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# **Linux Ide Documentation**

**The kernel development community**

**Jun 10, 2024**



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## 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.

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**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.

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### 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.

[mlord@pobox.com](mailto:mlord@pobox.com)

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](mailto: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
<code>→close.</code>		
<code>ht1</code>	major 37, minor 1	second IDE tape, rewind on
<code>→close.</code>		
<code>...</code>		
<code>nht0</code>	major 37, minor 128	first IDE tape, no rewind on
<code>→close.</code>		
<code>nht1</code>	major 37, minor 129	second IDE tape, no rewind on
<code>→close.</code>		
<code>...</code>		

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  
\* or data protect error.  
\* Use HWIF and DEV\_HWIF macros as in ide.  
→ C.  
\* Always try to do a request\_sense after  
\* a failed command.  
\* Include an option to give textual  
→ descriptions  
\* of ATAPI errors.  
\* Fix a bug in handling the sector cache  
→ which  
\* showed up if the drive returned data  
→ in 512 byte  
\* blocks (like Pioneer drives). Thanks  
→ to  
\* Richard Hirst <srh@gpt.co.uk> for  
→ diagnosing this.  
\* Properly supply the page number field  
→ in the  
\* MODE\_SELECT command.  
\* PLAYAUDIO12 is broken on the Aztech;  
→ work around it.  
\* 2.05x Aug 11, 1995 -- lots of data structure renaming/  
→ restructuring in ide.c  
\* (my apologies to Scott, but now ide-cd.  
→ c is independent)  
\* 3.00 Aug 22, 1995 -- Implement CDROMMULTISESSION ioctl.  
\* Implement CDROMREADAUDIO ioctl  
→ (UNTESTED).  
\* Use input\_ide\_data() and output\_ide\_  
→ data().  
\* Add door locking.  
\* Fix usage count leak in cdrom\_open,  
→ which happened  
\* when a read-write mount was attempted.  
\* Try to load the disk on open.  
\* Implement CDROMEJECT\_SW ioctl (off by  
→ default).  
\* Read total cdrom capacity during open.  
\* Rearrange logic in cdrom\_decode\_status.  
→ Issue  
\* request sense commands for failed  
→ packet commands  
\* from here instead of from cdrom\_queue\_  
→ packet\_command.  
\* Fix a race condition in retrieving  
→ error information.  
\* Suppress printing normal unit  
→ attention errors and  
\* 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 Eißfeldt
↳<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 Hennus Bergman <hennus@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 CDRom_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@pcap2.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 CDRom_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
*
*
* 4.53 Feb 22, 1999
↳ Goldstar
*
*
↳ without a medium
*
*
↳ through
*
↳ don't support
*
↳ they must).
*
↳ a module), eg
*
*
↳ conjunction with
*
↳ doing the
*
*
* 4.54 Aug 5, 1999
↳ 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_
→ioctls, except
*                      for CDROMREADTOC[ENTRY|HEADER]. Some_
→of the drivers
*                      use this independently of the actual_
→audio handling.
*                      They will disappear later when I get_
→the time to
*                      do it cleanly.
*                      - Minimize the TOC reading - only do it_
→when we
*                      know a media change has occurred.
*                      - Moved all the CDROMREADx ioctls to_
→the Uniform layer.
*                      - Heiko Eißfeldt <heiko@colossus.escape.
→de> supplied
*                      some fixes for CDI.
*                      - CD-ROM leaving door locked fix from_
→Andries
*                      Brouwer <Andries.Brouwer@cwi.nl>
*                      - Erik Andersen <andersen@xmission.com>_
→unified
*                      commands across the various drivers_
→and how
*                      sense errors are handled.
*
* 4.56 Sep 12, 1999    - Removed changer support - it is now_
→in the
*                      Uniform layer.
*                      - Added partition based multisession_
→handling.
*                      - Mode sense and mode select moved to_
→the
*                      Uniform layer.
*                      - Fixed a problem with WPI CDS-32X_
→drive - it
*                      failed the capabilities
*
* 4.57 Apr 7, 2000     - Fixed sense reporting.
*                      - Fixed possible oops in ide_cdrom_get_
→last_session()
*                      - Fix locking mania and make ide_cdrom_
→reset relock
*                      - Stop spewing errors to log when_
→magicdev polls with
*                      TEST_UNIT_READY on some drives.
*                      - Various fixes from Tobias Ringstrom:
→reset.
*                      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.
 *                               Use the minimum of the LBA and CHS
↳ capacities.
 *                               Avoid hwgroup->rq == NULL on the last
↳ irq.
 *                               Fix potential null dereferencing with
↳ DEBUG_LOG.
 * Ver 0.8   Dec  7 97   Increase irq timeout from 10 to 50
↳ seconds.
 *                               Add media write-protect detection.
 *                               Issue START command only if TEST UNIT
↳ READY fails.
 *                               Add work-around for IOMEGA ZIP
↳ revision 21.D.
 *                               Remove idefloppy_get_capabilities().
 * Ver 0.9   Jul  4 99   Fix a bug which might have caused the
↳ number of
 *                               bytes requested on each interrupt to
↳ be zero.
 *                               Thanks to <shanos@es.co.nz> for
↳ pointing this out.
 * Ver 0.9.sv Jan 6 01   Sam Varshavchik <mrsam@courier-mta.com>
 *                               Implement low level formatting.
↳ Reimplemented
 *                               IDEFLOPPY_CAPABILITIES_PAGE, since we
↳ need the srfp
 *                               bit. My LS-120 drive barfs on
 *                               IDEFLOPPY_CAPABILITIES_PAGE, but maybe
```

