Future Drive Accelerator

Uses the **free memory** as a **cache**, the program reacts automatically on changes in memory resources, so that you will always get the maximum speed for your drives. Even "resources-hungry" programs will get enough memory.

Version 1.4 (7-May-1999)

by Martin Tauchmann

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Table of Contents

1 The concepts behind `Future Drive Accelerator`

`Future Drive Accelerator` is a disk-cache program.

A cache buffers all data which is written or read from the drive (hard disks, floppy disks, Compact-Disk, removable disk, ZIP...).

If requested data is already in the cache, it doesn't need to be loaded from the slow disk.

So far nothing new!

Memory is, as we all know, always short. So you better think twice before you give it to programs. No matter how you set it up, you can never make it suitable for all programs. One program runs (thanks to the cache) faster than ever before, another one stops working (due to the lack of RAM).

With all other cache programs, you had to adjust the memory usage. Of course, the more memory a cache can use, the faster it will work. So with old cache programs the memory usage had been set quite high, but because other programs stopped working this was stopped rather quickly. Now the cache is commonly set to an average size, so that all "memory-eating" programs run.
Or you always had to change the cache-size manually to fit the current situation. But this is not a very satisfactory solution. And this is where `Future Drive Accelerator` comes in.

The whole free memory, whose size is changing all the time, **is used as cache.**

With this technique, an `Amiga` with a 68030 50Mhz processor and 16 MByte FastMemory (Blizzard IV) averages a **factor 4** speed up. See Chapter 3 [Benchmarks], page 3.

Write accesses are buffered, and later, while **writing back** to the drive, the head is moved from the highest to the lowest address.

Another improvement is built-in for people who use exchangable media like disks, CDs, MagnetOptical-disks and ZIPs. When inserting the media again, the still filled cache is used. The media doesn't need to be accessed again.

What speed improvements can be achieved with `Future Drive Accelerator`?2

Who used a lot of dos-buffers?[1] for the file system, you can now even `save` this memory.

Not to mention that you **help protecting the environment**. The motor and the electronics of the drive is used less and thus, energy is saved.
⇒ the **nuclear power plants** can be shutted down earlier.
You should also keep in mind that the **hardware** wears out less.

2 What is required to use `Future Drive Accelerator`?

`Future Drive Accelerator` needs at least:

AmigaOS 2.0
: or better.

2 Megabyte memory, more memory is recommended.

Additionally, the following software is supported:

DiskSafe (`http://de.aminet.net/pub/aminet/disk/salv/DiskSafe.lha`)
: After a reset or system crash, the cache will be written back before restarting the system.

  Example installation for '`s:Startup-Sequence`':

```
DiskSafe DF1: DF0: HD0: Store: Font: HD2: HD3: HD4: ... REBOOT QUICK-
KEY WAITVERIFY VERIFYREQ LOGFILE=Store:T/DiskSafe.log IGNORE
```

  If this shouldn't work, try adding RESETKEY.

CopyMemQuicker
: See Appendix A [Speed up], page 32.

FileSystems, *Devices*
: See Chapter 10 [Features], page 19.

[1] A dos-buffer requires (per default) a half KiloByte.

3 What speed improvements can be achieved with `Future Drive Accelerator`?

- Copies 850KB in **35 seconds** from hard to floppy disk, this equals the speed of formatting. This is possible because, minimizes the overall seek time required to read or write data from or to disk. Outstanding I/O requests are ordered such that they can all be performed "**with one sweep**" of the disk head assembly, from the highest to the lowest disk address (Elevator seeking).
- **23 MB/s** while reading, (SysInfo V3.23) instead of 7 MB/s without cache, with an Amiga and following equiment: Zorro III, CyberStorm MKIII, 060/PPC 604 150Mhz, UltraWide SCSI HD, 64 MB Fast-Memory, CopyMemQuick 40**+**.
- The booting can get twice as fast if there are a lot of small files to load and many files reside in the '`WBStartup`' directory.
- Faster access to directories from Workbench.
- Amiga MC68030 50MHz, 16MB FastMemory.
  - IDE-HardDisk (tested with `DiskSpeed`)[2]

    `read` *6.8* **times** `faster.`
    `write` *8.1* **times** `faster.`
  - DD-FloppyDisk (tested with `DiskSpeed`)

    `read` *488.0* **times** `faster.`
    `write` *997.6* **times** `faster.`
  - Copying from one partition to another.

    ```
    44 Dirs, 561 Files = 2.3MB Size
    c:Copy MUI: ASWAP:MUI ALL CLONE QUIET

    Dos  457 Dos-Buffers  46 secs 253999 micros
    FDA    7 Dos-Buffers  11 secs 196642 micros (4.13 times faster)
    ```
- Amiga PPC604 233MHz MC68060 50MHz, 96MB FastMemory.
  - IDE-HardDisk (tested with `DiskSpeed`)

    `read` *19.5* **times** `faster.`
    `write` *20.4* **times** `faster.`
  - SCSI-HardDisk (tested with `DiskSpeed`)

    `read` *3.8* **times** `faster.`
    `write` *3.5* **times** `faster.`

More (graphical) statistics, which have been created using `DiskSpeed` can be found in the guide-file '`FDA-Benchmarks`'.

[2] DiskSpeed Reference: 262144 byte, MEMF_FAST, LONG-aligned buffer.

4 Tested systems

Hardware List

```
A4000/40/40Mhz PPC 200Mhz + 64 Fast
CVPPC + 8Mb
Zip Drive
Oktagon Controller
1.3Gb SCSI II Hard Drive (1 partition)
4.3GB SCSI III Hard Drive (3 partitions)
Toshiba 12xCD
IOBlix Super Fast Serial Card
Epson GT-6000 Flatbed Scanner
Pace 56 Voice (V90)(ISP=Wirenet)
Micronik A4000 Tower case
Epson Stylus Color 800
External floppy Drive
Minolta 7000 Camera
External Speakers
MicroVitec GPM 1701 Monitor
Tabby (Drawing Pad)
Sound Sampler
Prelude Sound Card
```

Software Most Often Used

```
AHI (music to your ears - registered)
All Experimental PPC Software
PFS2 (So so fast)
CybergraphX V4 (Good with CVPPC)
PPaint 7.1 (It‘s all in the eye of the beholder)
ImageFX Ver 3.2 (Very stable at this upgrade)
Netconnect (Kiss - Keep It Simple Stupid)
Miami (Works great with my IOBlix)
Turboprint 6.02 (Faster now as it‘s using the PPC Module)
PageStream 3.3a (I love it)
Organiser (Who am I)
Opus Magellan II (My god, it’s full of stars)
CandyFactoryPro (Good PPC Program)
Zip Drivers (Backup my Backups)
HappyDT (Sometimes crashes Netconnect and other programs)
Elastic Dreams (Game for a laugh)
Cyberview (Registered)
```

```
Cybershow (Registered)
AK-Datatypes (Registered)
Quicksampler (Good PD)
MultiCX (Registered)
OxyPatcher (Make Those Programs Burn)
MUI (3.8) (Workbench 4 perhaps?)
Kingcon (No two shells are the same)
```

Relaxing Software Used

```
Genetic Species
Foundation
Alternate Reality (RPG)
Bane of the Cosmic Forge (RPG)
Bards Tale (RPG)
Quake
UFO
Dungeon Master 1 & 2 (RPG)
Ultima VI (RPG)
Birds of Prey
Theme Park
Civilisation
Syndicate
Doom
Stratego (PD)
Myst
Colonization
Frontier Elite II
Deluxe Galaga
Shadow Of The First Moon
VChess
JetPilot
Tiny Troops
Blade (Good Iso RPG)
EaglePlayer (Registered)
MrJQuote

Amiga 1200:
 + 2 880KB Floppys
 + 2 MegaByte 32 Bit Fast-Memory
 + Turbo Jet A1230-BOARD (R) Harms Computertechnik
   MC 68030+MMU 14.2 MHz Cache Burst VBR=$0
   FPU68881    15.4 MHz
```

```
+ WesternDigital Caviar 2850 (850MB)
  - since I have this HD, I had to slow down my MC68030 from 28MHz to
    14.2~MHz. If anybody knows a solution, I would really like to know.
    See Chapter 9 [Author], page 18.
```

```
CPU               :MC 680030 50MHz
Computer          :Amiga 1200
OS                :V 3.0
Controller        :IDE (Buddha)
Memory            :16MB FastMem
                    2MB Chip
FileSystem        :FastFileSystem 44.5
Hard Disk         :1x Quantum Fireball 3.68 GB
ZORRO-II-Karten   :1x MultifaceIII, 1x Buddha IDE
other cards       :Blizzard 1230 (CPU-PORT)
others            :Micronik Tower mit Zorro II Datherborad
running programs  :Prometheus V2.6, FKey, MouseBlanker, MultiCX V2.78,
                   NewIcons V40.2, PowerIcons V1.0, SleepingPointers
                   V1.0a, Multifax Spooler V3.1, Killclick2
```

```
CS PPC 233MHz, 060 50MHz

A4000 MC68040 25MHz 16FastMem
```

```
A3000 CSPPS 604/200 060/50
PicassoII running cybergraphics (will soon be CVPPC)
4 different SCSI harddisks of which 3 are SCSI-2 and one UWSCSI
CSPPC-interface.
DAT-tapestreamer, CD-ROM, 70MB RAM and many things I can't remember.
```

```
Amiga 4000 with 68040/40Mhz, about 80MB Fastram, most of it
on the turboboard, and 3,5MB Fast on the motherboard.
2nd.scsi.device / scsi.device / ffs/afs/sfs..
```

```
Amiga 1200  040/40 2/32MB 2GB TowerhawkII X2 Multiscan
CPU         : MC 68040 40MHz
OS          : V 3.1
```

```
Controller  : IDE
Memory      : 32MB Fast, 2MB Chip
FileSystem  : FastFileSystem 43.19
Hard disk   : 1 2GB-Platte with 2 Partitionen (50MB and the rest)
CD          : 1 4fach-CD-Rom (RandyCD-Rom)
DirOpus5 Magellan is used as Workbench replacement.
```

5 If you like the demo...

If you like this *demo-version* you might want to use the **full version** which features:

- Faster, because the complete free memory is used as cache.
- Unlimited number of cached drives.
- And of course no time limit.

