Installing MorphOS on a Harddisk — Page 17
- Step 5 - Booting from Harddisk — Page 18
- Step 6 - Autoboot — Page 18

Trouble Shooting — Page 19
Hardware Compatibility — Page 20

ITEM CHECKLIST

Check all items that came with your PEGASOS mainboard. The complete package should include:

- One bPlan PEGASOS II mainboard
- One PEGASOS CPU module with a G3 or G4 processor
- One ATX backplate
- MorphOS CDROM
- PEGASOS User Manual

Customer Information

Mailing Lists and MorphOS download

MorphOS updates are available to all PEGASOS owners on a restricted server. Moreover, there is a mailing list available which informs about new OS updates and add-on files. In order to get access, please send an email to the following address:

support@morphos.net

For news, forums and other online ressources concerning MorphOS, please visit the following websites:

www.morphzone.org **www.morphos-news.de**

If you are interested to run Linux on your PEGASOS, visit the following website for news, downloads and a support forum:

linux.pegasosppc.com

TECHNICAL DETAILS

The Pegasos II is a MicroATX form factor motherboard for PowerPC G3 and G4 processors. The processor sits on its own interchangeable CPU module card which allows for very simple upgrading. The speed of your computer can be upgraded by only changing the CPU card.

For the Pegasos II, bPlan uses the high-performance Marvell Discovery II System Controller featuring an internal bandwidth of 100 Gigabit per second. DDR RAM (Double Data Rate Random Access Memory) support is provided as well as two on-board ethernet controllers. The first delivers 1 Gigabit per second for high-speed networking and the second offers an additional 100 Megabit per second for standard performance.

Also, three Firewire ports are included (2 external, 1 internal) for connecting high-speed peripherals. There are four USB ports (2 external, 1 internal, 1 on the AGP slot). These allow for the connection of many standard peripherals such as Mouse, Keyboard, Printer, Digital Camera, etc.

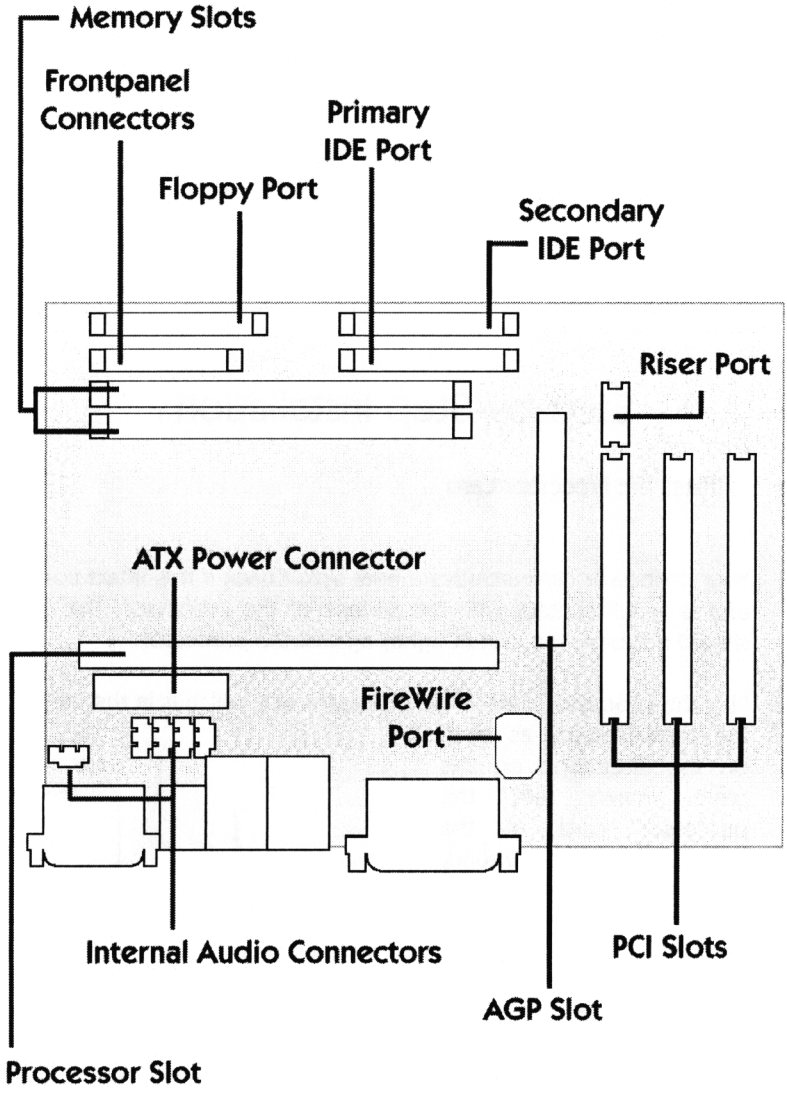
Pegasos II has two dual channel ATA100 connectors for attaching a total of four IDE devices, such as harddisks, CDROM drives, DVD drives, CD/DVD burners, etc.