```
→it's just me.
*
→to get this
*
→order to
*
→with 0x4600,
*
*           Jan 9 01
→verify.
*
→idefloppy drives
*
→CAPABILITIES_PAGE, and
*
→reporting in
*
→spurious
*
*
→move it to
*
→not used
*
*
→progress indication
*
→register.
*
→device to be
*
→can be used to
*
→device capacity.
* Ver 0.91  Dec 11 99
*           <paul@paulbristow.net>
* Ver 0.92  Oct 22 00
→maintainer for this
*
→zip kludge.
* Ver 0.93  Oct 24 00
*
→works
* Ver 0.94  Oct 27 00
→everywhere
* Ver 0.95  Nov  7 00
* Ver 0.96  Jan  7 01
→of 2.4.0
*
→Russell
* Ver 0.97  Jul 22 01
```

Compromise by not reporting a failure  
mode page. Implemented four IOCTLs in  
implement formatting. IOCTLs begin  
0x46 is 'F' as in Format.  
Userland option to select format  
Added PC\_SUPPRESS\_ERROR flag - some  
do not implement IDEFLOPPY\_  
return a sense error. Suppress error  
this particular case in order to avoid  
errors in syslog. The culprit is  
idefloppy\_get\_capability\_page(), so  
idefloppy\_begin\_format() so that it's  
unless absolutely necessary.  
If drive does not support format  
monitor the dsc bit in the status  
Also, 0\_NDELAY on open will allow the  
opened without a disk available. This  
open an unformatted disk, or get the  
Added IOMEGA Klik! drive support by  
Paul Bristow became official  
driver. Included Powerbook internal  
Fixed bugs for Klik! drive  
no disk on insert and disk change now  
Tidied up to remove strstr(Klik)  
Brought across to kernel 2.4  
Actually in line with release version  
including set\_bit patch from Rusty  
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      was successful ! (Using tar cvf ...
 *                               device interface).
↳ on the block           A longer backup resulted in major
 *                               overall Linux performance and
 *                               we received non serial read-ahead
↳ swapping, bad          requests from the
 *                               buffer cache.
↳ eventually failed as   Long backups are now possible, thanks
 *                               character device interface. Linux's
↳ requests from the     and performance doesn't seem to be
 *                               from the background backup procedure.
 *                               Some general mtio.h magnetic tape
↳ requests from the     now supported by our character device.
 *                               popular tape utilities are starting
↳ As a result,           ide tapes :-)
 *                               The following configurations were
↳ to work with           1. An IDE ATAPI TAPE shares the same
 *                               and irq with an IDE ATAPI CDRom.
 *                               2. An IDE ATAPI TAPE shares the same
↳ tested:               and irq with a normal IDE disk.
 *                               Both configurations seemed to work
↳ interface             However, to be on the safe side, it
 *                               just fine !
 *                               just fine !
 *                               just fine !
```

```
→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 on normal operation most of the time, requests are relatively fast, and performing one tape r/w request, a request from the other device can be queued and service all of them after this single request. 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 we won't cause an interrupt timeout, as happened occasionally in the previous version. While polling for DSC, the current request is 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



<p>*  → now present a  *  → mix of block sizes  *  → supported. The  *  → internally and  *  → recommended transfer  *  → independent of the  *  *  *  → mastering DMA can  *  → drives as well.  *  → to dramatically  *  → accessing the device,  *  → -dl on the tape's  *  → read the  *  * Ver 1.4    Mar 13 96  * Ver 1.5    Apr 12 96  → broken in 1.3.85.  *  *  * Ver 1.6    Aug 16 96  *  * Ver 1.7    Sep 10 96  → model.  * Ver 1.8    Sep 26 96  → between good  *  → throughput.  * Ver 1.9    Nov 5 96  → filemarks rather  *  → command.  *  *  → incorrect results.  *  → MTIOCGGET ioctl.  *  * Ver 1.10   Nov 5 96</p>	<p>The character device interface will  continuous view of the media - any  during a backup/restore procedure is  driver will buffer the requests  convert them to the tape's  unit, making performance almost  chosen user block size.  Some improvements in error recovery.  By cooperating with ide-dma.c, bus  now sometimes be used with IDE tape  Bus mastering DMA has the potential  reduce the CPU's overhead when  and can be enabled by using hdparm  block device interface. For more info,  comments in ide-dma.c.  Fixed serialize support.  Fixed shared interface operation,  Fixed pipelined read mode inefficiency.  Fixed nasty null dereferencing bug.  Fixed FPU usage in the driver.  Fixed end of media bug.  Minor changes for the CONNER CTT8000-A  Attempt to find a better balance  interactive response and high system  Automatically cross encountered  than requiring an explicit FSF  Abort pending requests at end of media.  MTTELL was sometimes returning  Return the real block size in the  Some error recovery bug fixes.  Major reorganization.</p>
---	---

```
* 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 rmmod 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.
*/

```