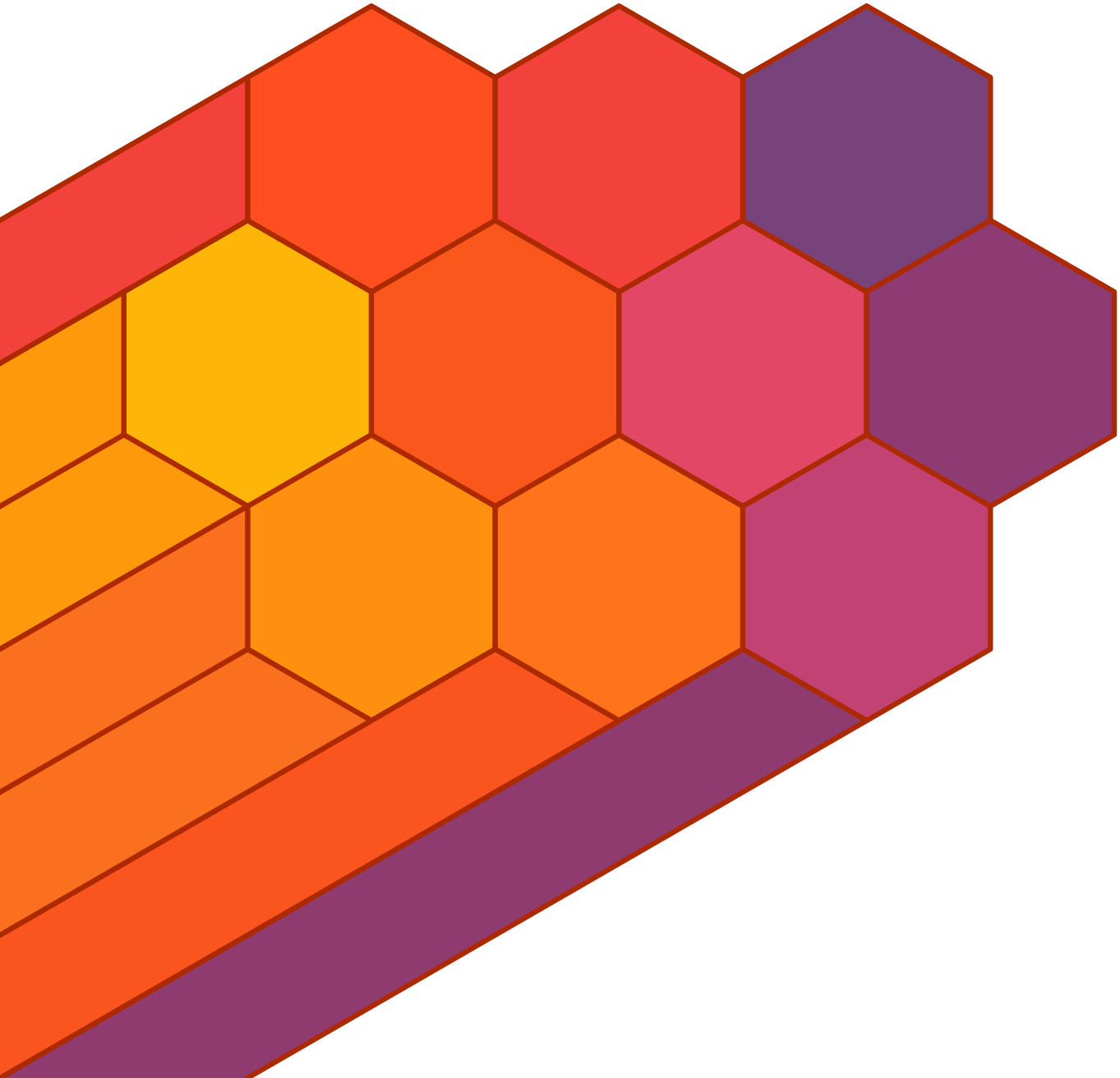
ucsd-psystem-fs
UCSD p-System Filesystem

Reference Manual

Peter Miller
pmiller@opensource.org.au



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This document describes ucsd-psystem-fs version 1.22
and was prepared 21 July 2013.

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NAME

ucsd-psystem-fs − UCSD p-System file system

DESCRIPTION

The *ucsd-psystem-fs* package is a collection of tools for manipulating and mounting UCSD p-System disk images.

ARCHIVE SITE

The latest version of *ucsd-psystem-fs* is available on the Web from:

URL:	http://ucsd-psystem-fs.sourceforge.net/	
File:	ucsd-psystem-fs-1.22.README	# Description, from the tar file
File:	ucsd-psystem-fs-1.22.lsm	# Description, LSM format
File:	ucsd-psystem-fs-1.22.tar.gz	# the complete source
File:	ucsd-psystem-fs-1.22.pdf	# Reference Manual

BUILDING ucsd-psystem-fs

Full instructions for building *ucsd-psystem-fs* may be found in the *BUILDING* file included in this distribution.

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ucsd-psystem-fs version 1.22

AUTHOR

Peter Miller	E-Mail:	pmiller@opensource.org.au
/\/*	WWW:	http://miller.emu.id.au/pmiller/

RELEASE NOTES

This section details the various features and bug fixes of the various releases.

Version 1.22 (2012-Jul-08)

- The web site was not updating the version number correctly, due to a missing build dependency rule.
- A false positive has been fixed in test 20.

Version 1.21 (2011-May-24)

• There is a new *ucsdpsys_disk*(1) −−**system−volume** option, which may be used to test whether or not a disk image looks like a system disk. It is intended for use by shell scripts.

Version 1.20 (2010-Oct-11)

- The *ucsdpsys_charset*(1) command has been moved to the ucsd-psystem-xc project.
- There is a new *ucsdpsys_disk*(1) −−**wipe−unused** option, used to reset unused blocks to zero.