Ordering the full version is easy, convenient and comfortable - 24h a day worldwide!

Prices

- The **full version** is available for only **19,99 DM ($12.99) (11,99 EUR)**.
- Minus **5,- DM (-$3) (-2,60 EUR)** if PowerCache, DynamiCache or HyperCache can be leased.
- Minus **4,- DM (-$2.5) (-2,10 EUR)** if you are **a student, umemployed or a pensioner** ;-). Please add some proof. See Chapter 9 [Author], page 18.
- Plus **4,- DM ($2.5) (2,10 EUR)** (outside Europe 8,- DM ($5) (4,20 EUR)) shipping, if you can not receive Email. See [Free Email], page 9. For an update, just transfer the money to my bank account.
- Update **0,- DM ($0) (0 EUR)** if it can be sent via Email. See [Free Email], page 9.
- Special prices for 10 or more users. Prepaying of licenses and commercial reselling is also possible. Please contact the author for more details. See Chapter 9 [Author], page 18.

Ordering

1. Online in the World Wide Web (`http://shareit1.element-5.de/programs.html?nr=102792`), SSL encoded.
   - Credit cards

- Visa
- Eurocard/Mastercard
- American Express
- Diners Club
- Wire-transfer

2. per Phone, FAX or E-Mail
   - ShareIt service.
     (Program-number *102792*)
     - [Free FAX], page 9: +49-221-2407278 (Germany)
     - Phone: +49-221-2407279 (Germany)
     - FAX: +1-724-8508187 (USA)
     - Phone: +1-800-9034152 (USA) free
     - Phone: +1-724-8508186 (USA)
     - E-Mail: `MartinTauchmann@bigfoot.com`
3. US check

   Send $15.5 to the address below, include the program-number *102792*.

   ```
   ShareIt! Inc.
   PO Box 844
   Greensburg, PA 15601-0844
   USA
   ```
4. Eurocheque

   Please fill in the amount in EUR and send to the Chapter 9 [Author], page 18.
5. Bank transfer

   Transfer the money in EUR or DM to:

   ```
   Badische Beamtenbank eG (Germany)
   76119 Karlsruhe
   Bank Location Number: 660 908 00
   Martin Tauchmann
   Account Nr.: 2473135
   Usage: FDA MC68020 <Your E-mail address>
   ```

6. Cash (worldwide)

   Put the money in an envelope and send it to the Chapter 9 [Author], page 18. (Use an envelope where the money can't be seen against the light.)

Free Email

http://mail.yahoo.com
http://mail.angelfire.com
http://www.gmx.de
http://www.dejanews.com (No problems with a "FireWall")

Free FAX

http://www-usa.tpc.int/sendfax.html?destnumber=49 221 2407278

6 How to install and configure Future Drive Accelerator

Please use the included installer script to install Future Drive Accelerator. The *AmigaOS* Installer V43.3 is required. This version can be found in *Aminet*.

Future Drive Accelerator can be started in different ways:

- Move it to the 'WBStartup' directory, and remove the brackets from the tooltype QUIET. (Workbench-Menu ->*Pictogram* ->*Information*
- or insert this line:

  RUN <>*NIL: SYS:System/FDA QUIET* in the file 'S:Startup-Sequence' after
  - SetPatch
  - SaferPatches (http://de.aminet.net/pub/aminet/util/misc/SaferPatches.lha) or SetMan
  - PoolMem See Appendix A [Speed up], page 32.
  - HDOff (not really necessary, but you can then work with the cache when the harddisk is off.)

`Future Drive Accelerator` uses the following Workbench Tool Types and Shell parameters:

`FROM` (Only from Shell)
: Specifies the name of the configuration file.

`QUIET`
: Initialising messages are not printed.
This is useful for an installation in the '`SYS:WbStartup`' directory, or the '`S:Startup-Sequence`'.

7 How to configure `Future Drive Accelerator`

`Future Drive Accelerator` can be configured using the `Future Drive Accelerator Preference Editor`:

The Preference Editor uses the following Workbench Tool Types and Shell parameters:

`FROM` (Only from Shell)
: Specifies the name of a configuration file to load.

`EDIT` (default option)
: The configuration can be changed.

`USE`
: The new configuration will be saved temporary.

`SAVE`
: The new configuration will be saved permanently.

`MAINPROGPATH`
: Directory of `Future Drive Accelerator`, e.g. '`Sys:System/`'. The configuration ('`FDA.prefs`') will be saved to the directory. If Future Drive Accelerator loaded before '`ENV:`' is initialized, which is the case when booting from floppy disk, the config will be found anyway.

7.1 The Mainwindow

The MainWindow contains a listing of drives. When you select a window, a new window (see Section 7.2 [DeviceWindow], page 12) will be opened.

`Not used FastMemory`
: For calibration.
How much of your fast memory shall not be used as cache?
60 kiloBytes is a good value here, because a minimal amount of memory is necessary to send messages. This way, memory can be made available faster.

`Not used ChipMemory`
: For calibration.
How much of your chip memory shall not be used as cache?
100%=No chip memory will be used ⇒ which is the fastest setting.

`FastMemory first`
: `Off`: The cache uses ChipMemory first, then FastMemory.

  `On`: The cache uses FastMemory first, then maybe ChipMemory.

`View color flash if track moved or deleted`
: `Off`: No color flash is created.

  `On`: There will be a **green** flash, when a part of the cache is moved in the RAM.
  There will be a **red** flash when a part of the cache is removed from RAM.

Rem.:This option is useful to calibrate `Not used Fast- ChipMemory`.

`Protect tracks in memory with checksummes`
: `Off`: The cache is not protected.

  `On`: The cache will be protected from external programs.

Rem.:This is recommended for Intros, games and badly programmed software which change foreign memory blocks. See Section D.1.1 [DebugFiles], page 38.
Or if you have bad memory. See Appendix B [Mark Bad Memory], page 33.

> Remember: The FileSystem itself calculates checksums. If you get an “Warning¡‘-Requester with a “checksum-**error**“ , you may not, in no case, press “Cancel“, but instead reboot your Amiga at once!
> This may also happen without `Future Drive Accelerator`, but it is not so likely that a program wrote into the dos-buffers accidently. Dos-buffers just are a “smaller target“.

The buttons at the bottom of the window are used to set the path where the config-file will be saved. The name of the file is ‘`FDA.prefs`’.

`Save`
: The configuration is saved to the ‘`ENVARC:`’ directory. The new config will be used automatically by `Future Drive Accelerator`

and will survive a reboot. The preferences editor will quit after saving.

`Use` The configuration is saved to the '`ENV:`' directory. The new config will be used automatically by `Future Drive Accelerator` but will *not* survive a reboot. The preferences editor will quit after saving.

`Cancel` To quit the preferences editor. All changes will be lost.

7.2 The Device Window

The following can be set in the Device Window:

When data is written back to the drive, if the data should be verified, how much data should be pre-read and how much of the cache can be used by this drive.

`Removeable Disk?`
Does this drive contain a removable disk?
e.g.: floppy-, CompactDisc-, ZIP, MagnetOptical or SyQuest-drive.

If `Removeable Disk` is set to Off, then `Future Drive Accelerator` does not need to know which FileSystem is used, to recognize a disk after re-inserting.
⇒ The initializing of the cache is faster.

`Verify write`
The data will be checked if it has been properly written.
⇒ Useful for floppy-disk and old hard-disks.

`Write`

- `Through`
  Data will be saved at once and moved into the cache at the same time (write-retention).
  ⇒ When the data is read again, it can be accessed by the cache very fast.
- `Sync`
  Like `Through` with the difference that the data is written to

the drive[3] after the writing of the file was completed[4] .
⇒ The parallel reading and writing is done more gentle in multitasking.
⇒ The program waits for the end of the write-access (Syncron).

