UOS Init User's Guide

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Introduction

UOS
Init User's Guide

June 2017

Note: This manual w as prepared using

Preface

This guide provides a description of the UOS Init program.

The audience for this guide includes:
- Anyone installing UOS for the first time.
- Anyone upgrading a previous version of UOS.
- System administrators wishing to tune UOS.

Conventions:

This guide uses the following conventions:

bold   Indicates text that is typed by the user.
italics   Indicates a placeholder for a command, rather than literal texxt

Getting Started

UOS startup

When UOS starts, the Init program is run to prepare for, and load, the UOS operating system.

When Init starts, it sounds a tone to indicate that it is ready to enter command-mode, if desired. If nothing is typed within 2 seconds of the tone, Init will immediately start up UOS on the default boot device. If this device is a distribution medium, such as an install CDROM, the UOS install program will be started. If any character is typed on the keyboard within 2 seconds of the tone, Init will enter command mode, which allows the user to perform system configuration operations.

Note: if there is no system console connected to the computer, UOS will automatically be started.

If UOS doesn't start, this can indicate that there is no install media mounted and no installed copy of UOS to boot.

Init Options

The following table lists the Init commands and sub commands.

Command	Sub command	Function
BOOT	None	Bootstrap a device.
DISK	Disk sub commands: CLONE CREATE DELETE DIRECTORY HELP LIST INITIALIZE PARTITION RAID REBUILD SET	Perform disk-related tasks.
HALT	None	Halt the CPU.
HARDWARE	Hardware sub commands: DATE DEVICE HELP MEMORY TIME	Perform hardware-related tasks.
HELP	None	Show list of commands.
IDENTIFY	None	Show Init identification.
START	None	Start UOS.
VIDEO	None	Toggle video/printer mode for console.

The options are arranged in alphabetical order, and each is described in a separate section. Common error messages associated with an option appear at the end of the option description.

Note that pressing the escape (Esc) key will return you to the last level that you were at. Pressing control-C (holding the Ctrl key and then C key simultaneously) will always return you to the main Init prompt. Note that pressing control-C may interrupt processes before they complete. If you want to avoid this, do not press control-C unless you are at a prompt.

BOOT

Bootstrap Device

The BOOT option bootstraps another device. Use the BOOT option if you need to bootstrap another disk or tape.

NOTE: This option is not yet implemented.

DISK

DISK sub commands - Configure disks

The following sections describe the disk configuration sub commands of the DISK command. These sub commands allow you to perform operations on disks.

The DISK sub commands are:

- CLONE - copy a disk to another disk.
- CREATE - Create a RAM disk.
- DELETE - Delete a RAM disk.
- DIRECTORY - List files on a disk.
- HELP - Show valid sub commands.
- LIST - Show all disks.
- INITIALIZE - Initialize a disk so that it can contain files.
- PARTITION - Add/remove partitions on a disk.
- RAID - Create/Remove/Modify mirror sets.
- REBUILD - Rebuild a disk that was not shut down properly.
- SET - Modify disk attributes.

CLONE

CLONE - Copy a disk

The CLONE command creates an exact image of the data on one disk, on another disk. Use the CLONE command if you want to create a duplicate disk. The disks must be of the same capacity and sector size.

CLONE Dialogue

```
Init> DISK CLONE
```

Response - Type DISK CLONE at the main Init prompt.

```
Disk clone (DISKA0) > DISKA0
```

Explanation - Init asks for the disk to make a copy of and defaults to one of the disks.

Response - Enter the name of the disk that contains the data you wish to copy. If you type a ? or HELP in response to the prompt, you will be shown the help text at this level.

```
Disk clone DISKA0 (DISKA1) > DISKA1
```

Explanation - Init asks for the disk to copy the data to.

Response - Enter the name of the disk that you wish to copy data to. If you type a ? or HELP in response to the prompt, you will be shown the help text at this level.

```
Any existing data on DISKA1 will be lost.  Continue? <NO>
```

Explanation - Init reminds you that any data on the target disk will be lost as it it overwritten with data from the source disk.

Response - Press the Enter key or type NO to stop the clone operation before data is lost on the target disk. If you respond with YES, the clone operation will begin. The time required for the operation depends upon the size of the disk being cloned. As it progresses, the progress is shown, in percentages.

Error Messages

Cannot clone a disk to itself
    The same disk is specified for the source and target disk. You cannot clone a disk to itself.

Incompatible disks
    The source and target disks have different sector sizes, or different total capacities.

Invalid device
    The entered disk name is invalid or does not match any available disks.

CREATE

CREATE - Create a RAM Disk

The CREATE sub command creates a new RAM Disk. A RAM Disk is a segment of memory that is reserved to hold data like a physical disk. When complete, a new disk name is created that starts with "DISKY".

CREATE Dialogue

```
Init> DISK CREATE
```

Response - Type DISK CREATE at the main prompt.

```
RAM disk size <1 Mb>
```

Explanation - CREATE asks for the size of the new RAM disk. It shows the default in brackets.

Response - Type the amount of RAM to set aside for the RAM disk. The value may be anything between 4096 and the maximum size of memory (minus that needed by UOS).

```
RAM disk cluster size <256>
```

Explanation - CREATE asks for the cluster size for the RAM disk. This is the minimum allocatable amount amount for the disk.

```
Init>
```

Explanation - Init returns to the main prompt.

Error Messages

Invalid size
    The entered size, or cluster size, is not numeric, or is an invalid numeric value (such as a negative number).

Minimum permitted clustersize is 32

The cluster size cannot be less than 32 bytes for a RAM disk.

