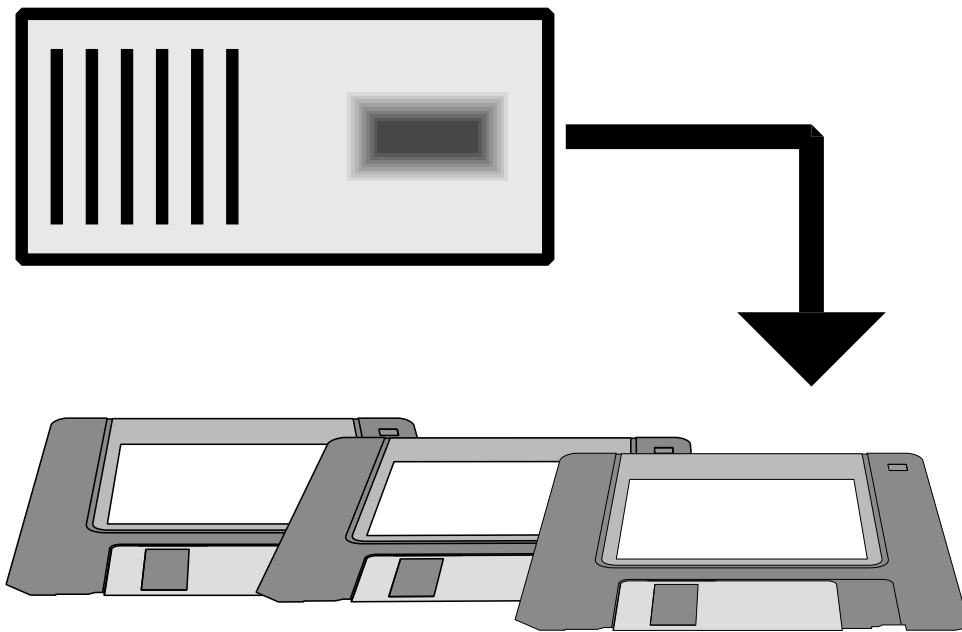


HardBack



Hard Disc Backup

For the Acorn Archimedes and Risc PC

Open Source Version

© Theo Markettos 1993-2002

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About this manual

This manual is divided into several sections:

1 Introduction

What HardBack does, and installation instructions.

2 HardBack in use

An in-depth guide to all the features provided by HardBack. The two programs, Backup and Restore, will be covered separately, since they differ substantially in their operation.

3 Other matters

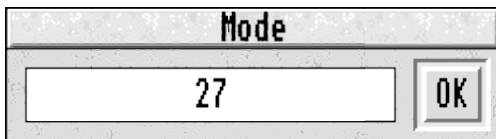
Points which are relevant to both programs, some of a more general nature.

4 Appendices

A: Information on how to contact the author.

B: Copyright information, etc.

This manual assumes you are fairly familiar with the desktop of the Acorn and that you know about choosing menu options, dragging icons, etc. If you are not familiar with this, first read the Welcome Guide and User Guide supplied with your computer.



All the screenshots in this manual have been taken from Risc OS 3.5 in high resolution mode 27. In low resolution modes, and on other versions of Risc OS, especially version 2, some of the windows may look slightly different. This has no effect on how HardBack works.

Also, you should check the textual version of this section, as it may contain a section of release notes, which give information about particular versions of HardBack and any last-minute details not contained in the main manual.

Introduction

HardBack is a hard disc backup utility which allows you to protect your data from unforeseen events. If your hard disc crashes or you accidentally delete an important file, having a backup copy can save you a great deal of trouble and prevent you losing what may be many hours work. It can also help, for example, if your computer is stolen or some errant virus deletes your hard work.

This version is supplied under Open Source licensing conditions. See Appendix B for more details.

Features of this full version of HardBack include:-

- Compressing of files, typically 50-60% of original size.
- Splitting of large files between discs.
- Filling up of discs completely.
- Multitasking backup and restore operations, allowing you to get on with other work while the backup proceeds.
- Restoring selected items from windows which look and behave almost exactly like Filer windows.
- Dragging of objects from the selected items window directly onto programs, without having to drag them to a disc first.
- Selecting of virtually any destination.
- Backing up on media of any size, from 12K RAM discs to 4Gb+ hard drives.
- Improved handling of hard discs, Syquests, Zip discs, Jaz discs etc.
- Mixing of media size within the same backup.
- Choosing to backup particular files/directories or backup the contents of one directory.
- Choosing to backup only particular types of files, including Impression documents.
- Ignoring certain files/directories, if you do not want them to be backed up.
- Backing up of objects created after either the last backup or created after a specified date and time.
- Choosing various options about how to backup PC partitions and similar files.
- Renaming of discs so that different backups can be distinguished (optional).
- Calculating of a checksum for each file to ensure that, when restored, it is identical to the file that was backed up.
- Optimising HardBack to work as efficiently as possible through various configuration options, such as choosing not to compress short files or files of particular types.
- Saving of all options as a script file, which, as well as being

- able to be reloaded into HardBack, can be run from other programs or double-clicked to start the backup procedure.
- Saving of a script file as the default to be loaded when HardBack starts up. This script file can be anywhere and need not be inside the !Backup application.
- Requiring no disc workspace for Backup and Restore; they do not write to files inside their applications, so they could easily be put onto a CD-Rom.
- Carrying out of a backup operation without human assistance – for example, in the middle of the night – due to several command line options.
- Managing of memory dynamically, which allows you to alter the amount of memory used as workspace by HardBack – files can be backed up and restored using a lot or a little memory.
- Formatting of discs automatically, if necessary.
- Preserving of all the other files on backup discs, which need not be empty; the files will remain intact, if you wish.
- Informing you comprehensively of how the backup is proceeding and giving you an estimate of time to go.
- Pausing of the backup operation option, which allows you to halt it temporarily.
- Backing up can be stopped at any point, without quitting the application.
- Restoring the whole backup or only selected items, as you prefer.
- Working on all versions 2-5 of Risc OS, under Risc OS 3, with nice 3D windows and solid sprite drags for all drag operations.
- Containing all messages in a file which can be translated into any language.
- Backing up of individual files directly from the source entry, a way to archive large files over several discs.
- Supporting fully of Interactive help.
- Speeding up of many operations compared to the demo version.
- Saving of script files on every backup disc – this aids identifying them later.



Installation

To install HardBack onto your hard disc, simply drag the applications !Backup and !Restore to a suitable directory viewer on your hard disc.

HardBack in use

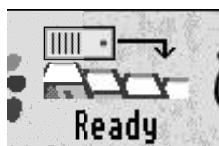
This section gives an in-depth guide to the features present in Backup and Restore.

Backup

Basic overview

When you first load HardBack, an icon is displayed on the iconbar. Clicking on this icon will bring up the options window, allowing you to set various options about the backup, and save and load script files. Once these have been set, a click on Start starts the backup operation proper. This opens the status window, which tells you how the backup is progressing. At certain times dialogue boxes may appear, either asking to make choices or to do something (such as insert a new disc) and click **Continue**. Once the backup has finished, a short message will be displayed at the bottom of the status window. When this has happened, you can start another backup operation by closing the status window and clicking on the iconbar icon, which will display the options window once again.

Starting up

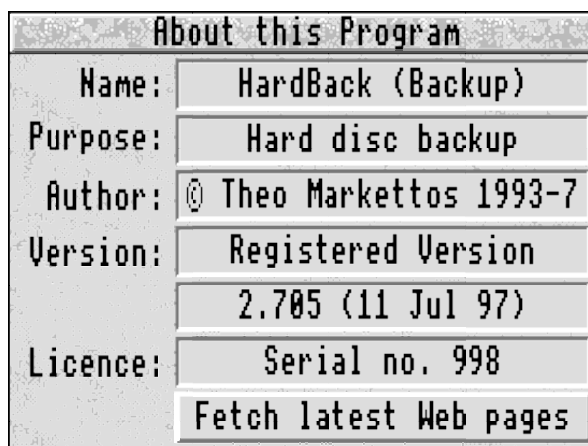


To start up Backup, double-click on the !Backup icon in a directory display. After a short pause, the icon will appear on the iconbar, with the word 'Ready' underneath it. This signals that Backup is waiting for you to tell it to do something. If you click Menu over the iconbar icon, a short menu will appear.



