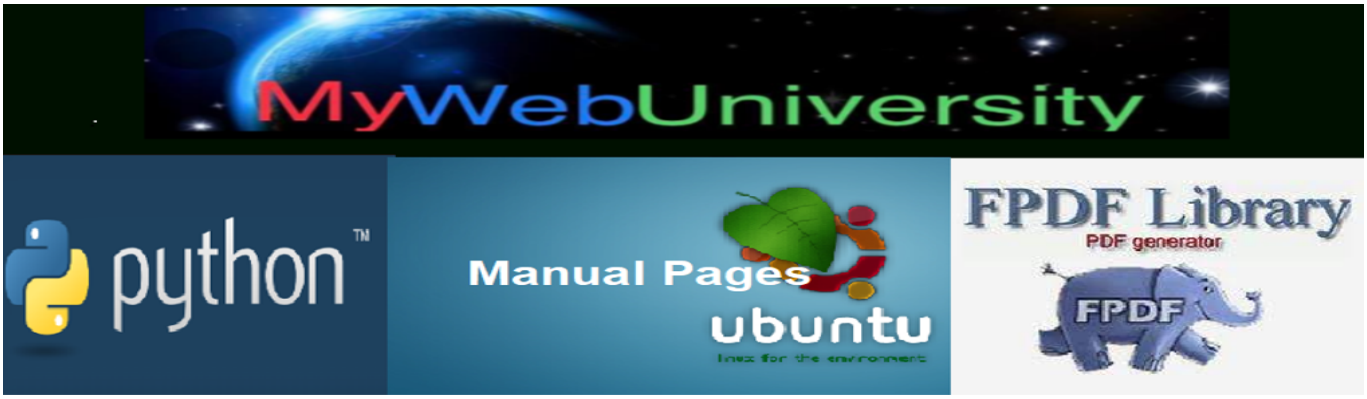

Full credit is given to the above companies including the Operating System (OS) that this PDF file was generated!

Rocky Enterprise Linux 9.2 Manual Pages on command 'mkisofs.1'

$ man mkisofs.1

GENISOIMAGE(1) General Commands Manual GENISOIMAGE(1)

NAME

genisoimage - create ISO9660/Joliet/HFS filesystem with optional Rock Ridge attributes

SYNOPSIS

genisoimage [options] [-o filename] pathspec [pathspec ...]

DESCRIPTION

genisoimage is a pre-mastering program to generate ISO9660/Joliet/HFS hybrid filesystems.

genisoimage is capable of generating the System Use Sharing Protocol records (SUSP) speci? fied by the Rock Ridge Interchange Protocol. This is used to further describe the files in the ISO9660 filesystem to a Unix host, and provides information such as long filenames, UID/GID, POSIX permissions, symbolic links, and block and character device files.

If Joliet or HFS hybrid command line options are specified, genisoimage will create the additional filesystem metadata needed for Joliet or HFS. Otherwise genisoimage will gen? erate a pure ISO9660 filesystem.

genisoimage can generate a true (or shared) HFS hybrid filesystem. The same files are seen as HFS files when accessed from a Macintosh and as ISO9660 files when accessed from other machines. HFS stands for Hierarchical File System and is the native filesystem used on Macintosh computers.

As an alternative, genisoimage can generate the Apple Extensions to ISO9660 for each file. These extensions provide each file with CREATOR, TYPE and certain Finder flags when ac? cessed from a Macintosh. See the HFS MACINTOSH FILE FORMATS section below.

genisoimage takes a snapshot of a given directory tree, and generates a binary image which will correspond to an ISO9660 and/or HFS filesystem when written to a block device.

Each file written to the ISO9660 filesystem must have a filename in the 8.3 format (up to 8 characters, period, up to 3 characters, all uppercase), even if Rock Ridge is in use. This filename is used on systems that are not able to make use of the Rock Ridge extensions (such as MS-DOS), and each filename in each directory must be different from the other filenames in the same directory. genisoimage generally tries to form correct names by forcing the Unix filename to uppercase and truncating as required, but often this yields unsatisfactory results when the truncated names are not all unique. genisoimage assigns weightings to each filename, and if two names that are otherwise the same are found, the name with the lower priority is renamed to include a 3-digit number (guaranteed to be unique). For example, the two files foo.bar and foo.bar.~1~ could be rendered as FOO.BAR;1 and FOO000.BAR;1.

When used with various HFS options, genisoimage will attempt to recognise files stored in a number of Apple/Unix file formats and will copy the data and resource forks as well as any relevant Finder information. See the HFS MACINTOSH FILE FORMATS section below for more about formats genisoimage supports.

Note that genisoimage is not designed to communicate with the writer directly. Most writers have proprietary command sets which vary from one manufacturer to another, and you need a specialized tool to actually burn the disc. wodim is one such tool. The latest version of wodim is available from http://www.cdrkit.org/.

pathspec is the path of the directory tree to be copied into the ISO9660 filesystem. Multiple paths can be specified, and genisoimage will merge the files found in all of the specified path components to form the filesystem image.

If the option -graft-points has been specified, it is possible to graft the paths at points other than the root directory, and it is possible to graft files or directories onto the cdrom image with names different than what they have in the source filesystem. This is easiest to illustrate with a couple of examples. Let's start by assuming that a local file ../old.lis exists, and you wish to include it in the cdrom image.

```
foo/bar/=../old.lis
```

will include old.lis in the cdrom image at /foo/bar/old.lis, while

```
foo/bar/xxx=../old.lis
```

will include old.lis in the cdrom image at /foo/bar/xxx. The same sort of syntax can be used with directories as well. genisoimage will create any directories required such that the graft points exist on the cdrom image ? the directories do not need to appear in one

of the paths. By default, any directories that are created on the fly like this will have permissions 0555 and appear to be owned by the person running genisoimage. If you wish other permissions or owners of the intermediate directories, see -uid, -gid, -dir-mode, -file-mode and -new-dir-mode.

genisoimage will also run on Windows machines when compiled with Cygnus' cygwin (available from http://www.cygwin.com/). Therefore most references in this man page to Unix can be replaced with Win32.

OPTIONS

Several options can be specified as defaults in a .genisoimagerc configuration file, as well as on the command line. If a parameter is specified in both places, the setting from the command line is used. For details on the format and possible locations of this file, see genisoimagerc(5).

-abstract file

Specifies the abstract filename. There is space for 37 characters. Equivalent to ABST in the .genisoimagerc file.

-A application_id

Specifies a text string that will be written into the volume header. This should describe the application that will be on the disc. There is space for 128 charac? ters. Equivalent to APPI in the .genisoimagerc file.

-allow-limited-size

When processing files larger than 2GiB which cannot be easily represented in ISO9660, add them with a shrunk visible file size to ISO9660 and with the correct visible file size to the UDF system. The result is an inconsistent filesystem and users need to make sure that they really use UDF rather than ISO9660 driver to read a such disk. Implies enabling -udf.

-allow-leading-dots

-ldots Allow ISO9660 filenames to begin with a period. Usually, a leading dot is replaced with an underscore in order to maintain MS-DOS compatibility.

This violates the ISO9660 standard, but it happens to work on many systems. Use with caution.

-allow-lowercase

This options allows lowercase characters to appear in ISO9660 filenames.

This violates the ISO9660 standard, but it happens to work on some systems. Use

with caution.

-allow-multidot

This options allows more than one dot to appear in ISO9660 filenames. A leading dot is not affected by this option, it may be allowed separately using -allow-lead? ing-dots.

This violates the ISO9660 standard, but it happens to work on many systems. Use with caution.

-biblio file

Specifies the bibliographic filename. There is space for 37 characters. Equiva? lent to BIBL in the .genisoimagerc file.

-cache-inodes

-no-cache-inodes

Enable or disable caching inode and device numbers to find hard links to files. If genisoimage finds a hard link (a file with multiple names), the file will also be hard-linked on the CD, so the file contents only appear once. This helps to save space. -cache-inodes is default on Unix-like operating systems, but -no-cache-in? odes is default on some other systems such as Cygwin, because it is not safe to as? sume that inode numbers are unique on those systems. (Some versions of Cygwin cre? ate fake inode numbers using a weak hashing algorithm, which may produce dupli? cates.) If two files have the same inode number but are not hard links to the same file, genisoimage -cache-inodes will not behave correctly. -no-cache-inodes is safe in all situations, but in that case genisoimage cannot detect hard links, so the resulting CD image may be larger than necessary.

-alpha-boot alpha_boot_image

Specifies the path and filename of the boot image to be used when making an Al? pha/SRM bootable CD. The pathname must be relative to the source path specified to genisoimage.

-hppa-bootloader hppa_bootloader_image

Specifies the path and filename of the boot image to be used when making an HPPA bootable CD. The pathname must be relative to the source path specified to genisoimage. Other options are required, at the very least a kernel filename and a boot command line. See the HPPA NOTES section below for more information.

-hppa-cmdline hppa_boot_command_line

Specifies the command line to be passed to the HPPA boot loader when making a bootable CD. Separate the parameters with spaces or commas. More options must be passed to genisoimage, at the very least a kernel filename and the boot loader filename. See the HPPA NOTES section below for more information.

-hppa-kernel-32 hppa_kernel_32

-hppa-kernel-64 hppa_kernel_64

Specifies the path and filename of the 32-bit and/or 64-bit kernel images to be used when making an HPPA bootable CD. The pathnames must be relative to the source path specified to genisoimage. Other options are required, at the very least the boot loader filename and the boot command line. See the HPPA NOTES section below for more information.