Standard AC97 Audio is supported providing a variety of CD quality audio ports. Additionally, there is digital audio output via the SPDIF port.

Pegasos II has three PCI expansion slots. One of these can be fitted with a Riser Card. Also, an AGP (1X) slot is provided for graphics cards. The Pegasos board supports the AGP 2.0 standard so most AGP1x and AGP2x cards will work. In order to be sure, check if the voltage of your card is 3.3V. Otherwise, your card will not fit physically.

Pegasos II also supports the following ports: Floppy drive connector, Serial Port, Parallel Port, two PS/2 ports and a Game Port.

BOARD OVERVIEW



HARDWARE INSTALLATION

Precautions: Before installing the mainboard, processor card, memory modules, add-on cards, cables, etc., please make sure to unplug the on-board power connector. If power is still active while installing new hardware, there is a high likelihood of components getting damaged.

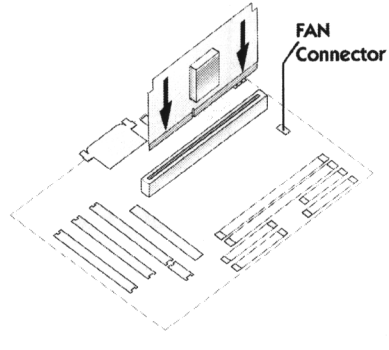
Also, please touch a grounded metal object before you touch any electronic components. This should discharge any static electricity on your clothes or body.

Step-by-Step Installation

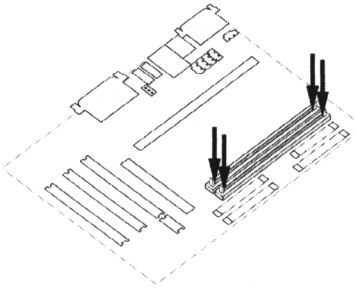
Step 1 – Install the Processor Card

1. Your processor card includes a heat sink. Check if it is fitted correctly and is in full contact with the surface of the processor. The cooler should not be loose, but fit tightly against the processor.

2. Plug the processor card in the processor slot which is in the centre of the motherboard as seen on the illustration on this page. Make sure the processor card is the correct way around, otherwise it will not fit. Set the processor card in its slot and push downwards at both ends. This may need a good push, but do not use excessive force as that can damage the motherboard.



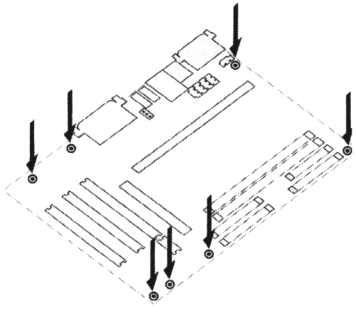
Step 2 – Install DDR RAM System Memory



1. Open the tabs at either end of the memory slot.

2. Insert the memory module into the slot. Please note that memory modules are directional and will not fit into the slot unless properly oriented. After pressing the module down, the tabs at both ends of the memory slot should be locked again. If this only happens at one end, push the other end down so it also clicks into place.

Step 3 – Install Mainboard in a MicroATX or ATX Case



1. Check if the case is on a steady surface or on the floor.

2. The mainboard is mounted in the case via studs (small screws with holes in their back) or spacers (plastic parts). Check which holes in the computer case line up with the holes in the motherboard.

3. Screw the studs or spacers in those holes in the case.

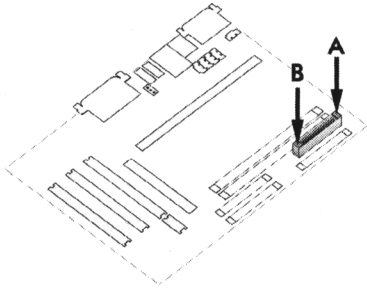
4. Add the mainboard and place it on top of the spacers or studs.

5. Place screws through the holes on the mainboard and into the studs. Then, screw them up.

Note: The mainboard itself must not touch the case. This will cause short circuits and is likely to damage your hardware.

