
Linux Ide Documentation

The kernel development community

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CONTENTS

INFORMATION REGARDING THE ENHANCED IDE DRIVE

The `hdparm` utility can be used to control various IDE features on a running system. It is packaged separately. Please Look for it on popular linux FTP sites.

Important: BUGGY IDE CHIPSETS CAN CORRUPT DATA!!

PCI versions of the CMD640 and RZ1000 interfaces are now detected automatically at startup when PCI BIOS support is configured.

Linux disables the “prefetch” (“readahead”) mode of the RZ1000 to prevent data corruption possible due to hardware design flaws.

For the CMD640, linux disables “IRQ unmasking” (`hdparm -u1`) on any drive for which the “prefetch” mode of the CMD640 is turned on. If “prefetch” is disabled (`hdparm -p8`), then “IRQ unmasking” can be used again.

For the CMD640, linux disables “32bit I/O” (`hdparm -c1`) on any drive for which the “prefetch” mode of the CMD640 is turned off. If “prefetch” is enabled (`hdparm -p9`), then “32bit I/O” can be used again.

The CMD640 is also used on some Vesa Local Bus (VLB) cards, and is NOT automatically detected by Linux. For safe, reliable operation with such interfaces, one MUST use the “`cmd640.probe_vlb`” kernel option.

Use of the “serialize” option is no longer necessary.

1.1 Common pitfalls

- 40-conductor IDE cables are capable of transferring data in DMA modes up to `udma2`, but no faster.
- If possible devices should be attached to separate channels if they are available. Typically the disk on the first and CD-ROM on the second.
- If you mix devices on the same cable, please consider using similar devices in respect of the data transfer mode they support.
- Even better try to stick to the same vendor and device type on the same cable.

1.2 This is the multiple IDE interface driver, as evolved from hd.c

It supports up to 9 IDE interfaces per default, on one or more IRQs (usually 14 & 15). There can be up to two drives per interface, as per the ATA-6 spec.:

```
Primary:    ide0, port 0x1f0; major=3; hda is minor=0; hdb is minor=64
Secondary:  ide1, port 0x170; major=22; hdc is minor=0; hdd is minor=64
Tertiary:   ide2, port 0x1e8; major=33; hde is minor=0; hdf is minor=64
Quaternary: ide3, port 0x168; major=34; hdg is minor=0; hdh is minor=64
fifth..    ide4, usually PCI, probed
sixth..    ide5, usually PCI, probed
```

To access devices on interfaces > ide0, device entries please make sure that device files for them are present in /dev. If not, please create such entries, by using /dev/MAKEDEV.

This driver automatically probes for most IDE interfaces (including all PCI ones), for the drives/geometries attached to those interfaces, and for the IRQ lines being used by the interfaces (normally 14, 15 for ide0/ide1).

Any number of interfaces may share a single IRQ if necessary, at a slight performance penalty, whether on separate cards or a single VLB card. The IDE driver automatically detects and handles this. However, this may or may not be harmful to your hardware.. two or more cards driving the same IRQ can potentially burn each other' s bus driver, though in practice this seldom occurs. Be careful, and if in doubt, don' t do it!

Drives are normally found by auto-probing and/or examining the CMOS/BIOS data. For really weird situations, the apparent (fdisk) geometry can also be specified on the kernel "command line" using LILO. The format of such lines is:

```
ide_core.chs=[interface_number.device_number]:cyls,heads,sects
```

or:

```
ide_core.cdrom=[interface_number.device_number]
```

For example:

```
ide_core.chs=1.0:1050,32,64 ide_core.cdrom=1.1
```

The results of successful auto-probing may override the physical geometry/irq specified, though the "original" geometry may be retained as the "logical" geometry for partitioning purposes (fdisk).

If the auto-probing during boot time confuses a drive (ie. the drive works with hd.c but not with ide.c), then an command line option may be specified for each drive for which you' d like the drive to skip the hardware probe/identification sequence. For example:

```
ide_core.noprobe=0.1
```

or:

```
ide_core.chs=1.0:768,16,32
ide_core.noprobe=1.0
```

Note that when only one IDE device is attached to an interface, it should be jumpered as “single” or “master” , not “slave” . Many folks have had “trouble” with cdroms because of this requirement, so the driver now probes for both units, though success is more likely when the drive is jumpered correctly.

Courtesy of Scott Snyder and others, the driver supports ATAPI cdrom drives such as the NEC-260 and the new MITSUMI triple/quad speed drives. Such drives will be identified at boot time, just like a hard disk.

If for some reason your cdrom drive is not found at boot time, you can force the probe to look harder by supplying a kernel command line parameter via LILO, such as::

```
ide_core.cdrom=1.0      /* "master" on second interface (hdc) */
```

or:

```
ide_core.cdrom=1.1      /* "slave" on second interface (hdd) */
```

For example, a GW2000 system might have a hard drive on the primary interface (/dev/hda) and an IDE cdrom drive on the secondary interface (/dev/hdc). To mount a CD in the cdrom drive, one would use something like:

```
ln -sf /dev/hdc /dev/cdrom
mkdir /mnt/cdrom
mount /dev/cdrom /mnt/cdrom -t iso9660 -o ro
```

If, after doing all of the above, mount doesn’ t work and you see errors from the driver (with dmesg) complaining about status=0xff, this means that the hardware is not responding to the driver’ s attempts to read it. One of the following is probably the problem:

- Your hardware is broken.
- You are using the wrong address for the device, or you have the drive jumpered wrong. Review the configuration instructions above.
- Your IDE controller requires some nonstandard initialization sequence before it will work properly. If this is the case, there will often be a separate MS-DOS driver just for the controller. IDE interfaces on sound cards usually fall into this category. Such configurations can often be made to work by first booting MS-DOS, loading the appropriate drivers, and then warm-booting linux (without powering off). This can be automated using loadlin in the MS-DOS autoexec.