-hppa-ramdisk hppa_ramdisk_image

Specifies the path and filename of the ramdisk image to be used when making an HPPA bootable CD. The pathname must be relative to the source path specified to genisoimage. This parameter is optional. Other options are required, at the very least a kernel filename and the boot command line. See the HPPA NOTES section below for more information.

-mips-boot mips_boot_image

Specifies the path and filename of the boot image to be used when making an SGI/big-endian MIPS bootable CD. The pathname must be relative to the source path specified to genisoimage. This option may be specified several times, to store up to 15 boot images.

-mipsel-boot mipsel_boot_image

Specifies the path and filename of the boot image to be used when making an DEC/little-endian MIPS bootable CD. The pathname must be relative to the source path specified to genisoimage.

-B img_sun4,img_sun4c,img_sun4m,img_sun4d,img_sun4e

-sparc-boot img_sun4,img_sun4c,img_sun4m,img_sun4d,img_sun4e

Specifies a comma-separated list of boot images that are needed to make a bootable CD for SPARC systems. Partition 0 is used for the ISO9660 image, the first image file is mapped to partition 1. The comma-separated list may have up to 7 fields, including empty fields. This option is required to make a bootable CD for Sun SPARC systems. If -B or -sparc-boot has been specified, the first sector of the

resulting image will contain a Sun disk label. This disk label specifies slice 0 for the ISO9660 image and slices 1 to 7 for the boot images that have been speci? fied with this option. Byte offsets 512 to 8191 within each of the additional boot images must contain a primary boot that works for the appropriate SPARC architec? ture. The rest of each of the images usually contains a UFS filesystem used for the primary kernel boot stage.

The implemented boot method is the one found with SunOS 4.x and SunOS 5.x. How? ever, it does not depend on SunOS internals but only on properties of the Open Boot prom, so it should be usable for any OS for SPARC systems. For more information also see the NOTES section below.

If the special filename ... is used, the actual and all following boot partitions are mapped to the previous partition. If genisoimage is called with -G image -B ... all boot partitions are mapped to the partition that contains the ISO9660 filesys? tem image and the generic boot image that is located in the first 16 sectors of the disc is used for all architectures.

-G generic_boot_image

Specifies the path and filename of the generic boot image to be used when making a generic bootable CD. The boot image will be placed on the first 16 sectors of the CD, before the ISO9660 primary volume descriptor. If this option is used together with -sparc-boot, the Sun disk label will overlay the first 512 bytes of the generic boot image.

-b eltorito_boot_image

Specifies the path and filename of the boot image to be used when making an El Torito bootable CD for x86 PCs. The pathname must be relative to the source path specified to genisoimage. This option is required to make an El Torito bootable CD. The boot image must be exactly 1200 kB, 1440 kB or 2880 kB, and genisoimage will use this size when creating the output ISO9660 filesystem. The PC BIOS will use the image to emulate a floppy disk, so the first 512-byte sector should contain PC boot code. This will work, for example, if the boot image is a LILO-based boot floppy.

If the boot image is not an image of a floppy, you need to add either -hard-disk-boot or -no-emul-boot. If the system should not boot off the emulated disk, use -no-boot.

If -sort has not been specified, the boot images are sorted with low priority (+2) to the beginning of the medium. If you don't like this, you need to specify a sort weight of 0 for the boot images.

-eltorito-alt-boot

Start with a new set of El Torito boot parameters. Up to 63 El Torito boot entries may be stored on a single CD.

-hard-disk-boot

Specifies that the boot image used to create El Torito bootable CDs is a hard disk image. The image must begin with a master boot record that contains a single parti? tion.

-no-emul-boot

Specifies that the boot image used to create El Torito bootable CDs is a "no emula? tion" image. The system will load and execute this image without performing any disk emulation.

-no-boot

Specifies that the created El Torito CD should be marked as not bootable. The sys? tem will provide an emulated drive for the image, but will boot off a standard boot device.

-boot-load-seg segment_address

Specifies the load segment address of the boot image for no-emulation El Torito CDs.

-boot-load-size load_sectors

Specifies the number of "virtual" (512-byte) sectors to load in no-emulation mode. The default is to load the entire boot file. Some BIOSes may have problems if this is not a multiple of 4.

-boot-info-table

Specifies that a 56-byte table with information of the CD-ROM layout will be patched in at offset 8 in the boot file. If this option is given, the boot file is modified in the source filesystem, so make a copy of this file if it cannot be eas? ily regenerated! See the EL TORITO BOOT INFO TABLE section for a description of this table.

-C last_sess_start,next_sess_start

This option is needed to create a CD Extra or the image of a second session or a

higher-level session for a multisession disc. -C takes two numbers separated by a comma. The first is the first sector in the last session of the disc that should be appended to. The second number is the starting sector number of the new session. The correct numbers may be retrieved by calling wodim -msinfo ... If -C is used in conjunction with -M, genisoimage will create a filesystem image that is intended to be a continuation of the previous session. If -C is used without -M, genisoimage will create a filesystem image that is intended to be used for a second session on a CD Extra. This is a multisession CD that holds audio data in the first session and an ISO9660 filesystem in the second session.

-c boot_catalog

Specifies the path and filename of the boot catalog, which is required for an El Torito bootable CD. The pathname must be relative to the source path specified to genisoimage. This file will be inserted into the output tree and not created in the source filesystem, so be sure the specified filename does not conflict with an existing file, or it will be excluded. Usually a name like boot.catalog is chosen. If -sort has not been specified, the boot catalog sorted with low priority (+1) to the beginning of the medium. If you don't like this, you need to specify a sort weight of 0 for the boot catalog.

-check-oldnames

Check all filenames imported from the old session for compliance with the ISO9660 file naming rules. Without this option, only names longer than 31 characters are checked, as these files are a serious violation of the ISO9660 standard.

-check-session file

Check all old sessions for compliance with actual genisoimage ISO9660 file naming rules. This is a high-level option that combines -M file -C 0,0 -check-oldnames. For the parameter file, see the description of -M.

-copyright file

Specifies copyright information, typically a filename on the disc. There is space for 37 characters. Equivalent to COPY in the .genisoimagerc file.

-d Do not append a period to files that do not have one.

This violates the ISO9660 standard, but it happens to work on many systems. Use with caution.

-D Do not use deep directory relocation, and instead just pack them in the way we see

them.

If ISO9660:1999 has not been selected, this violates the ISO9660 standard, but it happens to work on many systems. Use with caution.

-dir-mode mode

Overrides the mode of directories used to create the image to mode, specified as 4 digits of permission bits as in chmod(1). This option automatically enables Rock Ridge extensions.

-dvd-video

Generate a DVD-Video compliant UDF filesystem. This is done by sorting the order of the content of the appropriate files and by adding padding between the files if needed. Note that the sorting only works if the DVD-Video filenames include upper? case characters only.

Note that in order to get a DVD-Video compliant filesystem image, you need to pre? pare a DVD-Video compliant directory tree. This requires a directory VIDEO_TS (all caps) in the root directory of the resulting DVD, and usually another directory AU? DIO_TS. VIDEO_TS needs to include all needed files (filenames must be all caps) for a compliant DVD-Video filesystem.

-f Follow symbolic links when generating the filesystem. When this option is not in use, symbolic links will be entered using Rock Ridge if enabled, otherwise they will be ignored.

-file-mode mode

Overrides the mode of regular files used to create the image to mode, specified as 4 digits of permission bits as in chmod(1). This option automatically enables Rock Ridge extensions.

-gid gid

Overrides the group ID read from the source files to the value of gid. Specifying this option automatically enables Rock Ridge extensions.

-gui Switch the behaviour for a GUI. This currently makes the output more verbose but may have other effects in the future.

-graft-points

Allow use of graft points for filenames. If this option is used, all filenames are checked for graft points. The filename is divided at the first unescaped equal sign. All occurrences of `\' and `=' characters must be escaped with `\' if

-graft-points has been specified.

-hide glob

Hide any files matching glob, a shell wildcard pattern, from being seen in the ISO9660 or Rock Ridge directory. glob may match any part of the filename or path. If glob matches a directory, the contents of that directory will be hidden. In or? der to match a directory name, make sure the pathname does not include a trailing `/' character. All the hidden files will still be written to the output CD image file. See also -hide-joliet, and README.hide. This option may be used multiple times.

-hide-list file

A file containing a list of shell wildcards to be hidden. See -hide.

-hidden glob

Add the hidden (existence) ISO9660 directory attribute for files and directories matching glob, a shell wildcard pattern. This attribute will prevent the files from being shown by some MS-DOS and Windows commands. glob may match any part of the filename or path. In order to match a directory name, make sure the pathname does not include a trailing `/' character. This option may be used multiple times.

-hidden-list file

A file containing a list of shell wildcards to get the hidden attribute. See -hid? den.

-hide-joliet glob

Hide files and directories matching glob, a shell wildcard pattern, from being seen in the Joliet directory. glob may match any part of the filename or path. If glob matches a directory, the contents of that directory will be hidden. In order to match a directory name, make sure the pathname does not include a trailing `/' character. All the hidden files will still be written to the output CD image file. This option is usually used with -hide. See also README.hide. This option may be used multiple times.

-hide-joliet-list file

A file containing a list of shell wildcards to be hidden from the Joliet tree. See -hide-joliet.

-hide-joliet-trans-tbl

Hide the TRANS.TBL files from the Joliet tree. These files usually don't make

sense in the Joliet world as they list the real name and the ISO9660 name which may both be different from the Joliet name.

