

# Installing a harddisk >4 GB with TD64

## **Why TD64?**

The Amiga was a pioneer with its 32-bit architecture in 1984/85. Having a harddisk was pure luxury, and the average size was hardly above 50MBytes. To address the space of a harddisk, 32 bits have been reserved. This is enough to address  $2^{32}=4\text{GB}$ . The Amiga even interprets the value as a signed number, thus displaying sizes above 2GB as negative numbers. Imagine you want to read a number on the display of a calculator. The number displayed is 279, but all digits except for the last two ones are covered. You'd read 79, so if you'd have use this number as a place where to store data, you'd make a mistake. TD64 gives additional 32 digits to the "calculator", so you can access 4 billion times 4 GB. This is presumably enough for the next few decades: Even for the freshly announced 72GB harddrive from IBM you only need 37 bits. For one Terabyte you need 40 bits, and 64 will address 8 Exabyte. Although you can only use partitions of 2GB max. (this is a DOS limit), TD64 is necessary for harddisks larger than 4GB.

## **What's changed?**

In order to use TD64, only the FastFileSystem has to be patched. Instructions on how to do that are contained in the TD64 archive that's also available in the download area of this website. You can also find the patch on the Aminet and on the driverdisks that are shipped with IDE-fix express and Buddha controllers. When the patch is done and the new filesystem is located in your L: directory, you can start the installation.

## **Preparing the harddisk**

To prepare the harddisk, use HDToolbox. It's located on the install disk that has been shipped with your Amiga. If you already have an installed workbench on your harddrive, the HDToolbox is located in the tools directory. Right after startup, HDToolbox searches for drives present in the system and displays the results in a list. If none of the harddrives in the list is labeled as *unknown*, please continue reading at *Partitioning the harddrive*. If your harddrive is labeled *unknown*, click on *Change Drive Type*. A new menu will appear, click on *Define New...* on that screen. The following screen will allow you to enter the drive data. Since Buddha and IDE-fix can fetch this data from the drive, you don't have to do this manually. Just click on *Read Configuration* and confirm your choice with *Continue*. The data gathered from the harddrive is entered into the fields automatically, and the size is also among all those numbers. Since HDToolbox is also a 32-bit program, the displayed size is not the actual space available on the harddrive. For example, an IBM DTTA 16gig harddisk is shown with -260MB size. Just ignore the size and click on *OK*, and in the following menu on *OK* again. The new harddisk is now shown in the list of available drives and you can start partitioning it.

## **Partitioning the harddisk**

Click on the harddisk you want to partition and then on *Partition Drive*. A graphic will appear that shows the layout of the harddrive. HDToolbox suggests to divide the harddrive into two halves, but this would result in partitions that are much too large for Amiga OS - the limit is 2GB, otherwise the commands format and info won't work properly. Move the arrow under the graphic until the size is smaller than 2000MB, keeping in mind that HDToolbox is a 32-bit program. That means: If you have a 16gig drive, a partition must occupy about 1/8

of the graphic. There are some positions where about 2000MB are being displayed, but only the one where the graphic display shows the smallest block is the correct one. The field *Partition Device Name* lets you enter a device name for your partition, for example "hd0". Now you can start the actual installation of TD64 itself: Tick the box *Advanced Options*. Further fields appear, giving you more information about the harddisk setup. In these fields, you can enter a new filesystem by clicking on *Add/Update...*. A list of the available filesystems is shown, but the new TD64 FFS is not yet in that list. To include it, click on *Add New File System...*. Enter *l:fastfilesystem\_44\_5* in the requester. The list now shows two filesystems, and the old one (the upper one in the list) is obsolete. Tag this filesystem and click on *Delete File System*. Before you leave this menu by clicking on *OK*, check if the list only contains the following:

Identifier	Version	Size	File System Name
0x444f5303	44.5	25612	International (FFS)

The filesystem is now properly setup on your harddrive and you can continue partitioning the disk. Check the setup of the filesystems for each partition by clicking on the field *Change...* (located under *File System:*): A window will be opened that gives you detailed information about the filesystem. Check these things: FFS-TD64 is a *Standard File System*. The boxes *Fast File System* and *International Mode* must be ticked. The box *Directory Cache* must not be ticked! Cross-check these settings by comparing with the identifier field: It must show the value 0x444f5303. The values for *Mask* and *MaxTransfer* are chosen automatically by IDE-fix and the Buddha drivers, so any change done to these fields will have no effect. The box *Use custom boot code* must not be ticked. We recommend a block size of 512 bytes. Leave this menu by clicking on *OK*. If you have created all partitions, you can leave the partition menu with a click on *OK*. The freshly partitioned drive will now be displayed as *Changed* in the list. To write the new filesystem and partition data to the harddisk, click on *Save Changes to Drive* and leave HDToolbox with *Exit*.

## **Formatting the partitions**

The only thing left to do before you can store data on the harddisk is formatting it. This cannot be compared to formatting a floppy disk, because harddrives are pre-formatted by the vendor. It wouldn't make sense to do a full format on a harddisk. With TD64, you **MUST** use quick format, because the format command is 32-bit, so it would only work for partitions located in the lower 4GB space of the harddrive. If used on a partition that is located after the 4gig-barrier, data in the first 4gig area would be destroyed. To Quick-format a harddrive, click on it's icon once and chose *Format Disk...* from the *Icons* menu. You can enter the name for the partition in that window (for example "Workbench"). Do not change the settings for *Fast File System*, *International Mode* and *Directory Cache*, because this would cause errors. To start formatting, click on *Quick Format* (the middle gadget). and confirm the requesters with *Format*. Since you're formatting a harddrive, two requesters will be opened. To be absolutely sure that you didn't make a mistake, you can do a simple check: Just enter *version hd0:* in a shell (or the name that you chose for your partitions). The output must be *filesystem 44.5*, otherwise you have made a mistake while installing the harddrive. Just check all settings step-by-step with this document. Maybe a restart of your computer is necessary before the new filesystem is activated. You made it! Your harddisk is now setup with TD64 and can be used just as every other Amiga harddisk.