Minimum permitted RAM disk size is 4,096
    The RAM disk cannot have a capacity of less than 4K (4,096 bytes).

Not enough RAM
    There is not enough contiguous memory available to create the RAM disk. This could indicate that you
    need to make the RAM disk smaller, or remove other RAM disks, or add more RAM to your computer.

Warning: clustersize is too small for a UOS file system
    Although you can make a RAM disk with a cluster size of less than 256, if you do then you will be
    unable to initialize a UOS file system on the RAM disk. Do not specify a size that is less than 256
    bytes if you want a UOS file system on the disk. If you plan to use the disk for some other purpose that
    supports a smaller cluster size, then you can proceed.

DELETE

DELETE - Delete a RAM Disk

The DELETE sub command removes an existing RAM Disk.

DELETE Dialogue

```
Init> DISK DELETE
```

Response - Type DISK DELETE at the main prompt.

```
Disk to delete <DISKY0> :
```

Explanation - DELETE asks for the name of the RAM disk to remove. It shows the default in brackets.

Response - Press the Enter key to select the default disk or type the name of the disk to remove. When a
RAM disk is removed, it may result in the names of other RAM disks changing.

```
Init>
```

Explanation - Init returns the main prompt.

Error Messages

Invalid device
    The device name you entered is not a valid device name.

Not a RAM disk
    The device you specified is not a RAM disk.

DIRECTORY

DIRECTORY - List files on a disk

The DIRECTORY sub command shows a list of files in a file system on a disk.

DIRECTORY Dialogue

```
Init> DISK DIRECTORY
```

Response - Type DISK DIRECTORY at the main Init prompt.

```
Disk dir (DISKA0) >
```

Explanation - DIRECTORY asks for the disk for which you want a directory of files. The default is shown in parentheses.

Response - Press the Enter key to select the default disk or enter the name of the disk that you want a file list for. If you type a ? or HELP in response to the prompt, you will be shown the help text at this level. You can press the Esc key to return to the previous prompt or Ctrl-C to exit to the main Init prompt.

```
Disk dir DISKA0 (\) >
```

Explanation - DIRECTORY asks for the folder that you want a directory listing for. The default is shown in the parentheses.

Response - Press the Enter key to select the default folder or type the folder name you want.

```
Name                    Attributes          Size    Creation
AT.sys                  S, Pe              2/512    08-Mar-2016 22:40
Index.sys               S, Pe             20/512    08-Mar-2016 22:40
Strings.sys             S, Pe             96/512    08-Mar-2016 22:40
BadBlocks.sys           Pl, S, Pe          0/0      08-Mar-2016 22:40
```

Explanation - DIRECTORY lists the files in the requested folder. The first column contains the file names. The Attributes column lists file attributes. The Size column lists the size of the file. The first number is the logical file size and the second number is the amount of disk space reserved for the file. The Creation column lists the date and time the file was created. The possible attributes are:

Attribute	Meaning
C	Contiguous file. File is contiguous on the disk.
Di	Directory. File is a folder.
H	Hidden file. File is hidden by default.
Pe	Permanent. File cannot be deleted.
Pl	Placed. File has been positioned at a specific location on the disk.
RO	Read-only. File cannot be written to.
S	System file. Special files reserved by the file system of UOS.

```
Disk dir DISKA0 (\) >
```

Explanation - Init prompts you for another folder to list.

Error Messages

Invalid device
> The disk name you specified is not a valid disk.

Not a valid file system
> The disk you specified does not have a file system initialized on it.

HELP

HELP - Show Help for the DISK Command

The HELP sub command shows a list of valid sub commands for the DISK command.

HELP Dialogue

```
Init> DISK HELP
```

Response - Type DISK HELP at the main Init prompt.

CLONE <disk1> <disk2> - Copy contents of disk1 to disk2
CREATE - Create a RAM disk
DELETE <disk> - Delete a RAM disk
DIRECTORY <disk> n - List directory n on disk
HELP - Show this text
LIST - List all disks
INITIALIZE <disk> {/QUERY} - Initialize a new file system on disk
PARTITION <disk> - Manage partitions
RAID <type> - Manage RAID sets
REBUILD <disk> - Rebuild file structure on disk
SET <disk> - Set disk status

Explanation - HELP lists the supported DISK commands.

LIST

LIST - List disks

The LIST command displays the disks on the system.

LIST Dialogue

```
Init> DISK LIST
```

Response - Type DISK LIST at the main Init prompt.

```
DISKA0          52428800  50 Mb
  DISKA0a        10485760  10 Mb
DISKA1          52428800  50 Mb
  DISKA1a         1048576   1 Mb
  DISKA1b         2097152   2 Mb
  DISKA1c         4194304   4 Mb
  DISKA1d         8388608   8 Mb
  DISKA1e        16777216  16 Mb
  DISKA1f         8388608   8 Mb
  DISKA1g         4194304   4 Mb
  DISKA1h         2097152   2 Mb
  DISKA1i         1048576   1 Mb
```

```
  DISKA1j           4191232  3 Mb
DISKA2            5242880  5 Mb
DISKZ0           52428288  49 Mb
  DISKZ0a         10485760  10 Mb
```

Explanation - LIST displays the disks that are currently available. The first column lists the disk, with partitions of the disk indented under the disk name. The second column shows the capacity of the disk in bytes, and in abbreviated form.

INITIALIZE

INITIALIZE - Initialize a Disk with a File System

The INITIALIZE command creates a new file system on a disk. Once the file system is initialized, it can be used to store files.