Info

This opens a window giving information about the Backup program:



It also displays the version and serial numbers, which should be quoted in all correspondence with the author.

The 'Artistic Licence' button (not shown in this screenshot) will open the licence terms for your copy of HardBack.

The 'Fetch latest Web pages' button will do nothing unless an Internet connection is active and a suitable Web browser (such as ArcWeb, Fresco, Voyager etc.) is loaded. In this case, clicking on it will open the HardBack home page at <http://www-stu.cai.cam.ac.uk/~atm26/hardback/>

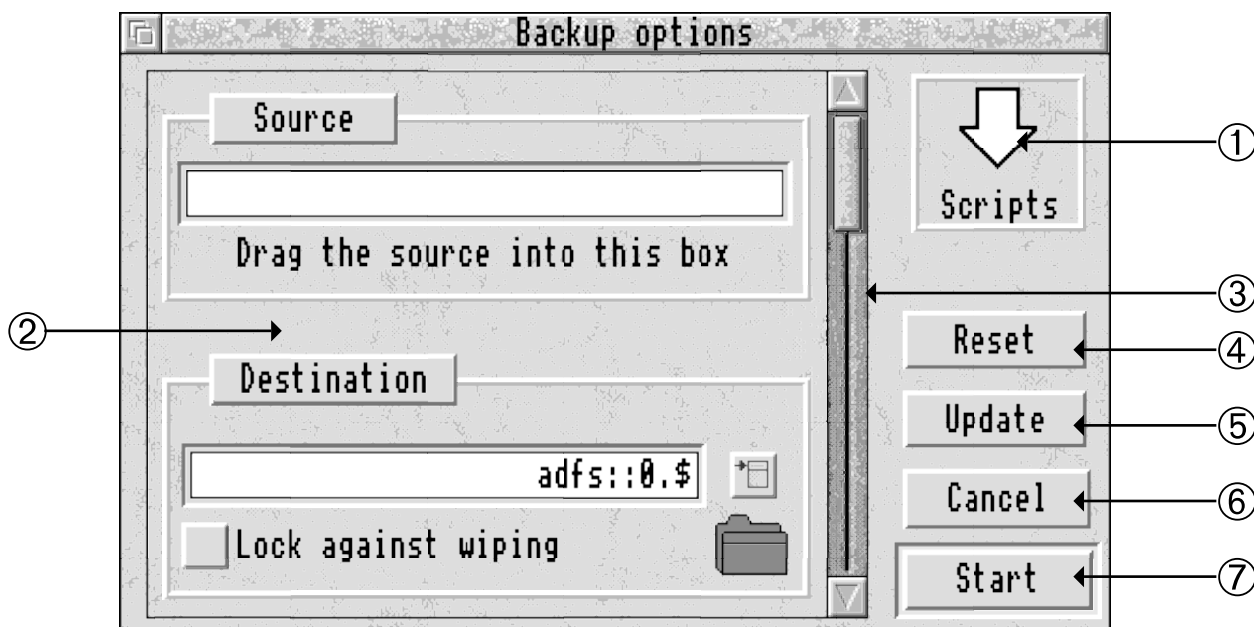
Quit

This exits the Backup program and removes it from memory. You will be asked if you really want to quit, if there is a backup in progress.

If you click on the iconbar icon, the *Options window* will appear.

Options window

This window permits you to change a large number of factors, which affect what the backup does and how it works.



① Load target

Drag a script file here to load it into HardBack. If Shift is held down, then any files in the Selected and Ignored windows will be cleared before the script file is loaded; otherwise the items currently there will remain and the selected/ignored parts of the two files will merge.

This version of HardBack can also load ClicBack options files in this way. The conversion is not exact, as each program has sections which are not supported by the other, but HardBack tries its best.

② Scrolling section (pane)

This section contains the options themselves and can be scrolled by using ③. The official Acorn name for it is a *pane*.

③ Scroll bar

Use this to scroll the scrolling section, as you would any other Risc OS window.

④ Reset

This button resets the options to what they were when they were last stored – when Start or Update was clicked, or when a script file was loaded or saved. Note that Selected and Ignored files, plus the contents of the ‘Only file of type...’ and ‘Don’t compress types’ lists are stored each time a new entry is added, removed, selected, or deselected, and so these values will not change.

⑤ Update

This updates the copy of the options stored within the program to that shown in the options window.

⑥ Cancel

This is the same as reset, but it also closes the options window.

⑦ Start

This is the same as update, but it also starts the backup operation described by the options.

Options menu

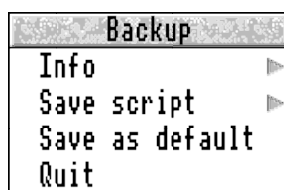
This behaves in a similar way to the iconbar menu, except it has two extra items:

Save script

This leads to a normal save dialogue box, allowing you to save a script file. See below for more details on what they do.

Save as default

This saves the script file so that these settings will be present in the options window every time you load Backup. Usually the script file is saved inside !Backup, but this can be changed – see the Other Matters section for more details.

**Script files**

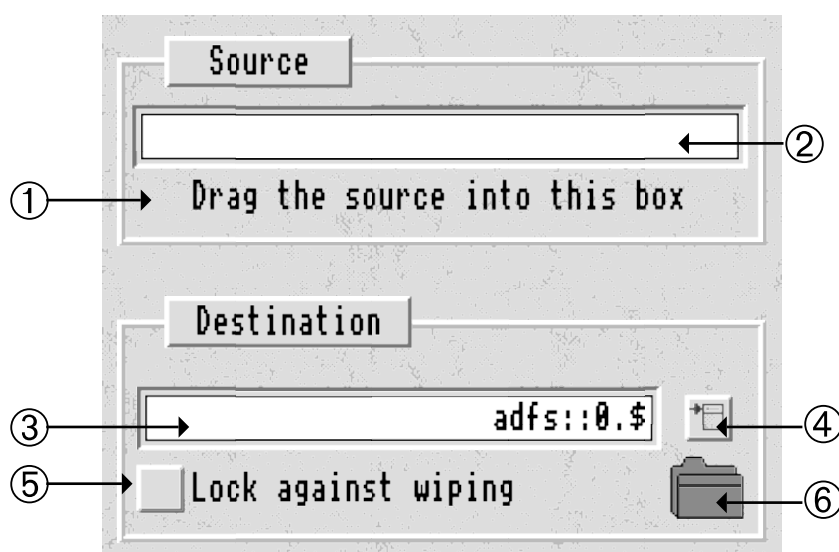
Script files are a method by which you can save the settings in the options window, so that, if you want to repeat a backup, all you need to do is save a script file when you do the first backup (there is an option to automatically save one on each backup disc) and then drag it into Backup when you want to repeat it. Backup will be set up exactly as before, allowing exactly the same backup operation to take place. If script files are dragged to the options

window, they are loaded into it, while, if they are dragged to the iconbar icon, they are loaded and the backup operation started. When you are doing a backup for the first time, you can ignore the 'Load script file' option.

Scrolling options

This is the main part of the options window that allows you to set the criteria by which the backup is carried out. It is divided into several parts:

Source/Destination



① Source box

Dragging a file or directory here will fill in the source icon with its name. Dragging with Ctrl held down will enter the name of its parent into the source icon.