-hide-rr-moved

Rename the directory RR_MOVED to .rr_moved in the Rock Ridge tree. It seems to be impossible to completely hide the RR_MOVED directory from the Rock Ridge tree. This option only makes the visible tree less confusing for people who don't know what this directory is for. If you need to have no RR_MOVED directory at all, you should use -D. Note that if -D has been specified, the resulting filesystem is not ISO9660 level-1 compliant and will not be readable on MS-DOS. See also the NOTES section.

-input-charset charset

Input charset that defines the characters used in local filenames. To get a list of valid charset names, call genisoimage -input-charset help. To get a 1:1 map? ping, you may use default as charset name. The default initial values are cp437 on DOS-based systems and iso8859-1 on all other systems. See the CHARACTER SETS sec? tion below for more details.

-output-charset charset

Output charset that defines the characters that will be used in Rock Ridge file? names. Defaults to the input charset. See CHARACTER SETS section below for more details.

-iso-level level

Set the ISO9660 conformance level. Valid numbers are 1 to 4.

With level 1, files may only consist of one section and filenames are restricted to 8.3 characters.

With level 2, files may only consist of one section.

With level 3, no restrictions (other than ISO-9660:1988) do apply.

With all ISO9660 levels from 1 to 3, all filenames are restricted to uppercase let? ters, numbers and underscores (_). Filenames are limited to 31 characters, direc? tory nesting is limited to 8 levels, and pathnames are limited to 255 characters.

Level 4 officially does not exist but genisoimage maps it to ISO-9660:1999, which is ISO9660 version 2.

With level 4, an enhanced volume descriptor with version number and file structure version number set to 2 is emitted. Directory nesting is not limited to 8 levels,

there is no need for a file to contain a dot and the dot has no special meaning, filenames do not have version numbers, and filenames can be up to 207 characters long, or 197 characters if Rock Ridge is used.

When creating Version 2 images, genisoimage emits an enhanced volume descriptor, similar but not identical to a primary volume descriptor. Be careful not to use broken software to make ISO9660 images bootable by assuming a second PVD copy and patching this putative PVD copy into an El Torito VD.

-J Generate Joliet directory records in addition to regular ISO9660 filenames. This is primarily useful when the discs are to be used on Windows machines. Joliet filenames are specified in Unicode and each path component can be up to 64 Unicode characters long. Note that Joliet is not a standard ? only Microsoft Windows and Linux systems can read Joliet extensions. For greater portability, consider using both Joliet and Rock Ridge extensions.

-joliet-long

Allow Joliet filenames to be up to 103 Unicode characters, instead of 64. This breaks the Joliet specification, but appears to work. Use with caution.

-jcharset charset

A combination of -J -input-charset charset. See the CHARACTER SETS section below for more details.

-l Allow full 31-character filenames. Normally the ISO9660 filename will be in an 8.3 format which is compatible with MS-DOS, even though the ISO9660 standard allows filenames of up to 31 characters. If you use this option, the disc may be diffi? cult to use on a MS-DOS system, but will work on most other systems. Use with cau? tion.

-L Outdated option; use -allow-leading-dots instead.

-jigdo-jigdo jigdo_file

Produce a jigdo .jigdo metadata file as well as the filesystem image. See the JIGDO NOTES section below for more information.

-jigdo-template template_file

Produce a jigdo .template file as well as the filesystem image. See the JIGDO NOTES section below for more information.

-jigdo-min-file-size size

Specify the minimum size for a file to be listed in the .jigdo file. Default (and

minimum allowed) is 1KB. See the JIGDO NOTES section below for more information.

-jigdo-force-md5 path

Specify a file pattern where files must be contained in the externally-supplied MD5 list as supplied by -md5-list. See the JIGDO NOTES section below for more informa? tion.

-jigdo-exclude path

Specify a file pattern where files will not be listed in the .jigdo file. See the JIGDO NOTES section below for more information.

-jigdo-map path

Specify a pattern mapping for the jigdo file (e.g. Debian=/mirror/debian). See the JIGDO NOTES section below for more information.

-md5-list md5_file

Specify a file containing the MD5sums, sizes and pathnames of the files to be in? cluded in the .jigdo file. See the JIGDO NOTES section below for more information.

-jigdo-template-compress algorithm

Specify a compression algorithm to use for template date. gzip and bzip2 are cur? rently supported, and gzip is the default. See the JIGDO NOTES section below for more information.

-log-file log_file

Redirect all error, warning and informational messages to log_file instead of the standard error.

-m glob

Exclude files matching glob, a shell wildcard pattern, from being written to CD- ROM. glob may match either the filename component or the full pathname. This op? tion may be used multiple times. For example:

genisoimage -o rom -m '*.o' -m core -m foobar

would exclude all files ending in `.o', or called core or foobar from the image. Note that if you had a directory called foobar, it too (and of course all its de? scendants) would be excluded.

-exclude-list file

A file containing a list of shell wildcards to be excluded. See -m.

-max-iso9660-filenames

Allow ISO9660 filenames to be up to 37 characters long. This option enables -N as

the extra name space is taken from the space reserved for file version numbers.

This violates the ISO9660 standard, but it happens to work on many systems. Al? though a conforming application needs to provide a buffer space of at least 37 characters, discs created with this option may cause a buffer overflow in the read? ing operating system. Use with extreme care.

-M path

-M device

-dev device

Specifies path to existing ISO9660 image to be merged. The alternate form takes a SCSI device specifier that uses the same syntax as the dev= parameter of wodim. The output of genisoimage will be a new session which should get written to the end of the image specified in -M. Typically this requires multisession capability for the CD recorder used to write the image. This option may only be used in conjunc? tion with -C.

-N Omit version numbers from ISO9660 filenames.

This violates the ISO9660 standard, but no one really uses the version numbers any? way. Use with caution.

-new-dir-mode mode

Specify the mode, a 4-digit number as used in chmod(1), to use when creating new directories in the filesystem image. The default is 0555.

-nobak

-no-bak

Exclude backup files files on the ISO9660 filesystem; that is, filenames that con? tain the characters `~' or `#' or end in .bak. These are typically backup files for Unix text editors.

-force-rr

Do not use the automatic Rock Ridge attributes recognition for previous sessions. This can work around problems with images created by, e.g., NERO Burning ROM.

-no-rr Do not use the Rock Ridge attributes from previous sessions. This may help to avoid problems when genisoimage finds illegal Rock Ridge signatures on an old ses? sion.

-no-split-symlink-components

Don't split the symlink components, but begin a new Continuation Area (CE) instead.

This may waste some space, but the SunOS 4.1.4 cdrom driver has a bug in reading split symlink components.

It is questionable whether this option is useful nowadays.

-no-split-symlink-fields

Don't split the symlink fields, but begin a new Continuation Area (CE) instead.

This may waste some space, but the SunOS 4.1.4 and Solaris 2.5.1 cdrom driver have a bug in reading split symlink fields (a `/' can be dropped).

It is questionable whether this option is useful nowadays.

-o filename

Specify the output file for the the ISO9660 filesystem image. This can be a disk file, a tape drive, or it can correspond directly to the device name of the optical disc writer. If not specified, stdout is used. Note that the output can also be a block device for a regular disk partition, in which case the ISO9660 filesystem can be mounted normally to verify that it was generated correctly.

-pad Pad the end of the whole image by 150 sectors (300 kB). This option is enabled by default. If used in combination with -B, padding is inserted between the ISO9660 partition and the boot partitions, such that the first boot partition starts on a sector number that is a multiple of 16.

The padding is needed as many operating systems (e.g. Linux) implement read-ahead bugs in their filesystem I/O. These bugs result in read errors on files that are located near the end of a track, particularly if the disc is written in Track At Once mode, or where a CD audio track follows the data track.

-no-pad

Do not pad the end by 150 sectors (300 kB) and do not make the the boot partitions start on a multiple of 16 sectors.

-path-list file

A file containing a list of pathspec directories and filenames to be added to the ISO9660 filesystem. This list of pathspecs are processed after any that appear on the command line. If the argument is -, the list is read from the standard input.

-P Outdated option; use -publisher instead.

-publisher publisher_id

Specifies a text string that will be written into the volume header. This should describe the publisher of the CD-ROM, usually with a mailing address and phone num?

ber. There is space for 128 characters. Equivalent to PUBL in the .genisoimagerc file.

-p preparer_id

Specifies a text string that will be written into the volume header. This should describe the preparer of the CD-ROM, usually with a mailing address and phone num? ber. There is space for 128 characters. Equivalent to PREP in the .genisoimagerc file.

-print-size

Print estimated filesystem size in multiples of the sector size (2048 bytes) and exit. This option is needed for Disk At Once mode and with some CD-R drives when piping directly into wodim, cases where wodim needs to know the size of the filesystem image in advance. Old versions of mkisofs wrote this information (among other information) to stderr. As this turns out to be hard to parse, the number without any other information is now printed on stdout too. If you like to write a simple shell script, redirect stderr and catch the number from stdout. This may be done with:

```
cdblocks=` genisoimage -print-size -quiet ... `
genisoimage ... | wodim ... tsize=${cdblocks}s -
```

-quiet This makes genisoimage even less verbose. No progress output will be provided.

-R Generate SUSP and RR records using the Rock Ridge protocol to further describe the files on the ISO9660 filesystem.