Version 1.19 (2010-Sep-18)

- There is now a pre-built package in the LaunchPad PPA, and a link from the ucsd-psystem-fs web site.
- An Ubuntu Maverick build problem was fixed.
- Several test false negatives were foxed.

Version 1.18 (2010-Sep-12)

- The debian packaging Build-Depends was missing libboost-dev

Version 1.17 (2010-Sep-09)

- A build problem on i386 Linux has been fixed. The large file mechanism is fragile.

Version 1.16 (2010-Sep-08)

- A build problem on 32-bit Linux machines has been fixed, a necessary include file had been omitted in several places.
- All of the commands now ask libexplain for a four column hanging indent on each error message. This makes it easier to see when one ends and the next begins.

Version 1.15 (2010-Aug-24)

- The package now depends on libexplain (http://libexplain.sourceforge/net/) for its error messages and error handling.
- The *ucsdpsys_disk*(1) and *ucsdpsys_mkfs*(1) commands now understand how to write the boot blocks.

Version 1.14 (2010-Jun-22)

- The *ucsdpsys_disk*(1) command has a new −−**all** option, that can be used to request that dot-files also be transferred when a while directory is being added to a disk image. By default dot-files are ignored.
- The *ucsdpsys_mkfs*(1) command now defaults its disk size based on the −−**architecture** given.

Version 1.13 (2010-Jun-20)

- The *ucsdpsys_mkfs*(1) command has a new **−−architecture** option, that can be used to set the byte sex of the new file system. See *ucsdpsys_mkfs*(1) for more information.
- There is a new *ucsdpsys_rt11*(1) command, that may be used to extract files from an RT-11 disk image.

Version 1.12 (2010-Jun-18)

Some verbose, annoying, left-over debugging code has been removed from the sort-by-name directory listing.

Version 1.11 (2010-Jun-16)

- The *ucsdpsys_disk*(1) command now allows you to specify the sort criteria for the file listing. See the *ucsdpsys_disk*(1) man page for more information.
- The *ucsdpsys_disk*(1) command can now move all of the files to the beginning of the disk image, maximizing the space available for the UCSD p-System to work with. See the *ucsdpsys_disk*(1) man page for more information.

Version 1.9 (2010-May-30)

- It is now possible to specify a third interleave type on the *ucsdpsys_mkfs*(1) command line, see the man page for details.
- The file system now silently translates shash (/) characters in file names into underscore (_) characters. This was causing a very mysterious and uninformative error message to be reported.
- The *ucsdpsys_mkfs*(1) command's **−−label** option now converts the label to upper case before writing it to the disk image/

Version 1.8 (2010-Apr-09)

- The commands now all understand long option names.
- A bug has been fixed in the file-kind guessing code, it no longer tries to make SYSTEM.PASCAL a text file.
- It is now possible to add a size suffix when specifying the size to *ucsdpsys_mkfs*(1).

Version 1.7 (2010-Apr-03)

- The code that tries to divine the file type from the file's name, has been extended to understand more of the types of the system files.
- The `.imd` format code is now able to cope with broken sector maps.
- There is a new *ucsdpsys_interleave −Tguess* option, for guessing the interleave of a disk image.
- The code has been made more robust around volume header records with incorrect dnumfiles fields. This is now detected, and can be repaired with the *ucsdpsys_fsck*(1) command.

Version 1.6 (2008-Jan-20)

- There is a new *ucsdpsys_mount −t* option, which may be used to have text files converted text files between Unix and UCSD formats on-the-fly.
- The *ucsdpsys_umount*(1) command now exits with a non-zero exit status if it runs out of retries. It also emits a comforting message if it succeeds after more than one attempt.
- The FUSE behaviour has changed slightly, and it is now sometimes necessary to retry umount attempts is within (about) a second of the last access. We use *usleep*(2) if available to minimize the time spent sleeping.

Version 1.5 (2008-Jan-10)

- The text file decoding can now cope with text block padding in the first block.
- The Teledisk TD0 format is now understood for reading. See http://www.classiccmp.org/dunfield/img/td0notes.txt for a description.

Version 1.4 (2007-Sep-10)

- The IMageDisk (IMD) format is now supported for reading.
- The license has been changed to GNU GPL version 3.

Version 1.3 (2007-Apr-04)

- A couple of build problems have been fixed.
- Files ending in `.pas` are now considered text files.
- The file names in the system are now converted to upper case automatically. This is bacuse the p-System performs case *sensitive* file name comparisons some of the time, and case *in*sensitive at other times. The only way to work consistently is to always convert the names of new files to upper case.
- The *ucsdpsys_disk*(1) command now automagically converts text files during put (**−p**) and get (**−p**) operations unless specifically requested to berform binary transfers (**−B**).
- The *ucsdpsys_disk*(1) command now preserves the modification date (as far as is possible) across gets (**−g**) and puts (**−p**).
- The *ucsdpsys_disk*(1) command is now able to get and put whole directories from and to UCSD p-System disk images.

Version 1.2 (2006-Apr-16)

- A bug has been fixed in the *ucsdpsys_text*(1) program. It no longer inserts tab characters in the text of a line when a tab is in the Unix file at that position − space characters are inserted instead. A warning is issued for all other cases of non-printing characters.
- A bug has been fixed in the date-last-modified file meta-data. The bit layout being used for dates was wrong.
- The *ucsdpsys_disk*(1) command now understands how to manipulate disk files which have differing Unix and p-System file names.
- The *ucsdpsys_disk*(1) directory listings now resemble the original more closely.
- The *write*(2) handling in the file system has been improved. It now uses the existing gap beyond the current file if that will serve immediate needs. This saves expensive block shuufling to make a gap we didn't need. This situation can arrise, for example, as a result of an open with O_TRUNC specified.