② Source icon

This icon allows you to type in and edit directly the name of the source file or directory, i.e. the name of the file or directory you want to be backed up.

③ Destination icon

This icon allows you to enter and edit the name of the destination drive and directory, i.e. the drive and directory to back up the source onto. In most circumstances, directories which are mentioned in this path, but do not exist, will be created. There are two types of destination which can be used. Either a complete pathname can be used, as shown at the top of a directory display, such as 'adfs::FredDisc.\$HD5Back.Work'. This is the form that

should be used for hard discs, as it does not prompt you for more discs if the current one is full. Alternatively, the destination can be in the form 'adfs::3.\$Back010396'. This form allows multiple removable discs to be used and prompts for the next to be inserted. To qualify for this, it *must* have a drive number, not a disc name. The directory can be set for the hard disc type by dragging a file or directory to this icon. As before, if Ctrl is held down, the parent will be entered into the box. The destination can be set for the floppy/removable disc type by choosing from the menu as detailed below. If you are backing up to a SCSI hard drive, it is better to use the 'scsi::HardDisc7.\$' approach, rather than choosing it from the menu. This is because the menu/multiple disc version mounts and dismounts the disc several times before the backup commences. Depending on your SCSI card/drive combination, this may repeatedly power up and power down the drive. While this does not harm the drive, it does cause increased wear on the bearings and wastes time.

Removable media other than ADFS and SCSI devices should work, but obviously it is impractical to test every possible device available. To use them, enter the filing system name in the form magopt::0.\$

④ Destination menu icon

This icon opens a pop-up menu containing a selection of possible destinations. It auto-senses how many ADFS floppies and SCSI drives are connected, and puts only valid items onto the menu. However, it cannot sense what type devices are – for example, CD Rom drives connected via SCSI may appear on the menu, when they obviously cannot write data. If a parallel Zip drive is active, choosing izipfs::0.\$ will select it.

⑤ Lock against wiping

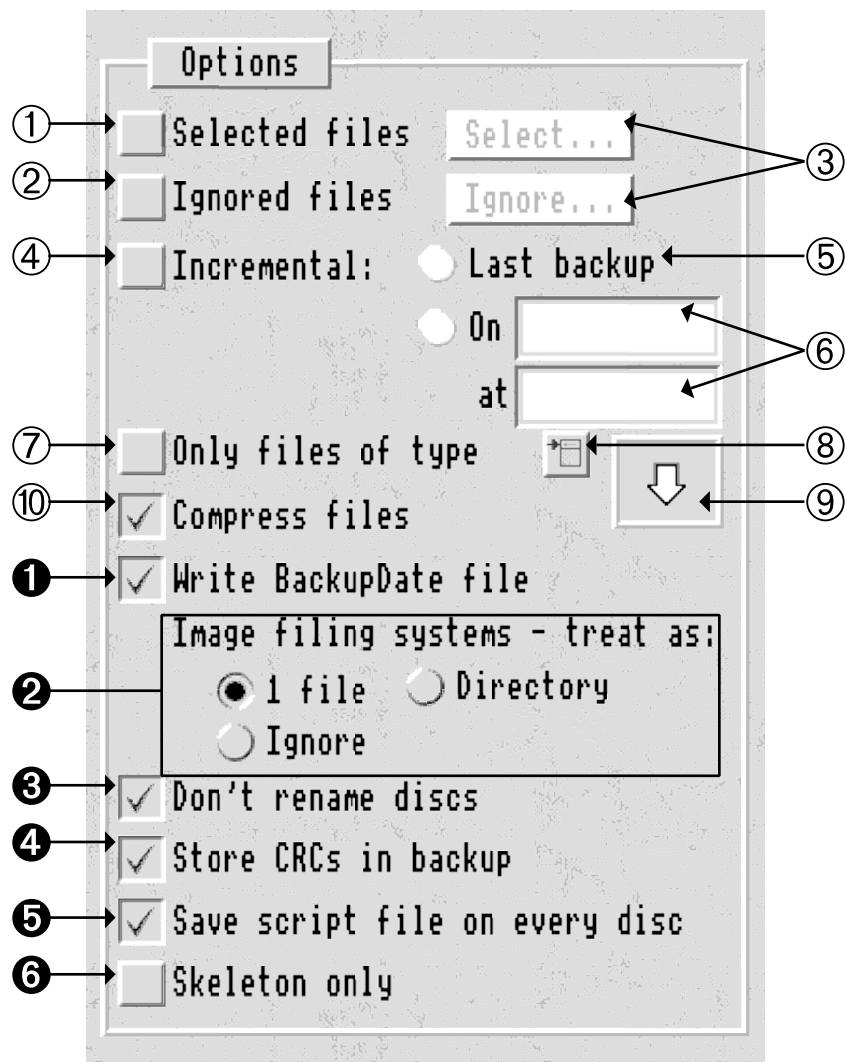
This option, when turned on, inhibits queries as to whether to wipe the destination or not, and so keeps the contents of the destination intact. This is useful if you have specified a hard disc or other similar device for the destination – it is all too easy to accidentally OK a request asking whether you want to wipe your hard drive.

⑥ Destination directory icon

The destination directory can also be set by dragging this icon to a directory display and the destination will be set to it. Remember that doing this will store the backup files directly into the directory it is dragged into, so that, if you want to put them in a subdirectory which does not currently exist, you should edit the path afterwards.

Options

This region permits you to set some of the major, but non-compulsory, options.



① Selected files

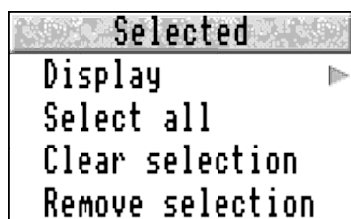
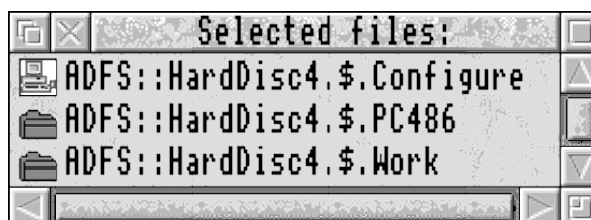
This allows you to choose particular files and directories to backup. They needn't be in the same directory, or even on the same drive or filing system. When this is selected, incremental backups are disabled, and so ④, ⑤, ⑥, and ⑪ are disabled. Click on **Select...** to display a window into which you can drag particular files. When **Selected files** is used, the source name is not necessary. However, it is still stored in the backup file as the 'parent' of all the files, as if they all came from the same directory, and it is used as the default directory when you are restoring the whole backup. If no name is present, Backup.Selections will be used instead.

② Ignored files

This allows you to opt to ignore certain files and directories that you don't want to be backed up. The files to ignore can be anywhere within the directory structure as long as a parent is specified to be backed up; if it is not specified, then clearly nothing will happen. If a file or directory is present in both the **Selected** and **Ignored** windows, then it will be ignored.

③ Select.../Ignore...

Clicking either of these buttons brings up a window, to which you can drag files and directories, to choose either to backup or not to backup.



You can select particular items in the same way you would do in a Risc OS 3 Filer window, and clicking Menu over the window brings up a menu which gives you options to remove files or directories from the window by means of selecting them and choosing **Remove selection**. The **Display** entry leads to a submenu, allowing you to sort the contents of this window in either alphabetical or filetype order. Please note that it is not advisable to drag two files which have the same filename, but from different directories, into this window. HardBack won't complain, nor will it have any problem backing them up, but, if they are both restored at the same time, one will overwrite the other. If this does happen, you should use **Restore selected files** to restore them separately.

④ Incremental

This option allows you to backup files that have changed since a certain date. It does not apply to directories; all directories are scanned, but their contents will not be backed up if it is older than the date specified. Files which are untyped, i.e. have load/execution addresses rather than a filetype and date stamp will always be backed up.