- Async
  Like Sync, but the program doesn't wait for the end of the write-access (ASyncron). What means data is written in an instant.
  ⇒ Additionally, minimizes the overall seek time required to read or write data from or to disk. Outstanding I/O requests are ordered such that they can all be performed "**with one sweep**" of the disk head assembly, from the highest to the lowest disk address (Elevator seeking).

  The cache is written in the background.
  ⇒ You can write data to the cache, while the cache is writing to the drive.
  See Section 10.2 [DataSafety], page 21.

- Late as possible
  Like Async but the data is written as late as possible. This is recommended for Cache-directories of World-Wide-Web browsers or Internetcomputer, where there is (more or less) always data written.

  Data is written when memory is needed or Future Drive Accelerator exits, and, if DiskSafe is installed, before a Reset/System-crash. See Chapter 2 [Requirements], page 2.

---

[3] Syncron write-back, or the asyncron delay is started when:
- e.Update-command from FileSystem,
- e.Motor-off-command from FileSystem,
- If a program requests memory, and the cache (the whole RAM) is filled with data that has to be written back.
- Disk removed : "You must replace Volume"
- If DiskSafe is installed : Before a Reset or a Guru.
- or if the cache is full with data to write (at least 7 free tracks)

[4] The end of the write-access is signalled explicit by the FileSystem to make sure that a device, software- or hardware-cache in the hardisk has written the data completely.
Most harddisks have an internal cache of 64 KB.

- For temporary
  Like Late as possible but data is NOT written before a Reset/System-crash.
  ⇒ This is useful for directories whose contents don't need to be the same after the reset, for example: 'env:' 't:'.

Async delay
: For how many seconds shall the write-back be delayed with Async?

Size of Track
: Number of bytes a track[5] requires in the cache.
⇒ How many bytes shall be **read ahead**?
Reommended values are for harddisks and CDs about 40KB and for floppy disks (2 tracks = 1 cylinder).
If the harddisk is not fragmented, you could achieve a dramatic speed improvement when you set a high value.
If you use two or more harddisks you should use the **same** value for all unit to avoid the fragmenting of memory. This will be improved in future versions.

Cache usage priority
: What priority has this drive compared to other drives for caching?

The buttons in the bottom row of the window can be used to activate or deactivate the cache, and to get informations about the drive

Enable
: Cache active.

Info
: Shows Section 7.3 [InfoWindow], page 14 about the drive.

Disable
: Cache inactive.

7.3 Informations about the drive

This window shows informations about the selected drive.

---

[5] If only a block (part) of the track is read, the hardware copies the whole track into a buffer and passes on only the requested Block.
Future Drive Accelerator makes use of this behavior: It always reads the whole track into the cache. Reading of a Tracks is a little bit slower than reading a block. slow hardware-head, which would be necessary for reading another block.
⇒ And the hardware isn't stressed because the requested block is already in the cache.

Size of Block
: can be modified using the HDToolBox©AmigaInc. or in the mountfile in the directory 'Devs:DosDrivers' (SectorSize * SectorsPerBlock). But this is not recommend, because most programs depend on a value of *512* here.

No of Tracks
: Number of tracks. Is also the capacity of the partition, floppy ... multiplied with Size of Track.

First Track Number
: Start postions of the partition on the harddisk.

Root Track
: Depends on the FileSystem. Is used by Future Drive Accelerator to recognize a floppy/removable disk only.

Name and Dates Position
: The position where the partition-name, the date of creation and the date of the last modification can be found. Is used by Future Drive Accelerator to recognize a floppy/removable disk only.

Unit Number
: Hardware Unit Number.

Device Name.
: Name of the Software-Device.

Buffer Memory Type
: Either Chip- or Fastmemory. If "Need! ChipMemory (slow)" appears here, you should get more recent Device-Software, or try to set BufMemType=*1* in 'Devs:DosDrivers', because the drive is slower than it needs to be.

4-GByte ''boundary''
: If anything else than "No problems" appears here, then this partition is beyond the "4 GB boundary"; you should make sure that you use a FileSystem and Software Device that can handle harddisks bigger than **4 GigaByte**. See Section 10.1 [FileSystem installation], page 20.

New Style Device
: Supports the Device-Software the new device standard©AmigaInc.?

8 How to quit and monitor Future Drive Accelerator

Future Drive Accelerator

`Future Drive Accelerator` can monitored and exited using `Future Drive Accelerator View`:

The monitor accepts Workbench Tool Types and shell parameters:

`KILL-FDA` Writes the cache to the drive (if necessary) and quits `Future Drive Accelerator`.

`FLUSH` Flushes the cache, except for data that has to be written to disk.

`UPDATE` Writes the cache to the drive (if necessary).

`Future Drive Accelerator View` is a by-product, which has helped the author while developing `Future Drive Accelerator` to find the optimal algorithm[6] for using the cache. The author didn't plan to release this program, but does it now anyway for the curious ones.
Normally, `Future Drive Accelerator View` is only required to quit `Future Drive Accelerator`.

The **right** part of the window shows the current **cache structure** (sorted). Above this is a summary of the list, **how many tracks are in memory** and **how many** of them are waiting to be **written** to the drive. On the **left** side you can control how the list should appear.
Finally, at the top, you can see how much of the free memory is used as currently as cache (`Avail Memory`).

A simplier statistic would be of no use, because the cache is always **used at 100%**.

`Sorted by`

`Location` Lists the **memory areas** where the cache-parts reside[7].
The whole cache is listed.

- `Location` Start position of the track in memory.
- `Type` Memory Type
- `Size` Number of Bytes a tracks uses in the cache.

[6] The used algorithm is required to figure out which tracks is the last in the queue. This is the oldest track, and if there are several tracks of the same age, the tracks with the smallest access counter is killed.
If you know a more effective algorithm, don't hesitate and let me know.

[7] The cache is a summary of different tracks.

- Track Number of Track. No. 0 is the first.
- Used Number of accesses to the track.
- Old Time (in seconds) since the last access.
- Parti Logical partition- or drive-name.
- DiskName Virtual partition-, medium- or disk-name.

Above this is written how many tracks are **in the cache alltogether** (all free memory) and how many of that must still be written to the disk.

Track

Lists the **cache-parts** of a partition, medium or disk.

- Track Number of track. No. 0 is the first.
- Location Start position of the track in memory.
- Type Memory typet.
- Used Number of accesses to the track.
- Old Time (in seconds) since the last access.
- Flags
  - NowBusy Track is read or written.
  - MustWrite Track must be written.

Above this is written how many tracks **of the medium**[8] are in the cache and how many of that must be written to drive.

The next lines contain

2. the Unit the medium/partition belongs to, the name of the device and the start postion (track-number) of the partition on the disk.
3. logical partition- or drive-name and virtual partition-, medium- or disk-name.
4. When the medium was created (formatted) and the date of the last modification. (Only Fast-FileSystem)

[8] A medium can be a partition, an inserted diskette/ a removable harddisk / CD or a removed diskette...

Page Up
: One page up.
⟨Cursor left, Shift+Cursor up⟩.

Page Down
: One page down.
⟨Cursor right, Shift+Cursor down⟩.

Top
: Top of the list.
⟨Key T⟩.

End
: End of the list.
⟨Key E⟩.

Before Medium
: Jump to the previous medium.

Next Medium
: Jump to the next medium.

9 Where to send bug reports, comments and orders?

The author can be reached through the following addresses:

Postal addresse:


```
      Martin Tauchmann
      Scheffelstr. 49
79102 Freiburg im Breisgau
      GERMANY
```

E-Mail:

MartinTauchmann@bigfoot.com

Sometime you can find me in IRC at “irc.uni-stuttgart.de“ in the “#amiga“-channel as NickName “Gaddis“.

There is also a Future Drive Accelerator homepage in the World Wide Web, with cyberlinks to “**Super Find Engines**“ and many other usefull cyberlinks:

Germany (http://MartinTauchmann.home.pages.de)
U.S.A. (http://bigfoot.com/~martintauchmann/)

The Pretty Good Privacy (PGP) “PublicKey“ is available with Finger, or via WWW (http://horowitz.surfnet.nl:11371/pks/lookup?op=index&search=0xF74B8D1D).

ICQ, aka UIN is on my HomePage.

