Disk Support for Unix 8.2

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January 27, 1987

1. OVERVIEW

The new release of the operating system (8.2) supports Priam, 5.25 inch and Eagle disks. The purpose of this document is to describe how these disks are partitioned, what partitions can be swapped on and on which partitions filesystems (like root and u0) can be mounted.

1.1. Disks Supported in 8.2

The following disks are supported in 8.2

- Priam P3450 - 35Mb
- Priam P7050 - 70Mb

- Fujitsu F2243as - 85Mb
- Fujitsu F2246e - 170Mb
- Hitachi H511 - 85Mb
- Hitachi H512 - 170Mb

- Fujitsu EAGLE F2351 474Mb

1.2. Basic Principles

Each disk is divided into 16 overlapping partitions or sections. A disk partition is just a contiguous number of blocks on the disk that is treated as a single entity. Typically, a filesystem is mounted on a partition of a disk, or a partition of a disk is used as the system swap area. Disk partitions are labeled from 0 to 15. The following partitions have special meaning:

Partition 0: This partition refers to the whole disk - including the space for mapping bad tracks

Partition 1: This partition refers to the whole of the usable disk (i.e. this is just partition 0 minus the space reserved for bad tracks).

Partition 5: This partition is reserved for the boot code on disk 0 
i.e. the executable program loaded by CRM which boots vmunix

Partition 6: This is the root partition on disk 0

It is important to understand that the 16 partitions are overlapping and that the use of certain partitions precludes the use of other partitions, e.g. it does not make sense to talk about
partition 6 on a disk when a filesystem is mounted on partition 1, since partition 1 is ALL of the usable part of the disk. Also, since certain partitions overlap care should be taken when mounting filesystems and assigning swap.

For example, consider the Priam p7050 disk:

- partition 8 starts at block 19780 and extends for 24495 blocks
- partition 10 starts at block 28060 and extends for 87975 blocks
- partition 11 starts at block 44275 and extends for 71760 blocks

Clearly, partition 11 starts where partition 8 ends, so it makes sense that these two partitions can be used at the same time. In fact when it is required that the root and u0 filesystems and a swap area of approximately 12 Mb be on the same Priam p7050 the root filesystem is mounted on partition 6, the u0 filesystem is mounted on partition 11 and partition 8 is assigned as the swap area.

However, if partition 8 was used as the swap area and the u0 filesystem was mounted on partition 10 then it is clear that the blocks from block 28060 (the start of partition 10) to block 44275 (the end of partition 8) form part of both partitions. Therefore these blocks could be written to as part of swap and as part of the u0 filesystem. The probable result of this is that the u0 filesystem will be corrupted resulting in a system crash and possible loss of files from u0.

So, for each disk type, certain combinations of partitions make sense and others are not supported. This document describes the valid configurations for each of the disks supported in 8.2.

2. Partition Naming Conventions

All disks supported in 8.2 use one of two possible makes of disk controller, a rimfire controller or an interphase controller. The Priam p3450 and Priam p7050 both use the rimfire controller. All other supported disks (Eagle, Hitachi h511 and h512, Fujitsu f2243as and f2246e) use an interphase controller.

In this document disk partitions will be named as follows:

$$ed(x,y)$$

where e is the initial letter of the controller used by the disk (i.e. r for rimfire and i for interphase), x is the disk number and y is the partition on that disk.

For example, rd(0,6) refers to partition 6 on rimfire disk 0 (which is the root partition if the Priam is the boot disk). Similarly, id(1,1) refers to partition 1 on interphase disk 1 which is the entire second interphase disk (Eagle, h511, h512, f2243as or f2246e).  

Note: Partition y on rimfire disk 1 (i.e. partition y on the second Priam disk) is referred to by rd(2,y), not rd(1,y) as would be expected.
3. Priam Disks (35 Mb)

Currently, 3 disk configurations are supported on a Priam p3450. Any partition listed below (excluding rd(0,6) on the boot disk) can be assigned as the system swap area.