⑤ Last backup

This option, when Incremental is switched on, will read the date of the last backup from the BackupDate file stored in the source directory and back up all files created after the date held within it. If a BackupDate file is not present in the source, then an error will be given when you try to start the backup. You can check the date held in a BackupDate file by loading it into a text editor, such as Zap or Edit. It is stored in an intelligible form at the end of the file.

⑥ On/at

This allows you to specify a date and, if necessary, a time directly by typing it into the icons. The date should go in the top icon in the form day/month/year and the time, in the bottom icon as either hours:minutes or hours:minutes:seconds. The year can either be as four digits (1998) or as two (98). If it is as two, then it is assumed to be in the 21st century. Alternatively, dragging a file or directory onto this icon will set the date and time to when it was last saved.

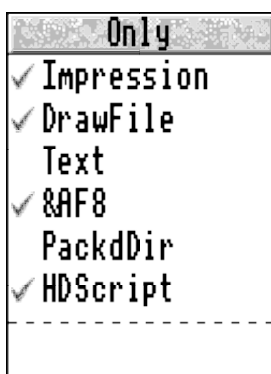
⑦ Only files of type ...



Basic menu

This option allows you to choose only to backup files of specified filetypes, including Impression documents stored as applications. The list which contains those filetypes you do want to backup can be added to by clicking on the pop-up menu icon to the right (Ⓢ), or by dragging files of that type to the load target (Ⓣ).

⑧ Only files... pop-up menu



With a few types added

Clicking on this icon opens the menu which contains a list of those filetypes you want to backup. At the top of the menu is a list of the filetypes that have been entered already. You can click on any of these and it will toggle whether that type is to be backed up or not. If a filetype is to be backed up, its entry will be ticked. At the bottom of the menu is a writeable icon, into which you can enter filetypes. This can either be in the name of the type, such as 'DrawFile', or its hexadecimal type, such as '3FB'. The entry will then be put on the menu and automatically ticked. The Impression option recognises an Impression file as being a directory with a file called !DocData inside it. If you have any directories with !DocData files inside them which are not Impression files, then they will be backed up. Also, if you have any Impression files without !DocData, then they will not be backed up. To back up Impression Style or Publisher documents saved with **Single file document** switched on, add ImpDoc to the list.

⑨ Only files... load target

Drag files here to add their types to the list of filetypes to backup, as displayed on the menu produced by clicking on ⑧.

⑩ Compress files

Select this option if you want files to be compressed when stored in the backup. This will reduce the number of discs they use, but may slow the backup operation down somewhat. The compression achieved depends on the contents and length of each individual file, and the size of file buffers.

① Write BackupDate file

The BackupDate file is used to store the date of the last backup – see ④ Incremental for more details. If this option is off a BackupDate file will not be created in the source directory. This is useful if you do not intend to do an incremental backup on a particular source or because the source is read only, such as a network.

② Image filing systems...

Under Risc OS 3 only, image files are partitions of a disc which are actually a file, but, when double-clicked, open like a directory – for example, PC partitions and ArcFS 2 archives. This section provides three possible ways of backing them up:

1 file: This treats the image file as a file and backs it up in the exact form it is on the disc. This means you can restore an identical copy from either the **Entire backup** or **Selected items** part of Restore, but you will not be able to access the files inside it under **Selected items**.

Directory: This treats it as a directory, and so opens it and backs up each of the files inside individually. In Restore, you can only access the contents under **Selected items** – you cannot restore the whole image in **Entire backup** or drag out the image file itself from **Selected files** because HardBack has no way of knowing how the original image file was structured. **Restore entire backup** will simply ignore image files stored in this way.

Ignore: This ignores all image files completely.

Please note that an image file is only recognised as an image file if the relevant software is loaded – for instance, until ArcFS 2 is loaded, all ArcFS archives will be treated as normal files.

HardBack can cope with files which have names up to 255 characters long. However, in Restore under **Selected items**, the directory display may be slightly messed up if they have more than 12. This should have no effect on restoring them.

③ Don't rename discs

By default, discs are renamed to a name which allows you to determine that they are backup discs and to what set they belong. The name is in the form 17Oct95/42. The first part is the date (17th October 1995) and the second part, the disc number within the set (42). If this option is selected, discs will not be renamed. This is useful for hard discs or discs which are not used solely for backups.

④ Store CRCs in backup

CRC stands for Cyclic Redundancy Check – basically this process adds up all the numbers making up a file. If this option is selected, a CRC is compiled for each of the files to be backed up and stored in the backup. When the backup is restored, Restore will calculate another CRC for each of the files restored. It will then compare the two CRCs and, if they do not match, it will warn you that the file has been corrupted. In effect, this option ensures that, when files are restored, they are checked to be the same as those files backed up. The reason why this option is not permanently switched on is that it takes time to compile the CRCs and so this will slow the backup down somewhat.

⑤ Save script file on every disc

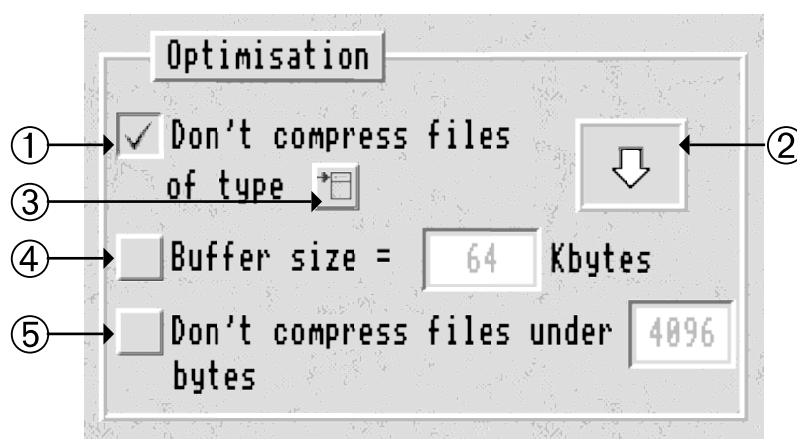
This option saves a script file detailing the backup on every backup disc used. This is useful because it means you can repeat a backup done some time ago and makes it easier to identify a backup disc. Without this on, the only identifier of what is on the disc is the disc name, if **Don't rename discs** is off. If it is on, you have no way of knowing of which set the disc belongs to.

⑥ Skeleton only

If this option is selected, only the details about the directory structure and the files contained within it will be stored, but not the contents of files. This allows you to create a skeleton of the directory structure and store in a small space. This skeleton can be navigated using Restore Selected Items and, if it is restored, the structure will be recreated, but files will be filled with zeros to their length when they were backed up. Restore will not overwrite old files when restoring a skeleton backup, so data loss is prevented.

Optimisation

This section allows you to speed up HardBack to the greatest possible extent and produce smaller backup files.



① Don't compress files of type ...

This option behaves in a similar way to 'Only files of type ...'. Click on ③ to bring up a menu which behaves in the same way as that produced by 'Only files...'. This option allows you to choose various filetypes that Backup will not try to compress. This option is most useful for files which are already compressed, such as ArcFS archives, JPEG images, etc. Ordinarily, Backup spends time trying to compress these files and, when it finds that it cannot do it, throws the result away and backs them up without compressing them. If the filetypes are on this list, Backup will not bother to try to compress them, thus saving time.

② Don't compress ... load target

Drag files here to include their filetypes on the Don't compress list.