-r This is like the -R option, but file ownership and modes are set to more useful values. The uid and gid are set to zero, because they are usually only useful on the author's system, and not useful to the client. All the file read bits are set true, so that files and directories are globally readable on the client. If any execute bit is set for a file, set all of the execute bits, so that executables are globally executable on the client. If any search bit is set for a directory, set all of the search bits, so that directories are globally searchable on the client. All write bits are cleared, because the filesystem will be mounted read-only in any case. If any of the special mode bits are set, clear them, because file locks are not useful on a read-only filesystem, and set-id bits are not desirable for uid 0 or gid 0. When used on Win32, the execute bit is set on all files. This is a re? sult of the lack of file permissions on Win32 and the Cygwin POSIX emulation layer.

See also -uid, -gid, -dir-mode, -file-mode and -new-dir-mode.

-relaxed-filenames

Allows ISO9660 filenames to include all 7-bit ASCII characters except lowercase letters.

This violates the ISO9660 standard, but it happens to work on many systems. Use with caution.

-root dir

Moves all files and directories into dir in the image. This is essentially the same as using -graft-points and adding dir in front of every pathspec, but is easier to use. dir may actually be several levels deep. It is created with the same permis? sions as other graft points.

-old-root dir

This option is necessary when writing a multisession image and the previous (or even older) session was written with -root dir. Using a directory name not found in the previous session causes genisoimage to abort with an error. Without this option, genisoimage would not be able to find unmodified files and would be forced to write their data into the image once more. -root and -old-root are meant to be used together to do incremental backups. The initial session would e.g. use: genisoimage -root backup_1 dirs. The next incremental backup with genisoimage -root backup_2 -old-root backup_1 dirs would take another snapshot of these direc? tories. The first snapshot would be found in backup_1, the second one in backup_2, but only modified or new files need to be written into the second session. Without these options, new files would be added and old ones would be preserved. But old ones would be overwritten if the file was modified. Recovering the files by copying the whole directory back from CD would also restore files that were deleted inten? tionally. Accessing several older versions of a file requires support by the oper? ating system to choose which sessions are to be mounted.

-sort sort_file

Sort file locations on the media. Sorting is controlled by a file that contains pairs of filenames and sorting offset weighting. If the weighting is higher, the file will be located closer to the beginning of the media, if the weighting is lower, the file will be located closer to the end of the media. There must be only one space or tabs character between the filename and the weight and the weight must

be the last characters on a line. The filename is taken to include all the charac?
ters up to, but not including the last space or tab character on a line. This is to
allow for space characters to be in, or at the end of a filename. This option does
not sort the order of the filenames that appear in the ISO9660 directory. It sorts
the order in which the file data is written to the CD image, which is useful in or?
der to optimize the data layout on a CD. See README.sort for more details.

-sparc-boot img_sun4,img_sun4c,img_sun4m,img_sun4d,img_sun4e

See -B above.

-sparc-label label

Set the Sun disk label name for the Sun disk label that is created with -sparc-
boot.

-split-output

Split the output image into several files of approximately 1 GB each. This helps
to create DVD-sized ISO9660 images on operating systems without large file support.
wodim will concatenate more than one file into a single track if writing to a DVD.
To make -split-output work, -o filename must be specified. The resulting output im?
ages will be named: filename_00, filename_01, filename_02....

-stream-media-size #

Select streaming operation and set the media size to # sectors. This allows you to
pipe the output of the tar(1) program into genisoimage and to create an ISO9660
filesystem without the need of an intermediate tar archive file. If this option
has been specified, genisoimage reads from stdin and creates a file with the name
STREAM.IMG. The maximum size of the file (with padding) is 200 sectors less than
the specified media size. If -no-pad has been specified, the file size is 50 sec?
tors less than the specified media size. If the file is smaller, genisoimage will
write padding. This may take awhile.
The option -stream-media-size creates simple ISO9660 filesystems only and may not
used together with multisession or hybrid filesystem options.

-stream-file-name name

Reserved for future use.

-sunx86-boot UFS_img,,,AUX1_img

Specifies a comma-separated list of filesystem images that are needed to make a
bootable CD for Solaris x86 systems.

Note that partition 1 is used for the ISO9660 image and that partition 2 is the whole disk, so partition 1 and 2 may not be used by external partition data. The first image file is mapped to partition 0. There may be empty fields in the comma-separated list, and list entries for partition 1 and 2 must be empty. The maximum number of supported partitions is 8 (although the Solaris x86 partition table could support up to 16 partitions), so it is impossible to specify more than 6 partition images. This option is required to make a bootable CD for Solaris x86 systems. If -sunx86-boot has been specified, the first sector of the resulting image will contain a PC fdisk label with a Solaris type 0x82 fdisk partition that starts at offset 512 and spans the whole CD. In addition, for the Solaris type 0x82 fdisk partition, there is a SVr4 disk label at offset 1024 in the first sector of the CD. This disk label specifies slice 0 for the first (usually UFS type) filesystem image that is used to boot the PC and slice 1 for the ISO9660 image. Slice 2 spans the whole CD slice 3 ... slice 7 may be used for additional filesystem images that have been specified with this option.

A Solaris x86 boot CD uses a 1024 byte sized primary boot that uses the El-Torito no-emulation boot mode and a secondary generic boot that is in CD sectors 1..15. For this reason, both -b bootimage -no-emul-boot and -G genboot must be specified.

-sunx86-label label

Set the SVr4 disk label name for the SVr4 disk label that is created with -sunx86-boot.

-sysid ID

Specifies the system ID. There is space for 32 characters. Equivalent to SYSI in the .genisoimagerc file.

-T Generate a file TRANS.TBL in each directory on the CD-ROM, which can be used on non-Rock Ridge-capable systems to help establish the correct filenames. There is also information present in the file that indicates the major and minor numbers for block and character devices, and each symlink has the name of the link file given.

-table-name table_name

Alternative translation table filename (see above). Implies -T. If you are creat? ing a multisession image you must use the same name as in the previous session.

-ucs-level level

Set Unicode conformance level in the Joliet SVD. The default level is 3. It may be

set to 1..3 using this option.

-udf Include UDF filesystem support in the generated filesystem image. UDF support is currently in alpha status and for this reason, it is not possible to create UDF-only images. UDF data structures are currently coupled to the Joliet structures, so there are many pitfalls with the current implementation. There is no UID/GID support, there is no POSIX permission support, there is no support for symlinks. Note that UDF wastes the space from sector ~20 to sector 256 at the beginning of the disc in addition to the space needed for real UDF data structures.

-uid uid

Overrides the uid read from the source files to the value of uid. Specifying this option automatically enables Rock Ridge extensions.

-use-fileversion

The option -use-fileversion allows genisoimage to use file version numbers from the filesystem. If the option is not specified, genisoimage creates a version number of 1 for all files. File versions are strings in the range ;1 to ;32767 This op? tion is the default on VMS.

-U Allows "untranslated" filenames, completely violating the ISO9660 standards de? scribed above. Enables the following flags: -d -l -N -allow-leading-dots -re? laxed-filenames -allow-lowercase -allow-multidot -no-iso-translate. Allows more than one `.' character in the filename, as well as mixed-case filenames. This is useful on HP-UX, where the built-in cdfs filesystem does not recognize any exten? sions. Use with extreme caution.

-no-iso-translate

Do not translate the characters `#' and `~' which are invalid for ISO9660 file? names. Although invalid, these characters are often used by Microsoft systems. This violates the ISO9660 standard, but it happens to work on many systems. Use with caution.

-V volid

Specifies the volume ID (volume name or label) to be written into the master block. There is space for 32 characters. Equivalent to VOLI in the .genisoimagerc file. The volume ID is used as the mount point by the Solaris volume manager and as a la? bel assigned to a disc on various other platforms such as Windows and Apple Mac OS.

-volset ID

Specifies the volume set ID. There is space for 128 characters. Equivalent to VOLS in the .genisoimagerc file.

-volset-size #

Sets the volume set size to #. The volume set size is the number of CDs that are in a CD volume set. A volume set is a collection of one or more volumes, on which a set of files is recorded.

Volume Sets are not intended to be used to create a set numbered CDs that are part of e.g. a Operation System installation set of CDs. Volume Sets are rather used to record a big directory tree that would not fit on a single volume. Each volume of a Volume Set contains a description of all the directories and files that are recorded on the volumes where the sequence numbers are less than, or equal to, the assigned Volume Set Size of the current volume.

genisoimage currently does not support a -volset-size that is larger than 1.

The option -volset-size must be specified before -volset-seqno on each command line.

-volset-seqno #

Sets the volume set sequence number to #. The volume set sequence number is the index number of the current CD in a CD set. The option -volset-size must be speci? fied before -volset-seqno on each command line.

-v Verbose execution. If given twice on the command line, extra debug information will be printed.

-x glob

Identical to -m glob.

-z Generate special RRIP records for transparently compressed files. This is only of use and interest for hosts that support transparent decompression, such as Linux 2.4.14 or later. You must specify -R or -r to enable Rock Ridge, and generate com? pressed files using the mkzftree utility before running genisoimage. Note that transparent compression is a nonstandard Rock Ridge extension. The resulting disks are only transparently readable if used on Linux. On other operating systems you will need to call mkzftree by hand to decompress the files.

HFS OPTIONS

-hfs Create an ISO9660/HFS hybrid CD. This option should be used in conjunction with the -map, -magic and/or the various double dash options given below.

-apple Create an ISO9660 CD with Apple's extensions. Similar to -hfs, except that the Ap?
ple Extensions to ISO9660 are added instead of creating an HFS hybrid volume. For?
mer genisoimage versions did include Rock Ridge attributes by default if -apple was
specified. This versions of genisoimage does not do this anymore. If you like to
have Rock Ridge attributes, you need to specify this separately.