1 Partition

rd(z,1) - 30 Mb

rd(z,1) can be used if one large filesystem is needed (approx 30 Mb) or if the entire disk is to be used as swap. Configuring a Priam p3450 disk for only 1 large partition prohibits the use of that disk as the boot disk.

3 Partitions - small swap (4 Mb)

rd(z,6) - 10 Mb
rd(z,9) - 4 Mb
rd(z,10) - 16 Mb

In this configuration the root filesystem must be mounted on partition 6 (i.e. rd(0,6)) if the disk is the boot disk. Partition rd(z,9) is usually assigned as the system swap area in this configuration, leaving rd(z,10) available for a filesystem.

3 Partitions - large swap (10 Mb)

rd(z,6) - 10 Mb
rd(z,8) - 10 Mb
rd(z,11) - 10 Mb

In this configuration the root filesystem must be mounted on partition 6 (i.e. rd(0,6)) if the disk is the boot disk. Partition rd(z,8) is usually assigned as the system swap area in this configuration, leaving rd(z,11) available for a filesystem.
4. Priam Disks (70 Mb)

Currently, 4 disk configurations are supported on a Priam p7050. Any partition listed below (excluding rd(0,6) on the boot disk) can be assigned as the system swap area.

1 Partition

\[
\begin{align*}
\text{rd}(z,1) & : 56 \text{ Mb} \\
\end{align*}
\]

\(\text{rd}(z,1)\) can be used if one large filesystem is needed (approx 56 Mb) or if the entire disk is to be used as swap. Configuring a Priam p7050 disk for only 1 large partition prohibits the use of that disk as the boot disk.

3 Partitions - 4 or 42 Mb swap

\[
\begin{align*}
\text{rd}(z,6) & : 10 \text{ Mb} \\
\text{rd}(z,9) & : 4 \text{ Mb} \\
\text{rd}(z,10) & : 42 \text{ Mb} \\
\end{align*}
\]

In this configuration the root filesystem must be mounted on partition 6 (i.e. \(\text{rd}(0,6)\)) IF THE DISK IS THE BOOT DISK. Partition \(\text{rd}(z,9)\) can be assigned as the system swap area in this configuration, leaving \(\text{rd}(z,10)\) available for a filesystem. Alternatively, partition \(\text{rd}(z,10)\) can be assigned as the system swap area in this configuration, leaving \(\text{rd}(z,9)\) available for a filesystem.

3 Partitions - 12 Mb swap

\[
\begin{align*}
\text{rd}(z,6) & : 10 \text{ Mb} \\
\text{rd}(z,8) & : 12 \text{ Mb} \\
\text{rd}(z,11) & : 34 \text{ Mb} \\
\end{align*}
\]

In this configuration the root filesystem must be mounted on partition 6 (i.e. \(\text{rd}(0,6)\)) IF THE DISK IS THE BOOT DISK. Partition \(\text{rd}(z,8)\) is usually assigned as the system swap area in this configuration, leaving \(\text{rd}(z,11)\) available for a filesystem.

3 Partitions - 20 Mb swap

\[
\begin{align*}
\text{rd}(z,6) & : 10 \text{ Mb} \\
\text{rd}(z,13) & : 28 \text{ Mb} \\
\text{rd}(z,14) & : 20 \text{ Mb} \\
\end{align*}
\]

In this configuration the root filesystem must be mounted on partition 6 (i.e. \(\text{rd}(0,6)\)) IF THE DISK IS THE BOOT DISK. Partition \(\text{rd}(z,14)\) is usually assigned as the system swap area in this configuration, leaving \(\text{rd}(z,13)\) available for a filesystem.
5. 5.25 inch Disks ( 85 Mb )

The partitioning schemes for both 85 Mb 5.25 inch disks (Fujitsu f2243as and Hitachi h511) are very similar. Currently, 4 disk configurations are supported on a Fujitsu f2243as disk and 3 disk configurations are supported on a Hitachi h511 disk. The first 3 listed below are supported on both types of disks, the fourth configuration is supported on the Fujitsu 2243as only.