④ Buffer size

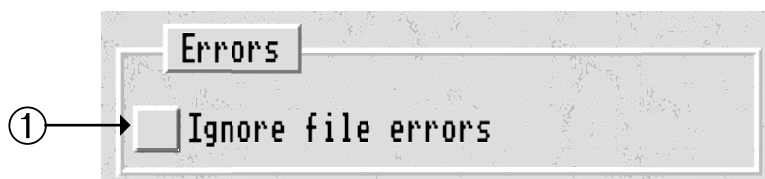
This allows you to expressly set the size of file buffers used, when reading data from files and copying it into the backup file. Basically, the higher this value, the faster the backup proceeds. Another way to increase the size of the file buffers is to open the Task Manager's Task Display and drag the red bar next to HardBack (Backup) to the right, thus increasing the memory allocation. For more details, see the section Memory Management in section 3.

⑤ Don't compress files under xxx bytes

This option allows you to set a size above which files will be compressed. This is useful because the overheads of compression may cancel out the space saved for small files.

Errors

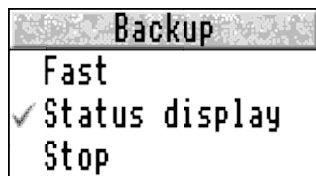
This is a rather small section, containing just one item.



① Ignore file errors

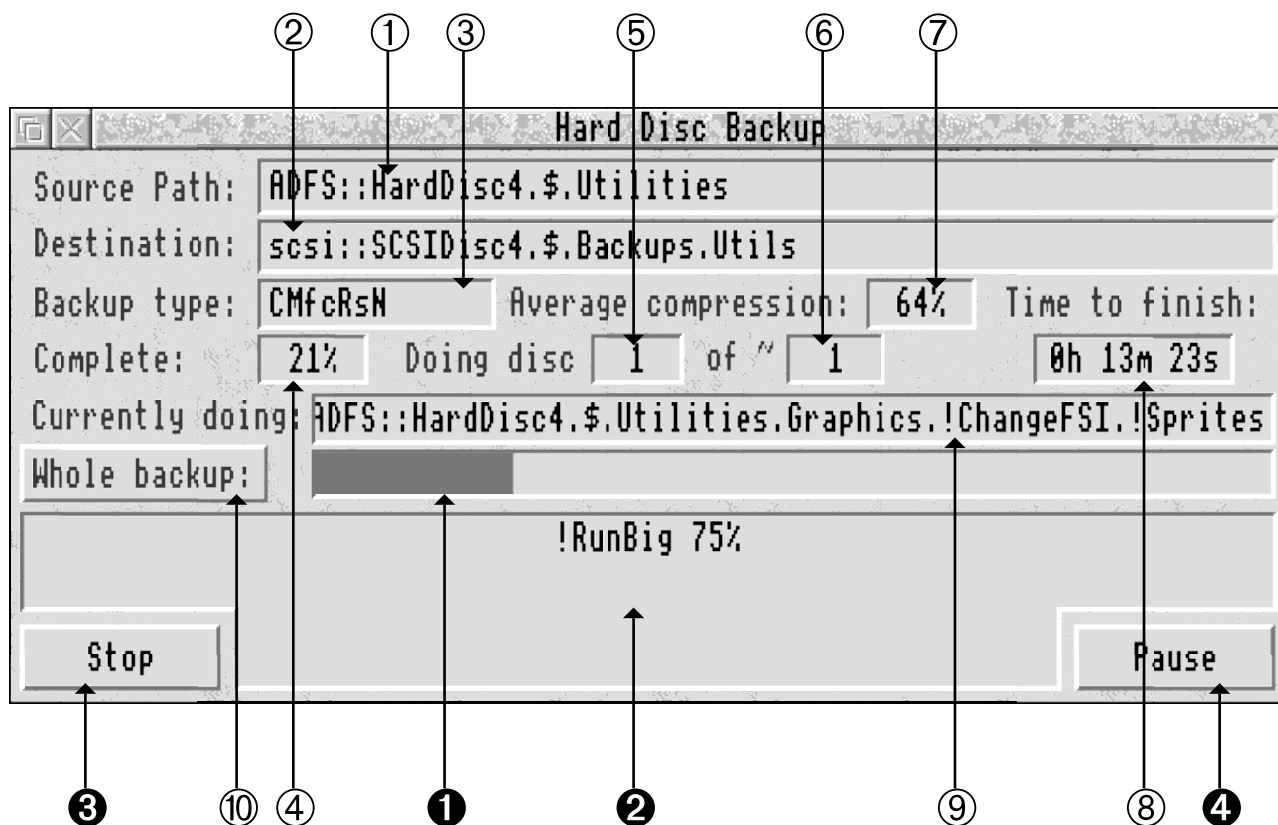
If this is set, HardBack will not warn you about errors concerning individual files in the source, such as 'Access violation', 'Disc error...' etc. It will display the error in the messages icon in the option window, but will not open a window and ask you to click on **Continue**. This option is useful if you want to do an unattended backup – obviously you don't want it stopping halfway through and waiting for you to click on OK.

Status window



Once you have clicked on Start in the Options window, it closes and is replaced by the status window. This window gives you information about the backup operation, its progress and any problems that occur. Clicking Menu over this window produces a menu with three items: Fast, Status display and Stop. Stop acts the same as clicking on the **Stop** button (③). If you click on Fast, HardBack will be put into fast mode and so operate more quickly by suspending the desktop. Hold down Escape to leave fast mode. When the message 'Press Escape...' has gone, you are back in multitasking mode. Once the backup operation has finished, closing this window and then clicking on the iconbar icon will take you back to the options window, with the options chosen for the backup still there.

Status display, if deselected, prevents the information in the status window from being updated, which means that the backup runs slightly faster.



①, ② Source, Destination paths

These are simply reminders of where the backup is coming from and going to. They are exactly the same as those specified in the options window.

③ Backup type

This is a basic reminder of the settings in the options window.

Each letter, or pair of letters, stands for a setting which is switched on:

- L** Lock against wiping destination
- S** Selected items
- I** Ignored items
- i** Incremental:
 - l** Last backup
 - o** On/at specified date/time
- O** Only files of type...
- C** Compress files
- B** Write BackupDate
- M** Treat image files as:
 - f** One file
 - d** Directory
 - i** Ignore completely
- c** Store CRCs
- R** Don't rename discs
- s** Save script file on every disc
- K** Skeleton only
- N** Don't compress files of type...
- U** Don't compress files under xxx bytes
- b** Buffer size set

Image files will always be set to something, so this will never be empty.

④ Complete

This indicates approximately how much of the backup operation has been completed as a percentage. It is calculated from the file sizes of those files done and those files to go, and so may be slightly out as regards the time taken to finish. For example, if the backup consisted of one 100k file and 200 empty files, then as soon as the 100k file had been backed up, Complete would show 100%, while the backup would continue for some time doing all the empty files.

⑤ Doing disc ...

This displays the number of the current destination disc.

⑥ ... of ~ ...

This displays the estimated total number of discs. This is worked out in a similar way to Complete and so may not be exact. Also, it cannot anticipate what capacity discs you will be using and, as a result, may be slightly inaccurate. It is calculated using the mix of disc capacities you have used so far and so assumes that you will be using the same mix until the end of the backup.

⑦ Average compression

This displays the average (mean) compression. It is shown as a percentage of the original size of the files.

⑧ Time to finish

This displays a rough guess at the time that it will take to finish the backup. As with Complete and Doing disc ..., this is an approximate figure and so may not be exact or count down precisely in seconds. For the first few files you should ignore this value as it will often be ludicrously high – this is simply due to inaccuracies in timing, which are evened out after the first few files.

⑨ Currently doing

This shows the file or directory that is currently being backed up.

① Progress bar

This displays graphically how far the backup has proceeded. It can either display the progress of the whole backup or how far the file being backed up at the moment has been done. To swap between these modes, click on ⑩, which also shows the current mode.

② Messages bar

This bar shows any other messages which are reported from the backup. In the screenshot above, it is displaying the compression ratio for a particular file. It can also be used to report errors and tells you which files are too old to be backed up in an incremental backup.