INITIALIZE Dialogue

```
Init> DISK INITIALIZE
```

Response - Type DISK INITIALIZE at the main Init prompt.

```
Disk init (DISKA0) >
```

Explanation - INITIALIZE prompts you for the disk to initialize. The default disk is shown in parentheses.

Response - Press Enter to select the default disk or type the name of the disk to initialize. If you type a ? or HELP in response to the prompt, you will be shown the help text at this level.

This device appears to have an existing public file system, labeled "System"
Any existing data on the device will be lost. Continue? <NO>

Explanation - If a file system has already been initialized on this disk, you are informed of the fact. INITIALIZE asks you to confirm that you realize that any existing data on the disk will be lost if you continue the initialization.

Response - If you do not wish to proceed, you should choose the default of NO. If you type YES, the initialization will continue.

```
Proceed? <No>
```

Explanation - This is the final chance to abort the initialization operation.

Response - If you respond with YES, the existing data on the disk will be erased and a new file system will be initialized on the disk. If you choose the default or type NO, the initialization will be canceled and the data on the disk will not be erased.

```
.10%.20%.30%.40%.50%.60%.70%.80%.90%.100%
```

No bad clusters found

Explanation - As the initialization progresses, INITIALIZE display the percentage complete. When complete, the number of bad clusters that were found is displayed.

Long INITIALIZE Dialogue

If you type /Q after the disk name, INITIALIZE will ask you several questions about how to initialize the disk. If you do not include the switch, the disk is initialized with the default settings. For example:

```
Disk init (DISKA0) > DISKA1/Q
```

The following questions are asked if you specify /Q:

```
Number of patterns: <3>
```

Explanation - INITIALIZE is asking how many patterns to initialize the disk with. Each pattern is a different combination of bits that is written to every location on the disk. Three patterns are enough to completely erase any previous data, in accordance with the DoD 5220.22-M standard for data sanitization. Three patterns can also ensure that any bad spots on the disk are found and added to the badblocks file so that data is not written to those unreliable spots.

Response - You can choose as many patterns as you want, but the more patterns chosen, the longer it will take to initialize the disk. You may choose 0 patterns to skip this step, or you may choose 1 pattern to set all bytes on the disk to 0. Note that if you run no patterns, some of the previous data on the disk may be left on the disk and available to unscrupulous people.

```
Volume Label: <System>
```

Explanation - INITIALIZE asks for the label used to identify the disk. The default is "System".

Response - Press Enter to select the default label, or enter the label you want the disk to have.

```
Volume Password: <none>
```

Explanation - INITIALIZE asks for password to use to restrict access to this disk. The default is to have no password.

Response - Press Enter to choose the default of no password, or enter a password. Note that anything you type in response to this prompt is not shown (echoed) for security purposes.

```
Verify Password:
```

Explanation - INITIALIZE asks you to verify the password to make sure you typed in what you thought you typed. This question is not asked if you did not enter a password at the previous prompt. Note that anything you type in response to this prompt is not shown (echoed) for security purposes.

Response - Enter the same password you entered in the previous prompt.

```
Disk Cluster Size: <512>
```

Explanation - A cluster is a fixed number of disk sectors that are allocated contiguously on a disk. The disk cluster size is the minimum amount of space that can be allocated to a file on the disk. The default is shown in angle brackets. The larger the cluster size, the faster that files can be accessed. The smaller the cluster size, the less space is wasted. On average, one-half of this number of bytes is wasted per file. For instance, with a cluster size of 512, an average of 256 bytes will be wasted per file.

Response - Press Enter to choose the default, or enter the cluster size, in bytes. Note that the cluster size cannot be less than the sector size, and must be a multiple of the disk's sector size.

```
Folder Cluster Size: <512>
```

Explanation - INITIALIZE asks you for the folder cluster size for the disk. The default is shown in angle brackets. This indicates the size of folder extents.

Response - Press Enter to choose the default, or enter the folder cluster size, in bytes. Not that the folder

cluster size cannot be less than the disk cluster size and must be a multiple of the disk's cluster size.

```
Public or Private: <PUBLIC>
```

Explanation - INITIALIZE asks if you want the disk to be marked as a public or private disk. The default is in the angle brackets.

Response - Press Enter to choose the default of public, or type PRIVATE to mark the disk as private. All public disks on UOS are considered together as a common pool of storage - essentially creating a single large disk that is the size of the sum of all public disks. Private disks are treated separately.

```
SAT position: <523776>
```

Explanation - The Store Allocation Table (SAT) is a file that controls the use of disk space. Each time you extend or delete files, the SAT must be updated. The question asks where you want to place this file on the disk. The default indicates a position near the center of the disk. It is advantageous to place the SAT in the center of the disk to reduce the average seek times for accessing the table. However, you may locate the SAT in a different place to reduce fragmentation if you have large contiguous files.

Response - Press Enter to place the SAT in the center of the disk, or enter an offset on the disk where the table should be kept. Note that whatever number you enter, the table will always start on a cluster boundary.

```
Proceed? <No>
```

Explanation - This is the final chance to abort the initialization operation.

Response - If you respond with YES, the existing data on the disk will be erased and a new file system will be initialized on the disk. If you choose the default or type NO, the initialization will be canceled and the data on the disk will not be erased.

Error Messages

nnnnnn bad clusters found
    This is an informational notice of the number of bad clusters found while writing patterns.

File System initialization error: xxxxxx
    This indicates a disk error during the file system initialization.