Any partition listed below (excluding id(0,6) on the boot disk) can be assigned as the system swap area. However, it is a good idea to use partition 2 (id(x,2)) for swap (20 Mb) on an 85 Mb disk. All other partitions are available for mounting filesystems.

1 Partition

\[\text{id}(x,1) \quad \text{-} \quad 65 \text{ Mb}\]

id(x,1) can be used if one large filesystem is needed (approx 65 Mb) or if the entire disk is to be used as swap. Configuring an 85 Mb disk for only 1 large partition prohibits the use of that disk as the boot disk.

2 Partitions

\[\text{id}(x,4) \quad \text{-} \quad 40 \text{ Mb}\]
\[\text{id}(x,7) \quad \text{-} \quad 25 \text{ Mb}\]

Configuring an 85 Mb disk for 2 large partitions prohibits the use of that disk as the boot disk (since there is no partition 6).

3 Partitions

\[\text{id}(x,2) \quad \text{-} \quad 20 \text{ Mb}\]
\[\text{id}(x,6) \quad \text{-} \quad 20 \text{ Mb}\]
\[\text{id}(x,7) \quad \text{-} \quad 25 \text{ Mb}\]

In this configuration the root filesystem must be mounted on partition 6 (i.e. id(0,6)) IF THE DISK IS THE BOOT DISK.

3 Partitions - Large swap (Fujitsu f2243as only)

\[\text{id}(x,3) \quad \text{-} \quad 40 \text{ Mb}\]
\[\text{id}(x,6) \quad \text{-} \quad 20 \text{ Mb}\]
\[\text{id}(x,14) \quad \text{-} \quad 5 \text{ Mb}\]

In this configuration the root filesystem must be mounted on partition 6 (i.e. id(0,6)) IF THE DISK IS THE BOOT DISK. Note that this configuration is supported on the Fujitsu f2243as 85 Mb disk only. This configuration is used when a swap space of 40 Mb (id(0,3)) is required on the Fujitsu f2243as Mb boot disk.
6. **5.25 inch Disks (170 Mb)**

The partitioning schemes for both 170 Mb 5.25 inch disks (Fujitsu f2246e and Hitachi h512) are the same. Currently, 3 disk configurations are supported on 170 Mb disks.

Any partition listed below (excluding id(0,6) on the boot disk) can be assigned as the system swap area. However, it is a good idea to use partition 2 (id(2)) for swap (40 Mb) on an 170 Mb disk. All other partitions are available for mounting filesystems.

**1 Partition**

<table>
<thead>
<tr>
<th>id(x,1)</th>
<th>120 Mb</th>
</tr>
</thead>
</table>

id(x,1) can be used if one large filesystem is needed (approx 120 Mb) or if the entire disk is to be used as swap. Configuring a 120 Mb disk for only 1 large partition prohibits the use of that disk as the boot disk.

**2 Partitions**

<table>
<thead>
<tr>
<th>id(x,4)</th>
<th>60 Mb</th>
</tr>
</thead>
<tbody>
<tr>
<td>id(x,7)</td>
<td>60 Mb</td>
</tr>
</tbody>
</table>

Configuring an 170 Mb disk for 2 large partitions prohibits the use of that disk as the boot disk (since there is no partition 6).

**3 Partitions**

<table>
<thead>
<tr>
<th>id(x,2)</th>
<th>40 Mb</th>
</tr>
</thead>
<tbody>
<tr>
<td>id(x,6)</td>
<td>20 Mb</td>
</tr>
<tr>
<td>id(x,7)</td>
<td>60 Mb</td>
</tr>
</tbody>
</table>

For the above configuration the root filesystem must be mounted on partition 6 (i.e. id(0,6)) if the disk is the boot disk.
7. Eagle Disks

Currently, 12 disk configurations are supported on an eagle disk Any partition listed below (excluding id(0,6) on the boot disk) can be assigned as the system swap area. However, it is a good idea to use partition 2 (id(x,2)) for small swap (40 Mb) or partition 3 (id(x,3)) for large swap (140 Mb) on an Eagle disk. All other partitions are available for mounting filesystems.