If you always get timeout errors, interrupts from the drive are probably not making it to the host. Check how you have the hardware jumpered and make sure it matches what the driver expects (see the configuration instructions above). If you have a PCI system, also check the BIOS setup; I’ ve had one report of a system which was shipped with IRQ 15 disabled by the BIOS.

The kernel is able to execute binaries directly off of the cdrom, provided it is mounted with the default block size of 1024 (as above).

Please pass on any feedback on any of this stuff to the maintainer, whose address can be found in linux/MAINTAINERS.

The IDE driver is modularized. The high level disk/CD-ROM/tape/floppy drivers can always be compiled as loadable modules, the chipset drivers can only be compiled into the kernel, and the core code (ide.c) can be compiled as a loadable module provided no chipset support is needed.

When using ide.c as a module in combination with kmod, add:

```
alias block-major-3 ide-probe
```

to a configuration file in /etc/modprobe.d/.

When ide.c is used as a module, you can pass command line parameters to the driver using the “options=” keyword to insmod, while replacing any ‘,’ with ‘;’.

1.3 Summary of ide driver parameters for kernel command line

For legacy IDE VLB host drivers (ali14xx/dtc2278/ht6560b/qd65xx/umc8672) you need to explicitly enable probing by using “probe” kernel parameter, i.e. to enable probing for ALI M14xx chipsets (ali14xx host driver) use:

- “ali14xx.probe” boot option when ali14xx driver is built-in the kernel
- “probe” module parameter when ali14xx driver is compiled as module (“modprobe ali14xx probe”)

Also for legacy CMD640 host driver (cmd640) you need to use “probe_vlb” kernel parameter to enable probing for VLB version of the chipset (PCI ones are detected automatically).

You also need to use “probe” kernel parameter for ide-4drives driver (support for IDE generic chipset with four drives on one port).

To enable support for IDE doublers on Amiga use “doubler” kernel parameter for gayle host driver (i.e. “gayle.doubler” if the driver is built-in).

To force ignoring cable detection (this should be needed only if you’ re using short 40-wires cable which cannot be automatically detected - if this is not a case please report it as a bug instead) use “ignore_cable” kernel parameter:

- “ide_core.ignore_cable=[interface_number]” boot option if IDE is built-in (i.e. “ide_core.ignore_cable=1” to force ignoring cable for “ide1”)
- “ignore_cable=[interface_number]” module parameter (for ide_core module) if IDE is compiled as module

Other kernel parameters for ide_core are:

- “nodma=[interface_number.device_number]” to disallow DMA for a device
- “noflush=[interface_number.device_number]” to disable flush requests
- “nohpa=[interface_number.device_number]” to disable Host Protected Area
- “noprobe=[interface_number.device_number]” to skip probing

- “nowerr=[interface_number.device_number]” to ignore the WRERR_STAT bit
- “cdrom=[interface_number.device_number]” to force device as a CD-ROM
- “chs=[interface_number.device_number]” to force device as a disk (using CHS)

1.4 Some Terminology

IDE Integrated Drive Electronics, meaning that each drive has a built-in controller, which is why an “IDE interface card” is not a “controller card” .

ATA AT (the old IBM 286 computer) Attachment Interface, a draft American National Standard for connecting hard drives to PCs. This is the official name for “IDE” .

The latest standards define some enhancements, known as the ATA-6 spec, which grew out of vendor-specific “Enhanced IDE” (EIDE) implementations.

ATAPI ATA Packet Interface, a new protocol for controlling the drives, similar to SCSI protocols, created at the same time as the ATA2 standard. ATAPI is currently used for controlling CDROM, TAPE and FLOPPY (ZIP or LS120/240) devices, removable R/W cartridges, and for high capacity hard disk drives.

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Wed Apr 17 22:52:44 CEST 2002 edited by Marcin Dalecki, the current maintainer.

Wed Aug 20 22:31:29 CEST 2003 updated ide boot options to current ide.c comments at 2.6.0-test4 time. Maciej Soltysiak <solt@dns.toxicfilms.tv>

IDE ATAPI STREAMING TAPE DRIVER

This driver is a part of the Linux ide driver.

The driver, in co-operation with `ide.c`, basically traverses the request-list for the block device interface. The character device interface, on the other hand, creates new requests, adds them to the request-list of the block device, and waits for their completion.

The block device major and minor numbers are determined from the tape's relative position in the ide interfaces, as explained in `ide.c`.

The character device interface consists of the following devices:

<code>ht0</code>	major 37, minor 0	first IDE tape, rewind on close.
<code>ht1</code>	major 37, minor 1	second IDE tape, rewind on close.
...		
<code>nht0</code>	major 37, minor 128	first IDE tape, no rewind on close.
<code>nht1</code>	major 37, minor 129	second IDE tape, no rewind on close.
...		

The general magnetic tape commands compatible interface, as defined by `include/linux/mtio.h`, is accessible through the character device.

General ide driver configuration options, such as the `interrupt-unmask` flag, can be configured by issuing an `ioctl` to the block device interface, as any other ide device.

Our own `ide-tape ioctl`'s can be issued to either the block device or the character device interface.

Maximal throughput with minimal bus load will usually be achieved in the following scenario:

1. `ide-tape` is operating in the pipelined operation mode.
2. No buffering is performed by the user backup program.

Testing was done with a 2 GB CONNER CTMA 4000 IDE ATAPI Streaming Tape Drive.

Here are some words from the first releases of `hd.c`, which are quoted in `ide.c` and apply here as well:

- Special care is recommended. Have Fun!

2.1 Possible improvements

1. Support for the ATAPI overlap protocol.

In order to maximize bus throughput, we currently use the DSC overlap method which enables `ide.c` to service requests from the other device while the tape is busy executing a command. The DSC overlap method involves polling the tape's status register for the DSC bit, and servicing the other device while the tape isn't ready.

In the current QIC development standard (December 1995), it is recommended that new tape drives will in addition implement the ATAPI overlap protocol, which is used for the same purpose - efficient use of the IDE bus, but is interrupt driven and thus has much less CPU overhead.