③ Stop button

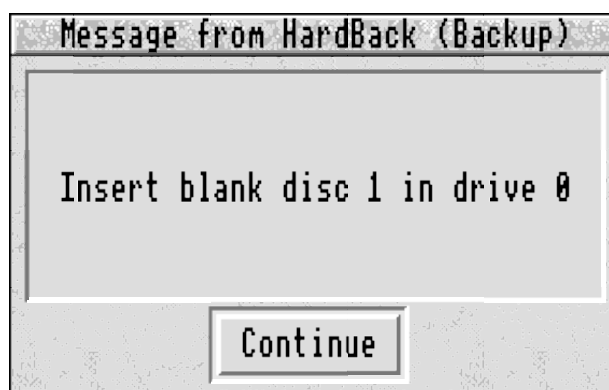
This button stops the backup completely. Generally, if the backup is stopped in this way, then it will still be readable in the Entire backup part of Restore, but obviously only up until the point it was stopped.

④ Pause button

This button pauses the backup. All disc activity stops, although files are still left open. The word 'Pause' changes to 'Continue' and so, to carry on with the backup, you must click on this icon again.

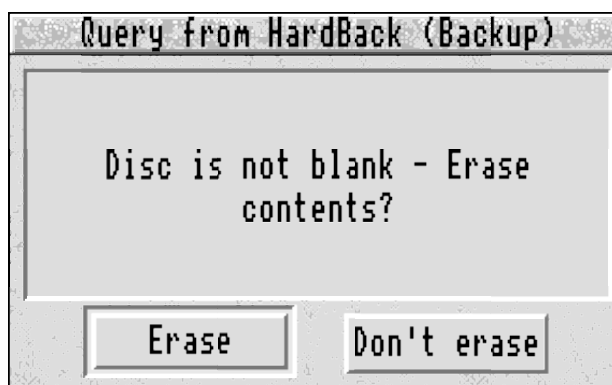
Request window

This window gives you simple prompts, such as 'Insert blank disc X into drive Y' or 'Please wait, formatting disc.'. While it is on the screen, the backup is paused. If you click Menu over it, a menu is produced which acts identically to the menu produced when Menu is clicked over the status window. When this window opens for the first time to ask you to insert the first blank disc, and the backup is being done to ADFS floppy discs, the approximate maximum number of E and F format discs is displayed in the status window.



Query window

This window asks you questions which mostly involve handling of discs. A menu identical to that mentioned above is produced when you click Menu over it.



There are a number of messages that can be given that need explaining:

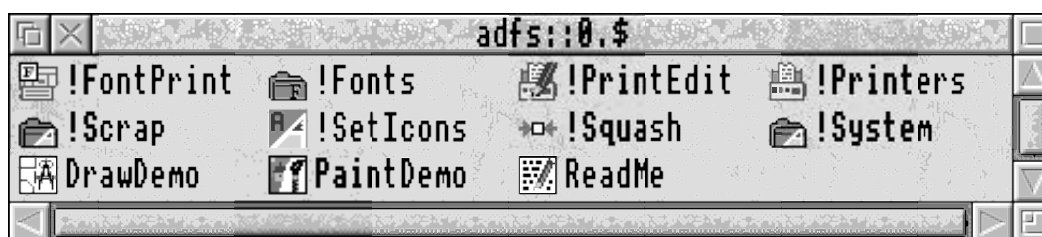
Disc is not blank – erase contents?

This means there is some space free on the disc. If you click **OK**, the disc will be wiped; if you click **Cancel**, the files will be left as they are and the backup files added to them. This obviously means that you can get less data on a disc which is not blank.

Disc is full – erase contents?

This is different from the above error because it means the disc is absolutely full and there is not even room to create the backup file. Clicking **OK** will wipe the disc, while **Cancel** will prompt you to insert another disc.

If either of these two messages appear, a window will appear displaying the contents of the disc in question:



This is merely a display, so files cannot be selected, deleted etc. However, it does give a quick reminder of what is on the disc, without having to click on the drive icon to find out.

Error: xxxxx. Do you want to continue using this disc?

This is used to report errors, such as 'Disc is write-protected'. Click **OK** to try again or **Cancel** to use another disc.

Error: xxxxx. Format disc?

This is used to report errors, such as 'Disc not understood – has it been formatted?'. Click **OK** to format the disc or **Cancel** to use another.

Restore

Restore is the second program in the HardBack package, which is used to restore backups, either completely or selectively, using a window which behaves almost identically to a Filer window.

Starting up

This is virtually identical to Backup – double-clicking on the !Restore icon places the Restore icon on the iconbar. Clicking on this icon opens the main options window.

Iconbar menu

This menu is the same as the Backup iconbar menu, except with an extra item, End restore. This is greyed out, unless you are in restore selected files mode, when it acts the same as End restore on the files display menu.

Options window

Since Restore is mainly controlled by all the choices you made in Backup, it has very few options of its own. Those that it does have are documented below:



① Entire backup

This option restores the whole backup to a specified place. It first asks for you to enter disc 1, and then the rest of the discs in order.

② Selected items

This allows you to choose exactly what you restore and where it goes. Firstly, it needs the last disc in the set, and then you are prompted to enter any discs that are necessary. More information on these two methods is given below.

③ Source drive

This is similar to the destination drive/directory in Backup – see that section for more information. The entry here should be the

same as when the file was backed up, although for floppies you can change the drive. If the backup was spread over several discs, you must supply a drive number instead of disc name, so that HardBack knows which drive the backup will be restored from.

You can also set the source directory by dragging a directory to this icon – if Ctrl is held down, its parent will be used instead.

④ **Show status display**

This option allows you to choose whether the status window, which gives basic information about how a restore operation is progressing, will be displayed. If it is not displayed, the restore operation speeds up marginally.

⑤ **Cancel**

This closes the window and resets the options to their former state.

⑥ **OK**

This stores the options and goes onto the next phase, which depends on whether Entire backup or Selected items was chosen.

Methods of restoring

There are two methods of restoring files, which depend on what you want to restore.

Entire backup

This method is fairly simple because it simply requests the discs in sequence and restores what is held on them to a single directory. It only uses the file 'Backup' which is stored on each disc. However, the downside is that, if a disc is corrupt or missing, then Restore will not be able to restore the files on any of the discs after this.

Selected items

This method involves opening a Filer-style window and allows you to move up and down directories, and drag files and directories out to wherever you like. This works by reading the information stored in the 'Keyfile', which is stored on the last disc in the set. It requests discs only when they are needed to extract files from them. This means that if any disc, except the last, is missing or corrupt, you can still restore a large percentage of the original data. One minor point, which makes this less useful to restore the whole backup, is that it is slightly slower than the Entire backup method. Also, if the keyfile is corrupt, you cannot restore anything without Entire backup.

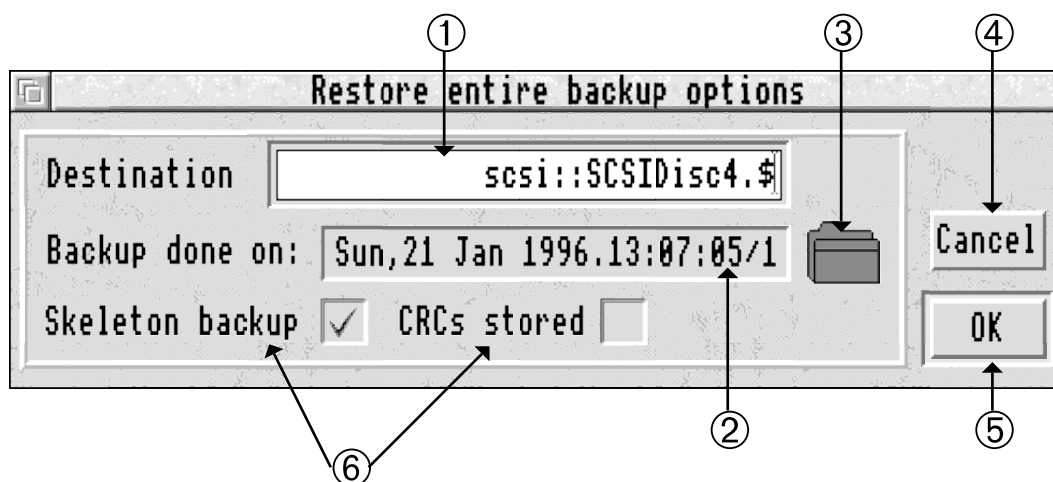
Restore entire backup

This section documents how Restore behaves when Entire backup is selected on the options window.