Version 1.1 (2006-Apr-11)

- The *ucsdpsys_mount*(1) is used to mount a UCSD p-System filesystem disk image as a Linux file system. See *ucsdpsys_mount*(1) for more information.
- The *ucsdpsys_umount*(1) is used to unmount a filesystem mounted by the *ucsdpsys_mount*(1) command. See *ucsdpsys_umount*(1) for more information.
- The *ucsdpsys_mkfs*(1) is used to create a new empty UCSD p-System filesystem disk image. See *ucsdpsys_mkfs*(1) for more information.
- The *ucsdpsys_fsck*(1) is used to verify and repair a UCSD p-System filesystem disk image. See *ucsdpsys_fsck*(1) for more information.
- The *ucsdpsys_disk*(1) is used to list, extract, insert and remove files from a UCSD p-System filesystem disk image, without mounting it. See *ucsdpsys_disk*(1) for more information.
- The *ucsdpsys_text*(1) is used to convert text files from the UCSD p-System format to a Unix text file, and back again. See *ucsdpsys_text*(1) for more information.

NAME

How to build ucsd-psystem-fs

BEFORE YOU START

There are a few pieces of software you may want to fetch and install before you proceed with your installation of ucsd-psystem-fs.

FUSE
: The *ucsd-psystem-fs* package depends on the FUSE (file system in user space) package. If it is not available on your system, ucsd-psystem-fs will not work on your system. At the moment, that means Linux, BSD, MacOS X, Hurd and OpenSolaris only.
http://fuse.sourceforge.net/

Boost
: The *ucsd-psystem-fs* package depends on the Boost C++ library.
http://boost.org/

libexplain
: The *ucsd-psystem-fs* package depends on libexplain (>= 0.33), a library of system-call-specific strerror replacements, for most of its error messages.
http://libexplain.sourceforge.net/

GNU Groff
: The documentation for the *ucsd-psystem-fs* package was prepared using the GNU Groff package (version 1.14 or later). This distribution includes full documentation, which may be processed into PostScript or DVI files at install time − if GNU Groff has been installed.

SITE CONFIGURATION

The **ucsd-psystem-fs** package is configured using the *configure* program included in this distribution.

The *configure* shell script attempts to guess correct values for various system-dependent variables used during compilation, and creates the *Makefile* and *lib/config.h* files. It also creates a shell script *config.status* that you can run in the future to recreate the current configuration.

Normally, you just *cd* to the directory containing *ucsd-psystem-fs*'s source code and then type

```
% ./configure
...lots of output...
%
```

Running *configure* takes a minute or two. While it is running, it prints some messages that tell what it is doing. If you don't want to see the messages, run *configure* using the quiet option; for example,

```
% ./configure --quiet
%
```

To compile the **ucsd-psystem-fs** package in a different directory from the one containing the source code, you must use a version of *make* that supports the *VPATH* variable, such as *GNU make*. Change directory to the directory where you want the object files and executables to go and run the *configure* script. The *configure* script automatically checks for the source code in the directory that *configure* is in and in .. (the parent directory). If for some reason *configure* is not in the source code directory that you are configuring, then it will report that it can't find the source code. In that case, run *configure* with the option `--srcdir=`*DIR*, where *DIR* is the directory that contains the source code.

By default, *configure* will arrange for the *make install* command to install the **ucsd-psystem-fs** package's files in */usr/local/bin*, and */usr/local/man*. There are options which allow you to control the placement of these files.

`--prefix=`*PATH*
: This specifies the path prefix to be used in the installation. Defaults to */usr/local* unless otherwise specified.

`--exec-prefix=`*PATH*
: You can specify separate installation prefixes for architecture-specific files files. Defaults to *${prefix}* unless otherwise specified.

`--bindir=`*PATH*
: This directory contains executable programs. On a network, this directory may be shared between machines with identical hardware and operating systems; it may be mounted read-only. Defaults to *${exec_prefix}/bin* unless otherwise specified.

`--mandir=`*PATH*
: This directory contains the on-line manual entries. On a network, this directory may be shared between all machines; it may be mounted read-only. Defaults to *${prefix}/man* unless otherwise specified.

The *configure* script ignores most other arguments that you give it; use the `--help` option for a complete list.

On systems that require unusual options for compilation or linking that the *ucsd-psystem-fs* package's *configure* script does not know about, you can give *configure* initial values for variables by setting them in the environment. In Bourne-compatible shells, you can do that on the command line like this:

```
$ CXX='g++ -traditional' LIBS=-lposix ./configure
...lots of output...
$
```

Here are the *make* variables that you might want to override with environment variables when running *configure*.

Variable: CXX
: C++ compiler program. The default is *c++*.

Variable: CPPFLAGS
: Preprocessor flags, commonly defines and include search paths. Defaults to empty. It is common to use `CPPFLAGS=-I/usr/local/include` to access other installed packages.

Variable: INSTALL
: Program to use to install files. The default is *install* if you have it, *cp* otherwise.

Variable: LIBS
: Libraries to link with, in the form `-l`*foo* `-l`*bar*. The *configure* script will append to this, rather than replace it. It is common to use `LIBS=-L/usr/local/lib` to access other installed packages.

If you need to do unusual things to compile the package, the author encourages you to figure out how *configure* could check whether to do them, and mail diffs or instructions to the author so that they can be included in the next release.

BUILDING UCSD-PSYSTEM-FS

All you should need to do is use the

```
% make
...lots of output...
%
```

command and wait. When this finishes you should see a directory called *bin* containing several programs.

If you have GNU Groff installed, the build will also create a *etc/reference.ps* file. This contains the README file, this BUILDING file, and all of the man pages.