-map mapping_file
Use the mapping_file to set the CREATOR and TYPE information for a file based on
the filename's extension. A filename is mapped only if it is not one of the know
Apple/Unix file formats. See the HFS CREATOR/TYPE section below.

-magic magic_file
The CREATOR and TYPE information is set by using a file's magic number (usually the
first few bytes of a file). The magic_file is only used if a file is not one of the
known Apple/Unix file formats, or the filename extension has not been mapped using
-map. See the HFS CREATOR/TYPE section below for more details.

-hfs-creator creator
Set the default CREATOR for all files. Must be exactly 4 characters. See the HFS
CREATOR/TYPE section below for more details.

-hfs-type type
Set the default TYPE for all files. Must be exactly 4 characters. See the HFS CRE?
ATOR/TYPE section below for more details.

-probe Search the contents of files for all the known Apple/Unix file formats. See the
HFS MACINTOSH FILE FORMATS section below for more about these formats. However,
the only way to check for MacBinary and AppleSingle files is to open and read them,
so this option may increase processing time. It is better to use one or more double
dash options given below if the Apple/Unix formats in use are known.

-no-desktop
Do not create (empty) Desktop files. New HFS Desktop files will be created when the
CD is used on a Macintosh (and stored in the System Folder). By default, empty
Desktop files are added to the HFS volume.

-mac-name
Use the HFS filename as the starting point for the ISO9660, Joliet and Rock Ridge
filenames. See the HFS MACINTOSH FILENAMES section below for more information.

-boot-hfs-file driver_file

Installs the driver_file that may make the CD bootable on a Macintosh. See the HFS BOOT DRIVER section below. (Alpha).

-part Generate an HFS partition table. By default, no partition table is generated, but some older Macintosh CD-ROM drivers need an HFS partition table on the CD-ROM to be able to recognize a hybrid CD-ROM.

-auto AutoStart_file

Make the HFS CD use the QuickTime 2.0 Autostart feature to launch an application or document. The given filename must be the name of a document or application located at the top level of the CD. The filename must be less than 12 characters. (Alpha).

-cluster-size size

Set the size in bytes of the cluster or allocation units of PC Exchange files. Im? plies --exchange. See the HFS MACINTOSH FILE FORMATS section below.

-hide-hfs glob

Hide glob, a shell wildcard pattern, from the HFS volume. The file or directory will still exist in the ISO9660 and/or Joliet directory. glob may match any part of the filename. Multiple globs may be excluded. Example:

genisoimage -o rom -hfs -hide-hfs '*.o' -hide-hfs foobar

would exclude all files ending in `.o' or called foobar from the HFS volume. Note that if you had a directory called foobar, it too (and of course all its descen? dants) would be excluded. The glob can also be a path name relative to the source directories given on the command line. Example:

genisoimage -o rom -hfs -hide-hfs src/html src

would exclude just the file or directory called html from the src directory. Any other file or directory called html in the tree will not be excluded. Should be used with -hide and/or -hide-joliet. In order to match a directory name, make sure the pattern does not include a trailing `/' character. See README.hide for more de? tails.

-hide-hfs-list file

Specify a file containing a list of wildcard patterns to be hidden as in -hide-hfs.

-hfs-volid hfs_volid

Volume name for the HFS partition. This is the name that is assigned to the disc on a Macintosh and replaces the volid used with -V.

-icon-position

Use the icon position information, if it exists, from the Apple/Unix file. The icons will appear in the same position as they would on a Macintosh desktop. Folder location and size on screen, its scroll positions, folder View (view as Icons, Small Icons, etc.) are also preserved. (Alpha).

-root-info file

Set the location, size on screen, scroll positions, folder View etc. for the root folder of an HFS volume. See README.rootinfo for more information. (Alpha)

-prep-boot file

PReP boot image file. Up to 4 are allowed. See README.prep_boot for more informa? tion. (Alpha)

-chrp-boot

Add CHRP boot header.

-input-hfs-charset charset

Input charset that defines the characters used in HFS filenames when used with -mac-name. The default charset is cp10000 (Mac Roman). See the CHARACTER SETS and HFS MACINTOSH FILENAMES sections below for more details.

-output-hfs-charset charset

Output charset that defines the characters that will be used in the HFS filenames. Defaults to the input charset. See the CHARACTER SETS section below for more de? tails.

-hfs-unlock

By default, genisoimage will create an HFS volume that is locked. This option leaves the volume unlocked so that other applications (e.g. hfsutils) can modify the volume. See the HFS PROBLEMS/LIMITATIONS section below for warnings about using this option.

-hfs-bless folder_name

"Bless" the given directory (folder). This is usually the System Folder and is used in creating HFS bootable CDs. The name of the directory must be the whole path name as genisoimage sees it. E.g., if the given pathspec is ./cddata and the required folder is called System Folder, the whole path name is "/cddata/System Folder" (re? member to use quotes if the name contains spaces).

-hfs-parms parameters

Override certain parameters used to create the HFS filesystem. Unlikely to be used

in normal circumstances. See the libhfs_iso/hybrid.h source file for details.

--cap Look for AUFS CAP Macintosh files. Search for CAP Apple/Unix file formats only. Searching for the other possible Apple/Unix file formats is disabled, unless other double dash options are given.

--netatalk

Look for NETATALK Macintosh files

--double

Look for AppleDouble Macintosh files

--ethershare

Look for Helios EtherShare Macintosh files

--ushare

Look for IPT UShare Macintosh files

--exchange

Look for PC Exchange Macintosh files

--sgi Look for SGI Macintosh files

--xinet

Look for XINET Macintosh files

--macbin

Look for MacBinary Macintosh files

--single

Look for AppleSingle Macintosh files

--dave Look for Thursby Software Systems DAVE Macintosh files

--sfm Look for Microsoft's Services for Macintosh files (NT only) (Alpha)

--osx-double

Look for Mac OS X AppleDouble Macintosh files

--osx-hfs

Look for Mac OS X HFS Macintosh files

CHARACTER SETS

genisoimage processes filenames in a POSIX-compliant way as strings of 8-bit characters. To represent all codings for all languages, 8-bit characters are not sufficient. Unicode or ISO-10646 define character codings that need at least 21 bits to represent all known languages. They may be represented with UTF-32, UTF-16 or UTF-8 coding. UTF-32 uses a plain 32-bit coding but seems to be uncommon. UTF-16 is used by Microsoft with Win32 with

the disadvantage that 16-bit characters are not compliant with the POSIX filesystem inter? face.

Modern Unix operating systems may use UTF-8 coding for filenames. Each 32-bit character is represented by one or more 8-bit characters. If a character is coded in ISO-8859-1 (used in Central Europe and North America) is maps 1:1 to a UTF-32 or UTF-16 coded Unicode character. If a character is coded in 7-Bit ASCII (used in USA and other countries with limited character set) is maps 1:1 to a UTF-32, UTF-16 or UTF-8 coded Unicode character. Character codes that cannot be represented as a single byte in UTF-8 (if the value is > 0x7F) use escape sequences that map to more than one 8-bit character.

If all operating systems used UTF-8, genisoimage would not need to recode characters in filenames. Unfortunately, Apple uses completely nonstandard codings and Microsoft uses a Unicode coding that is not compatible with the POSIX filename interface.

For all non-UTF-8-coded operating systems, the actual character that each byte represents depends on the character set or codepage (the name used by Microsoft) used by the local operating system ? the characters in a character set will reflect the region or natural language set by the user.

Usually character codes 0x00-0x1f are control characters, codes 0x20-0x7f are the 7-bit ASCII characters and (on PCs and Macs) 0x80-0xff are used for other characters.

As there are a lot more than 256 characters/symbols in use, only a small subset are repre? sented in a character set. Therefore the same character code may represent a different character in different character sets. So a filename generated, say in central Europe, may not display the same character when viewed on a machine in, say eastern Europe.

To make matters more complicated, different operating systems use different character sets for the region or language. For example, the character code for `?' (small e with acute accent) may be character code 0x82 on a PC, code 0x8e on a Macintosh, code 0xe9 on a Unix system in western Europe, and code 0x000e9 in Unicode.

As long as not all operating systems and applications use the same character set as the basis for filenames, it may be necessary to specify which character set your filenames use in and which character set the filenames should appear on the CD.

There are four options to specify the character sets you want to use:

-input-charset

Defines the local character set you are using on your host machine. Any character set conversions that take place will use this character set as the starting point.

The default input character sets are cp437 on MS-DOS-based systems and iso8859-1 on all other systems. If -J is given, the Unicode equivalents of the input character set will be used in the Joliet directory. -jcharset is the same as -input-charset -J.

-output-charset

Defines the character set that will be used with for the Rock Ridge names on the CD. Defaults to the input character set.

-input-hfs-charset

Defines the HFS character set used for HFS filenames decoded from any of the vari? ous Apple/Unix file formats. Only useful when used with -mac-name. See the HFS MACINTOSH FILENAMES for more information. Defaults to cp10000 (Mac Roman).

-output-hfs-charset

Defines the HFS character set used to create HFS filenames from the input character set in use. In most cases this will be from the character set given with -in? put-charset. Defaults to the input HFS character set.

There are a number of character sets built in to genisoimage. To get a listing, use -in? put-charset help. This list doesn't include the charset derived from the current locale, if genisoimage is built with iconv support.