10 Compatibility, Features of Future Drive Accelerator

- Accelerates all kind of media e.g.*: Harddisk-, Floppy-, Compact-, ZIP, MagnetOptical- or SyQuest-drives, almost like a RamDrive.
- Uses the **free memory** as **cache** , the program reacts automatically on changes in memory resources, so that you will always get the maximum speed for your drives. Even “resources-hungry“ programs will get enough memory.
- Minimizes the overall seek time required to read or write data from or to disk. Outstanding I/O requests are ordered such that they can all be performed “**with one sweep**“ of the disk head assembly, from the highest to the lowest disk address (Elevator seeking).
- Gentle, parallel reading and writing in Multitasking.
- Smart-Power-Technologie: Minimizes the number of disk-accesses.
- SmartCache: Read-ahead of blocks.
- When disks are removed, the cache is only removed if necessary. When disks are re-inserted, the cache will be used again.
- No fragmentation of memory. (Opposite to DynamiCache.)
- Can possibly save memory, because dos-buffers are not required anymore.
- Power-LED flashes when accessing cache.
- Verify is as fast as in a copy-program, because data is verified in the background while writing. (the processor isn't used much while writing anyway).
- If `DiskSafe` is installed, the cache will be written before a reset or system-crash restarts the computer. See Chapter 2 [Requirements], page 2.
- Supports `DiskExpander` (`http://de.aminet.net/pub/aminet/util/pack/epu14.lha`), `Virtual-Memory-Manger` (VMM), XFH (`http://de.aminet.net/pub/aminet/util/pack/XFH.lha`) `temporal files` and `World-Wide-Web browsers`.
- Supported devices: (probably all
  - scsi (`http://www.amiga.de/files/index.html`), 2nd.scsi, NewStyleDevice, atapi (`http://de.aminet.net/pub/aminet/disk/misc/IDEfix97.lha`), cybscsi,
  - trackdisk, floppy (`http://de.aminet.net/pub/aminet/disk/misc/floppy43.lha`), diskspare (`http://de.aminet.net/pub/aminet/disk/misc/Diskspr3.lha`), hackdisk (`http://de.aminet.net/pub/aminet/disk/misc/NewHackdisk.lha`), mfm.device (©CrossDOS), messydisk (`http://de.aminet.net/pub/aminet/misc/emu/msh-156.lha`),
  - fmsdisk (`http://de.aminet.net/pub/aminet/disk/misc/fmsdisk.lha`),

  - xpkdisk (http://de.aminet.net/pub/aminet/util/pack/xpkDisk37_8c.lha),
  - cd.
- Supported FileSystems: (All knownn)
  - FastFileSystem(FFS), V44.5 (http://de.aminet.net/pub/aminet/disk/misc/ffstd64.lha) V43.20 (ftp://ftp.amiga.com/pub/)
  - ProfiFileSystem1+2(PFS) (http://de.aminet.net/pub/aminet/disk/misc/pfs95.lha), HomePage (http://www.greed.nl)
  - AmiFileSafe(AFS) (http://de.aminet.net/pub/aminet/biz/demo/afsdemo159.lha),
  - SmartFileSystem(SFS) (http://www.xs4all.nl/~hjohn/SFS/),
  - MessyFileSystem(MSD) (http://de.aminet.net/pub/aminet/misc/emu/msh-156.lha),
  - CrossDOSFileSystem(MSD) (©CrossDOS),
  - Berkeley (NetBSD LinUX) Fast FileSystem (BFFS UNI\02) (http://de.aminet.net/pub/aminet/misc/emu/bffs1.3.lha).

  and compatible, furthermore all MultiUser-“clones“.
- Supports FileSystems with a variable block-size.
- Supports harddisks with a capacity of 4 GigaByte or more.
- Protects partitions beyond the 4 GigaByte “barrier“ from faulty accesses.
- Is the fastest cache program. Accelerates harddisks by the **factor 2-20**, floppy disks by the **factor 2-997**.

10.1 How to use harddisks bigger than 4 GigaBytes.

Type *VERSION HD0:* into a shell, to find out if version *44.5* (http://de.aminet.net/pub/aminet/disk/misc/ffstd64.lha) or *43.x* (ftp://ftp.amiga.com/pub/) of the FastFileSystems is installed.

The **new FastFileSystem** version[9] must be installed into the **RigidDiskBlock (RDB)** using HDToolBox. Copying to the L: directoy is not enough.[10]

If you have more than one harddisk on your Amiga, **the FastFileSystem is loaded** *only* **from the** Boot-Unit-HardDisk-RDB. So you have to install the new FastFileSystem into the Boot-Unit; but of course doesn't it do any harm if all Unit-HardDisk-RDB's are updated.

Reformatting of the partitionen **is not required**, this means the files remain accessible with the

[9] or SmartFileSystem_SCSIdirect, ProfiFileSystem-2_SCSIdirect.

[10] FastFileSystem V44.5 is not compatibele with vdisk.device, statram.device, diskspare.device and fms.device

new FastFileSystem (`http://de.aminet.net/pub/aminet/disk/misc/ffstd64.lha`).
The new `FastFileSystem` works of course with **IDE-drives**, too.

How do you update the `FastFileSystem`?
Start the program '`SYS:Utilities/HDTools/HDToolsBox`':

Select your `Boot-HardDisk`, 'Partition Drive', 'Advanced Options', 'Add/Update...', **now you can see which version is running in your Amiga**, 'Update File System...', enter *`l:FastFileSystem`*, 'OK', **now it should read Version:** *44* **and Revision:** *5*, 'OK', 'OK', 'OK', 'Save Changes to Drive', 'Exit'.

10.2 DataSafety

The datasafety of the `FastFileSystem` is extended with *`Write Async`* in the case of a power cut.

The `ProfiFileSystem-2` and the `SmartFileSystem` provide datasafety even in the case of a power cut, the medium is always "validated".

The medium is kept "validated" by saving the structure-organizing data to the disk immediatly.
⇒ You could image this as a tree, whose branches have always to be present, the leaves (files) may grow or fall off without harming the tree itself.
New leaves are written to the "list of existing leaves" when the completely grown up. ⇒ Of course, files which were saved during the power cut are lost.

To maintain a valid structure on the medium, the FileSystem must not loose control about the moment of writing, this means the structure must be written "syncron".
⇒ *`Write Async`* may not be activated, to ensure datasafety during a power cut.

`Write Async` can be activated, if there is **enough free memory** available to cache the WHOLE write-process.
⇒ The medium is always "validated".

In future versions, using a new FileSystem, datasafety will be maintained during a power cut, even with low memory, using *`Write Async`*. The important structure data (tree) is written "Syncron" and the files (leaves) "Asyncron".

11 What will happen to Future Drive Accelerator?

The oracle foretells:

- Porting to the new *AmigaOS* QNX.
- New memory-routines. See Appendix D [Known Bugs], page 35.
- Better cooperation with PFS-2 to ensure datasafety during a power-cut.See Section 10.2 [DataSafety], page 21. Furthermore a speedup, because PFS-2 reads and writes directly in the cache.
- Translating the documentation in several languages.
- Porting of oo2c (`http://www.uni-kl.de/OOC/`) to the Amiga, which makes it possible, thanks to GNU-C (GCC), to develop Oberon-2 programs for any platform. `Oberon-2` is almost identical to `Amiga E`, `ADE 95 (gnat)`, `Modula/Pascal` and `Cluster`.
- Porting of Garbage Collector (`http://reality.sgi.com/boehm_mti/`) to the Amiga. Replaces C `malloc`, C++ `new` as well as C string (cord) which is used for fast string operations.
- New ixemul.library version.

12 Development history of Future Drive Accelerator

1.4, Release date 7-Mai-99

- Brandnew documentation. (Guide, HTML, PS, DVI)
- `Size of Track` is now variable.
  ⇒ Possible to read more data, before they are needed (read-ahead). ⇒ No fragmentation of memory, if all Units set to the **same** `Size of Track`.
- Support Virtual-Memory-Manger (VMM). Make in VMM-Prefs Code=No Data=No Program=FDA.
- Fixed, could hang sometimes 1/1.000.000, while writing back Cache.
  Because, AbortIO of the Timer Device of OS3.0 has a bug. The Vertical-Blank-Interrupt can jump between the CheckIO and AbortIO of the time-request.
  ⇒ Now doesn't use AbortIO. Restart the Timer if it came back to early.
- Fixed, Checksum-Error, if HD has a capacity more than 2GB (2^31 "SignedLongWord border").
  Because, Oberon has no support for ULongWord (UnSigned).

Replaced all DIV in uDIV, and MUL in uMUL.
IF (highCyl+1) * surfaces > MAX(LONGINT) DIV ASH(SizeOfTrack,-1) THEN /* HD > 4 GB */
Thanks to Timo Murzo (Master.T.M) Sysop of Unity Mailbox Hamm
Thanks to Michael Kilimann
Thanks to Denis Zwornarz
⇒ Current limit is 1126 GB.

- No further translation of SCSI-direct commands into TrackDisk commands.
  If FDA is called with a SCSI-direct command, it uses the same command. ⇒ FFS V44.5 and the special SCSI-direct Versions of PFS-2 and SFS, have no limits (1126 GB) about the HardDisk size. See Section 10.1 [FileSystem installation], page 20.
- If the cache (whole memory) is full of data and any other program needs memory, the cache will be written back (flush) and than is memory free again.
- Update-Task (writing back) priority is now one higher than Unit-Task (read/write).
- Fixed, Enforcer hits.
  Thanks to Michael Kilimann
- Added ChangeInterrupt. CD-Drives need this, to detect a DiskChanges.
  Excluded 'mfm.device' V40.9 (21.05.93), 'multidisk.device' and 'xpkdisk.device' V37.8, because they had a BUG while removeChangeInt.
  Device developer: Please, take a look at HackDisk.device Assembler-SourceCode.
  Thanks to Marc Michael (yogi)
- Dos-Buffers set to 7.
- Fixed, Dos-Buffers not freed if "QUIET" was used.
- Supported Berkeley (NetBSD LinUX) Fast FileSystem.
  ⇒protStatus Command detect "Disk Inserted" and Motor off interpeted as "update" Command.
  Set the Dos-Buffers of Berkeley (NetBSD LinUX) Fast FileSystem to *456*, because lower values made read errors (found with DiskSpeed V4.2).
- One timer for one Partition, not only one for the whole Unit.
- Fixed, don't turn off the DiskFloppy motor at some systems.
  Motor command is again back in the waiting queue.