Invalid cluster size
    The cluster size is not numeric, or less than the disk's sector size, or not a multiple of the disk's sector size. For folder cluster size this can also indicate that the size is not a multiple of the disk cluster size.

Invalid pattern count
    The value entered for patterns is not numeric or less than 0.

Invalid position
    The SAT position is not numeric, or before the first cluster, or after the last available cluster on the disk.

Passwords do not match
    The password entered for verification did not match the previously-entered password. The passwords must match.

PARTITION

PARTITION - Partition a Disk

The PARTITION command is used to partition a disk. A partitioned disk contains contiguous sections that are treated as separate disks. Each partition can have its own file system.

PARTITION Dialogue

```
Init> DISK PARTITION
```

Response - Type DISK PARTITION at the main Init prompt.

```
Disk partition (DISKA0) >
```

Explanation - PARTITION prompts you for the disk to modify. The default disk is shown in parentheses.

Response - Press Enter to select the default disk or type the name of the disk to partition. If you type a ? or HELP in response to the prompt, you will be shown the help text at this level.

```
Disk partition DISKA0>
```

Explanation - PARTITION prompts you for the partition option to perform.

Response - Enter the partition option to perform. You can Add a partition, Delete a partition, or List existing partitions. If you type a ? or HELP in response to the prompt, you will be shown the help text at this level.

ADD

PARTITION ADD - Add a Partition to a Disk

The PARTITION ADD command is used to add a partition to a disk..

PARTITION ADD Dialogue

```
Disk partition DISKA0> ADD
```

Response - Type ADD at the Disk Partition prompt.

Depending upon whether or not the disk already has partitions, the dialogue changes.

On a disk with no partitions

If the disk isn't partitioned, PARTITION needs to create the partition structure on the disk.

PARTITION ADD Dialogue

```
Partition standard (MBR or GUID) <GUID>:
```

Explanation - PARTITION prompts you for the type of partition scheme to use on the disk. The default scheme is shown in parentheses.

Response - Press Enter to select the default scheme, or enter MBR. Two partition schemes are supported by UOS. The older MBR scheme supports up to 4 partitions of up to 4,294,967,296 sectors each. On a disk with 512 byte sectors, this means that each partition can be up to 2 Terabytes in length. The newer

GUID scheme allows for up to 128 partitions of up to 16 quintillion bytes each (for disks with 512 byte sectors).

GUID Partition Scheme

PARTITION ADD Dialogue for GUID Partitions

```
Max partitions to support (1-128) <128>:
```

Explanation - PARTITION prompts you for the maximum number of partitions to allow on the disk. The default is shown in parentheses. The number of partitions cannot be changed in the future without re-partitioning the disk. The more partitions that are allowed, the more disk space overhead is used to store information about those partitions.

Response - Press Enter to select the default number of allowed partitions. Although you can specify a single partition, it would be more efficient to not use partitions at all in that case.

```
Partition name <System>:
```

Explanation - PARTITION prompts you for the name to give to the partition. This is simply a notation for yourself.

Response - Press Enter to select the default name or enter a name of your choice. The name cannot exceed 36 characters in length.

```
Partition size (512-10 Mb) <10 Mb>:
```

Explanation - PARTITION prompts you for the size of the partition. The valid minimum and maximum sizes are shown in parentheses. The default is shown in angle brackets.

Response - Press Enter to select the default size or enter a size of your choice. The size must be a multiple of the disk sector size. You can type MAX to allocate all remaining space to the partition.

```
Any existing data on the device will be lost.  Continue? <NO>:
```

Explanation - PARTITION prompts you to verify that you realize that all existing data on the disk will be lost. The default is shown in the angle brackets.

Response - Press Enter or type NO to abort the partitioning, or type YES to continue.

MBR Partition

PARTITION ADD Dialogue for MBR Partitions

```
Partition size (512-10 Mb) <10 Mb>:
```

Explanation - PARTITION prompts you for the size of the partition. The valid minimum and maximum sizes are shown in parentheses. The default is shown in angle brackets.

Response - Press Enter to select the default size or enter a size of your choice. The size must be a multiple of the disk sector size. You can type MAX to allocate all remaining space to the partition.

```
Any existing data on the device will be lost.  Continue? <NO>:
```

Explanation - PARTITION prompts you to verify that you realize that all existing data on the disk will be lost. The default is shown in the angle brackets.

Response - Press Enter or type NO to abort the partitioning, or type YES to continue.

On a disk with existing partitions

If the disk is already partitioned, a new partition is created in addition to the existing ones. But the total number of partitions cannot exceed the number defined when the disk was partitioned. The MBR scheme has four partitions available.

MBR Partition

PARTITION ADD Dialogue for MBR Partitions

```
Partition size (512-10 Mb) <10 Mb>:
```

GUID Partition

PARTITION ADD Dialogue for GUID Partitions

```
Partition name <System>:
```

Explanation - PARTITION prompts you for the name of the partition. The valid minimum and maximum sizes are shown in parentheses. The default is shown in angle brackets.

Response - Press Enter to select the default name or enter a name of your choice.

```
Partition size (512-10 Mb) <10 Mb>:
```

Explanation - PARTITION prompts you for the size of the partition. The valid minimum and maximum sizes are shown in parentheses. The default is shown in angle brackets.

Response - Press Enter to select the default size or enter a size of your choice. The size must be a multiple of the disk sector size. You can type MAX to allocate all remaining space to the partition.

GUID Partition

PARTITION ADD Dialogue for GUID Partitions

MBR Partition

PARTITION ADD Dialogue for MBR Partitions

```
Partition size (512-10 Mb) <10 Mb>:
```

Explanation - PARTITION prompts you for the size of the partition. The valid minimum and maximum sizes are shown in parentheses. The default is shown in angle brackets.