Additional character sets can be read from file for any of the character set options by giving a filename as the argument to the options. The given file will only be read if its name does not match one of the built-in character sets.

The format of the character set files is the same as the mapping files available from http://www.unicode.org/Public/MAPPINGS. This format is:

Column #1 is the input byte code (in hex as 0xXX)

Column #2 is the Unicode (in hex as 0xXXXX)

The rest of the line is ignored.

Any blank line, line without two (or more) columns in the above format or comments lines (starting with the # character) are ignored without any warnings. Any missing input code is mapped to Unicode character 0x0000.

Note that, while UTF-8 is supported, other Unicode encodings such as UCS-2/UTF-16 and UCS-4/UTF-32 are not, as POSIX operating systems cannot handle them natively.

A 1:1 character set mapping can be defined by using the keyword default as the argument to any of the character set options. This is the behaviour of old versions of mkisofs.

The ISO9660 filenames generated from the input filenames are not converted from the input character set. The ISO9660 character set is a very limited subset of the ASCII characters, so any conversion would be pointless.

Any character that genisoimage cannot convert will be replaced with a `_' character.

HFS CREATOR/TYPE

A Macintosh file has two properties associated with it which define which application cre? ated the file, the CREATOR and what data the file contains, the TYPE. Both are (exactly) 4 letter strings. Usually this allows a Macintosh user to double-click on a file and launch the correct application etc. The CREATOR and TYPE of a particular file can be found by using something like ResEdit (or similar) on a Macintosh.

The CREATOR and TYPE information is stored in all the various Apple/Unix encoded files. For other files it is possible to base the CREATOR and TYPE on the filename's extension using a mapping file (with -map) and/or using the magic number (usually a signature in the first few bytes) of a file (with -magic). If both these options are given, their order on the command line is significant. If -map is given first, a filename extension match is attempted before a magic number match. However, if -magic is given first, a magic number match is attempted before a filename extension match.

If a mapping or magic file is not used, or no match is found, the default CREATOR and TYPE for all regular files can be set by using entries in the .genisoimagerc file or using -hfs-creator and/or -hfs-type, otherwise the default CREATOR and TYPE are Unix and TEXT.

The format of the mapping file is the same afpfile format as used by aufs. This file has five columns for the extension, file translation, CREATOR, TYPE and Comment. Lines start? ing with the `#' character are comment lines and are ignored. An example file would be like:

```
# Example filename mapping file
#
# EXTN   XLate   CREATOR   TYPE     Comment
.tif     Raw     '8BIM'    'TIFF'   "Photoshop TIFF image"
.hqx     Ascii   'BnHq'    'TEXT'   "BinHex file"
.doc     Raw     'MSWD'    'WDBN'   "Word file"
.mov     Raw     'TVOD'    'MooV'   "QuickTime Movie"
*        Ascii   'ttxt'    'TEXT'   "Text file"
```

Where:

The first column EXTN defines the Unix filename extension to be mapped. The default mapping for any filename extension that doesn't match is defined with the `*' char? acter.

The Xlate column defines the type of text translation between the Unix and Macin? tosh file it is ignored by genisoimage, but is kept to be compatible with aufs(1).

Although genisoimage does not alter the contents of a file, if a binary file has its TYPE set as TEXT, it may be read incorrectly on a Macintosh. Therefore a better choice for the default TYPE may be ????.

The CREATOR and TYPE keywords must be 4 characters long and enclosed in single quotes.

The comment field is enclosed in double quotes ? it is ignored by genisoimage, but is kept to be compatible with aufs.

The format of the magic file is almost identical to the magic(5) file used by the file(1) command.

This file has four tab-separated columns for the byte offset, type, test and message. Lines starting with the `#' character are comment lines and are ignored. An example file would be like:

```
# Example magic file
#
# off   type      test       message
0       string    GIF8       8BIM GIFf  GIF image
0       beshort   0xffd8     8BIM JPEG  image data
0       string    SIT!       SIT! SIT!  StuffIt Archive
0       string    \037\235   LZIV ZIVU  standard Unix compress
0       string    \037\213   GNUz ZIVU  gzip compressed data
0       string    %!         ASPS TEXT  Postscript
0       string    \004%!     ASPS TEXT  PC Postscript with a ^D to start
4       string    moov       txtt MooV  QuickTime movie file (moov)
4       string    mdat       txtt MooV  QuickTime movie file (mdat)
```

The format of the file is described in magic(5). The only difference here is that for each entry in the magic file, the message for the initial offset must be be 4 characters for the CREATOR followed by 4 characters for the TYPE ? white space is optional between them. Any other characters on this line are ignored. Continuation lines (starting with a

`>') are also ignored, i.e., only the initial offset lines are used.

Using -magic may significantly increase processing time as each file has to opened and read to find its magic number.

In summary, for all files, the default CREATOR is Unix and the default TYPE is TEXT. These can be changed by using entries in the .genisoimagerc file or by using -hfs-creator and/or -hfs-type.

If the a file is in one of the known Apple/Unix formats (and the format has been se? lected), the CREATOR and TYPE are taken from the values stored in the Apple/Unix file.

Other files can have their CREATOR and TYPE set from their filename extension (with -map), or their magic number (with -magic). If the default match is used in the mapping file, these values override the default CREATOR and TYPE.

A full CREATOR/TYPE database can be found at http://www.angelfire.com/il/szekely/.

HFS MACINTOSH FILE FORMATS

Macintosh files have two parts called the Data and Resource fork. Either may be empty. Unix (and many other OSs) can only cope with files having one part (or fork). To add to this, Macintosh files have a number of attributes associated with them ? probably the most important are the TYPE and CREATOR. Again, Unix has no concept of these types of at? tributes.

E.g., a Macintosh file may be a JPEG image where the image is stored in the Data fork and a desktop thumbnail stored in the Resource fork. It is usually the information in the data fork that is useful across platforms.

Therefore to store a Macintosh file on a Unix filesystem, a way has to be found to cope with the two forks and the extra attributes (which are referred to as the Finder info). Unfortunately, it seems that every software package that stores Macintosh files on Unix has chosen a completely different storage method.

The Apple/Unix formats that genisoimage (partially) supports are:

CAP AUFS format

Data fork stored in a file. Resource fork in subdirectory .resource with same file? name as data fork. Finder info in subdirectory .finderinfo with same filename.

AppleDouble/Netatalk

Data fork stored in a file. Resource fork stored in a file with same name prefixed with `%'. Finder info also stored in same `%' file. Netatalk uses the same format, but the resource fork/Finder info stored in subdirectory .AppleDouble with same

filename as data fork.

AppleSingle

Data structures similar to above, except both forks and Finder info are stored in one file.

Helios EtherShare

Data fork stored in a file. Resource fork and Finder info together in subdirectory .rsrc with same filename as data fork.

IPT UShare

Like the EtherShare format, but the Finder info is stored slightly differently.

MacBinary

Both forks and Finder info stored in one file.

Apple PC Exchange

Used by Macintoshes to store Apple files on DOS (FAT) disks. Data fork stored in a file. Resource fork in subdirectory resource.frk (or RESOURCE.FRK). Finder info as one record in file finder.dat (or FINDER.DAT). Separate finder.dat for each data fork directory.

Note: genisoimage needs to know the native FAT cluster size of the disk that the PC Exchange files are on (or have been copied from). This size is given by -clus? ter-size. The cluster or allocation size can be found by using the DOS utility chkdsk.

May not work with PC Exchange v2.2 or higher files (available with MacOS 8.1). DOS media containing PC Exchange files should be mounted as type msdos (not vfat) when using Linux.

SGI/XINET

Used by SGI machines when they mount HFS disks. Data fork stored in a file. Re? source fork in subdirectory .HSResource with same filename. Finder info as one record in file .HSancillary. Separate .HSancillary for each data fork directory.

Thursby Software Systems DAVE

Allows Macintoshes to store Apple files on SMB servers. Data fork stored in a file. Resource fork in subdirectory resource.frk. Uses the AppleDouble format to store resource fork.

Services for Macintosh

Format of files stored by NT Servers on NTFS filesystems. Data fork is stored as

filename. Resource fork stored as a NTFS stream called filename:AFP_Resource. The Finder info is stored as a NTFS stream called filename:Afp_AfpInfo. NTFS streams are normally invisible to the user.

Warning: genisoimage only partially supports the SFM format. If an HFS file or folder stored on the NT server contains an illegal NT character in its name, NT converts these characters to Private Use Unicode characters. The characters are: " * / < > ? \ | and a space or period if it is the last character of the filename, character codes 0x01 to 0x1f (control characters) and Apple's apple logo. Unfortunately, these private Unicode characters are not readable by the genisoimage NT executable. Therefore any file or directory name containing these characters will be ignored ? including the contents of any such directory.

Mac OS X AppleDouble

When HFS/HFS+ files are copied or saved by Mac OS X on to a non-HFS filesystem (e.g. UFS, NFS etc.), the files are stored in AppleDouble format. Data fork stored in a file. Resource fork stored in a file with same name prefixed with `._'. Finder info also stored in same `._' file.

Mac OS X HFS (Alpha)

Not really an Apple/Unix encoding, but actual HFS/HFS+ files on a Mac OS X system. Data fork stored in a file. Resource fork stored in a pseudo file with the same name with the suffix /rsrc. The Finder info is only available via a Mac OS X li? brary call.

See also README.macosx.

Only works when used on Mac OS X.