Step 4 – Connect Frontpanel Switches/LEDs/Speaker

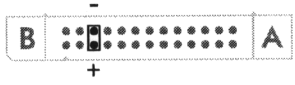
Your computer case has small LED lights which shine when your computer is powered on or data on your harddisk is accessed. Moreover, it features buttons to switch on or reset your computer. In order to make these things work as expected, you have to connect various cables found in your case to a header on your mainboard.



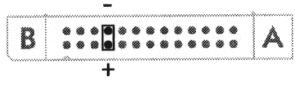
1. ATX Soft Power On/Off (PWR PT)

2. Hardware Reset Switch (RST)

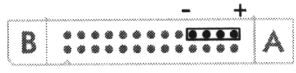
3. Power LED (PLED)



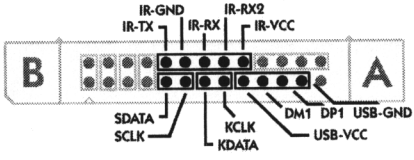
4. Harddisk LED (HLED)



5. PC Speaker (SPEAK)



6. Other Connectors (Optional)

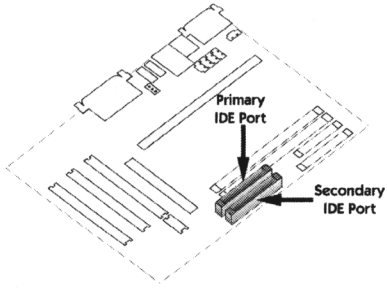


IR : Infrared Connector
USB : Third USB Connector
S*: Infrared Connector
K*: Keyboard

Step 5 – Install Internal Peripherals (IDE Devices)

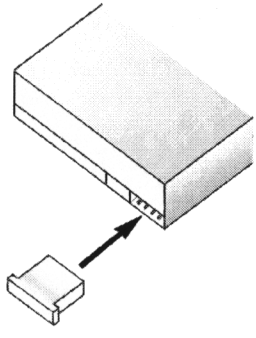
1. Set the required jumpers of all IDE devices according to the instructions by the manufacturer. (Harddisk and CDROM/DVD drives have to be set to Master and Slave modes if you want to connect more than one IDE device with the same IDE connector on the mainboard. If there are two Masters or two Slaves on one cable, they will not function.)

2. Put your IDE devices (harddisks, CDROM/DVD drives, etc.) into the system case.



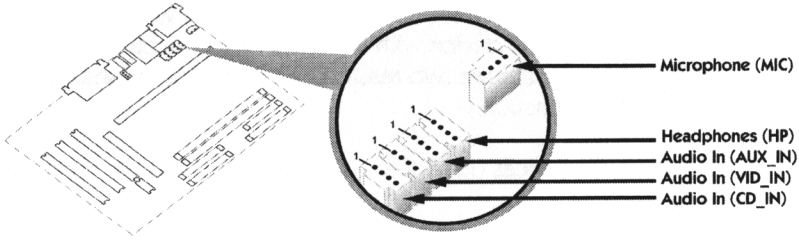
3. Connect an IDE cable on the back-panel of each IDE device to the corresponding headers on the mainboard. Close the tabs to secure the connector. Please note that IDE cables are directional and cannot fit correctly unless properly oriented.

Important: You need to use ATA-100 (IDE100) or better cables for your IDE devices. Old 40 wire cables will not work.



4. Connect an available power cable to the backplate of each peripheral device. Please note that the power cable is directional and will not fit unless properly oriented.

Step 6 – Connect Other Internal Peripherals (Optional)

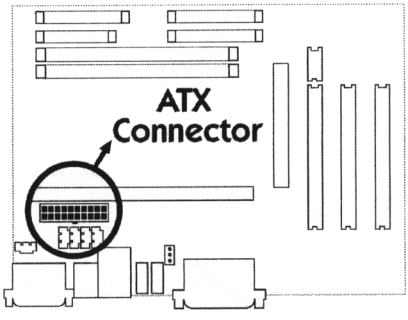


Step 7 – Connect Power Supply

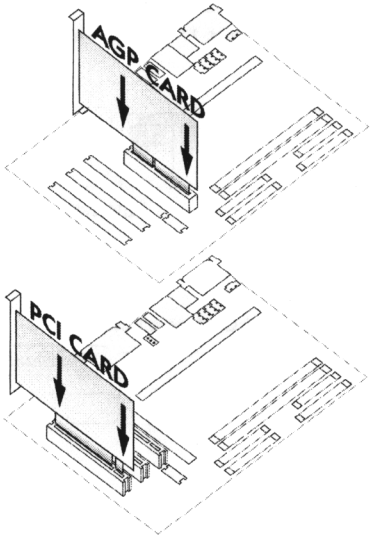
1. Make sure that the Power Supply Unit is **without electricity**.