Response - Press Enter to select the default size or enter a size of your choice. The size must be a multiple of the disk sector size. You can type MAX to allocate all remaining space to the partition.

Error Messages

Error Messages

No space for new partitions
    There is no free space on the disk to assign to a partition, or all partitions are already valid.

Not a valid value
    The specified partition count is less than 1 or larger than the maximum partitions supported.

Not a valid choice
    Something other than GUID or MBR was entered for the partition scheme.

No more partitions can be added to the device
    All possible partitions are in use, so a new partition cannot be added to the disk.

Name too long. Must be 36 characters or less
    The partition name is too long.

Invalid size
    The size must be 2 or more. Any smaller value is invalid.

Size too small
    The size specified was less than the sector size. The size must be at least one sector in length.

Size too large
    The size specified was larger than the disk space that is not already allocated to partitions.

Not enough free space on device
    The size of the partition and the partition support structures exceed the available space on the disk.

DELETE

PARTITION DELETE - Delete a Partition from a Disk

The PARTITION DELETE command is used to delete a partition to a disk..

PARTITION DELETE Dialogue

```
Disk partition DISKA0> DELETE
```

Response - Type DELETE at the Disk Partition prompt.

```
Delete which partition (a-d) ?
```

Explanation - PARTITION shows the range of partitions that exist on the disk and asks for the partition to delete.

Response - Type the partition letter (or number) for the partition you wish to delete. You can type ALL to delete all partitions.

Error Messages

xxxxxx has no partitions
   The disk has no partitions to delete.

Invalid partition
   The partition you entered is either not a valid partition letter or number.

Partition out of range
   The partition you entered is beyond the last partition on the disk.

Partition already deleted
   The specified partition was never added or has already been deleted.

LIST

PARTITION LIST - List Partitions on a Disk

The PARTITION LIST command is used to list all partitions on a disk..

PARTITION LIST Dialogue

```
Disk partition DISKA0> LIST
```

Response - Type LIST at the Disk Partition prompt.

```
Device   Status                Size              Name  FS Type/Name
DISKA0a Active       1048576    1 Mb           System  UOSFS   "System" (pub)
DISKA0b Active       2097152    2 Mb             sys2
DISKA0c Active       4194304    4 Mb              new  UOSFS   "System" (pub)
DISKA0d Active       8388608    8 Mb             sys4
DISKA0e Active      16777216   16 Mb             sys5
DISKA0f Active       8388608    8 Mb             sys6
DISKA0g Active       4194304    4 Mb             sys7  UOSFS   "System" (pub)
DISKA0h Active       2097152    2 Mb             sys8
DISKA0i Active       1048576    1 Mb             sys9  UOSFS   "System" (pub)
DISKA0j Active       4191232    3 Mb             sysa
```

Explanation - PARTITION lists all of the partitions on the disk. There are five columns for each line.

Device - the disk/partition name

Status - the status. "Active" means an active partition. "Inactive" indicates a deleted partition. "Unused" indicates space that has not been made part of a partition.

Size - capacity of the disk.

Name - partition names (for GUID partitions only)

FS Type/Name - the file system. In the case of the UOS file system, this includes the file system type (UOSFS), the name given to the file system, and whether it is public or private.

Error Messages

Device has no partitions
    This indicates that the disk has no partitions to list.

RAID

RAID - Manage a Mirror Set

The RAID sub command manages mirror sets. A mirror set is a group of disks that are kept synchronized for data redundancy and performance.

RAID Dialogue

```
Init> DISK RAID
```

Response - Type DISK RAID at the main Init prompt.

```
Disk RAID>
```

Explanation - RAID prompts you for the mirror set option you wish to perform.

Response - The RAID sub command allows you to create a new set, delete an existing set, add disks to a set, and remove disks from a set. If you type a ? or HELP in response to the prompt, you will be shown the help text at this level.

ADD

RAID ADD - Add a Disk to a Mirror Set

The RAID ADD sub command is used to add a disk to a mirror set.

RAID ADD Dialogue

```
Disk RAID> ADD
```

Response - Type ADD at the Disk RAID prompt.

```
Existing mirror set device <DISKZ0> :
```

Explanation - RAID asks for the mirror set you wish to add a disk to. The default mirror set is shown in angle brackets.

Response - Press Enter to choose the default disk, or enter the mirror set you wish to add a disk to.

```
Disk to add to mirror set:
```

Explanation - RAID asks for the disk to add to the mirror set.

Response - Enter the name of the disk you want to add to the mirror set.

```
Any existing data on the device will be lost.  Continue? <NO>:
```

Explanation - RAID asks you to verify that you understand that the data on the disk will be lost. The default is shown in angle brackets.

Response - Press Enter to choose the default and abort adding the disk to the mirror set, or type YES to add the disk to the mirror set.

Error Messages

Device characteristics do not match
    All members of a mirror set must have the same sector size and total capacity.

Device is a mirror set and cannot be added as a set member
    A mirror set cannot be added as a member of a mirror set.

Device is already part of a RAID set
    The disk is already in a mirror set.

Device is not a mirror set
    You cannot add a member disk to a device which is not a mirror set.

Invalid device
    The device you specified is not a valid disk or partition.

No existing mirror sets
    There are no mirror sets to add a disk to.

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CREATE

RAID CREATE - Create a New Mirror Set

The RAID CREATE sub command is used to create a new mirror set.