Developer: Imagine, if you're using SendIO instead of DoIO, the execution is **a**sync not only by reading and writing also with the changeState, motor, protStatus, remove, changeNum ... commands.
Thanks to Herbert Pittermann
Thanks to Jörg Liebelt

- Spared one uDIV Processor instruction. (A modulation and a division in an single uDIV instruction.)
  ⇒ Little bit faster.
- Little speed up, if an SCSI-direct FileSystem is used.
- Uses exec.GetMsg only if an Message is available (Port.msgList.head^.succ`<>`NIL).

  ⇒ Little bit faster (0.44%-0.51%).
- Fixed, printed *-1*, at verify requester as Track number.
- Fixed, verify retry.
- Fixed, no error number result if an update error exists in `Sync-writing-mode`.
- Fixed, can't find the icon. ⟨QUIET⟩ Tooltype now working.
  ⇒ No window opening, if it's started from WBStartup-Drawer.
  # Thanks to Harald Wünsche
- Windows are now simple-refresh.
  ⇒ spares ChipMemory.
- Reduced Stack allocation.
- DSG (Benchmark-Statistics) is now able to read DiskSpeed V4.2 results, but it can't display values greater than 9.9MB.
- Added Blizzard-IV (030 50Mhz) Accelerate-Card benchmarks in the guide.
- Added PPC604 233MHz 060 50MHz Accelerate-Card benchmarks in the guide.
- Prefrences:
  - Renamed the Options.
  - Removed "Write-Retention off".
  - Replaced "ASync-update-writing" with "Write async = 0 sec".
  - Added "Write as late as possible", for Cache-directorys of WWW-Browsers.
  - Added "Write for temporary", for t: env: directorys.
  - Now, quick toggle device with Shift+LeftMouse.
  - Converted "low Track" to "low Cylinder".

  - Device-List gagdget uses the default font, fall back to the topaz.font, if the other text font is proportional or the default font is also proportional.
    Thanks to Andrew Mowatt
    Thanks to Frédéric Laboureur (Fred) AlphaSOUND - FANTAISIE Software (1998)
  - Added "Size of Block" of FileSystem in Info.
  - Used really New-Look-Menus.
  - Fixed, menu "LastSaved" and "Restore".
  - Fixed, Argumente "USE" and "SAVE".
  - Reinserted "USE".
  - Fixed, division by zero trap, if no FastMem available.
    Thanks to Flemming Steffensen
  - Fixed, division by zero trap, if "blocks per track" or "surfaces" are zero. (NewPortHandler)
    Thanks to Flemming Steffensen
  - Fixed, trap if BlockSize`<>`0.
    Thanks to Carsten
  - Fixed, no NewStyleDevice detection if anoter unit as zero are used.
- View:
  - View uses the default font; if it's proportional and the size isn't 8x8, it falls back to the topaz.font.
    Thanks to Herbert Pittermann
    Thanks to Helge Böhme
  - Use New-Look-Menus.
    Thanks to Frédéric Laboureur (Fred) AlphaSOUND - FANTAISIE Software (1998)
  - Fixed, bad DiskName if another "Size Of Block" as 512 is used.
- In the Demo Version is writing now possible, but only the half free memory can be used by two drives as cache.
- Price increased by 4.99DM to 19.99DM.

1.2, Release date 20-Aug-98
- Speed up Read/Write little bit.
- Preferences: 'Not used Memory' Proportional-Gadgets are now in Percentage and KiloByte.
  Special thanks to Andrew Mowatt
- Better communication between the filesystem and FDA. Should fix occasional hangings in the previous release.

- Fixed, detect Partitions after 2-GB as 4-GB Partitions. Support 4-GB HDs is more possible.
  Thanks to Timo Murzo (Master.T.M) Sysop of Unity Mailbox Hamm
- Preferences
  - Used New-Look-Menus and scale checkboxes.
    Thanks to Frédéric Laboureur (Fred) AlphaSOUND - FANTAISIE Software (1998)
  - Unnecessary 'Can't open x.device' removed, if it is not a New Style Device.
    Thanks to Marc Michael (yogi)
- Nicer looking MWB icons.
  Thanks to Frédéric Laboureur (Fred) AlphaSOUND - FANTAISIE Software (1998)

1.0, Release date 20-Jul-98
- Added SmartFileSystem benchmarks in the guide.
- Write operation a little bit faster.
- Fixed, StartUp RangeCheck trap, if `Size of Track >` 131072.
- Dos-Buffers set to 20.
- Supports NewStyleDevice: (NSD) 64-Bit Commands (4GB border).
- Supports scsiCmd (4GB border).
- Preferences
  - Include more "big" HDs.
    Thanks to Timo Murzo (Master.T.M) Sysop of Unity Mailbox Hamm
  - DeviceCompatible removed.

0.98, Release date 04-Jul-98
- Supports Partitions after the 4GB border (not tested).
- Speedup Read & Write operations.
- Preferences
  - Includes LateBinding-Devices.
  - Preferences: Removed bugy "USE".

0.96, Release date 25-Mar-98
- First puplic release `@` the AmiNet.

13 Other products

From the same author:

- Future Copper Producer (`http://de.aminet.net/pub/aminet/gfx/edit/FCP.lha`)
  - Convert Pic -> CopperList (6BitPlane -> 0 BitPlane CopperList)
  - CopperListEditor
  - CopperListSearcher
  - Full Modula-2 SourceCode
- Telekom Bill (`http://de.aminet.net/pub/aminet/comm/misc/TelekomBill.lha`)

  German Phone-Bill calculater for WG's
- Active Window Picture (`http://de.aminet.net/pub/aminet/gfx/show/ActiveWinPic.lha`)

  displays pictures in any window, especial SHELL.
- File 2 Partition (`http://de.aminet.net/pub/aminet/misc/unix/File2Partition.lha`)

  Spares memory if LinUX is installed, stores files direct to HD, Disks or any LogicalDevice
- Is Inserted? (`http://de.aminet.net/pub/aminet/util/boot/IsInserted.lha`)

  StartUp-Check if a Disk inserted then start BootUte, or any ...
- BrainBird (`http://de.aminet.net/pub/aminet/mods/slow/BrainBird.lha`)

  Shaman drums to meditate and 14 Ambient/NewAge/Music concrete Songs.
- Exec.library disassembly (`http://de.aminet.net/pub/aminet/dev/asm/ExecDis.lha`)

  A commented disassembly of the exec library 1.2.
- PasTeX ShowDVI-SuperHighRes EpsonMedium/Low (`http://computer.freepage.de/tauchmann/PasTeX-SuperHighRes.lha`) (5.1 MB)
  SuperHighRes & Epson medium pk-fonts, other resolutions possible.
  ⇒ Display 9PinPrinter "Quality" on Screen.

From other authors (in Aminet):

- Better Amiga feeling
  - Copper-rainbows on ALL pubscreens (`http://de.aminet.net/pub/aminet/util/wb/Copper-Demon.lha`). Needs ScreenNotify.library (`http://de.aminet.net/pub/aminet/util/libs/ScreenNotify10.lha`),
  - PersonalPaint (`http://de.aminet.net/pub/aminet/biz/cloan/PPaint64.lha`) AnimBrush (16 colors) as Mouse-Pointer (`http://de.aminet.net/pub/aminet/gfx/aga/AnimPoint10.lha`),

needs AGA/3.0 needs QMouse (`http://de.aminet.net/pub/aminet/util/cdity/qmouse290.lha`) to blank pointer, because MultiCX can't do it.

  - Animated Busy Pointer Hack (`http://de.aminet.net/pub/aminet/util/boot/pointerx.lha`).
  - Time and Mem (`ftp://ftp.uni-stuttgart.de/pub/systems/amiga/amok/amok080/TimeAndMem.lha`) in the Shell-Prompt.
  - AntiTopaz (`http://de.aminet.net/pub/aminet/util/misc/AntiTopaz.lha`) Substitutes topaz with system default font.
- Relax Music
  - DI-* “MagneticNorth“ (`http://de.aminet.net/pub/aminet/mods/slow/DI-*.lha`).

14 The author wants to thank. . .

The development would have been impossible without the feedback of some `Future Drive Accelerator` users. Many ideas and features came from these sources. . .

So I'd like to thank the following persons:

For Alpha-/Beta-Tests, ideas & bug-reports:
: Frédéric Laboureur, Michael Kilimann, Denis Zwornarz, Andrew Mowatt, Marc Michael, Herbert Pittermann **Kisses for you sweet Kids**, Harald Wünsche, Timo Murzo, Jörg Liebelt, Flemming Steffensen, Helge Böhme, Andreas, Carsten.