You can remove the program binaries and object files from the source directory by using the

```
% make clean
...lots of output...
%
```

command. To remove all of the above files, and also remove the *Makefile* and *lib/config.h* and *config.status* files, use the

```
% make distclean
...lots of output...
%
```

command.

The file *etc/configure.in* is used to create *configure* by a GNU program called *autoconf*. You only need to know this if you want to regenerate *configure* using a newer version of *autoconf*.

TESTING UCSD-PSYSTEM-FS

The *ucsd-psystem-fs* package comes with a test suite. To run this test suite, use the command

```
% make sure
...lots of output...
Passed All Tests
%
```

The tests take a few seconds each, with a few very fast, and a couple very slow, but it varies greatly depending on your CPU.

If all went well, the message

```
Passed All Tests
```

should appear at the end of the make.

If a test fails, make will stop. The make **-k** tells it to keep going.

If you see an error message like “Software caused connection abort” or “Transport endpoint is not connected”, it may indicate that your FUSE kernel module and your FUSE user-space library have a version mismatch. Or it could be a bug in *ucsdpsys_mount*(1).

INSTALLING UCSD-PSYSTEM-FS

As explained in the *SITE CONFIGURATION* section, above, the *ucsd-psystem-fs* package is installed under the */usr/local* tree by default. Use the `--prefix=`*PATH* option to *configure* if you want some other path. More specific installation locations are assignable, use the `--help` option to *configure* for details.

All that is required to install the *ucsd-psystem-fs* package is to use the

```
% make install
...lots of output...
%
```

command. Control of the directories used may be found in the first few lines of the *Makefile* file and the other files written by the *configure* script; it is best to reconfigure using the *configure* script, rather than attempting to do this by hand.

GETTING HELP

If you need assistance with the *ucsd-psystem-fs* package, please do not hesitate to contact the author at

```
Peter Miller <pmiller@opensource.org.au>
```

Any and all feedback is welcome.

When reporting problems, please include the version number given by the

```
% ucsdpsys_mount -V
ucsdpsys_mount version 1.22.D005
...warranty disclaimer...
%
```

command. Please do not send this example; run the program for the exact version number.

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ucsd-psystem-fs version 1.22

AUTHOR

Peter Miller E-Mail: pmiller@opensource.org.au
/\/* WWW: http://miller.emu.id.au/pmiller/

NAME

ucsdpsys_disk − manipulate files on a UCSD p-System filesystem image

SYNOPSIS

ucsdpsys_disk −f *disk-image* **−l**
ucsdpsys_disk −f *disk-image* **−g** *files-to-get...*
ucsdpsys_disk −f *disk-image* **−p** *files-to-put...*
ucsdpsys_disk −f *disk-image* **−r** *files-to-remove...*
ucsdpsys_disk −f *disk-image* **−k**
ucsdpsys_disk −f *disk-image* **−−system−volume**
ucsdpsys_disk −V

DESCRIPTION

The *ucsdpsys_disk* program is used to manipulate the contents of a UCSD p-System filesystem disk image.

Features include

- Get single files from the disk image, with automatic text file translation.
- Put single files into the disk image, with automatic text file translation.
- Get all files from a disk image into a directory, with a single command, with automatic text file translation.
- Put all files from a directory into a disk image, with a single command, with automatic text file translation.
- Remove files from a disk image.
- You can crunch a disk image; that is, you can move all of the files as close to the start of the disk image as possible. (Also known as **−−squeeze** or **−−defragment**.)
- List all of the files in a disk image. You can select the sort criterion.

This program understands a variety of sector interleave patterns, and detects them automatically. It also automatically recongises ImageDisk (`.imd`) and Teledisk (`.td0`) files, but access is read-only.

OPTIONS

The following options are understood:

−A

−−all By default, files with names that start with a dot (“`.`”) are ignored when you **−−put** a whole directory. This option says to include files with names that start with a dot.

−B

−−all-binary
This option requests that all file transfers be binary, without text encoding or decoding. If you happen to transfer a text file this way, you can use the *ucsdpsys_text*(1) command to translate the text files afterwards.

−b *filename*

−−boot=*filename*
This option may be used to obtain the boot blocks (with the **−−get** option) or set the boot blocks (with the **−−put** option). The named file is expected to be raw binary (exactly 1 KiB).

−D

−−debug
Increase debug level. Only of interest to developers.

−f *filename*

−−file=*filename*
: The name of the file containing the UCSD p-System filesystem disk image.

−g *filename...*

−−get *filename...*
: Get the named files from the disk image and write them to Unix, using the same file name. Naming a directory will result in the whole directory being transferred. Note that text file formats will *not* be translated.

−k

−−crunch
: Move all of the files as far towards the start of the disk image as possible. This will maximize the space available for writing by the (much dumber) UCSD p-System. You can use this option in combination with the **−−put** or **−−remove** options. It is common to combine this option with the **−−wipe-unused** option, see below.

−l

−−list
: Obtain a listing of the volume's files. (Used twice, it will print the block numbers as well.)

  By default, files are sorted by start block (the order they appear in the disk image). To sort by a different criterion, use the **−−sort** option; see below.

−p *filename...*

−−put *filename...*
: Put the named files into the disk image, reading from the Unix file of the same name. Naming a directory will result in the whole directory being transferred. Note that text file formats will *not* be translated.

−r *filename...*

−−remove=*filename...*
: Remove the named files from the filesystem image.

  Actually, this just removes the directory entry. To completely erase the file contents as well, use the **−−wipe-unused** option; see below.

−S

−−system−volume
: This option may be used to test whether or not a disk image can be considered a system volume, by testing for the presence of the "`SYSTEM.COMPILER`", "`SYSTEM.EDITOR`", "`SYSTEM.FILER`" and "`SYSTEM.PASCAL`" files. If all are present, it is probably a system volume.