RAID CREATE Dialogue

```
Disk RAID> CREATE
```

Response - Type CREATE at the Disk RAID prompt.

```
Name for new mirror set <> :
```

Explanation - CREATE prompts you for the name of the new mirror set. The default is to not name the set. Names for mirror sets are optional.

Response - Press Enter to not give the mirror set a name, or enter the name you want for the mirror set.

```
Enter disks to add to mirror set.
After last disk, enter a blank specification to continue.
Disk to add <> :
```

Explanation - CREATE prompts you for the name of a disk to add as a member of the new mirror set. Pressing Enter will finish the process of specifying members.

Response - Enter a disk to add as a set member. CREATE will prompt you for another disk. After all the disks have been specified, press Enter to create the set. Up to 64 disks can be added to each mirror set.

```
Any existing data on the device will be lost.  Continue? <NO>:
```

Explanation - CREATE gives you a chance to abort the creation by typing NO. The default is shown in angle brackets.

Response - Press Enter to select the default, or type YES to create the mirror set..

Error Messages

Disk already in list
    This indicates that the same disk was already specified to be added to the mirror set.

Device characteristics do not match
    This indicates that the disk has a different capacity or sector size from the previously specified disks.

Device is already part of a RAID set
    The device is part of another mirror set and cannot be added to this set.

Invalid device
    The specified device is not valid or not a store.

Too many devices for mirror set
    More than 64 devices were specified.

DELETE

RAID DELETE - Delete an Existing Mirror Set

The RAID ADD sub command is used to add a disk to a mirror set.

RAID DELETE Dialogue

```
Disk RAID> DELETE
```

Response - Type DELETE at the Disk RAID prompt.

```
Mirror set to delete:
```

Explanation - DELETE prompts for the mirror set to delete.

Response - Enter the device name of the mirror set to delete.

Error Messages

Device is not a mirror set
    This indicates that the mirror set device name given isn't a mirror set.

Invalid device
    The device name is not a valid device or not a store.

No mirror sets exist
    There are no mirror sets to delete.

REMOVE

RAID REMOVE - Add a Disk to a Mirror Set

The RAID REMOVE sub command is used to remove a disk from a mirror set.

RAID REMOVE Dialogue

```
Disk RAID> REMOVE
```

Response - Type REMOVE at the Disk RAID prompt.

```
Disk to remove from mirror set:
```

Explanation - REMOVE asks for the disk to remove from the mirror set.

Response - Enter the disk name to remove from the set.

Error Messages

Cannot remove a set from the set
    The specified device is a mirror set and thus is not a member of another mirror set.

Invalid device
    The specified device is not a valid device or not a store.

REBUILD

REBUILD - Rebuild a File System

The REBUILD sub command rebuilds a file system that was not dismounted correctly. Such a file system cannot be written to until it is rebuilt.

REBUILD Dialogue

```
Init> DISK REBUILD
```

Response - Type DISK REBUILD at the main Init prompt.

```
Disk rebuild (DISKA0) >
```

Explanation - REBUILD asks which disk contains the file system to rebuild. The default is shown in parentheses.

Response - Press Enter to select the default or type the name of the disk to rebuild. If you type a ? or HELP in response to the prompt, you will be shown the help text at this level.

```
Structure rebuilt
```

Explanation - REBUILD informs you that the file system was successfully rebuilt.

Error Messages

Disk is read-only
> This indicates that the disk is read-only. To rebuild a disk, Init must be able to write to it.

File system structure corruption found - run recovery process
> The rebuild finished but there were some instances of data corruption that Init cannot fix. After UOS starts, run the recovery program to fix the data.

Not a valid file system
> The disk you specified does not have a UOS file system and therefore cannot be rebuilt.

SET

SET - SET Disk Attributes

The SET sub command allows you to set or clear the read-only status of a device. Note that this cannot affect a device that is inherently read-only or that is set to read-only due to a hardware setting, such as a switch.

SET Dialogue

```
Init> DISK SET
```

Response - Type DISK SET at the main Init prompt.

```
Disk set (DISKA0) >
```

Explanation - SET prompts you for the disk to change. The default is shown in parentheses.

Response - Press Enter to choose the default disk or enter the name of the disk to change.

```
Disk set DISKA0>
```

Explanation - SET prompts you for the option to use on the shown disk.

Response - Enter the option to use.   If you type a ? or HELP in response to the prompt, you will be shown the help text at this level.

READONLY

SET READONLY - SET Disk to READ-ONLY

The SET READONLY option allows you to set a disk to be read-only.

SET READONLY Dialogue

`Disk set DISKA0>` **`READONLY`**

Response - Enter READONLY at the prompt to set the disk to read-only state.

WRITABLE

SET WRITABLE - SET Disk to READ/WRITE

The SET WRITABLE option allows you to set a disk to be read/write.

SET WRITABLE Dialogue

`Disk set DISKA0>` **`WRITABLE`**

Response - Enter WRITABLE at the prompt to set the disk to read/write state.

Error Messages

Error Messages

Invalid device
  The device you specified is not valid or is not a store.

Invalid Disk set command
  You entered a DISK SET command that was not recognized.

HALT

Halt

The HALT command halts the computer. This usually requires a hardware reset.

HARDWARE

HARDWARE sub commands - Configure hardware

The following sections describe the hardware configuration sub commands of the HARDWARE command. These sub commands allow you to perform operations on hardware devices.