ATAPI overlap is likely to be supported in most new ATAPI devices, including new ATAPI cdroms, and thus provides us a method by which we can achieve higher throughput when sharing a (fast) ATA-2 disk with any (slow) new ATAPI device.

IDE WARM-PLUG HOWTO

To warm-plug devices on a port 'idex' :

```
# echo -n "1" > /sys/class/ide_port/idex/delete_devices
```

unplug old device(s) and plug new device(s):

```
# echo -n "1" > /sys/class/ide_port/idex/scan
```

done

NOTE: please make sure that partitions are unmounted and that there are no other active references to devices before doing "delete_devices" step, also do not attempt "scan" step on devices currently in use - otherwise results may be unpredictable and lead to data loss if you' re unlucky

CHANGELOG FOR IDE CD

```
/*
 * 1.00 Oct 31, 1994 -- Initial version.
 * 1.01 Nov  2, 1994 -- Fixed problem with starting request in
 *                    cdrom_check_status.
 * 1.03 Nov 25, 1994 -- leaving unmask_intr[] as a
↳user-setting (as for disks)
 * (from mlord)      -- minor changes to cdrom_setup()
 *                  -- renamed ide_dev_s to ide_drive_t,
↳enable irq on command
 * 2.00 Nov 27, 1994 -- Generalize packet command interface;
 *                    add audio ioctls.
 * 2.01 Dec  3, 1994 -- Rework packet command interface to
↳handle devices
 *                    which send an interrupt when ready for
↳a command.
 * 2.02 Dec 11, 1994 -- Cache the TOC in the driver.
 *                    Don't use SCMD_PLAYAUDIO_TI; it's not
↳included
 *                    in the current version of ATAPI.
 *                    Try to use LBA instead of track or MSF
↳addressing
 *                    when possible.
 *                    Don't wait for READY_STAT.
 * 2.03 Jan 10, 1995 -- Rewrite block read routines to handle
↳block sizes
 *                    other than 2k and to move multiple
↳sectors in a
 *                    single transaction.
 * 2.04 Apr 21, 1995 -- Add work-around for Creative Labs
↳CD220E drives.
 *                    Thanks to Nick Saw <cwsaw@pts7.pts.mot.
↳com> for
 *                    help in figuring this out. Ditto for
↳Acer and
 *                    Aztech drives, which seem to have the
↳same problem.
 * 2.04b May 30, 1995 -- Fix to match changes in ide.c version
↳3.16 -ml
 * 2.05 Jun  8, 1995 -- Don't attempt to retry after an
```

```
↪illegal request
*
*
↪C.
*
*
*
↪descriptions
*
*
↪which
*
↪in 512 byte
*
↪to
*
↪diagnosing this.
*
↪in the
*
*
↪work around it.
* 2.05x Aug 11, 1995 -- lots of data structure renaming/
↪restructuring in ide.c
*
↪c is independent)
* 3.00 Aug 22, 1995 -- Implement CDROMMULTISESSION ioctl.
*
↪(UNTESTED).
*
↪data().
*
*
↪which happened
*
*
*
↪default).
*
*
↪ Issue
*
↪packet commands
*
↪packet_command.
*
↪error information.
*
↪attention errors and
*
*
```

or data protect error.
Use HWIF and DEV_HWIF macros as in ide.

Always try to do a request_sense after a failed command.
Include an option to give textual_ of ATAPI errors.
Fix a bug in handling the sector cache_ showed up if the drive returned data_ blocks (like Pioneer drives). Thanks_ Richard Hirst <srh@gpt.co.uk> for_ Properly supply the page number field_ MODE_SELECT command.
PLAYAUDIO12 is broken on the Aztech;_

(my apologies to Scott, but now ide-cd.

Implement CDROMMULTISESSION ioctl.
Implement CDROMREADAUDIO ioctl_ Use input_ide_data() and output_ide_ Add door locking.
Fix usage count leak in cdrom_open,_ when a read-write mount was attempted.
Try to load the disk on open.
Implement CDROMEJECT_SW ioctl (off by_ Read total cdrom capacity during open.
Rearrange logic in cdrom_decode_status.

request sense commands for failed_ from here instead of from cdrom_queue_ Fix a race condition in retrieving_ Suppress printing normal unit_ some drive not ready errors.
Implement CDROMVOLREAD ioctl.


```

*          Implement CDROMREADMODE1/2 ioctls.
*          Fix race condition in setting up
↳interrupt handlers
*          when the `serialize' option is used.
* 3.01 Sep 2, 1995 -- Fix ordering of reenabling interrupts
↳in
*          cdrom_queue_request.
*          Another try at using ide_[input,
↳output]_data.
* 3.02 Sep 16, 1995 -- Stick total disk capacity in partition
↳table as well.
*          Make VERBOSE_IDE_CD_ERRORS dump failed
↳command again.
*          Dump out more information for ILLEGAL
↳REQUEST errs.
*          Fix handling of errors occurring
↳before the
*          packet command is transferred.
*          Fix transfers with odd bytelengths.
* 3.03 Oct 27, 1995 -- Some Creative drives have an id of
↳just `CD'.
*          `DCI-2S10' drives are broken too.
* 3.04 Nov 20, 1995 -- So are Vertos drives.
* 3.05 Dec 1, 1995 -- Changes to go with overhaul of ide.c
↳and ide-tape.c
* 3.06 Dec 16, 1995 -- Add support needed for partitions.
*          More workarounds for Vertos bugs
↳(based on patches
*          from Holger Dietze <dietze@aix520.
↳informatik.uni-leipzig.de>).
*          Try to eliminate byteorder assumptions.
*          Use atapi_cdrom_subchnl struct
↳definition.
*          Add STANDARD_ATAPI compilation option.
* 3.07 Jan 29, 1996 -- More twiddling for broken drives: Sony
↳55D,
*          Vertos 300.
*          Add NO_DOOR_LOCKING configuration
↳option.
*          Handle drive_cmd requests w/NULL args
↳(for hdparm -t).
*          Work around sporadic Sony55e audio
↳play problem.
* 3.07a Feb 11, 1996 -- check drive->id for NULL before
↳dereferencing, to fix
*          problem with "hde=cdrom" with no
↳drive present. -ml
* 3.08 Mar 6, 1996 -- More Vertos workarounds.
* 3.09 Apr 5, 1996 -- Add CDROMCLOSETRAY ioctl.
*          Switch to using MSF addressing for
↳audio commands.