1 Partition

\[
\begin{align*}
id(x,1) & \quad 350 \text{ Mb} \\
id(x,2) & \quad 40 \text{ Mb} \\
id(x,6) & \quad 20 \text{ Mb} \\
id(x,15) & \quad 290 \text{ Mb}
\end{align*}
\]

id(x,1) can be used if one large filesystem is needed (approx 350 Mb) or if the entire disk is to be used as swap. Configuring an Eagle disk for only 1 large partition prohibits the use of that disk as the boot disk.

2 Partitions

\[
\begin{align*}
id(x,4) & \quad 60 \text{ Mb} \\
id(x,15) & \quad 290 \text{ Mb}
\end{align*}
\]

This configuration prohibits the use of the eagle as the boot disk.

3 Partitions - small swap (40 Mb)

\[
\begin{align*}
id(x,2) & \quad 40 \text{ Mb} \\
id(x,6) & \quad 20 \text{ Mb} \\
id(x,15) & \quad 290 \text{ Mb}
\end{align*}
\]

For this configuration the root filesystem must be mounted on partition 6 (i.e. id(0,6)) IF THE DISK IS THE BOOT DISK.

3 Partitions - large swap (140 Mb)

\[
\begin{align*}
id(x,3) & \quad 140 \text{ Mb} \\
id(x,6) & \quad 20 \text{ Mb} \\
id(x,14) & \quad 190 \text{ Mb}
\end{align*}
\]

For this configuration the root filesystem must be mounted on partition 6 (i.e. id(0,6)) IF THE DISK IS THE BOOT DISK.

3 Partitions - NOT BOOT DISK

\[
\begin{align*}
id(x,4) & \quad 60 \text{ Mb} \\
id(x,7) & \quad 100 \text{ Mb} \\
id(x,14) & \quad 190 \text{ Mb}
\end{align*}
\]

This configuration prohibits the use of the eagle as the boot disk.

4 Partitions - small swap (40 Mb)

\[
\begin{align*}
id(x,2) & \quad 40 \text{ Mb} \\
id(x,6) & \quad 20 \text{ Mb} \\
id(x,7) & \quad 100 \text{ Mb} \\
id(x,14) & \quad 190 \text{ Mb}
\end{align*}
\]

For this configuration the root filesystem must be mounted on partition 6 (i.e. id(0,6)) IF THE DISK IS THE BOOT DISK.

4 Partitions - large swap (140 Mb)
id(x,3) - 140 Mb
id(x,6) - 20 Mb
id(x,11) - 100 Mb
id(x,12) - 80 Mb

For this configuration the root filesystem must be mounted on partition 6 (i.e. id(0,6)) IF THE DISK IS THE BOOT DISK.

4 Partitions - NOT BOOT DISK
id(x,4) - 60 Mb
id(x,7) - 100 Mb
id(x,11) - 100 Mb
id(x,12) - 80 Mb

This configuration prohibits the use of the eagle as the boot disk.

5 Partitions - small swap (40 Mb)
id(x,2) - 40 Mb
id(x,6) - 20 Mb
id(x,7) - 100 Mb
id(x,11) - 100 Mb
id(x,12) - 90 Mb

For this configuration the root filesystem must be mounted on partition 6 (i.e. id(0,6)) IF THE DISK IS THE BOOT DISK.

5 Partitions - large swap (140 Mb)
id(x,3) - 140 Mb
id(x,6) - 20 Mb
id(x,8) - 60 Mb
id(x,9) - 60 Mb
id(x,10) - 70 Mb

For this configuration the root filesystem must be mounted on partition 6 (i.e. id(0,6)) IF THE DISK IS THE BOOT DISK.