The HARDWARE sub commands are:

- DATE - Change current date/time
- DEVICE - Change device settings
- HELP - Show available sub commands
- MEMORY - Change memory settings
- TIME - Change current date/time (same as DATE)

DATE

DATE - Set Date and Time

The DATE sub command sets the current date and time.

DATE Dialogue

```
Init> HARDWARE DATE
```

Response - Type HARDWARE DATE at the main Init prompt.

```
Today's date <23-Mar-2016> :
```

Explanation - DATE asks for the current date. The default is shown in angle brackets.

Response - Press Enter to choose the default, or type in a new date. You can enter the date in either of these formats:
- DD-MMM-YYYY (day, month, year)
- DD-MMM-YY (day, month, year

```
Current time <11:36 AM> :
```

Explanation - DATE asks for the current time. The default is shown in angle brackets.

Response - Press Enter to choose the default, or type in a new time. You can enter the time in either of these formats:

- HH:MM AM/PM (hour, minute, AM or PM)
- HH:MM (24 hour clock)

```
Line clock <60> :
```

Explanation - On some hardware, there is a time source that can be used for a system clock. DATE asks for the line clock rate, in hertz (cycles per second). The default is shown in angle brackets.

Response - Press Enter to choose the default or enter a new value.

Error Messages

Invalid date format
   The date was entered in a format that Init doesn't recognize.

Invalid number
   The value entered was not a valid number.

Invalid time format
>The time was entered in a format that Init doesn't recognize.

Invalid value
>The value entered is not supported by the hardware.

DEVICE

DEVICE - Configure Devices

The DEVICE sub command is used to configure devices.

DEVICE Dialogue

`Init>` **`HARDWARE DEVICE`**

Response - Type HARDWARE DEVICE at the main Init prompt.

`Hardware device>`

Explanation - HARDWARE prompts you for the hardware device option.

Response - Enter the hardware device option you wish to use.

DISABLE

DEVICE DISABLE - Disable a Device

The DEVICE DISABLE option disables a device controller or unit; that is, making it unavailable for use. If you disable a controller, you implicitly disable all units on that controller. Use DISABLE if you need to disable a device that is not working properly

DEVICE DISABLE Dialogue

`Hardware device>` **`DISABLE`**

Response - Type DISABLE at the Hardware device prompt.

`Hardware device(s) to disable:`

Explanation - DEVICE asks for the device/controller to disable.

Response - Enter the device or controller name that you want to disable.

Error Messages

Device already disabled
>The device or controller you entered is already disabled.

Invalid device
   The device or controller you entered is not a valid device or controller.

ENABLE

DEVICE ENABLE - Disable a Device

The DEVICE ENABLE option enables a disabled device controller or unit; that is, making it available for use.

DEVICE ENABLE Dialogue

```
Hardware device> ENABLE
```

Response - Type ENABLE at the Hardware device prompt.

```
Hardware device(s) to enable:
```

Explanation - DEVICE asks for the device/controller to enable.

Response - Enter the device or controller name that you want to enable.

Error Messages

Device not disabled
   The device or controller you entered is already enabled.

Invalid device
   The device or controller you entered is not a valid device or controller.

HELP

HELP - Show Help for the HARDWARE Command

The HELP sub command shows a list of valid options for the HARDWARE DEVICE command.

HELP Dialogue

```
Hardware device> HELP
```

Response - Type HELP at the Hardware device prompt.

```
DISABLE - Disable device(s)
ENABLE - Enable device(s)
HELP - Show this text
LIST - List devices
RESET - Reset hardware
```

Explanation - HELP lists the supported HARDWARE DEVICE commands.

LIST

DEVICE LIST - List Devices

The DEVICE LIST option lists all known devices.

DEVICE LIST Dialogue

```
Hardware device> LIST
```

Response - Type LIST at the Hardware device prompt.

```
Device     Type        Capacity    Attributes
TERMA0     serial
DISKA0     store        52428800    RAID 1, GUID 2DFE-DFB3-EF05-0F6B-2DFE-DFB3-
EF05-0F6B
DISKA1     store        52428800    Partitioned
DISKA2     store         5242880
DISKZ0     store        52428288    Partitioned
```

Explanation - DEVICE lists all known devices. Each line has four columns:

Device is the name of the device

Type is the type of the device. Terminals are serial devices. Disks are stores.

Capacity is the maximum capacity for stores.

Attributes list information about the device. The following table summarizes the possible attributes:

Attribute	Description
disabled	Device is disabled
media not present	Device has removable media and there is no media present
partitioned	Store has been partitioned
RAID 1	Store is a member of a mirror set. The GUID for the set is shown
read-only	Device is read-only
write-only	Device is write-only

If any devices are disabled, they will be listed at the end.

RESET

DEVICE RESET - Reset Devices

The DEVICE RESET option resets all devices to their start-up state.

DEVICE LIST Dialogue

```
Hardware device> RESET
```

Response - Type RESET at the Hardware device prompt.

HELP

HELP - Show Help for the HARDWARE Command

The HELP sub command shows a list of valid sub commands for the DISK command.

HELP Dialogue

Init> **HARDWARE HELP**

Response - Type DISK HELP at the main Init prompt.

```
DATE - Change date and time
DEVICE - Manage devices
HELP - Show this text
MEMORY - Manage memory
```

Explanation - HELP lists the supported HARDWARE commands.

MEMORY

MEMORY - Configure Memory

The MEMORY sub command is used to configure memory.

MEMORY Dialogue

Init> **HARDWARE MEMORY**

Response - Type HARDWARE MEMORY at the main Init prompt.

Hardware memory>

Explanation - HARDWARE prompts you for the hardware memory option.