```

```
*          Reformat to match kernel tabbing style.
*          Add CDRM_GET_UPC ioctl.
* 3.10 Apr 10, 1996 -- Fix compilation error with STANDARD_
↳ATAPI.
* 3.11 Apr 29, 1996 -- Patch from Heiko Eiβfeldt
↳<heiko@colossus.escape.de>
*          to remove redundant verify_area calls.
* 3.12 May 7, 1996 -- Rudimentary changer support. Based on
↳patches
*          from Gerhard Zuber <zuber@berlin.
↳snafu.de>.
*          Let open succeed even if there's no
↳loaded disc.
* 3.13 May 19, 1996 -- Fixes for changer code.
* 3.14 May 29, 1996 -- Add work-around for Vertos 600.
*          (From Hennis Bergman <hennis@sky.ow.
↳nl>.)
* 3.15 July 2, 1996 -- Added support for Sanyo 3 CD changers
*          from Ben Galliat <bgallia@luc.edu>
↳with
*          special help from Jeff Lightfoot
*          <jeffml@pobox.com>
* 3.15a July 9, 1996 -- Improved Sanyo 3 CD changer
↳identification
* 3.16 Jul 28, 1996 -- Fix from Gadi to reduce kernel stack
↳usage for ioctl.
* 3.17 Sep 17, 1996 -- Tweak audio reads for some drives.
*          Start changing CDRMLoadFromSlot to
↳CDROM_SELECT_DISC.
* 3.18 Oct 31, 1996 -- Added module and DMA support.
*
* 4.00 Nov 5, 1996 -- New ide-cd maintainer,
*          Erik B. Andersen
↳<andersee@debian.org>
*          -- Newer Creative drives don't always
↳set the error
*          register correctly. Make sure we
↳see media changes
*          regardless.
*          -- Integrate with generic cdrom driver.
*          -- CDRMGETSPINDOWN and CDRMSETSPINDOWN
↳ioctls, based on
*          a patch from Ciro Cattuto <>.
*          -- Call set_device_ro.
*          -- Implement CDRMMECHANISMSTATUS and
↳CDROMSLOTTABLE
*          ioctls, based on patch by Erik
↳Andersen
*          -- Add some probes of drive capability
↳during setup.
*
```

```

* 4.01  Nov 11, 1996  -- Split into ide-cd.c and ide-cd.h
*                                     -- Removed CDROMMECHANISMSTATUS and
↳CDROMSLOTTABLE
*                                     ioctls in favor of a generalized
↳approach
*                                     using the generic cdrom driver.
*                                     -- Fully integrated with the 2.1.X
↳kernel.
*                                     -- Other stuff that I forgot (lots of
↳changes)
*
* 4.02  Dec 01, 1996  -- Applied patch from Gadi Oxman
↳<gadio@netvision.net.il>
*                                     to fix the drive door locking
↳problems.
*
* 4.03  Dec 04, 1996  -- Added DSC overlap support.
* 4.04  Dec 29, 1996  -- Added CDROMREADRAW ioctl based on
↳patch
*                                     by Ales Makarov (xmakarov@sun.felk.
↳cvut.cz)
*
* 4.05  Nov 20, 1997  -- Modified to print more drive info on
↳init
*                                     Minor other changes
*                                     Fix errors on CDROMSTOP (If you have
↳a "Dolphin",
*                                     you must define IHAVEADOLPHIN)
*                                     Added identifier so new Sanyo
↳CD-changer works
*                                     Better detection if door locking
↳isn't supported
*
* 4.06  Dec 17, 1997  -- fixed endless "tray open" messages
↳-ml
* 4.07  Dec 17, 1997  -- fallback to set pc->stat on "tray
↳open"
* 4.08  Dec 18, 1997  -- spew less noise when tray is empty
*                                     -- fix speed display for ACER 24X, 18X
* 4.09  Jan 04, 1998  -- fix handling of the last block so we
↳return
*                                     an end of file instead of an I/O
↳error (Gadi)
* 4.10  Jan 24, 1998  -- fixed a bug so now changers can
↳change to a new
*                                     slot when there is no disc in the
↳current slot.
*                                     -- Fixed a memory leak where info->
↳changer_info was
*                                     malloc'ed but never free'd when
↳closing the device.