For the translations:
: The Amiga Translators Organization (ATO) (`http://ato.vapor.com`)

  Jens Neubauer `jens.neubauer@gmx.de`

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: Gregor Knechtges
  Heiko Hayn `Smeagel@gmx.net`

Malcolm Harnden
: For supporting the PPC Amiga.

Fred Fish
: Without your **excessive** commitment for the Amiga, I hardly would have gotten those bits and bytes to feed my curiosity. Your new GeekGadget (`ftp://ftp.unina.it/pub/amiga/geekgadgets/amiga/m68k/snapshots/current/`) Project with the GNU ports is **very praiseworthy**.
  The text you read at the moment has to be partly credited to Fred Fish because it is written in `Texinfo`.

Reinhard Spisser and Sebastiano Vigna
: for the Amiga-port of “makeinfo“.

Michael Marte, Hamish Macdonald, Geert Uytterhoeven, Chris Lawrence,
: Joerg Mayer, Martin Apel, Richard Hirst, Roman Hodek, Thomas Kruse, Benjamin (Benni) Lorenz, Odd-Jarle Kristoffersen, Jes Sorensen, Ron Flory ... (MC 680xx LinUX)
I can't find words.

Kamil Iskra, Philippe Brand, Fred Fish, Leonard Norrgard, Hans Verkuil, Gunther Nikl, Anders Wegge Jakobsen (GNU C Compiler)

: You made it possible to program for every platform.

Dirk Busse (CopyMemQuicker)

: Thanks to your optimising, the cache has become even more faster. See Appendix A [Speed up], page 32.

Matthew Dillon
: Without your **DME** (programable text-editor) maybe I had never started typing.

Friedjof Siebert
: Without your damn-fast Oberon-compiler, it would have been only half as much fun.

Amiga Modula Oberon Klub Stuttgart AMOK
: Your enthusiasm dragged me on. Where do you get all these good ideas from?

Niclaus Wirth
: Brought light into the darkness, finally one can read the programs.

Jonathan Potter
: Please stay with us. From ScreenX to DOpus, you evolved very much.

Ralph Babel
: Very dry, interesting book, in which sect are you now?

Commodore, AmigaInc. ...
: Don't dare to drop the Amiga like the Hippis the ‘68er. The Amiga is the Harley among the platforms.

Telekom
: He, I still don't have a modem.

Quasar (White Box), CodX (Dialer/UnlimitedAcces)
: Really clever how you fooled the Telekom back then.

William Gibson
: Great books, I still don't understand one word.

Future Drive Accelerator

William Gaddis
: Master of the dialogue, pity that your time is over.

Nico François
: PowerSnap is just great! RequesterTools anyway. PowerPacker was a must in times when buying a harddisk costed a fortune.

Georg Hörmann XFD
: Fixed the old bugs in the decrunchers.

ASDG FACC
: Your FloppyAccelerator inspired me.

TURBOBRAIN (D-Copy)
: Your D-Copy (`http://de.aminet.net/pub/aminet/disk/misc/DCopy31.lha`) finally brought X-Copy to an end.

Georg Heßmann
: Your PasTEX made the Amiga able to print.

? SoundTracker+
: The author is unknown, so I just thank
Tracer and DOCTOR MABUSE and UNKNOWN of D.O.C and
MnemoTroN / Silicon League,
TIP of THE NEW MASTERS.

BAMIGA SECTOR ONE, RED SECTOR ...
: Great intros, just very old.

Kai Nickel (MathX)
: Another remnant of AMOK. Abitur (school leaving examination) is impossible without your program.

TRIAD (TitanicsCruncher)
: Without your cruncher, one would have to buy RAM all the time.

Bert Jahn WHDLoad (`http://www.fh-zwickau.de/~jah/whdload/`),
Jean-François Fabre JST
(`http://perso.club-internet.fr/jffabre/amiga/patches.html`)
: Good work, finally the classic games work with AGA, too, and can be loaded quickly from the harddisk.

BullFrog (Populous, Powermonger...)
: It is real fun to play god.

John Matthews (MultiPrint)
: What did I have to suffer from print-programs until I found yours! Well, the handling could be easier.

BootX VirusX VirusZ ...
: I believe it was you who killed these poor viruses; and if not you, then it was OS2.0.

Zeitschrift Computing C-16
: I find it impossible to print programs on dozens of pages, which you had to type into your computer to play something.

Commodore C-16 Plus 4
: Was fun, especially because you could press some keys and break and disassemble and debug any given program.

Forum InformatikerInnen fuer Frieden und gesellschaftliche Verantwortung FIFF e.V.
Pretty Good Privacy PGP
: Thanks for telling the people about the governmental fooling.

Michael Sinz (MKSoft Development), Bryce Nesbitt
: Without DiskSpeed, no one had told me it was getting better. The Enforcer is absolutly necessary for debugging.

Martin Mares (MJSoft System Software)
: Your Resident Module Launcher, and SKick are really good, now you don't have to buy several ROMs each time.

Valenta Ferenc (Copper-Demon)
: Great feeling.

Sylvain Rougier (ParM)
: Your ParM is my ToolManager.

Stefan Becker (ToolManger)
: I used the structure of your documentation.

Richard Körber (PatchWork)
: See Appendix D [Known Bugs], page 35.

Thomas Richter (SaferPatches)
: DiskSafe (`http://de.aminet.net/pub/aminet/disk/salv/DiskSafe.lha`) is a nice little tool.
Your SaferPatches (`http://de.aminet.net/pub/aminet/util/misc/SaferPatches.lha`) solved the problem!

Harry Sintonen (HackDisk)
: Your HackDisk assembler-sourcecode answered my questions.

Urban Dominik Müller, Dirk Stöcker, Bryan Ford and Christian von Roques
: Your XPK-system is without competition.

all users who decided to register Future Drive Accelerator.

Future Drive Accelerator

Appendix A How to speed up Future Drive Accelerator even more

So you can make Amiga faster.

Install a CopyMem(Quick)[11] Replacement for your processor type: 68000 (http://de.aminet.net/pub/aminet/util/boot/COPMQR28.lha) 68020 (http://de.aminet.net/pub/aminet/util/boot/CMQ030.lha) 68040+ (http://de.aminet.net/pub/aminet/util/boot/CMQ060.lha) The MCP replacement shouldn't be used, because it is slower than these versions.

Set the SCSIsynchron-Flag in the RigidDiskBlock of your boot-harddisk with RDBFlags (http://de.aminet.net/pub/aminet/disk/misc/RDBFlags-1.3.lha).

Don't use ChipMemory as cache, and set `not used ChipMem` in the preferences, to *100%*. See Section 7.1 [MainWindow], page 10.

If you use the program `PoolMem`, start it with the argument *NoRamReverse*.

A.1 Better use of ATA[PI] drives

You don't have AmigaOS 3.1 and want to install the newest update of the[12] scsi.device (ftp://ftp.amiga.com/pub/) to get a better performance? (especially together with ATA[PI] drives)

Attention! There is no guarantee for this hack.[13] The modified file may not be distibuted.

The hack works on an 1200 with OS 3.0.

1. Rename the file '`a300.ls.strip`', if you use an Amiga 1200[14] , to '`scsi.device`', and copy it into the '`Devs:`' directory.
2. Load '`scsi.device`' V43.xx into a file-monitor:
   Search for *$0c6c0027*. The next value is *$0014 6516*. Replace *$6516* by *$6026*.

---

[11] CopyMem(Quick) is used to copy data between cache and system memory.

[12] The hack als works with FastFilesystem V43.20 (ftp://ftp.amiga.com/pub/)

[13] The hack removes an alert which informs the user that no OS3.1 is installed.

[14] If you have another Amiga, please read the '`readme`' text in the update-archive, to find out which file is the best for you.

3. Get
   AddModule (`http://de.aminet.net/pub/aminet/util/boot/NewAlertH.lha`).

   In the first line of your '`s:Startup-Sequence`' write:
   `RUN <>NIL: c:AddModule <>NIL: DEVS:scsi.device CLASS 1 PRI 10`
   `INIT ;V43 CLASS xoper e flags`

After the second reboot, the new `scsi.device` is loaded.

A.2 General speedup for turbo boards

You have a turbo board, e.g. a Blizzard-IV with Extra Fast Memory?

Is the `exec.library` "function-jump-table" (AVL) in the Chip Memory?
(Can be found out using `XOper` or `FastExec`.)
Get FastExec (`http://de.aminet.net/pub/aminet/util/boot/FastExec29.lha`).
Start it with:
`FastExec SysInfo`

Is the output for `SysStkUpper` *$xxxxxxxx* a value greater than
$00200000 if you have 2MB ChipMemory, or
$00100000 if you have 1MB ChipMemory?

If not, then the `''supervisor stack''` is in Chip Memory. This slows down the "task-switching".