Response - Enter the hardware memory option you wish to use.

HELP

HELP - Show Help for the HARDWARE MEMORY Command

The HELP option shows a list of valid sub commands for the HARDWARE MEMORY sub command.

HELP Dialogue

```
Hardware memory> HELP
```

Response - Type HELP at the hardware memory prompt.

```
HELP - Show this text
LIST - List memory
```

Explanation - HELP lists the supported HARDWARE MEMORY options.

LIST

LIST - List Memory

The LIST command displays the layout of memory.

HARDWARE MEMORY LIST Dialogue

```
Hardware memory> LIST
```

Response - Type LIST at the hardware memory prompt.

```
RAM                 0-            2047   2 Kb
NXT            2048-       1073676303
RAM      1073676304-       1342111759   256 Mb
```

Explanation - LIST displays the layout of memory. There are four columns for each line:

1 - the type of memory. This is one of the following:

NXT	Non-existent
RAM	Random-access memory
ROM	Read-only memory

2 - starting address

3 - end address

4 - the size of this segment of memory

HELP

HELP - Show Help for Init

The HELP command shows a list of valid commands for Init.

HELP Dialogue

```
Init> HELP
```

Response - Type HELP at the main Init prompt.

```
BOOT <device> - Boot from device
DISK - Manage disks
HALT - Halt system
HARDWARE - Manage hardware
HELP - Show this help text
IDENTIFY - Show information about Init
START - Start UOS
VIDEO - Toggle terminal between video and hardcopy output
```

Explanation - HELP lists the supported Init commands.

IDENTIFY

IDENTIFY - Show Init Version

The IDENTIFY command shows the version of Init.

IDENTIFY Dialogue

Init> **IDENTIFY**

Response - Type IDENTIFY at the main Init prompt.

`(ROM) UOS Init V0.1 23-Apr-2016 17:15`

Explanation - Init lists the Init version.

INSTALL

INSTALL - Install UOS

The INSTALL command creates a new installation of UOS by copying system files to a new directory.

INSTALL Dialogue

Init> **INSTALL**

Response - Type INSTALL at the main prompt.

`Disk to install to <DISKA0> :`

Explanation - INSTALL asks for the disk to install to. It shows the default in brackets.

Response - Enter the disk, or press Enter for the default.

`Name for install <UOS1> :`

Explanation - INSTALL asks for name of the new install. It shows the default in brackets. The name must be a valid file name since the directory created will have the entered name.

Response - Enter the disk, or press Enter for the default.

```
Make this the default install <YES>?
```

Explanation - INSTALL asks if this new installation is to be marked as the default installation.

Response - Type YES to make this the default installation. Type NO to leave the current default unchanged.

```
Copying files
Hooking uos...
```

Explanation - INSTALL indicates that it is copying files and then hooking the new installation.

START

Start UOS

The START command starts up UOS.

NOTE: This option is not yet implemented.

UOS

UOS sub commands - Manage UOS installations

The following sections describe the UOS installation management sub commands of the UOS command. These sub commands allow you to perform operations on existing UOS installations.

The UOS sub commands are:

- DEFAULT - Change which installation is the default
- HELP - Show available sub commands
- LIST - Show all UOS installations
- UNINSTALL - Remove a UOS installation

DEFAULT

DEFAULT - Set Default Installation

The DEFAULT sub command sets the default UOS installation.

DEFAULT Dialogue

```
Init> UOS DEFAULT
```

Response - Type UOS DEFAULT at the main Init prompt.

```
UOS (DISKA0) >
```

Explanation - DEFAULT asks for the store with the installations to affect. The default is shown in

parentheses.

Response - Press Enter to choose the default, or type in a new store name.

```
UOS DEFAULT DISKA0>
```

Explanation - DEFAULT prompts for the installation to select. No default is provided.

Response - Enter the UOS installation name to affect. The provided name will be made the default.

HELP

HELP - Show Help for the UOS Command

The HELP sub command shows a list of valid sub commands for the UOS command.

HELP Dialogue

```
Init> UOS HELP
```

Response - Type UOS HELP at the main Init prompt.

```
DEFAULT <disk> - Set default installation
HELP - Show this text
LIST <disk> - Show UOS installations
UNINSTALL <disk> - Remove installation
```

Explanation - HELP lists the supported UOS commands.

LIST

LIST - List Installations

The LIST sub command lists the UOS installations.

LIST Dialogue

```
Init> UOS LIST
```

Response - Type UOS LIST at the main Init prompt.

```
UOS List (DISKA0) >
```

Explanation - LIST asks for the store with the installations to list. The default is shown in parentheses.

Response - Enter the store for which to list UOS installations.

```
UOS1                01-Jan-2010 01:00
UOS2                01-Jan-2010 01:00  Default  Installed
```

Explanation - LIST shows the installations on the store. It indicates which one is the default and which

one is installed (hooked).

UNINSTALL

UNINSTALL - Remove UOS Installations

The UNINSTALL sub command removes UOS installations.

LIST Dialogue

`Init> UOS UNINSTALL`

Response - Type UOS UNINSTALL at the main Init prompt.

`UOS (DISKA0) >`

Explanation - UNINSTALL asks for the store with the installation to remove. The default is shown in parentheses.

Response - Enter the store with the installation to remove, or press Enter to choose the default.

`UOS Uninstall DISKA0 >`

Explanation - UNINSTALL asks for the name of the installation to remove.

Response - Enter the name of the installation to remove.

VIDEO

Video - Toggle Video Mode

The VIDEO command switches the console between hard-copy mode and video mode..