2. Check again if the Power Supply Unit is **really** without electricity.

3. Plug the ATX power cable into the ATX connector on your mainboard.



Step 8 – Install Add-On Cards in Expansion Slots



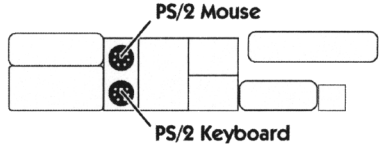
1. AGP and PCI cards plug into their respective slots with the metal plate fitting into a slot at the back of the case. Make sure the card is the correct way around, otherwise it shall not fit. Make sure the card is in the right slot, the AGP slot is for graphics cards.

2. Set the card in its slot and push downwards. It may need a pretty good push, but do not use excessive force as that can damage the motherboard.

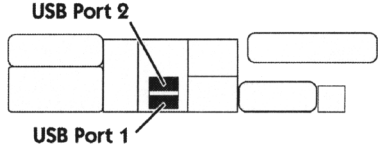
Note: Check if the voltage of your AGP card is 3.3V. Otherwise, your card will not fit physically.

Step 9 – Connect External Peripherals to Back-Panel

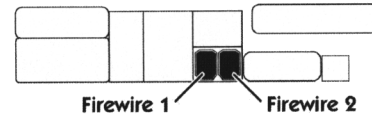
1. PS/2 Mouse and Keyboard



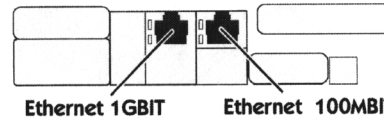
2. USB Ports



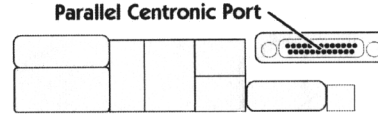
3. Firewire Ports



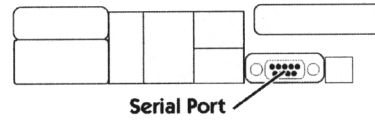
4. Ethernet Ports



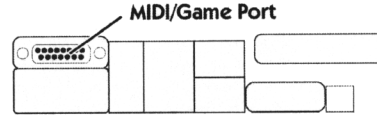
5. Parallel Port



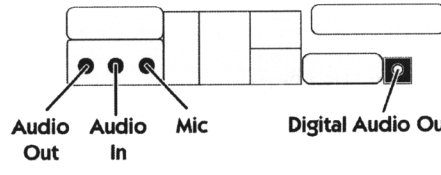
6. Serial Port



7. MIDI/Game Port



8. Audio Ports



Step 10 – Finishing Touches

1. Make sure that the processor card is not loose.
2. Check if all PCI/AGP cards sit correctly in their respective slots.
3. Make sure all memory modules were placed correctly.
4. Check again all cables.
5. Close your computer case.
6. Connect a power cable with the power supply unit.
7. Turn on the system power.

SOFTWARE INSTALLATION

```
133-P19700-002 64M DDR 200M/250E

Welcome to SmartFirmware(tm) for bplan Pegasos version 0.1b107 (20020919142323)
SmartFirmware(tm) Copyright 1996-2001 by CodeGen, Inc.
All Rights Reserved.
Pegasos BIOS Extensions Copyright 2001-2003 by bplan GmbH.
All Rights Reserved.
ok _
```

When you switch on your Pegasos it will greet you with the Smart Firmware screen. When the "ok" prompt appears, the system is ready to accept your commands.

Step 1 – Booting from CD

1. Insert the MorphOSBoot-CD in your CD drive. (If you have more than one, put it in the first CD drive. If you are unsure which one that is, simply try putting the CD in each CD drive and try to complete the next two steps.)
2. List the CD content by typing **ls /pci/ide/cd** and press the ENTER key. This will show if your CD drive works as expected. (You may press F9 in order to switch to a smaller font size so you can see more text on the screen. Pressing F6 will switch back to the bigger font size.)
3. Next, type **boot /pci/ide/cd boot.img** and press the ENTER key. MorphOS should now successfully boot from CD and load the Ambient environment.

