Freescale Semiconductor
Application Note

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Genesi Pegasos II Boot Options

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This application note is the second in a series of documents describing the Genesi Pegasos II system which contains a PowerPC™ microprocessor.

Contents

1 Introduction

This application note describes the boot menu and boot options. Section 8, “References,” lists the other application notes in this series that describe the operation of the Genesi Pegasos II system.

2 Terminology

The following terms are used in this document.

Linux OS	Linux operating system
Debian	One of the distributions of Linux
Yellow Dog	One of the distributions of Linux
Open Firmware	Firmware used in Genesi Pegasos II
Firmware	Code associated with booting and starting the motherboard

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Partition	All hard drives are broken into sections called partitions, which are defined in the partition table on the hard drive. Each partition has a starting sector, size, and type. The partition table can be built using either the partition editor fdisk on Yellow Dog or parted on Debian Linux.
GDM	GUI display manager
GUI	Graphical user interface
OS	Operating system. The firmware starts up the hardware and hands over control to the OS, which then is used as the interface to the user and controls the operation of the computer system.

3 Boot Menu

If the ON button is pushed and a boot menu screen does not display, the firmware or hard drive is not properly configured.Some solutions are as follows:

- If a firmware prompt does not display, make sure the power cable is firmly connected and there is power to the system.
- If the error message `no file system found` displays above the firmware `ok` prompt, ensure that the hard drive has power and logic connections. If there is only one hard drive, ensure that it is set to cable select.
- At the firmware `ok` prompt, type the following sequence of commands (if at any time the boot menu screen displays, skip the rest of these steps):
  - Type `boot`
  - Type `ls /pci/ide`
    If the display is not similar to the following, your hard drive is not powered, not connected, or has the incorrect master/slave/cable select setting:
    ```
    ls /pci/ide
    disk@0,0
    cdrom@1,0
    ```
  - Type `printenv` and look at the parameters near the bottom of the list:
    - If `boot-device` is not set to `ide:0`, then perform the following firmware command:
      `setenv boot-device ide:0`
      Note that there is a space between `setenv`, `boot-device`, and `ide:0`.
    - If `boot-file` is not set to `menu`, then use this command:
      `setenv boot-file menu`
    - If `boot-command` is not set to `boot`, then use this command:
      `setenv boot-command boot`
    - If `auto-boot-timeout` is not set to `500`, then use this command:
      `setenv boot-timeout 500`
    - If `auto-boot` is not set to true, then use this command:
      `setenv auto-boot true`
- If all these solutions fail, then contact risc10@email.sps.mot.com

When the ON button is pushed, the Genesi Pegasos II system will display a boot menu screen. If you do not stop the countdown process (within 25 seconds) by pressing any key, option 3, booting the Debian Linux Kernel 2.6 starts. Otherwise, the user may choose one of the following options.

1. MorphOS

2. Debian GNU/Linux 2.4 kernel
3. Debian GNU/Linux 2.6 kernel (default)
4. Yellow Dog Linux 2.4 kernel
5. Return to OF prompt,that is, drop into the firmware.

The boot uses partition 0, /dev/hda1, (an Amiga fast file system, type affs).

4 Option 1—Morphos

MorphOS is an OS similar to Linux. There are games, editors, media players, and several useful pdf documents. MorphOS has no facility for printing these documents. The application note *Genesi Pegasos II Debian Linux* (AN2739) discusses an alternate method for accessing and printing these pdf files.

MorphOS uses partition 1, /dev/hda2, type MOS and partition 2, /dev/hda3, type MOS-DATA which are SFS file systems.

MorphOS can be stopped by doing a right click on the mouse and choosing the Ambien/shutdown menu item.

Figure 1. Splash Screen for MorphOS

5 Option 2 and 3—Debian Linux

Debian Linux is distributed on the web site www.debian.org.

Option 2 and 3 use different Linux kernels. Option 2 uses a 2.4 Debian Linux Kernel; option 3 uses a 2.6 Debian Linux Kernel. The Debian root file system is the same for both options. It is inaccurate to call the kernels, Debian kernels. The kernels are generic; the style of Linux, which is Debian, is determined by the root file system.

Partition 3 is used as a linux swap partition, /dev/hda4, type LNX, swap file and partition 4 is the root file system partition, /dev/hda5, type ext3.

Ext2 and Ext3 are the default partition types for Linux.

Ext2 is a non-journaling file system, which means that most of the partition and file information tables are kept in memory and periodically written out to disk. During a normal shutdown, all of the memory tables are written back to the disk and the clean bit is set. Then on the next startup, these correct tables can again be written to memory and used by Linux. During an improper shutdown, these in-memory tables are not written back to the disk, so the disk has incomplete information and is therefore inconsistent and possibly corrupt. Linux recognizes this condition and tries to correct all of the inconsistent pointers using the fsck.ext2 utility. After fsck.ext2 completes, the disk will be consistent but may have lost some data from the last run. Also fsck.ext2 can be run from the command prompt for a more complete disk recovery operation.