  This option prints no output. It is silent, because it is intended for use in shell scripts and the like. The results are in the exit status: EXIT_SUCCESS (zero) if it is a system volume, or EXIT_FAILURE (non-zero) if it is not.

−s *name*

−−sort=*name*
: This option may be used to change the criterion by which the files are sorted in a directory listing.

  block
  : Sort the files according to their initial block number, the order in which they appear on the disk. This is the default, for compatibility with the original UCSD system.

  name
  : Sort the directory entries by the file name.

date
: Sort the directory entries by the date last modified, or by name if that is not sufficient.

kind
: Sort the directory entries by the kind of file they are, or by name if that is not sufficient.

Any other sort name is an error.

−t

−−auto-text
: Convert text files between Unix and UCSD text formats automatically, in the same way as the *ucsdpsys_mount*(1) command.

−V

−−version
: Print the version of the *ucsdpsys_disk* program being executed.

−w

−−wipe-unused
: This option may be used to make sure that all blocks not accounted for in the directory are reset to zero, wiping any “left over” content. Not only is this more secure (things you didn’t intent to stay on the disk don’t) but the disk images compress better, too. The boot blocks are unaffected.

  If there are any files that are not exact multiples of 512 bytes long, the unused portions of their last blocks are also reset to zero. Code files and text files are always multiples of 512 bytes long, but other data files can have short last blocks.

  When combined with other disk-altering options, this option is the last applied to the disk image. This is useful when combined with the **−−crunch** option.

All other options will produce a diagnostic error.

EXIT STATUS

The *ucsdpsys_disk* command will exit with a status of 1 on any error. The *ucsdpsys_disk* command will only exit with a status of 0 if there are no errors.

SEE ALSO

ucsdpsys_mkfs(1)
: create a new UCSD p-System disk image

ucsdpsys_mount(1)
: mount a UCSD p-System disk image as a Linux file system

ucsdpsys_text(1)
: translate to and from the UCSD p-System text file format

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AUTHOR

Peter Miller E-Mail: pmiller@opensource.org.au
/\/* WWW: http://miller.emu.id.au/pmiller/

NAME

ucsdpsys_fsck − verify and repair UCSD p-System filesystem images

SYNOPSIS

ucsdpsys_fsck [*option*...] *disk-image*
ucsdpsys_fsck −V

DESCRIPTION

The *ucsdpsys_fsck* program is used to verify and repair UCSD p-System filesystem disk images.

OPTIONS

The following options are understood:

−D

−debug Inclease debug level. Probably only of interest to file system developers.

−f

−−fix This option causes the file system to be fixed, without this the file system will be checked but not repaired.

−r

−−read-only
Open the disk image read-only. It will be checked but not repaired.

−V

−−version
Print the version of the *ucsdpsys_fsck* program being executed.

All other options will produce a diagnostic error.

EXIT STATUS

The *ucsdpsys_fsck* command will exit with a status of 1 on any error. The *ucsdpsys_fsck* command will only exit with a status of 0 if there are no errors.

SEE ALSO

ucsdpsys_disk(1)
manipulate a disk image

ucsdpsys_mount(1)
mount a disk image

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ucsdpsys_fsck version 1.22

AUTHOR

Peter Miller E-Mail: pmiller@opensource.org.au
/\/* WWW: http://miller.emu.id.au/pmiller/

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Version 3, 29 June 2007

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NAME

ucsdpsys_interleave − decode interleaved UCSD p-System filesystem image

SYNOPSIS

ucsdpsys_interleave −d −T*name infile outfile*
ucsdpsys_interleave −e −T*name infile outfile*
ucsdpsys_interleave −V

DESCRIPTION

The *ucsdpsys_interleave* program is used to read a UCSD p-System filesystem image and decode it into a new uninterleaved filesystem image file. It is also possible to do the reverse.

OPTIONS

The following options are understood:

−D

−−debug
Increase debug level. Only of interest to developers.

−d

−−decode
read a UCSD p-System filesystem image and decode it into a new **un**interleaved filesystem image file.

−e

−−encode
read a UCSD p-System filesystem image and encode it into a new interleaved filesystem image file.

−T *name*

−−type=*name*
This option is used to specify the type of interleaving in question. Known formats are:

apple The symmetric interleaving used by the Apple][Pascal system.

pdp The offset and asymmetric interleaved format used by the PDP11 (?) system.

guess For decode *only*, it is possible to have the *ucsdpsys_interleave* command attempt to guess the interleaving, using the same method as the *ucsdpsys_mount*(1) and *ucsdpsys_disk*(1) programs. This is particularly useful for decoding weird disk images into uninterleaved raw disk images. This only works if the disk image is of a UCSD p-System disk, it can't guess the interleave for any other type of disk image.

−V

−−version
Print the version of the *ucsdpsys_interleave* program being executed.

All other options will produce a diagnostic error.

EXIT STATUS

The *ucsdpsys_interleave* command will exit with a status of 1 on any error. The *ucsdpsys_interleave* command will only exit with a status of 0 if there are no errors.

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ucsdpsys_interleave version 1.22

command.

AUTHOR

Peter Miller E-Mail: pmiller@opensource.org.au
/\/* WWW: http://miller.emu.id.au/pmiller/

NAME

ucsdpsys_mkfs − create new UCSD p-System filesystem disk images

SYNOPSIS

ucsdpsys_mkfs [*option*...] *filename*
ucsdpsys_mkfs −V

DESCRIPTION

The *ucsdpsys_mkfs* program is used to create new UCSD p-System disk image files.

While the *ucsdpsys_disk*(1) command understands IMD and TD0 disk image formats for reading, it is not possible at this time to for *ucsdpsys_mkfs*(1) to create or *ucsdpsys_disk*(1) to modify these disk image formats.