Insert this line in your '`s:Startup-Sequence`', after `AddModule` (if present):
`FastExec REBOOT FASTSSP FASTMEM`

Appendix B How to use bad memory

Do your programs crash randomly?

Then your RAM-modules may be faulty. Especially PS-2 (SIMM) modules are very vulnerable to "static electricity".
Or you have some unused RAM-modules laying around?

No need to worry, like on a harddisk, you can mark bad memory and exclude it from usage.

But first we have to know where exactly the memory is faulty. For this purpose there is an excellent program called MemTest (`http://de.aminet.net/pub/aminet/util/misc/MemoryTest.lha`), which should be started without booting (as much free memory as possible).
Beforehand, the “DataCache“ of the CPU should be disabled with

CPU NODATACACHE NODATABURST NOEXTERNALCACHE

. Now start the “`Rotate 32`“ test and save the result.

Now get Allocate (`http://de.aminet.net/pub/aminet/dev/misc/allocate.lha`).

Insert at the beginning of your ‘`S:Startup-Sequence`’:

```
resident c:Allocate pure
Allocate <>NIL: 68900000 100000
Allocate <>NIL: 68B00000 100000
resident Allocate remove
```

The hexadecimal addresses should, of course, contain the bad memory areas. (Be generous, don’t be stingy with a few 100KB or MB (depending on the chip).)

This works with `Lin`UX, too:

Create a ‘`file`’, where you insert all areas which work 100% okay. For example

```
2097152
0x68000000 9437184
0x68A00000 1048576
0x68C00000 3670016
```

and start `AmiBoot` with *`-m FileName`*.

Appendix C How to make the Amiga more stable

Do your programs crash with a Guru *4* (Instruction error) or *$1000005* (Memory corrupt) ab?

The reason could be a too small stack. Every System has a different stack usage, because different programs run in the background, and change system-routines.

If several programs change the same system-routines, this may result in an stack overflow

- which can destroy the free-memory-list,
- or the return address of a subroutine is gone after a task-switch,
- or even other programs are changed accidently (Enforcer/CyberGuard-Hit).

Even if only one program changes a system-routine and doesn't use stack itself, there are at least 4 Bytes used.

Luckily there is `StackAttack` (`http://de.aminet.net/pub/aminet/util/boot/StackAttack.lha`), Which gives almost every program a little more stack.

example installation in the '`s:Startup-Sequence`':

```
StackAttack ADDSTACK=512
```

Appendix D Known bugs

If your think you found a bug in `Future Drive Accelerator`, please send a description see Section D.1 [New Bug], page 37 to the author see Chapter 9 [Author], page 18.

Here is a list of known bugs and problems:

Bugs:

- ABackUp has a problem with the RAM-Disk patch of `Future Drive Accelerator` V1.4.
  ⇒ If a file is packed with XPK and there is no space in the RamDisk, ABackup thinks the file is 2GigaByte large.
  Will be fixed in the near future, when the author has completly rewritten the memory-routines.
- `AvailMemory(largest)` gives a value that is too small.
  ⇒ There is a larger continous block; so "`not used FastMemory`" can be set tof *1*%.
  The real value can be determined if you start `Avail` from the shell, then quit FDA, and again start `Avail`.
  Will be fixed in the near future, when the author has completly rewritten the memory-routines.
- If the "`Size of Track`" is different from disk to disk, the memory will be fragmented.
  Will be fixed in the near future, when the author has completly rewritten the memory-routines.

Not real bugs:

- If `Not used ChipMemory`, see Section 7.1 [MainWindow], page 10 is set to *100%*, no track can be moved to make room.
  ⇒ The track is removed from the cache.
  Will be improved soon, when the author has rewritten the memory-routines.
- Doens't support AbortIO,CloseDevice yet.
- Supports, but not optimal, AllocMem(reverse).
  ⇒ AllocMem reserves a memory area which is the last free. Normally this is in an early region, because the cache is behind. See Chapter 6 [Installation], page 9.
  Will be fixed in the near future, when the author has completly rewritten the memory-routines.
- `ViNCEd` V3.63 doesn't use `AllocEntry` or `AllocPooled` from exec library, to maintain an own poolmemory, to bundle small memory allocations. (It replaces `AllocPooled` with an own routine.)
  ⇒ The cache is very often flushed unneccesary. That's a pity, because for instance the horizontal scrolling is a nice feature.
  `KingCON` V1.3 makes no problems.
  Will be fixed in the near future, when the author has completly rewritten the memory-routines.
- `vdisk.device` 2.7 (C) 1994-1997 by Etienne Vogt (like ramdrive.device) Doesn't work together, because `vdisk` does not use OS-memory functions. Is not that tragic, because it doesn't support FastFileSystem V44.5, too.

`Future Drive Accelerator` has been tested intensively with Enforcer/MungWall and PatchWork.

Patchwork has helped to figure out two very resistant bugs.

- CopyMem(Quick)
  size must not only be LongWordAlligned (size MOD 8=0), but also Destination & Source. The bug appeared only after several 1000 times and caused chaos in memory.
- CopyMem(Quick)
  "memory areas are overlapping (incremental)" seemed to work, but sooner or later, there will be chaos in memory, too, at least with CopyMemQuickerV2.8. This doesn't mean that CopyMemQuicker is not a good program. See Appendix A [Speed up], page 32.

Problems of other cache-programs

- PowerCache
  - Has caused **checksum error** while writing, because Read/Write request are not put in a queue. Especially because the settings are saved to late before a reboot.
  - Cache usage is not flexible.
  - Doesn't re-use the cache when reinserting a disk.
- DynamiCache
  - Does not support Write Async.
  - Does not support SCSI-direct-FileSystems.
  - Does not support harddisk with more than 4 GigaBytes.
  - Doesn't re-use the cache when re-inseritng a disk.
  - Fragments the memory **extremely**.
  - Does not support `AllocAbs` and `Allocate` to free the cache for other programs.
  - If flush is executed (memory full), the cache is deleted, although the memory is not too short anyway.
  - Does not cache accesses from `ArtStudioPro 3` and `Imagine`.

D.1 New bugr

1. Which version do you use?
2. What was set in FDAPref, see Section 7.2 [DeviceWindow], page 12? (Removeable Disk?, ...)
3. What says FDAPref, see Section 7.3 [InfoWindow], page 14, about the non-functioning partition?
4. If other programs do not work as they should, do they without FDA?
5. If DOS-checksum (Read/Write) error occured, please activate FDAPref ⟨Protect tracks in memory with checksummes⟩, see Section 7.1 [MainWindow], page 10. If FDA reports checksum errors, it is not a FDA BUG. Or try to install another FileSystem, if the harddisk has more than 4 GigaByte capacity. See Section 10.1 [FileSystem installation], page 20.
   Or remove static dust from your RAM-modules. See Appendix B [Mark Bad Memory], page 33.
6. How did the bug appear? How can it be reproduced?
7. Which hardware/software (Mem, OS, FileSystem, Device-Software) was used?
8. Was there a Guru-alert (error messages)?
   In FDA are Guru-number (error messages) built-in. These start with *$0FDA00##*.

If there was another number, please start SegTracker from the Enforcer-package. Start Tnt or if possible Enforcer or replacement programs like CyberGuard (MC68060). Wait for the bug to show up again.
Write down the error message.
SegTracker is important because the author would like to know when the BUG occours. See Section D.1.1 [DebugFiles], page 38.

9. If something like this appears, please start Segtracker before.

```
Guru #0005: Division durch 0
Dx 00007FFF 00000000 08C6FFFF 00000000  7FFFFFFF 00000000 081AAE54 00000000
Ax 081AADEC 08C5F9D6 08C5F9DA 08C5F88A  081AAE54 08C5FC34 08000AB0 08C5F820
segment FDAPref
hunk      0
offset  0000365E
sr 0000
pc 08C553E6
<RETURN>
```

D.1.1 SegTracker, Enforcer und Co.

Please read on if you have a processor with MMU, or want to know whether you have.

Needed files

Enforcer supports MC68060
(`http://de.aminet.net/pub/aminet/dev/debug/enforcer.lha`),

CyberGuard supports MC68060 DisASM
(`http://de.aminet.net/pub/aminet/biz/p5/68060-V44_3.lha`),

MungWall to detect Bad written Programs
(`http://de.aminet.net/pub/aminet/dev/debug/Mungwall37_64.lzh`).

needed to display output (Virtua Terminal) (Work also if the MultTasking is switched off), a replacement for Sushi
(`http://de.aminet.net/pub/aminet/dev/debug/MungFriend.lha`).

How to run Debugging-Tools?

SegTracker (Needed for locate (Hunk-offset) the bug)
`RUN Devel:Debug/Enforcer/SegTracker`

Enforcer
`MultiCX/RebootOff` (if MultiCX is running)
`RUN Enforcer SHOWPC VERBOSE DEADLY STACKCHECK AREGCHECK DREGCHECK`

RAWIO (need MungFriend)
RUN Enforcer SHOWPC VERBOSE DEADLY STACKCHECK AREGCHECK DREGCHECK FILE=CON:0/0/640/100/Enforcer/Auto/Close
LawBreaker (Any Output? Yes the MMU is working.)