Step 2 – Configuring a Harddisk

1. Double-click the CD icon in Ambient.

2. Open the "Tools" folder with a double-click on it. Execute the program "SCSIconfig" by double-clicking on its icon.

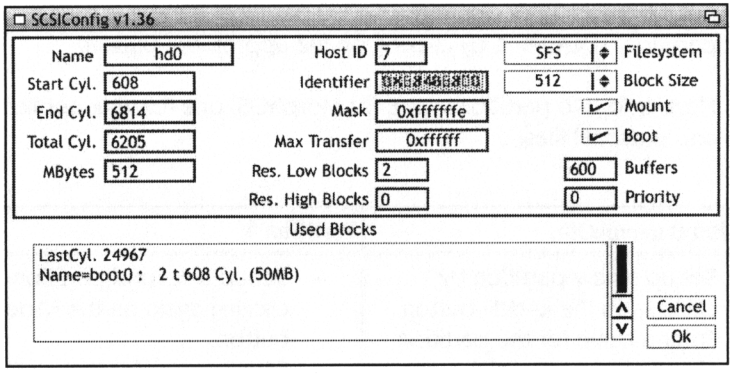
3. Select the "ide.device" in the "SCSI Controller" list. There should appear at least two devices in the "SCSI Drives" list. One of them is your harddisk, the other one is your CD drive. **Write down the unit number of your hard drive, you will need it later on.**

4. Now, select your harddisk and click on the «Partition» button. The "Partition List" will then pop up. If your hard drive is new, there should

not be any entry or possibly a QDH0 partition. If there is such a partition, «**Delete**» it by clicking on the appropiate button.

5. Next, add two partitions. One for MorphOS, one for your applications and personal files:

Partition 0 (MorphOS)	**Partition 1**
• Set up a new partition by clicking on the «Add» button. • Enter a name for the partition (for example, "boot0"). • Specify its size as 256 Mbytes. • Select "**FFS**" (Fast File System) as the filesystem for this partition. • Replace the given mask value "0xffffffff" with "0xfffffffe". (Please ignore any requesters saying that this setting might not be optimal.) • Set the check mark for the "Boot" option. • Set the check mark for the "Mount" option by clicking on it. • Set the Buffers value to 600. • Click on the «OK» button.	• Set up a second partition by clicking again on the «Add» button. • Enter a name for the partition (for example, "hd0"). Make sure that the name is not identical with the name entered for "Partition 0". • Type in a size for this partition. (If you are unsure what size would be best, 4096 Megabytes should be sufficient as a start. You may still add new partitions for your data later-on.) • Select "**SFS**" (Smart File System) as the filesystem for this partition. • Set the mask value to "0xfffffffe" as you did for the other partition. • Remove the check mark for the "Boot" option. • Set the check mark for the "Mount" option. • Set the Buffers value to 600. • Click on the «OK» button.
Note: If the space on "Partition 1" is not enough for your data, you may create additional partitions at any time. In order to do so, repeat the same steps as described for setting up "Partition 1". The maximum size of additional partitions depends on the size of your harddisk.	



In the "Partition List" window, click on the «OK» button. Back in the "SCSIconfig" main window, write all changes onto your hard drive by clicking on the «Save Changes» button. Confirm two times by pressing on «OK» and leave the program with «Quit». Reboot your system as requested to apply the changes.

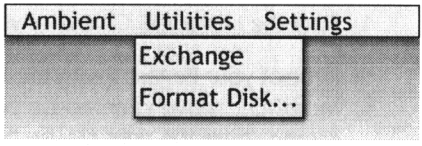
After the reboot, type **ls /pci/ide/disk@0,0** at the SmartFirmware prompt. With this command you may check if the partitions were installed correctly. . The first zero in the command stands for Channel 0, the second for Master. If the unit number you wrote down before is not 0, you have to alter the command the following way:

- Unit 0 == /pci/ide/disk@0,0 [channel0,master]
- Unit 1 == /pci/ide/disk@0,1 [channel0,slave]
- Unit 2 == /pci/ide/disk@1,0 [channel1,master]
- Unit 3 == /pci/ide/disk@1,1 [channel1,slave]

```
ok ls /pci/ide/disk@0,0
RDB patition 0 <FFS> : <boot0> (0x444F5301)
RDB patition 1 <SFS> : <hd0> (0x53465300)
ok _
```

If you see an almost identical display as in the figure above, everything should be alright. If there are DOS partitions instead of RDB partitions, you will get an "The Filesystem is not supported" error when booting from hard drive. (See the Trouble Shooting page for a solution.)