OPTIONS

The following options are understood:

−A *name*

−−architecture=*name*
: This option is used to specify the microprocessor of the host system. This, in turn, implies the byte sex of the file system to be created. The usual names are accepted, *e.g.* “pdp11”, “6502”, “6800”, *etc*

−B *number*

−−size=*number*
: This option may be used to specify the size of the disk image, in kilobytes (KB = 1024 bytes). Defaults to 140 if not specified, the size of an Apple Pascal floppy.

  Other common sizes are 800KB for 5.25" disks, and 1440KB for PC 3.5" floppies.

  You may specify B, K and M suffixes to indicate bytes, kilobytes (2**10) and megabytes (2**20).

  The maximum possible addressable size is 16MB (however, the limit of 77 files, and no subdirectories, makes it unlikely that a 16MB disk image would be useful). It is an error to specify a size greater than 16MB. The size must be a multiple of 4KB.

−b *filename*

−−boot=*filename*
: This option may be used to set the boot blocks. The named file is expected to be raw binary (1KiB).

−D

−−debug
: Increase debugging level. Only of interest to developers.

−i This is a synonym for `−−interleave=apple`

−−interleave=*name*
: Interleave the sectors in the style given. Known interleave patterns include:

  apple
  : The interleave pattern that Apple][Pascal used.

  pdp
  : The interleave pattern that PDP-11 used.

  none
  : No interleave. This is the default.

help
Print a list of known interleave pattern names

Name are case-**in**sensitive. All other names will result in a diagnostic error being issued.

−L *string*

−−label=*string*
This option may be used to specify the name of the volume. Defaults to something random, but probably unique, starting with "V". There is a size limit of 7 characters, the label will be truncated if it is longer than this.

−t

−−twin This option may be used to ask for two copies of the directory meta-data to be stored, not just one. This will not be used by *ucsdpsys_fsck*(1), but it will be kept up-to-date by all of the disk access methods.

−V

−−version
Print the version of the *ucsdpsys_mkfs* program being executed.

All other options will produce a diagnostic error.

EXIT STATUS

The *ucsdpsys_mkfs* command will exit with a status of 1 on any error. The *ucsdpsys_mkfs* command will only exit with a status of 0 if there are no errors.

SEE ALSO

ucsdpsys_fsck(1)
check a disk image

ucsdpsys_disk(1)
Manipulate a disk image. Is able to get, put and remove individual files, or whole directories.

ucsdpsys_mount(1)
mount a disk image

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ucsdpsys_mkfs version 1.22

AUTHOR

Peter Miller E-Mail: pmiller@opensource.org.au
/\/* WWW: http://miller.emu.id.au/pmiller/

NAME

ucsdpsys_mount − mount a UCSD p-System filesystem

SYNOPSIS

ucsdpsys_mount [*option*...] *filename directory*
ucsdpsys_mount −V

DESCRIPTION

All files accessible in a Unix system are arranged in one big tree, the file hierarchy, rooted at /. These files can be spread out over several devices. The *ucsdpsys_mount* command serves to attach a UCSD p-System disk image to the big file tree.

Disk Formats

At present, only the Apple][Pascal disk format is understood for reading and writing, however it is simple to add more formats in future.

This program understands a variety of sector interleave patterns, and detects them automatically. It also automatically recongises ImageDisk (`.imd`) and Teledisk (`.td0`) files, but access is read-only.

Umount When Finish

To umount the file system when you are done with it, use the

`ucsdpsys_umount` *directory*

command.

Concurrent Writes

The original p-System had difficulty writing to more than on file at time. This file system uses the Buffer Gap algorithm (a common implementation for text editors) to establish a gap for write to be performed within, compacting file automatically when necessary. While you have a single file open for writing, this is very efficient.

If you have two files open for writing, this file system can cope, but the constant block shuffling to obtain gaps in which to write two (or more) file simultaneously will affect performance.

OPTIONS

The following options are understood:

−D

−−debug
Turn on internal debugging. Specifying this option more than once increases the verbosity.

−d

−−fuse−debug
Turn on FUSE (libfuse) debugging. Only interesting to *ucsdpsys_mount*(1) developers. Implies the **−f** options.

−f

−−foreground
Execute the filesystem in the foreground. Usually a daemon process is spawned, and the *ucsdpsys_mount*(1) command returns immediately.

−o *string*

−−options=*string*
One or *mount*(1) options, separated by commas. This option may be given more than once.

−r

−−read−only
Mount the file system read-only.

−t

−−text Convert text files between Unix and UCSD formats on-the-fly.

−V

−−version
Print the version of the *ucsdpsys_mount* program being executed.

All other options will produce a diagnostic error.

EXIT STATUS

The *ucsdpsys_mount* command will exit with a status of 1 on any error. The *ucsdpsys_mount* command will only exit with a status of 0 if there are no errors.

SEE ALSO

fusermount(1)
mount FUSE file systems

ucsdpsys_fsck(1)
Check the integrity of UCSD p-System filesystem disk images.

ucsdpsys_mkfs(1)
create new empty UCSD p-System filesystem disk images.

ucsdpsys_umount(1)
unmount UCSD p-System filesystems

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ucsdpsys_mount version 1.22

AUTHOR

Peter Miller E-Mail: pmiller@opensource.org.au
/\/* WWW: http://miller.emu.id.au/pmiller/

NAME

ucsdpsys_rt11 − extract files from RT-11 disk images

SYNOPSIS

ucsdpsys_rt11 −f *disk-image* −g *filename*
ucsdpsys_rt11 −f *disk-image* −l
ucsdpsys_rt11 −−version

DESCRIPTION

The *ucsdpsys_rt11* program is used to extract fiels from RT-11 disk images.

OPTIONS

The following options are understood:

−f *filename*

−−file=*filename*
: The name of the file containing the disk image (usually coms as a pair of `.dir` and `.files` files, name either half).