When **OK** is clicked, Restore scans the disc in the selected drive. If it has a backup in the correct place, then the **Restore entire backup options window** is opened. If it is not a valid backup disc, you will be prompted to insert a backup disc 1. When this has been done, and Restore is satisfied that it is correct, the window below will be opened:

Restore entire backup options window

This window allows you to set where the backup will be restored to, and it also shows when the backup was performed.



① Destination

This shows where the backup will be restored to. You can either edit this manually or drag a directory here to set the destination to be inside it. If you drag a directory whilst holding down Ctrl, or a file, the source will be set as the parent of it.

② Backup done on ...

This shows the date on which the backup was performed. The /1 suffix shows the disc number, which in all cases should be 1.

③ Directory

This is probably the best way to set the destination – simply drag the directory icon out to a Filer window and the destination will be set to it. You shouldn't drag it to applications or iconbar icons, because they may give strange results like <Wimp\$Scrap>.

④ Cancel

This closes this window and returns you to the main options window.

⑤ OK

This accepts the settings and starts the restore operation.

⑥ Options indicators

These show some of the options that were set in Backup.

Status window

Once you have set the destination and clicked on OK, the status window appears. This displays what is happening and remains on screen until the backup has finished. Most of this window behaves in the same way as the Backup status window.



①,② Source, Destination

These are basically reminders of what you have just set.

③ Doing disc

Another reminder, this time giving the number of the disc currently in the drive.

④ Currently doing

This shows what is currently being restored at the moment.

⑤ Messages

This displays any messages that come from Restore, in a similar way to the messages panel in Backup.

⑥ Pause

This behaves similarly to the pause button on Backup's status window.

⑦ Stop

This will stop the restore operation immediately.

When the restore operation has finished or has been stopped, the status window will remain on the screen until you close it. After closing it, if you click on the iconbar icon again, the main options window will reappear.

Restoring selected items

This method presents you with a Filer-style window, from which you can drag files, directories and applications to wherever you like. It is designed to be as similar as possible to a Filer window so that you should spend hardly any time at all getting used to. The menu structure is also virtually identical, with a few obvious omissions, such as Rename.



Having chosen Selected items from the main options window, you will be prompted to insert the Keydisc. This is the last disc in the original backup set and contains the file named Keyfile. Having done this and clicked on OK, you should be presented with a window similar to a directory viewer, which will only contain one item. This is in effect the 'source' directory and it is simply here to make it easier to drag everything out in one go. If the original source was \$, then this is named Contents. If there was no source because selected files was on, it is named Selections; otherwise it is given the name of the entry in the source field in Backup.

Double-clicking on the solitary icon will open the top directory of the backup. In this version only, one directory display can be open at one time, so the previous one will close automatically. The ability to have more than one directory display open at the same time may be added in a future version.



You can now move up and down the directory tree as you wish. Remember that, because only one window can be open at one time, you can only move up directories by either Adjust-clicking the Close icon of the window or clicking Menu and choosing Open parent.

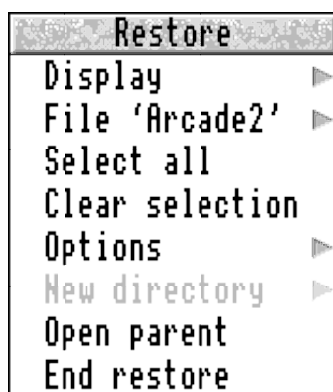
It is not possible to run files or applications directly from this window – they have to be dragged to a proper Filer window first. Therefore, double-clicking on applications will open them, as normally double-clicking with Shift would, and double clicking on files generates an error. It is possible, however, to drag files (not directories) directly onto programs without having to drag them to a directory display first.

You may have trouble distinguishing between Restore's window and Filer window. The easy way to tell is to click Menu over the window and look at the menu title.



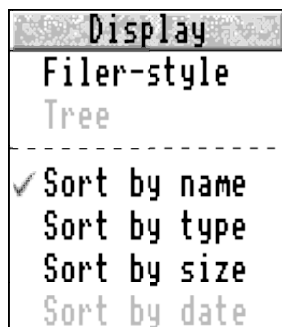
Spot the difference!

To restore files, directories or applications, simply select what you want, as with normal Filer windows, and then drag it out to wherever you want to put it. The status window will appear while the files are being restored (this is documented in the section Restore entire backup). While the restore is taking place, all the files in the window are greyed out. This is to stop you dragging out more files, which would start two restore operations at the same time and confuse Restore.



Clicking Menu over the window brings up a menu which behaves virtually identically to the Filer menu. A few options are missing or different, and there is an extra option (End restore). These are documented below. Those options that are missing or greyed out are irrelevant, such as New directory. Most of the other options operate in a similar way to those on Filer menus, and so do not need explaining here. For more information on individual items, use Acorn's Interactive Help.

Display



This item is similar to its Filer counterpart; both lead to a separate submenu, allowing you to choose how the window is displayed. However, this menu differs slightly from the Filer's version. Firstly, **Sort by date** is not available due to the way the data is stored. Secondly, the upper part of this menu is different and in this present release, irrelevant. Currently, a Filer-style display is all that is available. A tree display may be included in a future release.

File 'Arcade2'

This item varies, depending on what has been selected. It leads to a submenu similar to the Filer's variant, but missing a large number of options. This is because most of these involve writing to the disc, which is something that Restore cannot do. **Info** is shown here, as it is different from the Filer's version.



This window shows basic info on a particular object. Since the data stored in the keyfile differs from that provided by the Filer, this is also different. **True size** gives the uncompressed size of the file. **On disc** shows the first disc that is required to back this file up and **File pointer** shows where in the backup file this object is stored – these are for technical purposes only. The **Image** icon is ticked if the object is an image file – this means that it will not be restored using **Restore entire backup** and cannot itself be dragged out of this window, as only its contents can be accessed.

Options

This submenu contains only one entry – **Backup info**. Choosing this opens a window which shows general information about the backup, in a similar way to the window displayed when you choose Restore Entire Backup.

End restore

This closes the files window and clears the data in it from memory. It also reopens the main options window.

Other matters

In this section, matters which are relevant to both programs and of a more general nature are discussed.

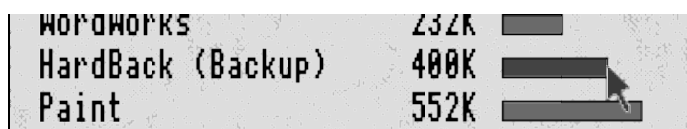
Note that, in this section, when something applies to both Backup and Restore, HardBack is used to mean either Backup or Restore.

PC partitions

HardBack can backup PC partitions in two ways: either it backs up the whole partition in one go or it backs up individual files inside it, one at a time. For more details, see the entry for image files in the Scrolling Options section of this manual.