Step 3 - Formatting all Partitions



Now, we will format the partitions you just created.

1. Boot MorphOS from CD again as described before.

2. Move your mouse pointer to the upper left corner of the screen and press the right mouse button. When pressing, you will see several new menu options on the bar at the top of the screen. (See image on this page.)

3. Next, move your mouse pointer on the "Utilities" category and select the "Format Disk..." entry.

4. Choose one of the two partitions.

5. Enter a name in the "Label" text field. (As a suggestion, name "hd0" as "Work" and label "boot0" as "MorphOS".)

6. Click on the "Format" button.

7. Repeat the same steps for the other partition.

Step 4 - Installing MorphOS on a Harddisk

1. Double-click on the CD symbol.

2. Double-click on the "HDInstall" icon.

3. Follow the instructions given by the install program.

4. You will be asked to select the partition where the "boot.img" should be installed. Select "Partition 0" (i.e. "boot0") which you had created in Step 2. Then, you will be asked where MorphOS should be installed. Again, select "Partition 0".

Step 5 – Booting from Harddisk

1. Take the MorphOS CD out of your CD drive.

2. Reboot your Pegasos with the reset button or by software. (In MorphOS, move your mouse pointer in the upper left corner of the screen. Press the right mouse button and select the "Ambient" category. Choose the menu entry labelled as "Shutdown". Then, click on the «Reboot» button.)

3. Now, type **boot /pci/ide/disk@0,0:0 boot.img** after the OpenFirmware screen appears again. (Pay attention to the unit number (see Step 2) and adapt the command according to your setup. The third zero after the colon refers to the partition number where your boot image is located.)

4. If all previous steps went okay, your Pegasos will now boot MorphOS.

Step 6 - Auto-booting

You do not have to type the command line mentioned In Step 5 everytime you start your computer. After a reboot, type the following lines on the OpenFirmware prompt:

1. **setenv boot-file boot.img ramdebug**
2. **setenv boot-device /pci/ide/disk@0,0:0** - Check the unit number!
3. **setenv auto-boot-timeout 3000** = Auto-boot after 3 seconds
4. **setenv auto-boot? true**

Note: The "ramdebug" parameter in the first line is MorphOS specific and will permit to use the serial port when running this operating system.

Disabling Auto-Boot

If you do not want to use the Auto-boot feature at some point, press the [Esc] key to interrupt the boot timeout. You may then work with the OpenFirmware.

To deactivate Auto-booting permanently, enter **setenv auto-boot? False** at the OpenFirmware prompt.

Trouble Shooting

Problem: SmartFirmware cannot find any of the two partitions
Did you pay attention to the unit number where neccesary? Make sure the hard drive is connected with an 80-wire IDE cable. Did you follow the steps exactly and in the right order while installing your hard drive?

Problem: When I boot from the hard-drive I get the error message: *"The Filesystem is not supported"*
Your harddisk was probably used in an Intel-compatible PC before and has a MBR (Master Boot Record). In order to solve this problem, open a MorphOS Shell window by using the menu at the top of the Ambient screen. Click the right mouse button to see the menu and select "NewShell" from the Ambient category. A new window will be opened.

Now, type **HDwrite ide.device <unit> MOSSYS:c/reboot 0** in the Shell window. Note: You have to replace <unit> with the unit number of your harddisk. You may find out the right unit number by using the SCSIConfig program.

Please make sure that you type exactly what is written above. Wrong use of Hdwrite may potentially result in data loss.

Hardware Compatibility

Here you will find a selection of graphics cards that are known to work with the PEGASOS II motherboard and MorphOS.

Supported video/graphics cards:

- ATI
  - Radeon 7000VE (RV100)
  - Radeon 7200 (R100)
  - Radeon 7500 (RV200)
  - Radeon 8500LE (R200)
  - Radeon 9000 (RV250)
  - Radeon 9000 Pro (RV250)
  - Radeon 9100 (RV200)
- 3dfx
  - Voodoo3 2000 (Avenger) (3D)
  - Voodoo3 3000 (Avenger) (3D)
  - Voodoo3 3500 (Avenger) (3D)
  - Voodoo4 4500 (VSA-100) (3D)
  - Voodoo5 5500 (VSA-100) (3D)
- SiS
  - 305
  - 300
  - 6326
- 3d Labs / Texas Instruments
  - Permedia2
  - Permedia2v

For uptodate information on supported hardware, please check:

www.morphos.net