−g *filename*

−−get=*filename*
: This option may be used to extract a file from the disk image. The filename is case-**in**sensitive; the file in the disk image is always upper-case, the Unix file it writes is always lower-case. When possible, the extracted file's modification time will be set to match the date stamp in the disk image.

−l

−−list This option may be used to request a directory listing.

−V

−−version
: Print the version of the *ucsdpsys_rt11* program being executed.

−x

−−extract-all
: Extract all of the files into the currect directory. All extracted file's names with be lower-case.

All other options will produce a diagnostic error.

EXIT STATUS

The *ucsdpsys_rt11* command will exit with a status of 1 on any error. The *ucsdpsys_rt11* command will only exit with a status of 0 if there are no errors.

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AUTHOR

Peter Miller E-Mail: pmiller@opensource.org.au
`/\/\*` WWW: http://miller.emu.id.au/pmiller/

NAME

ucsdpsys_text − translate UCSD p-System text files

SYNOPSIS

ucsdpsys_text −d [−*option*...][*filename*...]
ucsdpsys_text −e [−*option*...][*filename*...]
ucsdpsys_text −V

DESCRIPTION

The *ucsdpsys_text* program is used to translate UCSD p-System text files to and from Unix text files.

If no files are named on the command line, the standard input will be translated and written on the standard output.

Any files named on the command line will be translated *in situ*. A temporary output file will be in the same directory as each file being translated; the file system will need enough extra space to be able to hold the temporary files, until they are moved back over the input files. No backup copies of the inputs are kept.

The results are undefined if you attempt to use this command on binary data files.

OPTIONS

The following options are understood:

−d

−−decode
: This option is used to translate files from UCSD p-System text format to Unix text format.

−e

−−encode
: This option is used to translate files from Unix text format to UCSD p-System text format.

−N

−−nul
: There is a bug in the UCSD compiler. It will report error 400 (invalid character on line) if a line of text ends *exactly* at the end of the block.

  Interestingly, the editor is capable of reading text files with completely filled 1KB blocks, but never writes them out.

  By default, the encode (**−e**) option guarantees that there will be at least one NUL (0x00) character at the end of each 1KB block. The **−N** option says not to bother.

−t

−−tabs
: When decoding the default is to use tabs to replace leading spaces on a line (tabs are assumed to be 8 characters wide). When used with **−d**, this option says not to use tabs.

  When encoding the default is to use two byte sequences (0x10 *nn*) to replace leading spaces on a line. When used with **−e**, this option says not to use tabs.

−V

−−version
: Print the version of the *ucsdpsys_text* program being executed.

All other options will produce a diagnostic error.

EXIT STATUS

The *ucsdpsys_text* command will exit with a status of 1 on any error. The *ucsdpsys_text* command will only exit with a status of 0 if there are no errors.

SEE ALSO

ucsdpsys_disk(1)
: manipulate UCSD p-System disk images

ucsdpsys_text(5)
: format of UCSD p-System text files

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AUTHOR

Peter Miller E-Mail: pmiller@opensource.org.au
/\/* WWW: http://miller.emu.id.au/pmiller/

NAME

ucsdpsys_umount − unmount UCSD p-System filesystems

SYNOPSIS

ucsdpsys_umount *mount-point*
ucsdpsys_umount −V

DESCRIPTION

The *ucsdpsys_umount* program is used to unmount a file system mounted by the *ucsdpsys_mount*(1) command.

OPTIONS

The following options are understood:

−V

−−version
Print the version of the *ucsdpsys_umount* program being executed.

All other options will produce a diagnostic error.

EXIT STATUS

The *ucsdpsys_umount* command will exit with a status of 1 on any error. The *ucsdpsys_umount* command will only exit with a status of 0 if there are no errors.

SEE ALSO

fusermount(1)
umount FUSE file systems

ucsdpsys_mount(1)
mount UCSD p-System filesystem disk images.

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ucsdpsys_umount version 1.22

AUTHOR

Peter Miller E-Mail: pmiller@opensource.org.au
/\/* WWW: http://miller.emu.id.au/pmiller/

NAME

ucsdpsys_fs − UCSD p-System filesystem format

DESCRIPTION

The UCSD-pSystem file system format is very simple, compared to modern file systems. It consists of a single directory, containing at most 77 files. The file system does not support hierarchical directories.

The directory description, and the directory contents, assume the disk is composed of 512 byte blocks. While this is common in modern machines, it was uncommon in the 1970s, when 128 byte and 256 byte sectors were more common. If there is sector interleaving, this is done transparently from the perspective of the logical blocks access to the disks by the p-Machine.

In most cases, the directory resides at block 2 on the disk and extends for 4 blocks if it is a single directory, 8 blocks if it is a duplicated (backed-up) directory. In most cases, blocks 0 and 1 are reserved for the bootstrap.

In some cases, the entire disk contents are offset by several blocks, and this is also transparent. One trick, used when first developing the p-System, before it was self-hosting, was to have an RT-11 disk also contain a UCSD p-System directory, and have both file systems reference the same files. The offset avoided stomping on the RT-11 directory blocks.

Byte Sex

Byte sex is an issue for disk images. They have the same byte sex as the host microprocessor architecture. You can detect the byte sex by looking that the FIRSTBLK field of the first directory entry (the volume label). It will always be six, so the high byte will be zero.

Once the byte sex has been determined, it should be used for all 16-byte word accesses. When extracting a bit field, it is always specified as bits within such a value, never the raw bytes.

Strings (file names and volume names) are unaffected by the byte sex.