```

```
* -- Cleaned up the global namespace a bit,
↳by making more
* functions static that should already
↳have been.
* 4.11 Mar 12, 1998 -- Added support for the CDRM_SELECT_
↳SPEED ioctl
* based on a patch for 2.0.33 by Jelle
↳Foks
* <jelle@scintilla.utwente.nl>, a
↳patch for 2.0.33
* by Toni Giorgino <toni@pcape2.pi.
↳infn.it>, the SCSI
* version, and my own efforts. -erik
* -- Fixed a stupid bug which egcs was
↳kind enough to
* inform me of where "Illegal mode for
↳this track"
* was never returned due to a
↳comparison on data
* types of limited range.
* 4.12 Mar 29, 1998 -- Fixed bug in CDRM_SELECT_SPEED so
↳write speed is
* now set ionly for CD-R and CD-RW
↳drives. I had
* removed this support because it
↳produced errors.
* It produced errors _only_ for
↳non-writers. duh.
* 4.13 May 05, 1998 -- Suppress useless "in progress of
↳becoming ready"
* messages, since this is not an error.
* -- Change error messages to be const
* -- Remove a "\t" which looks ugly in the
↳syslogs
* 4.14 July 17, 1998 -- Change to pointing to .ps version of
↳ATAPI spec
* since the .pdf version doesn't seem
↳to work...
* -- Updated the TODO list to something
↳more current.
*
* 4.15 Aug 25, 1998 -- Updated ide-cd.h to respect machine
↳endianness,
* patch thanks to "Eddie C. Dost"
↳<ecd@skynet.be>
*
* 4.50 Oct 19, 1998 -- New maintainers!
* Jens Axboe <axboe@image.dk>
* Chris Zwilling <chris@cloudnet.com>
*
* 4.51 Dec 23, 1998 -- Jens Axboe <axboe@image.dk>
```

```

*
↳ subsystem
*
↳ <axboe@image.dk>
*
↳ thanks to
*
*
*
* 4.52 Jan 19, 1999 -- Jens Axboe <axboe@image.dk>
*
*
* 4.53 Feb 22, 1999 - Include other model Samsung and one_
↳ Goldstar
*
*
↳ without a medium
*
*
↳ through
*
↳ don't support
*
↳ they must).
*
↳ a module), eg
*
*
↳ conjunction with
*
↳ doing the
*
*
* 4.54 Aug 5, 1999 - Support for MMC2 class commands_
↳ through the generic
*
*
↳ it.
*
↳ area().
*
↳ interface for
*
*
↳ logs later.
*
↳ the other
*
↳ disc for
*
*

```

- ide_cdrom_reset enabled since the ide_ handles resets fine now.

- Transfer size fix for Samsung CD-ROMs, "Ville Hallik" <ville.hallik@mail.ee>.

- other minor stuff.

-- Jens Axboe <axboe@image.dk>

- Detect DVD-ROM/RAM drives

- Include other model Samsung and one_ drive in transfer size limit.

- Fix the I/O error when doing eject_ loaded on some drives.

- CDROMREADMODE2 is now implemented_ CDROMREADRAW, since many drives_ MODE2 (even though ATAPI 2.6 says_ Added ignore parameter to ide-cd (as_ insmod ide-cd ignore='hda hdb' Useful when using ide-cd in_ ide-scsi. TODO: non-modular way of_ same.

- Support for MMC2 class commands_ packet interface to cdrom.c.

- Unified audio ioctl support, most of_ cleaned up various deprecated verify_ Added ide_cdrom_packet() as the_ the Uniform generic_packet().

- bunch of other stuff, will fill in_ report 1 slot for non-changers, like_ cd-rom drivers. don't report select_ non-changers as well.

- mask out audio playing, if the device_

↳ can't do it.
*
* 4.55 Sep 1, 1999 - Eliminated the rest of the audio_ for CDROMREADTOC[ENTRY|HEADER]. Some_ use this independently of the actual_ They will disappear later when I get_ do it cleanly.
↳ ioctl's, except *
↳ of the drivers *
↳ audio handling. *
↳ the time to *
*
↳ when we *
*
↳ the Uniform layer. *
↳ de> supplied *
*
↳ Andries *
*
↳ unified *
↳ and how *
*
* 4.56 Sep 12, 1999 - Removed changer support - it is now_ Uniform layer.
↳ in the *
*
↳ handling. *
*
↳ the *
*
↳ drive - it *
*
* 4.57 Apr 7, 2000 - Fixed sense reporting.
*
↳ last_session() *
↳ reset relock *
↳ magicdev polls with *
*
*
↳ reset. *
*
- Minimize the TOC reading - only do it_ know a media change has occurred.
- Moved all the CDROMREADx ioctl's to_
- Heiko Eiβfeldt <heiko@colossus.escape.some fixes for CDI.
- CD-ROM leaving door locked fix from_
- Erik Andersen <andersen@xmission.com>_ commands across the various drivers_ sense errors are handled.
- Added partition based multisession_
- Mode sense and mode select moved to_
- Fixed a problem with WPI CDS-32X_ failed the capabilities
- Fixed possible oops in ide_cdrom_get_
- Fix locking mania and make ide_cdrom_
- Stop spewing errors to log when_
TEST_UNIT_READY on some drives.
- Various fixes from Tobias Ringstrom: tray if it was locked prior to the_

```
* - cdrom_read_capacity returns one.
↪ frame too little.
* - Fix real capacity reporting.
*
* 4.58 May 1, 2000 - Clean up ACER50 stuff.
* - Fix small problem with ide_cdrom_
↪ capacity
*
* 4.59 Aug 11, 2000 - Fix changer problem in cdrom_read_toc,
↪ we weren't
* correctly sensing a disc change.
* - Rearranged some code
* - Use extended sense on drives that
↪ support it for
* correctly reporting tray status --
↪ from
* Michael D Johnson <johnsom@orst.edu>
* 4.60 Dec 17, 2003 - Add mt rainier support
* - Bump timeout for packet commands,
↪ matches sr
* - Odd stuff
* 4.61 Jan 22, 2004 - support hardware sector sizes other
↪ than 2kB,
* Pascal Schmidt <der.eremit@email.de>
*/
```