5 Partitions - NOT BOOT DISK
id(x,4) - 60 Mb
id(x,7) - 100 Mb
id(x,8) - 60 Mb
id(x,9) - 60 Mb
id(x,10) - 70 Mb

This configuration prohibits the use of the eagle as the boot disk.

6 Partitions
id(x,2) - 40 Mb
id(x,6) - 20 Mb
id(x,7) - 100 Mb
id(x,8) - 60 Mb
id(x,9) - 60 Mb
id(x,10) - 70 Mb

For this configuration the root filesystem must be mounted on partition 6
( i.e. id(0,8) ) IF THE DISK IS THE BOOT DISK.
8. Mounting filesystems on partitions and assigning swap

As mentioned above all disks supported in 8.2 use either a rimfire or a interphase controller. Each partition of each disk in a particular disk configuration has an entry in the /dev directory. Disk partitions on disks using a rimfire controller (i.e. Priam disks) are referred to by names beginning with rim, while disks partitions on disks using a interphase controller (i.e. Eagle, h511, h512, f2243as, f2246e) are referred to by names beginning with u. Disk number and partition number are used to uniquely name a partition.

For example, /dev/rim06 refers to partition 6 on rimfire (Priam) disk number 0 - which may be the partition the root filesystem is mounted on if rimfire disk 0 is the boot disk. Similarly, /dev/u01 is partition 1 of the second interphase disk (which may be an Eagle, h511, h512, f2243as or f2246e).

Mounting a filesystem means allowing the filesystem on a partition of a disk to be referenced through a particular directory. Therefore, when we talk about mounting the u0 filesystem we mean taking the filesystem on a particular partition of a disk and letting all files in that filesystem be accessible through the directory called u0.

For example,

```
mount /dev/u01 /u0
```

allows access to all files in the first partition of the first Interphase disk (Eagle, h511, h512, f2243as, f2246e) through the /u0 directory.

When a system is booted to single user mode the only filesystem mounted is the filesystem on partition 6 of the boot disk. This filesystem is mounted by default on the directory /.

When a system is brought from single user to multi user the file /etc/fstab is examined and all the filesystems listed in this file are mounted on their corresponding directories.

To make a particular partition of a disk the system swap area the special file /dev/swap is linked to the appropriate entry in the /dev directory.

For example,

```
ln /dev/rim08 /dev/swap
```

makes partition 8 on Priam disk 0 the system swap area.

The 8.2 installation script /etc/install/b2install prompts for pertinent information and sets up the required filesystems and swap area. It is STRONGLY recommended that subsequent changes to the system disk configuration be made by using /etc/install/mk disk dev, rather than by hand.

9. Example Disk Configuration

Consider a system which has 1 Priam 70 Mb (p7050) and two Fujitsu 170 Mb (f2246e) disks. Suppose we want to boot from the Priam (i.e. we want to have the root filesystem on the Priam disk), and that we need 120 Mb swap area and a large u0 filesystem.

The root filesystem will be on partition 6 of the Priam, i.e. /dev/rim06.

The swap area /dev/swap will be linked to the first partition on the first Fujitsu, i.e. /dev/is01.

The u0 filesystem will be mounted on partition 1 of the second Fujitsu, i.e. /dev/is11.
This leaves some space on the Priam for additional filesystems. Alternatively, the 10th partition on the Priam, i.e. /dev/r0m0a, could be used for the u0 filesystem, which would leave all of the second Fujitsu available for additional filesystems.

Note: Partitions in unix are numbered in hex, so rd(0,10) becomes /dev/r0m0a, and id(1,11) becomes /dev/is1b, etc.
Fuji M235la Eagle
New map - Bootable
474 Mbyte

Fuji M235la Eagle
Old map
474 Mbyte

Priam P7050
70 Mbyte

Priam P3450
35 Mbyte

Fuji F2243as
85 Mbyte

Fuji F2246e / Hitachi dk512
170 Mbyte

Cylinder: HEX(DECIMAL)
Partition: Number [Size]

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