If a file is found with a zero length resource fork and empty finderinfo, it is as? sumed not to have any Apple/Unix encoding ? therefore a TYPE and CREATOR can be set using other methods.

genisoimage will attempt to set the CREATOR, TYPE, date and possibly other flags from the finder info. Additionally, if it exists, the Macintosh filename is set from the finder info, otherwise the Macintosh name is based on the Unix filename ? see the HFS MACINTOSH FILENAMES section below.

When using -apple, the TYPE and CREATOR are stored in the optional System Use or SUSP field in the ISO9660 Directory Record ? in much the same way as the Rock Ridge attributes are. In fact to make life easy, the Apple extensions are added at the beginning of the ex?

isting Rock Ridge attributes (i.e., to get the Apple extensions you get the Rock Ridge ex? tensions as well).

The Apple extensions require the resource fork to be stored as an ISO9660 associated file. This is just like any normal file stored in the ISO9660 filesystem except that the associ? ated file flag is set in the Directory Record (bit 2). This file has the same name as the data fork (the file seen by non-Apple machines). Associated files are normally ignored by other OSs

When using -hfs, the TYPE and CREATOR plus other finder info, are stored in a separate HFS directory, not visible on the ISO9660 volume. The HFS directory references the same data and resource fork files described above.

In most cases, it is better to use -hfs instead of -apple, as the latter imposes the lim? ited ISO9660 characters allowed in filenames. However, the Apple extensions do give the advantage that the files are packed on the disk more efficiently and it may be possible to fit more files on a CD.

HFS MACINTOSH FILENAMES

Where possible, the HFS filename that is stored with an Apple/Unix file is used for the HFS part of the CD. However, not all the Apple/Unix encodings store the HFS filename with the finderinfo. In these cases, the Unix filename is used ? with escaped special charac? ters. Special characters include `/' and characters with codes over 127.

AUFS escapes these characters by using `:' followed by the character code as two hex dig? its. Netatalk and EtherShare have a similar scheme, but uses `%' instead of a `:'.

If genisoimage cannot find an HFS filename, it uses the Unix name, with any %xx or :xx characters (xx are two hex digits) converted to a single character code. If xx are not hex digits ([0-9a-fA-F]), they are left alone ? although any remaining `:' is converted to `%', as `:' is the HFS directory separator. Care must be taken, as an ordinary Unix file with %xx or :xx will also be converted. e.g.

This:2fFile converted to This/File

This:File converted to This%File

This:t7File converted to This%t7File

Although HFS filenames appear to support uppercase and lowercase letters, the filesystem is case-insensitive, i.e., the filenames aBc and AbC are the same. If a file is found in a directory with the same HFS name, genisoimage will attempt to make a unique name by adding `_' characters to one of the filenames.

If an HFS filename exists for a file, genisoimage can use this name as the starting point for the ISO9660, Joliet and Rock Ridge filenames using -mac-name. Normal Unix files without an HFS name will still use their Unix name. e.g.

If a MacBinary (or PC Exchange) file is stored as someimage.gif.bin on the Unix filesystem, but contains a HFS file called someimage.gif, this is the name that would appear on the HFS part of the CD. However, as genisoimage uses the Unix name as the starting point for the other names, the ISO9660 name generated will probably be SOMEIMAG.BIN and the Joliet/Rock Ridge would be someimage.gif.bin. This option will use the HFS filename as the starting point and the ISO9660 name will probably be SOMEIMAG.GIF and the Joliet/Rock Ridge would be someimage.gif.

-mac-name will not currently work with -T ? the Unix name will be used in the TRANS.TBL file, not the Macintosh name.

The character set used to convert any HFS filename to a Joliet/Rock Ridge filename defaults to cp10000 (Mac Roman). The character set used can be specified using -input-hfs-charset. Other built-in HFS character sets are: cp10006 (MacGreek), cp10007 (MacCyrillic), cp10029 (MacLatin2), cp10079 (MacIcelandandic) and cp10081 (MacTurkish).

Note: the character codes used by HFS filenames taken from the various Apple/Unix formats will not be converted as they are assumed to be in the correct Apple character set. Only the Joliet/Rock Ridge names derived from the HFS filenames will be converted.

The existing genisoimage code will filter out any illegal characters for the ISO9660 and Joliet filenames, but as genisoimage expects to be dealing directly with Unix names, it leaves the Rock Ridge names as is. But as `/' is a legal HFS filename character, -mac-name converts `/' to a `_' in Rock Ridge filenames.

If the Apple extensions are used, only the ISO9660 filenames will appear on the Macintosh. However, as the Macintosh ISO9660 drivers can use Level 2 filenames, you can use options like -allow-multidot without problems on a Macintosh ? still take care over the names, for example this.file.name will be converted to THIS.FILE i.e. only have one `.', also filename abcdefgh will be seen as ABCDEFGH but abcdefghi will be seen as ABCDEFGHI. i.e. with a `.' at the end ? don't know if this is a Macintosh problem or a genisoimage/mkhybrid problem. All filenames will be in uppercase when viewed on a Macintosh. Of course, DOS/Win3.X machines will not be able to see Level 2 filenames...

HFS CUSTOM VOLUME/FOLDER ICONS

To give a HFS CD a custom icon, make sure the root (top level) folder includes a standard

Macintosh volume icon file. To give a volume a custom icon on a Macintosh, an icon has to be pasted over the volume's icon in the "Get Info" box of the volume. This creates an in? visible file called Icon\r (`\r' is the carriage return character) in the root folder.

A custom folder icon is very similar ? an invisible file called Icon\r exists in the folder itself.

Probably the easiest way to create a custom icon that genisoimage can use is to format a blank HFS floppy disk on a Mac and paste an icon to its "Get Info" box. If using Linux with the HFS module installed, mount the floppy:

```
mount -t hfs /dev/fd0 /mnt/floppy
```

The floppy will be mounted as a CAP filesystem by default. Then run genisoimage using something like:

```
genisoimage --cap -o output source_dir /mnt/floppy
```

If you are not using Linux, you can use hfsutils to copy the icon file from the floppy. However, care has to be taken, as the icon file contains a control character. For exam? ple:

```
hmount /dev/fd0
hdir -a
hcopy -m Icon^V^M icon_dir/icon
```

Where `^V^M' is control-V followed by control-M. Then run genisoimage by using something like:

```
genisoimage --macbin -o output source_dir icon_dir
```

The procedure for creating/using custom folder icons is very similar ? paste an icon to folder's "Get Info" box and transfer the resulting Icon\r file to the relevant directory in the genisoimage source tree.

You may want to hide the icon files from the ISO9660 and Joliet trees.

To give a custom icon to a Joliet CD, follow the instructions found at http://www.cdr? faq.org/faq03.html#S3-21-1.

HFS BOOT DRIVER

It may be possible to make the hybrid CD bootable on a Macintosh.

A bootable HFS CD requires an Apple CD-ROM (or compatible) driver, a bootable HFS parti? tion and the necessary System, Finder, etc. files.

A driver can be obtained from any other Macintosh bootable CD-ROM using the apple_driver utility. This file can then be used with -boot-hfs-file.

The HFS partition (i.e. the hybrid disk in our case) must contain a suitable System Folder, again from another CD-ROM or disk.

For a partition to be bootable, it must have its boot block set. The boot block is in the first two blocks of a partition. For a non-bootable partition the boot block is full of zeros. Normally, when a System file is copied to partition on a Macintosh disk, the boot block is filled with a number of required settings ? unfortunately I don't know the full spec for the boot block, so I'm guessing that the following will work.

Therefore, the utility apple_driver also extracts the boot block from the first HFS parti? tion it finds on the given CD-ROM and this is used for the HFS partition created by genisoimage.

Please note: By using a driver from an Apple CD and copying Apple software to your CD, you become liable to obey Apple Computer, Inc. Software License Agreements.

EL TORITO BOOT INFORMATION TABLE

When -boot-info-table is given, genisoimage will modify the boot file specified by -b by inserting a 56-byte boot information table at offset 8 in the file. This modification is done in the source filesystem, so make sure you use a copy if this file is not easily recreated! This file contains pointers which may not be easily or reliably obtained at boot time.

The format of this table is as follows; all integers are in section 7.3.1 ("little en? dian") format.

Offset	Name	Size	Meaning
8	bi_pvd	4 bytes	LBA of primary volume descriptor
12	bi_file	4 bytes	LBA of boot file
16	bi_length	4 bytes	Boot file length in bytes
20	bi_csum	4 bytes	32-bit checksum
24	bi_reserved	40 bytes	Reserved

The 32-bit checksum is the sum of all the 32-bit words in the boot file starting at byte offset 64. All linear block addresses (LBAs) are given in CD sectors (nor? mally 2048 bytes).

HPPA NOTES

To make a bootable CD for HPPA, at the very least a boot loader file (-hppa-bootloader), a kernel image file (32-bit, 64-bit, or both, depending on hardware) and a boot command line (-hppa-cmdline) must be specified. Some systems can boot either a 32- or a 64-bit kernel,

and the firmware will choose one if both are present. Optionally, a ramdisk can be used for the root filesystem using -hppa-cmdline.

JIGDO NOTES

Jigdo is a tool to help in the distribution of large files like CD and DVD images; see http://atterer.org/jigdo/ for more details. Debian CDs and DVD ISO images are published on the web in jigdo format to allow end users to download them more efficiently.