CHANGELOG FOR IDE FLOPPY

```
/*
 * Many thanks to Lode Leroy <Lode.Leroy@www.ibase.be>, who
↳tested so many
 * ALPHA patches to this driver on an EASYSTOR LS-120 ATAPI
↳floppy drive.
 *
 * Ver 0.1   Oct 17 96   Initial test version, mostly based on
↳ide-tape.c.
 * Ver 0.2   Oct 31 96   Minor changes.
 * Ver 0.3   Dec  2 96   Fixed error recovery bug.
 * Ver 0.4   Jan 26 97   Add support for the HDIO_GETGEO ioctl.
 * Ver 0.5   Feb 21 97   Add partitions support.
 *
↳capacities.
 *
↳irq.
 *
↳DEBUG_LOG.
 * Ver 0.8   Dec  7 97   Increase irq timeout from 10 to 50
↳seconds.
 *
 *
↳READY fails.
 *
↳revision 21.D.
 *
 * Ver 0.9   Jul  4 99   Remove idefloppy_get_capabilities().
↳number of
 *
↳be zero.
 *
↳pointing this out.
 * Ver 0.9.sv Jan 6 01   Sam Varshavchik <mrsam@courier-mta.com>
 *
↳Reimplemented
 *
↳need the srfp
 *
 *
 * IDEFLOPPY_CAPABILITIES_PAGE, since we
 *
 * bit. My LS-120 drive barfs on
 * IDEFLOPPY_CAPABILITIES_PAGE, but maybe
```

```

↪it's just me.
*                               Compromise by not reporting a failure.
↪to get this                    mode page. Implemented four IOCTLS in
*                               implement formatting. IOCTLS begin
↪order to                       0x46 is 'F' as in Format.
*                               Userland option to select format
↪with 0x4600,                   Added PC_SUPPRESS_ERROR flag - some
*                               do not implement IDEFLOPPY_
*                               CAPABILITIES_PAGE, and
↪verify.                         return a sense error. Suppress error
*                               this particular case in order to avoid
↪idefloppy drives               errors in syslog. The culprit is
*                               idefloppy_get_capability_page(), so
↪reporting in                   idefloppy_begin_format() so that it's
*                               unless absolutely necessary.
*                               If drive does not support format
↪spurious                       monitor the dsc bit in the status
*                               Also, 0_NDELAY on open will allow the
*                               opened without a disk available. This
↪move it to                      open an unformatted disk, or get the
*                               device capacity.
↪not used                        * Ver 0.91 Dec 11 99 Added IOMEGA Klik! drive support by
*                               <paul@paulbristow.net>
↪progress indication            * Ver 0.92 Oct 22 00 Paul Bristow became official
*                               maintainer for this
↪register.                       driver. Included Powerbook internal
*                               zip kludge.
↪device to be                   * Ver 0.93 Oct 24 00 Fixed bugs for Klik! drive
*                               no disk on insert and disk change now
↪can be used to                 ↪works
*                               * Ver 0.94 Oct 27 00 Tidied up to remove strstr(Clik)
↪device capacity.              ↪everywhere
*                               * Ver 0.95 Nov 7 00 Brought across to kernel 2.4
*                               * Ver 0.96 Jan 7 01 Actually in line with release version
↪maintainer for this           ↪of 2.4.0
*                               including set_bit patch from Rusty
↪zip kludge.                   ↪Russell
*                               * Ver 0.97 Jul 22 01 Merge 0.91-0.96 onto 0.9.sv for ac

```

```
↪series
* Ver 0.97.sv Aug 3 01 Backported from 2.4.7-ac3
* Ver 0.98 Oct 26 01 Split idefloppy_transfer_pc into two
↪pieces to
* fix a lost interrupt problem. It
↪appears the busy
* bit was being deasserted by my IOMEGA
↪ATAPI ZIP 100
* drive before the drive was actually
↪ready.
* Ver 0.98a Oct 29 01 Expose delay value so we can play.
* Ver 0.99 Feb 24 02 Remove duplicate code, modify clik!
↪detection code
* to support new PocketZip drives
*/
```


CHANGELOG FOR IDE TAPE

```
/*
 * Ver 0.1   Nov  1 95   Pre-working code :-)
 * Ver 0.2   Nov 23 95   A short backup (few megabytes) and
↳ restore procedure
 *
↳ on the block
 *
 *
↳ swapping, bad
 *
↳ eventually failed as
 *
↳ requests from the
 *
 * Ver 0.3   Nov 28 95   Long backups are now possible, thanks
↳ to the
 *
↳ responsiveness
 *
↳ much affected
 *
 *
↳ operations are
 *
↳ As a result,
 *
↳ to work with
 *
 *
↳ tested:
 *
↳ interface
 *
 *
↳ interface
 *
 *
↳ just fine !
 *
```

Pre-working code :-)
A short backup (few megabytes) and
was successful ! (Using tar cvf ...
device interface).
A longer backup resulted in major
overall Linux performance and
we received non serial read-ahead
buffer cache.
Long backups are now possible, thanks
character device interface. Linux's
and performance doesn't seem to be
from the background backup procedure.
Some general mtio.h magnetic tape
now supported by our character device.
popular tape utilities are starting
ide tapes :-)
The following configurations were
1. An IDE ATAPI TAPE shares the same
and irq with an IDE ATAPI CDROM.
2. An IDE ATAPI TAPE shares the same
and irq with a normal IDE disk.
Both configurations seemed to work
However, to be on the safe side, it

```
↳is meanwhile
*
↳own interface
*
*
↳here is to
*
↳ide.c,
*
↳tape to finish
*
↳request (such
*
↳other device
*
↳doesn't disturb
*
↳because read/write
*
↳once we are
*
↳lot of requests
*
↳and ide.c will
*
↳tape request.
* Ver 1.0   Dec 11 95
↳development tree.
*
↳ask the drive
*
↳of bytes
*
↳its buffers,
*
↳If we can't,
*
↳the DSC bit.
*
↳transferring
*
↳to above, the
*
↳high and
*
↳as happened
*
*
↳request is
*
↳requests from
```

recommended to give the IDE TAPE its own and irq. The one thing which needs to be done is to add a "request postpone" feature to ide.c, so that we won't have to wait for the tape performing a long media access (DSC) as a rewind) before we can access the other device on the same interface. This effect is normal operation most of the time, as requests are relatively fast, and when performing one tape r/w request, a request from the other device can be queued and service all of them after this single interrupt. Integrated into Linux 1.3.46.