CyberGuard
RUN CyberGuard SHOWPC VERBOSE DEADLY STACKCHECK AREGCHECK DREGCHECK FILE=CON:0/0/640/100/CyberGuard/Auto/Close PCLINES=4 SHOWDISS

LawBreaker (Any Output? Yes the MMU is working.)

MungWall (Detect bad written Programms (CheckSumme-Error))
RUN MungWall INFO SHOWFAIL SHOWPC SHOWHUNK SHOWSTACK NAMETAG

Start Output Display Buffer (Virtual Terminal) (MungFriend ON RawSer->CON:)
RUN Devel:Debug/MungFriend INSTALL SIZE 40000 trace flash nobells noserial

Convert, only, GuruNumber in Hunk-offset, doesn't need an MMU.
Devel:Debug/Tnt FORCE

How to show the output?

MungFriend Type to Window
Devel:Debug/MungFriend >CON:0/0/696/200/MungFriendSerOutput/Auto/Close/Wait/SHELL TYPE

MungFriend Write to File
Devel:Debug/MungFriend Write ‘RequestFile DRAWER=SYS:T/ FILE=SerialOutput.txt TITLE="OutputFile"‘

MungFriend Clear
Devel:Debug/MungFriend CLEAR

MungFriend Info (Is any inside?)
Devel:Debug/MungFriend INFO

MungFriend ON RawSer->CON After Reset/Dead-GURU: (OutPut is still alife)
Devel:Debug/MungFriend update trace

MungFriend OFF
Devel:Debug/MungFriend REMOVE

Appendix E Technical data

For curious people, who want to know everything.

Future Drive Accelerator

- In Exec-Library are patched *AllocMem* (*AllocVec*, *AllocPooled*, *CreatePool*), *Allocate* (*AllocEntry*), *AvailMem*, *AllocAbs* and in the Device~*BeginIO*.
- Memory for the tracks is reserved decreasing (reverse).
- The program was written in `Oberon-2` and Assembler.
- One track requires 16 Byte in the cache-structure.
- Using Verify, memory of the size of one track is required per device.
- The TrackDisk64 and SCSI-direct commands support "only" 40-Bit

  ```
  2^40 =        1,0995 TeraByte   1125,9              GigaByte
  2^64 = 18446744,074  TeraByte      1,8889465931776e10 GigaByte
  ```

  The calculation is carried out with a "fast" 32-Bit division.
  1226 GByte Festplatten will not be available until the 3rd millenium (by todays standards).
- Only an offset which is divisible by 512 can be used. It would be possible to implement something else, but SCSI-drives don't support it anyway and there is no known program that doesn't read/write whole blocks (512 Bytes), so we can save a few bus-cycles here.
- These device commands are understood:

  '`include:exec/io.h`'
  read, write, update,

  '`include:devices/trackdisk.h`'
  format, extFormat, extRead, extWrite, rawWrite, extRawWrite, extUpdate, motor, extMotor, protStatus, getGeometry, getDriveType, getNumTracks, eject

  trackdisk64 (`http://de.aminet.net/pub/aminet/dev/misc/trackdisk64.lha`)

  read64, write64, format64

  NewStyleDevice (NSD)
  read64, write64, format64

  Is used by FastFileSystem V43.x (`ftp://ftp.amiga.com/pub/`).
  ⇒ No problems with harddisks bigger than 4 GigaBytes anymore.
  See Section 10.1 [FileSystem installation], page 20.

  Informations about these commands can be found here:
  NSDDocs (`http://www.amiga.de/files/index.html`)
  NSDPatch (`http://de.aminet.net/pub/aminet/disk/misc/NSDPatch43_20.lha`)

  '`include:devices/scsidisk.h`'
  scsiCmd

SmartFileSystem_SCSIdirect, FastFileSystem V44.5 und ProfiFileSystem-2_SCSIdirect use this command instead of the old trackdisk read/write commands.
⇒ No problems with harddisks bigger than 4 GigaBytes anymore.
See Section 10.1 [FileSystem installation], page 20.

Not all scsiCMD are used, because I don' have a documentation.

```
( SCSIProgrammer (http://de.aminet.net/pub/aminet/dev/misc/SCSIProgrammer.lha) )
( (include:scsi/commands.h SCSI-2 include files) )

( Direct Access devices       =da )
( Write Once devices          =wo )
( CD-ROM devices              =cd )
( Scanner devices             =sc )
( Optical memory devices      =om )
( Sequential access devices   =sa )
( Printer devices             =prt)
( Processor devices           =cpu)
scsiREAD6        =$08 ( da wo cd    om )(not tested)
scsiREAD10       =$28 ( da wo cd sc om )
scsiREAD12       =$A8 (    wo cd    om )(not tested)

scsiWRITE6       =$0A (    wo       om )(not tested)
scsiWRITE10      =$2A (    wo       om )
scsiWRITE12      =$AA (    wo       om )(not tested)
```

Has anyone a documentation for these commands?:

```
scsiREAD_BUFFER   =$3C ( da wo cd sc om sa prt cpu )
scsiWRITE_BUFFER  =$3B (    wo cd sc om sa prt cpu )
scsiUPDATE_BLOCK  =$3D (             om            )
```

E.1 What programmers should observe. . .

1. Data, which shall be written using the DOS functions `Read/Write`, should be `LongWordAlligned` (adr MOD 4=0), because the processor can access them faster then. This also applies to data which is sent directly to a device. AllocMem, Allocate. . . automatically return an address that is LongWordAlligned. So you only have to pay attention if you divide a memory block **manually**.
2. Remember: If you use `SendIO` instead of `DoIO`, the command is executed **A**sync. Not only reading and writing, but also `changeState, motor, protStatus, remove, changeNum` . . . commands.

E.2 Which values are the defaults?

At the first start and after choosing ⟨Edit/reset to Defaults⟩ from the menu, these values will be used:

```
Create Icons                                = FALSE (OFF)

Not used FastMemory                         = 60 KB
Not used ChipMemory                         = 50 KB
FastMemFirst                                = TRUE  (ON)
View color flash if track moved or deleted  = FALSE (OFF)
Protect tracks in memory with checksummes   = FALSE (OFF)


HD             Async delay                  = 4 seconds
Disk           Async delay                  = 7 seconds

Device| Pri | Settings
----------------------------------------------------------------------
DF0~  | 100~|~Removeable Disk, Write Async, Verify write
DF1   | 100~|~Removeable Disk, Write Async, Verify write
DF2   | 100~|~Removeable Disk, Write Async, Verify write
DF3   | 100~|~Removeable Disk, Write Async, Verify write
DS0~  |  80~|~Removeable Disk, Write Async, Verify write
DS1   | ~80~|~Removeable Disk, Write Async, Verify write
DS2   | ~80~|~Removeable Disk, Write Async, Verify write
DS3   | ~80~|~Removeable Disk, Write Async, Verify write
PC0   |  60~|~Removeable Disk, Write Async, Verify write
PC1   | ~60~|~Removeable Disk, Write Async, Verify write
PC2   | ~60~|~Removeable Disk, Write Async, Verify write
PC3   | ~60~|~Removeable Disk, Write Async, Verify write
PS0~  |  40~|~Removeable Disk, Write Async, Verify write
PS1   | ~40~|~Removeable Disk, Write Async, Verify write
PS2   | ~40~|~Removeable Disk, Write Async, Verify write
PS3   | ~40~|~Removeable Disk, Write Async, Verify write
CD0   |  20 | Removeable Disk, WriteRetention
HD0   |   0 | Write Async
HD1   |   0 | Write Async
HD2   |   0 | Write Async
HD3   |   0 | Write Async
DH0   |   0 | Write Async
DH1   |   0 | Write Async
DH2   |   0 | Write Async
DH3   |   0 | Write Async
```

E.3 Return values

The return values can be used within a shell-script.

```
Sys:Prefs/FDAPref ENVARC:FDA-AfterBoot.prefs USE
IF WARN ;FDA is not running
        RUN Sys:System/FDA ENVARC:FDA-AfterBoot.prefs QUIET
ENDIF

Sys:System/FDAView >NIL: Kill-FDA
IF NOT WARN ;FDA is running before
        RUN Sys:System/FDA ENVARC:FDA-AfterBoot.prefs QUIET
ENDIF

RUN Sys:System/FDA ENVARC:FDA-AfterBoot.prefs QUIET
IF $RC GE 5 ;FDA is running before
        Sys:Prefs/FDAPref ENVARC:FDA-AfterBoot.prefs USE
ENDIF
```

```
AlreadyRunning         = warn          (5)
PreferenceCancel       = error         (10)
PreferenceFDAnotRunning = warn         (5)
NoDeviceCached         = fail+1        (20~+1)
CanNotCreatePort       = fail+2
ReadArgsError          = fail+3
CanNotReadPrefs~       = fail+4
CanNotCreateTask~      = fail+5
AllocSignalError~      = fail+6
NoMem~                 = fail+777-fail
```

Index

P

Q

R

S