Ext3 is a journaling file system, which is compatible with ext2, but in addition, it keeps journals of in-memory file system tables on the disk. In case of an unclean shutdown, the disk can be recovered to a consistent state very quickly by reading the journal. Also, less data is lost from the previous unclean shutdown. However, it is not infallible. The system may have stopped during a journal write and some journal entries may be lost. It is also possible that the disk will be left in an inconsistent state and then a manual run of fsck.ext3 is needed.

Thus, recovery is faster and more complete. An ext2 recovery can take several minutes or more, while an ext3 recovery takes just a few seconds.

In any case, it is important to shut down Linux properly with a `shutdown -h now` command and avoid just shutting off the power on a running Linux system.

As soon as Debian Linux is booted, the user can log in through one of the text screens or through a graphic log-in screen. These screens are swapped by using the Alt+Fn keys. That is, Alt+F7 is the graphics screen and Alt+F3, +F4, +F5, and +F6 are text log-in screens.

Debian Linux supports many GUI display managers (GDM), however Genesi Pegasos II supports only the two most common GDMs, Gnome and KDE.

The most striking difference between Debian and Yellow Dog Linux is the location of the system administration files.

See application note *Genesi Pegasos II Debian Linux* (AN2739), for a more complete discussion of this option.

6 Option 4—Yellow Dog Linux

Yellow Dog Linux is distributed by www.yellowdoglinux.com. It can be purchased on the web or in a shrink wrapped box and is available in many local computer stores.

Option 4 uses a 2.4 Yellow Dog Linux Kernel with a Yellow Dog root file system. The kernels are generic; the style of Linux, which is Yellow Dog, is determined by the root file system.

It uses partition 3 as a Linux swap partition, /dev/hda4, type LNX swap file and partition 5 as the root file system partition, /dev/hda6, type ext3.

The discussion in Section 5, "Option 2 and 3—Debian Linux," on the ext2 and ext3 partition types is also true for Yellow Dog Linux.

The most noticeable difference between Debian and Yellow Dog Linux is the location of the system administration files.

Yellow Dog Linux also supports many GUI display managers (GDM), however, Genesi Pegasos II only supports the two most common GDMs, Gnome and KDE. At this time, the graphics terminal will not start correctly. The XFree86Config file needs to be changed and other problems need to be fixed. The text windows are available.

7 Option 5—Open Firmware

The Open Firmware web site is www.openfirmware.com.

Open Firmware is the firmware used for this system. It is an open specification, but a proprietary implementation by CodeGen and licensed to Genesi. The commands described in Section 3, "Boot Menu" are Open Firmware commands.

When key 5 is pushed and the system drops into the Open Firmware prompt `ok`, it also displays an error message `Error: error while trying to load or boot`. This is not an error; it is just an informative message indicating that no OS was booted.

Partitions on the master hard drive can be displayed by the Open Firmware command `ls ide:0` and displays the following information:

```
RDB partition 0 <FFS>: <boot> (0x444F5301)

RDB partition 1 <SFSS>:<MOS> (0x53465300)

RDB partition 2 <SFS>: <MOS-DATA> (0x53415300)

RDB partition 3 <LNX>: <swap> (0x4C4E5800)

RDB partition 4 <LNX>: <debian> (0x4C4E5800)

RDB partition 5 <LNX>: <YDL> (0x4C4E5800)
```

The partition table and program designed to handle it number the partitions starting at 0. However, Linux numbers the hardware partition devices starting at 1. Thus, partition 0 on IDE channel 0 master drive is /dev/hda1. A description of Linux device naming is given in the application note *Genesi Pegasos II Debian Linux* (AN2739).

This information was used to describe the partition types in the previous sections.

Refer to application note *Genesi Pegasos II Firmware* (AN2738), for a more complete discussion of this option.

8 References

The following documents describe the various applications of the Genesi Pegasos II system.

1. Freescale application note AN2666, *Genesi Pegasos II Setup*
2. Freescale application note AN2738, *Genesi Pegasos II Firmware*
3. Freescale application note AN2739, *Genesi Pegasos II Debian Linux*

4. Freescale application note AN2744, *PMON Module—An Example of Writing Kernel Module Code for Debian 2.6 on Genesi Pegasos II*
5. Freescale application note AN2743, *Software Analysis on Genesi Pegasos II Using PMON and Altivec*

For assistance or answers to any question on the information that is presented in this document, send an e-mail to risc10@freescale.com.

9 Document Revision History

Table 1 provides a revision history for this application note.

Table 1. Revision History

Revision	Date	Description
0	07/14/2004	Initial release.

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