On each read / write request, we now check if we can transfer a constant number of bytes (a parameter of the drive) only to the tape without causing actual media access. If we can't, we just wait until we can by polling the DSC bit. This ensures that while we are not transferring more bytes than the constant referred to above, the interrupt latency will not become too high and as happened occasionally in the previous version. While polling for DSC, the current requests are postponed and ide.c is free to handle

```

*
↳transparently to
*
↳which was used
*
*
↳provided by
*
*
*
↳suggested by Mark)
*
↳are now
*
↳before.
*
↳recommended
*
↳transfer
*
↳size.
*
↳number of this
*
↳driver
*
↳ioctl to get
*
*
↳on startup,
*
↳ This should
*
↳data buffer.
* Ver 1.1 Dec 14 95
↳when the tape
*
↳device.
*
*
↳which had
*
↳originated
*
*
↳opened, so
*
↳the unmask
*
↳an ioctl.
*

```

the other device. This is handled,

ide.c. The hwgroup locking method,

in the previous version was removed.

Use of new general features which are,

ide.c for use with atapi devices.

(Programming done by Mark Lord)

Few potential bug fixes (Again,

Single character device data transfers,

not limited in size, as they were,

We are asking the tape about its,

transfer unit and send a larger data,

as several transfers of the above,

For best results, use an integral,

basic unit (which is shown during,

initialization). I will soon add an,

this important parameter.

Our data transfer buffer is allocated,

rather than before each data transfer.

ensure that we will indeed have a,

Fixed random problems which occurred,

shared an interface with another,

(poll_for_dsc was a complete mess).

Removed some old (non-active) code,

to do with supporting buffer cache,

requests.

The block device interface can now be,

that general ide driver features like,

interrupts flag can be selected with,

This is the only use of the block,

↪device interface.
*
↪(currently only on
*
↪mode, the
*
↪maximum
*
↪of the
*
↪ it sometimes
*
↪Pipelined
*
↪it has a few
*
↪disable it.
*
↪operation mode
*
* Ver 1.2 Jan 1 96
↪condition.
*
↪restores
*
*
↪The new behavior
*
↪efficiency and
*
*
↪write request
*
↪parameters. In
*
↪allows us to
*
↪much lower value,
*
↪load on Linux,
*
*
↪operations.
*
↪returned by
*
*
* Ver 1.3 Feb 9 96
↪prevented the
*
↪restore procedure.

New fast pipelined operation mode.
writes). When using the pipelined
throughput can potentially reach the
tape supported throughput, regardless
user backup program. On my tape drive,
boosted performance by a factor of 2.
mode is enabled by default, but since
downfalls as well, you may want to
A short explanation of the pipelined
is available below.
Eliminated pipelined mode race.
Added pipeline read mode. As a result,
are now as fast as backups.
Optimized shared interface behavior.
typically results in better IDE bus
higher tape throughput.
Pre-calculation of the expected read/
service time, based on the tape's
the pipelined operation mode, this
adjust our polling frequency to a
and thus to dramatically reduce our
without any decrease in performance.
Implemented additional mtio.h
The recommended user block size is
the MTIOCGGET ioctl.
Additional minor changes.
Fixed pipelined read mode bug which
use of some block sizes during a

* The character device interface will
 ↪now present a continuous view of the media - any
 * during a backup/restore procedure is
 ↪mix of block sizes driver will buffer the requests
 * convert them to the tape's
 ↪supported. The unit, making performance almost
 * chosen user block size.
 ↪internally and Some improvements in error recovery.
 * By cooperating with ide-dma.c, bus
 ↪recommended transfer now sometimes be used with IDE tape
 * Bus mastering DMA has the potential
 ↪independent of the reduce the CPU's overhead when
 * and can be enabled by using hdparm
 ↪mastering DMA can block device interface. For more info,
 * comments in ide-dma.c.
 ↪drives as well. Fixed serialize support.
 * Fixed shared interface operation,
 ↪to dramatically reduce the CPU's overhead when
 * and can be enabled by using hdparm
 ↪accessing the device, block device interface. For more info,
 * comments in ide-dma.c.
 ↪-dl on the tape's Fixed serialize support.
 * Fixed shared interface operation,
 ↪ read the Fixed pipelined read mode inefficiency.
 * Fixed nasty null dereferencing bug.
 * Ver 1.4 Mar 13 96 Fixed FPU usage in the driver.
 * Ver 1.5 Apr 12 96 Fixed end of media bug.
 ↪broken in 1.3.85. Minor changes for the CONNER CTT8000-A
 * Fixed pipelined read mode inefficiency.
 * Fixed nasty null dereferencing bug.
 * Ver 1.6 Aug 16 96 Fixed FPU usage in the driver.
 * Fixed end of media bug.
 * Ver 1.7 Sep 10 96 Minor changes for the CONNER CTT8000-A
 ↪model. Attempt to find a better balance
 * Ver 1.8 Sep 26 96 interactive response and high system
 ↪between good Automatically cross encountered
 * than requiring an explicit FSF
 ↪throughput. Abort pending requests at end of media.
 * MTTELL was sometimes returning
 * filemarks rather Return the real block size in the
 * command. Some error recovery bug fixes.
 * Major reorganization.
 ↪incorrect results.
 * Return the real block size in the
 ↪MTIOCGET ioctl. Some error recovery bug fixes.
 * Major reorganization.
 * Ver 1.10 Nov 5 96 Major reorganization.

```

*                               Reduced CPU overhead a bit by
↳eliminating internal          bounce buffers.
*                               Added module support.
*                               Added multiple tape drives support.
*                               Added partition support.
*                               Rewrote DSC handling.
*                               Some portability fixes.
*                               Removed ide-tape.h.
*                               Additional minor changes.
* Ver 1.11 Dec 2 96             Bug fix in previous DSC timeout
↳handling.
*                               Use ide_stall_queue() for DSC overlap.
*                               Use the maximum speed rather than the
↳current speed
*                               to compute the request service time.
* Ver 1.12 Dec 7 97             Fix random memory overwriting and/or
↳last block data
*                               corruption, which could occur if the
↳total number
*                               of bytes written to the tape was not
↳an integral
*                               number of tape blocks.
*                               Add support for INTERRUPT DRQ devices.
* Ver 1.13 Jan 2 98             Add "speed == 0" work-around for HP
↳COLORADO 5GB
* Ver 1.14 Dec 30 98           Partial fixes for the Sony/AIWA tape
↳drives.
*                               Replace cli()/sti() with hwgroup
↳spinlocks.
* Ver 1.15 Mar 25 99           Fix SMP race condition by replacing
↳hwgroup
*                               spinlock with private per-tape
↳spinlock.
* Ver 1.16 Sep 1 99           Add OnStream tape support.
*                               Abort read pipeline on EOD.
*                               Wait for the tape to become ready in
↳case it returns
*                               "in the process of becoming ready" on
↳open().
*                               Fix zero padding of the last written
↳block in
*                               case the tape block size is larger
↳than PAGE_SIZE.
*                               Decrease the default disconnection
↳time to tn.
* Ver 1.16e Oct 3 99           Minor fixes.
* Ver 1.16e1 Oct 13 99        Patches by Arnold Niessen,
*                               niessen@iae.nl / arnold.
↳niessen@philips.com
*                               G0-1) Undefined code in idetape_read_