Directory Entry Format

The Pascal declaration of a directory entry is as follows:

```
TYPE
 DIRENTRY =
  PACKED RECORD
   FIRSTBLK: INTEGER;
   DLASTBLK: INTEGER;
   CASE DFKIND: FILEKIND OF
   SECUREDIR,
   UNTYPEDFILE: (
    FILLER1 : 0..2048;
    DVID: VID;
    DEOVBLK: INTEGER;
    DNUMFILES: DIRRANGE;
    DLOADTIME: INTEGER;
    DLASTBOOT: DATEREC);
   XDSKFILE,CODEFILE,TEXTFILE,INFOFILE,
   DATAFILE,GRAFFILE,FOTOFILE: (
    FILLER2 : 0..1024;
    STATUS: BOOLEAN;
    DTID: TID;
    DLASTBYTE: integer;
    DACCESS: DATEREC)
  END;
```

This is not useful unless you know how UCSD Pascal lays out it records.

The directory entry layout for regular file looks like this:

bytes 0, 1:
: The number of the first block of the file, counting from zero, relative to the start of the disk.

bytes 2, 3:
: The number of the first block past the end of the file, counting from zero, relative to the start of the disk.

bytes 4, 5:
: The bottom four bits of the 16-bit word (*i.e.* in a different byte depending on byte sex) describe the file kind.

  UNTYPEDFILE, 0:
  : Not used (but see Volume Label, below).

  XDSKFILE, 1:
  : Not used.

  CODEFILE, 2:
  : Created by the Compiler, Assembler, or Linker. Contains code segments, see *ucsdpsys_codefile*(5) from the ucsd-psystem-xc project, for more information.

  TEXTFILE, 3:
  : All text file created by the Editor, or Listings by the Compiler or Linker, are this file kind.

  INFOFILE, 4:
  : Not used.

  DATAFILE, 5:
  : Any file created by a program, that is not a text file, will be marked as a datafile.

  GRAFFILE, 6:
  : Not used.

  FOTOFILE, 7:
  : Not used.

  SECUREDIR, 8:
  : Not used.

  The file's extension is usually the first 4 bytes of the file kind. For example, ".TEXT" and ".CODE".

bytes 6..21:
: The file's name. The first byte is the length, remaining bytes are the name, in 7-bit ASCII, no control characters. Always upper case on disk, case insensitive for searching. A length of zero is invalid, a length greater than 15 is invalid.

bytes 22, 23:
: How many bytes of the last block are actually used.

bytes 24, 25:
: The date the file was last modified. In the 16-bit word, the lower 5 bits are the day (1..32), the next 4 bits are them month (1..12), the high 7 bits are the year (0..99).

Directory Format

Each directory entry is 26 bytes long. Thus, 78 directory entries fit into 2kB (4 blocks). The remaining bytes are zero padded. The first directory entry describes the directory itself, the remaining 77 entries are used for regular files.

The first two blocks are reserved for the boot loader.

Volume label.

The layout of the first directory entry (the volume label) is slightly different:

bytes 0, 1:
: The first physical block on the disk (*i.e.* zero).

bytes 2, 3:
: The first block after the directory (*i.e.* six or ten).

bytes 4, 5:
: Ignore, set to zero, corresponding to a UNTYPEDFILE file kind value, see above.

bytes 6..13:
: The volume's name. The first byte is the length, remaining bytes are the name, in 7-bit ASCII, no control characters. Always upper case on disk, case insensitive for searching. A length of zero is invalid, a length greater than 7 is invalid.

bytes 14, 15:
: The physical number of blocks on the volume (disk).

bytes 16, 17:
: The number of files on the disk.

bytes 18, 19:
: Ignore. Set to zero.

bytes 20, 21:
: The date the volume was last mounted or modified. Same date format as above.

bytes 22..25:
: Ignore. Set to zero.

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AUTHOR

Peter Miller E-Mail: pmiller@opensource.org.au
/\/* WWW: http://miller.emu.id.au/pmiller/

NAME

ucsdpsys_text − UCSD p-System text file format

DESCRIPTION

The format of a textfile is as follows:

- There are two blocks (1024 bytes) of header information at the beginning of the file. This information is used by the Pascal Editor. The Pascal system creates the header page when a user program opens a textfile. The header page is transferred only during disk-to-disk transfers; transfers to character devices, such as the console or printer, always omit the header page.
- The rest of the file consists of two-block pages. Each page contains lines of text, separated from each other by RETURN characters (ASCII 0x0D). No line ever crosses a page boundary; thus a page contains only whole lines. After the last line on a page, the remainder of the page is filled with NUL characters (ASCII 0x00). READ and READLN skip the NUL characters, and WRITE and WRITELN provide them automatically. Thus this page formatting is normally invisible to a Pascal program.
- A sequence of leading spaces in a line may be compressed to a DLE-blank code. This code consists of a DLE control character (ASCII 0x10) followed by one byte containing the number of spaces to indent plus 32 (decimal). Using this code saves a considerable amount of space in files where indentation occurs frequently. The Editor is the main creator of DLE-blank codes; it usually outputs a DLE-blank code where a sequence of spaces occurs at the beginning of a line. However, the DLE-blank code is optional; some lines may have it, and others may have space characters instead. Also, a line with no indentation may or may not be preceded by a DLE character and an indent code value of 32 (meaning O indentation).

Limitations

- The smallest text file is 2kB. There is no way to avoid the 1kB editor information at the start of a text file.
- You must guarantee that every 1KB text block ends with at least one NUL. This is to cope with a bug in the native compiler.

OPTIONS

The following options are understood:

−Help
: Provide some help with using the *ucsdpsys_text* program.

−VERSion
: Print the version of the *ucsdpsys_text* program being executed.

All other options will produce a diagnostic error.

SEE ALSO

ucsdpsys_text(1)
: convert UCSD p-System text files

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ucsdpsys_text version 1.22

AUTHOR

Peter Miller E-Mail: pmiller@opensource.org.au
/\/* WWW: http://miller.emu.id.au/pmiller/