To create jigdo and template files alongside the ISO image from genisoimage, you must first generate a list of the files that will be used, in the following format:

```
MD5sum   File size  Path
32 chars 12 chars   to end of line
```

The MD5sum must be written in standard hexadecimal notation, the file size must list the size of the file in bytes, and the path must list the absolute path to the file. For exam? ple:

```
00006dcd58ff0756c36d2efae21be376         14736  /mirror/debian/file1
000635c69b254a1be8badcec3a8d05c1        211822  /mirror/debian/file2
00083436a3899a09633fc1026ef1e66e         22762  /mirror/debian/file3
```

Once you have this file, call genisoimage with all of your normal command-line parameters. Specify the output filenames for the jigdo and template files using -jigdo-jigdo and -jigdo-template, and pass in the location of your MD5 list with -md5-list.

If there are files that you do NOT want to be added into the jigdo file (e.g. if they are likely to change often), specify them using -jigdo-exclude. If you want to verify some of the files as they are written into the image, specify them using -jigdo-force-md5. If any files don't match, genisoimage will then abort. Both of these options take regular ex? pressions as input. It is possible to restrict the set of files that will be used further based on size ? use the -jigdo-min-file-size option.

Finally, the jigdo code needs to know how to map the files it is given onto a mirror-style configuration. Specify how to map paths using -jigdo-map. Using Debian=/mirror/debian will cause all paths starting with /mirror/debian to be mapped to Debian:<file> in the output jigdo file.

EXAMPLES

To create a vanilla ISO9660 filesystem image in the file cd.iso, where the directory cd_dir will become the root directory of the CD, call:

```
% genisoimage -o cd.iso cd_dir
```

To create a CD with Rock Ridge extensions of the source directory cd_dir:

```
% genisoimage -o cd.iso -R cd_dir
```

To create a CD with Rock Ridge extensions of the source directory cd_dir where all files have at least read permission and all files are owned by root, call:

```
% genisoimage -o cd.iso -r cd_dir
```

To write a tar archive directly to a CD that will later contain a simple ISO9660 filesys? tem with the tar archive call:

```
% tar cf - . | genisoimage -stream-media-size 333000 | \
    wodim dev=b,t,l -dao tsize=333000s -
```

To create a HFS hybrid CD with the Joliet and Rock Ridge extensions of the source direc? tory cd_dir:

```
% genisoimage -o cd.iso -R -J -hfs cd_dir
```

To create a HFS hybrid CD from the source directory cd_dir that contains Netatalk Ap? ple/Unix files:

```
% genisoimage -o cd.iso --netatalk cd_dir
```

To create a HFS hybrid CD from the source directory cd_dir, giving all files CREATOR and TYPES based on just their filename extensions listed in the file "mapping".:

```
% genisoimage -o cd.iso -map mapping cd_dir
```

To create a CD with the Apple Extensions to ISO9660, from the source directories cd_dir and another_dir. Files in all the known Apple/Unix format are decoded and any other files are given CREATOR and TYPE based on their magic number given in the file magic:

```
% genisoimage -o cd.iso -apple -magic magic -probe \
      cd_dir another_dir
```

The following example puts different files on the CD that all have the name README, but have different contents when seen as a ISO9660/Rock Ridge, Joliet or HFS CD.

Current directory contains:

```
% ls -F
README.hfs    README.joliet  README.Unix    cd_dir/
```

The following command puts the contents of the directory cd_dir on the CD along with the three README files ? but only one will be seen from each of the three filesystems:

```
% genisoimage -o cd.iso -hfs -J -r -graft-points \
      -hide README.hfs -hide README.joliet \
      -hide-joliet README.hfs -hide-joliet README.Unix \
```

-hide-hfs README.joliet -hide-hfs README.Unix \

README=README.hfs README=README.joliet \

README=README.Unix cd_dir

i.e. the file README.hfs will be seen as README on the HFS CD and the other two README files will be hidden. Similarly for the Joliet and ISO9660/Rock Ridge CD.

There are probably all sorts of strange results possible with combinations of the hide options ...

NOTES

genisoimage may safely be installed suid root. This may be needed to allow genisoimage to read the previous session when creating a multisession image.

If genisoimage is creating a filesystem image with Rock Ridge attributes and the directory nesting level of the source directory tree is too much for ISO9660, genisoimage will do deep directory relocation. This results in a directory called RR_MOVED in the root directory of the CD. You cannot avoid this directory.

Many boot code options for different platforms are mutualy exclusive because the boot blocks cannot coexist, ie. different platforms share the same data locations in the image.

See http://lists.debian.org/debian-cd/2006/12/msg00109.html for details.

BUGS

Any files that have hard links to files not in the tree being copied to the ISO9660 filesystem will have an incorrect file reference count.

Does not check for SUSP record(s) in `.' entry of the root directory to verify the existence of Rock Ridge enhancements. This problem is present when reading old sessions while adding data in multisession mode.

Does not properly read relocated directories in multisession mode when adding data. Any relocated deep directory is lost if the new session does not include the deep directory.

Does not re-use RR_MOVED when doing multisession from TRANS.TBL.

Does not create whole_name entry for RR_MOVED in multisession mode.

There may be other bugs. Please, report them to the maintainers.

HFS PROBLEMS/LIMITATIONS

I have had to make several assumptions on how I expect the modified libhfs routines to work, however there may be situations that either I haven't thought of, or come across when these assumptions fail. Therefore I can't guarantee that genisoimage will work as expected (although I haven't had a major problem yet). Most of the HFS features work fine,

but some are not fully tested. These are marked as Alpha above.

Although HFS filenames appear to support uppercase and lowercase letters, the filesystem is case-insensitive, i.e., the filenames aBc and AbC are the same. If a file is found in a directory with the same HFS name, genisoimage will attempt to make a unique name by adding `_' characters to one of the filenames.

HFS file/directory names that share the first 31 characters have `_N' (a decimal number) substituted for the last few characters to generate unique names.

Care must be taken when "grafting" Apple/Unix files or directories (see above for the method and syntax involved). It is not possible to use a new name for an Apple/Unix en? coded file/directory. e.g. If a Apple/Unix encoded file called oldname is to added to the CD, you cannot use the command line:

genisoimage -o output.raw -hfs -graft-points newname=oldname cd_dir

genisoimage will be unable to decode oldname. However, you can graft Apple/Unix encoded files or directories as long as you do not attempt to give them new names as above.

When creating an HFS volume with the multisession options, -M and -C, only files in the last session will be in the HFS volume. i.e. genisoimage cannot add existing files from previous sessions to the HFS volume.

However, if each session is created with -part, each session will appear as separate vol? umes when mounted on a Mac. In this case, it is worth using -V or -hfs-volid to give each session a unique volume name, otherwise each "volume" will appear on the Desktop with the same name.

Symbolic links (as with all other non-regular files) are not added to the HFS directory.

Hybrid volumes may be larger than pure ISO9660 volumes containing the same data. In some cases (e.g. DVD sized volumes) the difference can be significant. As an HFS volume gets bigger, so does the allocation block size (the smallest amount of space a file can oc? cupy). For a 650MB CD, the allocation block is 10kB, for a 4.7GB DVD it will be about 70kB.

The maximum number of files in an HFS volume is about 65500 ? although the real limit will be somewhat less than this.

The resulting hybrid volume can be accessed on a Unix machine by using the hfsutils rou? tines. However, no changes can be made to the volume as it is set as locked. The option -hfs-unlock will create an output image that is unlocked ? however no changes should be made to the contents of the volume (unless you really know what you are doing) as it's not

a "real" HFS volume.

-mac-name will not currently work with -T ? the Unix name will be used in the TRANS.TBL file, not the Macintosh name.

Although genisoimage does not alter the contents of a file, if a binary file has its TYPE set as TEXT, it may be read incorrectly on a Macintosh. Therefore a better choice for the default TYPE may be ????.

-mac-boot-file may not work at all...

May not work with PC Exchange v2.2 or higher files (available with MacOS 8.1). DOS media containing PC Exchange files should be mounted as type msdos (not vfat) when using Linux.

The SFM format is only partially supported ? see HFS MACINTOSH FILE FORMATS section above.

It is not possible to use -sparc-boot or -generic-boot with -boot-hfs-file or -prep-boot.

genisoimage should be able to create HFS hybrid images over 4Gb, although this has not been fully tested.

SEE ALSO

genisoimagerc(5), wodim(1), mkzftree(8), magic(5).

AUTHORS

genisoimage is derived from mkisofs from the cdrtools 2.01.01a08 package from May 2006 (with few updates extracted from cdrtools 2.01.01a24 from March 2007) from .IR http://cdrecord.berlios.de/ , but is now part of the cdrkit suite, maintained by Joerg Jaspert, Eduard Bloch, Steve McIntyre, Peter Samuelson, Christian Fromme, Ben Hutchings, and other contributors. The maintainers can be contacted at debburn-de? vel@lists.alioth.debian.org, or see the cdrkit project web site at http://www.cdrkit.org/.

Eric Youngdale wrote the first versions (1993?1998) of mkisofs. J?rg Schilling wrote the SCSI transport library and its interface, and has maintained mkisofs since 1999. James Pearson wrote the HFS hybrid code, using libhfs by Robert Leslie. Pearson, Schilling, Jungshik Shin and Jaakko Heinonen contributed to the character set conversion code. The cdrkit maintainers have maintained genisoimage since 2006.

If you want to take part in the development of genisoimage, you may join the cdrkit devel?oper mailing list by following the instructions on http://alioth.de?bian.org/mail/?group_id=31006. The email address of the list is debburn-de?vel@lists.alioth.debian.org. This is also the address for user support questions. Note that cdrkit and cdrtools are not affiliated.

ACKNOWLEDGEMENTS