```

```

↪position
*
*           according to Gadi's email
*           AJN-1) Minor fix asc == 11 should be asc.
↪== 0x11
*
*           in idetape_issue_packet_
↪command (did effect
*
*           debugging output only)
*           AJN-2) Added more debugging output, and
*           added ide-tape: where missing.
↪I would also
*
*           like to add tape->name where.
↪possible
*
*           AJN-3) Added different debug_level's
*           via /proc/ide/hdc/settings
*           "debug_level" determines amount.
↪of debugging output;
*
*           can be changed using /proc/ide/
↪hdx/settings
*
*           0 : almost no debugging output
*           1 : 0+output errors only
*           2 : 1+output all sensekey/asc
*           3 : 2+follow all chrdev related.
↪procedures
*
*           4 : 3+follow all procedures
*           5 : 4+include pc_stack rq_stack.
↪info
*
*           6 : 5+USE_COUNT updates
*           AJN-4) Fixed timeout for retention in.
↪idetape_queue_pc_tail
*
*           from 5 to 10 minutes
*           AJN-5) Changed maximum number of blocks to.
↪skip when
*
*           reading tapes with multiple.
↪consecutive write
*
*           errors from 100 to 1000 in.
↪idetape_get_logical_blk
*
*           Proposed changes to code:
*           1) output "logical_blk_num" via /proc
*           2) output "current_operation" via /proc
*           3) Either solve or document the fact that.
↪`mt rewind' is
*
*           required after reading from /dev/nhtx.
↪to be
*
*           able to rmmmod the idetape module;
*           Also, sometimes an application finishes.
↪but the
*
*           device remains `busy' for some time.
↪Same cause ?
*
*           Proposed changes to release-notes:
*           4) write a simple `quickstart' section in.
↪the

```

```
*          release notes; I volunteer if you don't
↳want to
*          5) include a pointer to video4linux in the
↳doc
*          to stimulate video applications
*          6) release notes lines 331 and 362:
↳explain what happens
*          if the application data rate is higher
↳than 1100 KB/s;
*          similar approach to lower-than-500 kB/s
↳?
*          7) 6.6 Comparison; wouldn't it be better
↳to allow different
*          strategies for read and write ?
*          Wouldn't it be better to control the
↳tape buffer
*          contents instead of the bandwidth ?
*          8) line 536: replace will by would (if I
↳understand
*          this section correctly, a hypothetical
↳and unwanted situation
*          is being described)
* Ver 1.16f Dec 15 99  Change place of the secondary OnStream
↳header frames.
* Ver 1.17  Nov 2000 / Jan 2001  Marcel Mol, marcel@mesa.nl
*          - Add idetape_onstream_mode_sense_tape_
↳parameter_page
*          function to get tape capacity in
↳frames: tape->capacity.
*          - Add support for DI-50 drives( or any
↳DI- drive).
*          - 'workaround' for read error/blank
↳block around block 3000.
*          - Implement Early warning for end of
↳media for Onstream.
*          - Cosmetic code changes for readability.
*          - Idetape_position_tape should not use
↳SKIP bit during
*          Onstream read recovery.
*          - Add capacity, logical_blk_num and
↳first/last_frame_position
*          to /proc/ide/hd?/settings.
*          - Module use count was gone in the
↳Linux 2.4 driver.
* Ver 1.17a Apr 2001 Willem Riede osst@riede.org
*          - Get drive's actual block size from
↳mode sense block descriptor
*          - Limit size of pipeline
* Ver 1.17b Oct 2002  Alan Stern <stern@rowland.harvard.edu>
*          Changed IDETAPE_MIN_PIPELINE_STAGES to
↳1 and actually used
```

```
*           it in the code!
*           Actually removed aborted stages in
↳idetape_abort_pipeline
*           instead of just changing the command
↳code.
*           Made the transfer byte count for
↳Request Sense equal to the
*           actual length of the data transfer.
*           Changed handling of partial data
↳transfers: they do not
*           cause DMA errors.
*           Moved initiation of DMA transfers to
↳the correct place.
*           Removed reference to unallocated memory.
*           Made __idetape_discard_read_pipeline
↳return the number of
*           sectors skipped, not the number of
↳stages.
*           Replaced errant kfree() calls with __
↳idetape_kfree_stage().
*           Fixed off-by-one error in testing the
↳pipeline length.
*           Fixed handling of filemarks in the read
↳pipeline.
*           Small code optimization for MTBSF and
↳MTBSFM ioctls.
*           Don't try to unlock the door during
↳device close if is
*           already unlocked!
*           Cosmetic fixes to miscellaneous
↳debugging output messages.
*           Set the minimum /proc/ide/hd?/settings
↳values for "pipeline",
*           "pipeline_min", and "pipeline_max" to
↳1.
*/
```