Memory management

To operate, a backup or restore operation needs a block of memory to read data into and output from. Basically, the more memory HardBack has access to, the faster it goes. For this reason, it is recommended that you allocate as much memory as possible to whichever part of HardBack is running. This is possible in two ways. Firstly, you can set the buffer size directly within Backup's options window – this will only be used if it is a sensible amount.



| | | |
|-------------------|------|--|
| WORDWORKS | 232K | |
| HardBack (Backup) | 400K | |
| Paint | 552K | |

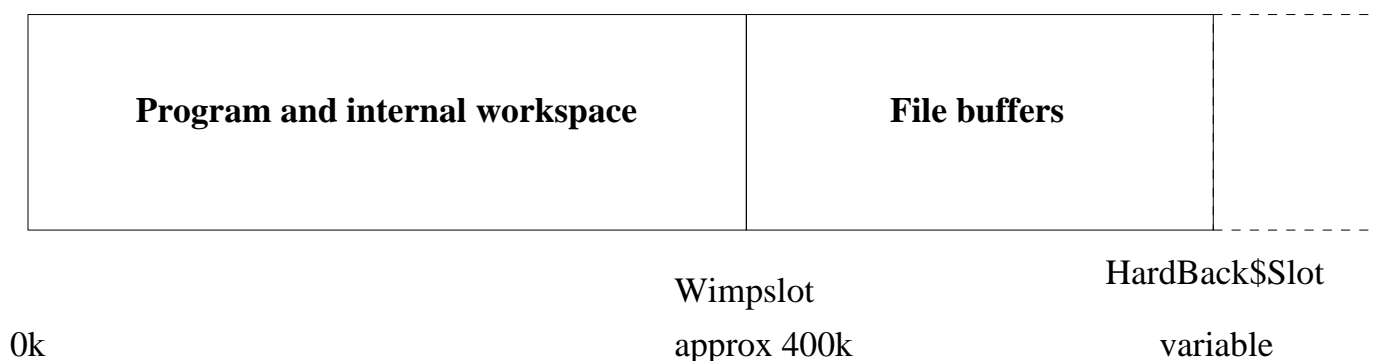
Altering the memory taken up by Backup dynamically

Secondly, both programs have a red draggable bar in the Task Manager, which allows you to alter the memory dynamically. If you drag this bar to the right, you will increase the memory supplied to HardBack, while dragging it to the left reduces it. You cannot drag it to zero, because some space has to be left for the program itself.

You can alter the memory allocation at any time, even when a backup or restore operation is in progress. This means that you could temporarily borrow some memory from HardBack to do something and then give it back after you have finished. The only disadvantage would be that HardBack slows down while it has less memory.

You can alter the memory permanently by changing the value of HardBack\$Slot in the !Run file of Backup. This value needs a little explaining:

Memory in HardBack is allocated in two blocks, with the sizes independently controlled. The first area contains the program code itself, plus internal workspace and other variables, and the length of this is controlled by the Wimpslot command in the !Run file. There is no need for this to be changed, since increasing it serves no purpose and decreasing it means HardBack will not work properly. The second area is controlled by HardBack\$Slot and forms the file buffer. This is the area which can be changed in size from the Task Manager. HardBack\$Slot contains the default setting for the length of the memory taken up by both blocks combined, in kilobytes. If HardBack\$Slot is out of range it will simply be ignored. Currently, in the !Run file, it is set to 640k.



Compression

The use of compression in a backup complicates matters somewhat. To understand why HardBack does certain things when compression is switched on, it is necessary to have a basic knowledge of how compression works.

When compression is switched on, the file buffer block of memory is split into two parts of equal size. If a file to be compressed is smaller than the size of block A, it is loaded into block A, compressed, storing the result in block B. If the result is larger than the original, it is discarded and the file copied uncompressed into the backup. If the result is smaller, i.e. compression was successful, the compressed version is written into the backup.

If the file is larger than block A, it is loaded piecemeal, compressed, and written into the backup. Here a problem arises: what happens if, once the file has been compressed, it is actually larger than the original? HardBack deals with this in a fairly intelligent way: before writing anything to the backup, it compares the size of the first block uncompressed to its compressed size, and, if they are above a certain ratio, it backs up the file without compression. This is further complicated by the fact that

compression of individual blocks within a file may not be even – for example, a graphic file may have a short uncompressible header and then a large expanse of highly compressible image data. Using this system, HardBack may conclude that the file is not compressible on the basis of the first block, because it is unable to examine the whole file. To prevent this, it is best to allocate as much memory as possible to compressed backups in progress – this should minimise this effect. Another way to improve this is to alter the ratio mentioned above, which will allow files which are apparently non-compressible to be compressed. This is held in the Messages file within !Backup (Shift-double click !Backup to find it) as a percentage. Towards the top of the file it is present with the identifier LongNoCompressionOver. It should be over 100%, and is set by default to a fairly mid-range value. However, if you wish to do a lot of backups containing large files, then it may be useful to change this – at 110%, virtually nothing is compressed in this way, while, at 400%, everything is stored in its compressed form, so compression ratios of 158% and the like may occur.

Another problem arises when a file compressed in chunks like this is split over more than one disc. To allow Restore to recover it properly, the length of a compressed file has to be written before the compressed data starts. However, this is not known until the whole file has been compressed. This has the net result that the value has to be written to a position before the compressed data, and so requires the disc holding the start of the compressed data to be inserted. This is why you may receive messages to ‘Please re-insert disc xxx’.

Stack problems

It is remotely possible that, if you are backing up a directory that contains more than 250 files, you may receive a ‘Backup stack overflowed’ error. It is possible to alter the size of the backup stack, used for composing the keyfile, by loading the Messages file found within the !Backup application into a text editor. To do, this double-click whilst holding down Shift on !Backup in a directory display, and double-click on the Messages file. Increase the number after StackSize at the start and resave the file.

Default script file

If you want to keep a default script file that is not in the !Backup directory, perhaps if it is stored on a read only filing system, simply set the system variable HardBack\$Default to the name of the file before you load !Backup. For example:

```
*Set HardBack$Default SCSI::HardDisc5.$.Utils.HardBack.Prefs
```

Risc OS 2

Throughout the development of HardBack, every effort has been made to ensure that nothing is used which will make it incompatible with Risc OS 2. This has largely meant that HardBack will run on Risc OS 2 machines without problems. However, there are a number of points to consider.

Firstly, to run HardBack, you will need the MessageTrans and Squash modules, which I cannot supply for copyright reasons. These should be available from Acorn or with other packages – for example Squash can be found on the demo discs for Resultz, Rhapsody3 and Rosie & Jim, as found on Acorn User CD N°1.

While most of HardBack is compatible with Risc OS 2, the program is forced to do things a little differently, some using slightly illegal methods. For example, the Incremental On/At setting has to write to the Real Time Clock. The old time is restored afterwards, so the time loss is minimal, but, if you do it several hundred times, you may lose a second or so.

Also, please note that the testing on Risc OS 2 was performed some time ago, so some of the newer features have not been tested. This is simply because I have not had access to a Risc OS 2 machine for a while. Any new information would be greatly appreciated.

Command line

Backup can also be called from the command line to backup the options set in a particular script file. A number of switches have been included to control features of Backup, which allow it to be run without human assistance – for example, from Risc OS 3 Alarm, in the middle of the night.

–read <filename>

If this command is present, Backup will load the script file specified, enter the details into the options window, and leave this window open. It will not proceed with the backup operation. If a filename is passed to Backup without either `–read` or `–execute`, then it is assumed that it began with `–read` and will behave as above.

–execute <filename>

This command has the same effect as double-clicking on a script file: HardBack loads the script file and begins the backup operation. Together with the three options below, it can be used to perform a backup operation without any human input while it is proceeding. If both `–execute` and `–read` are present, then the `–read` command will be ignored, and HardBack will load and carry out the file named after `–execute`.

–autodisc

This suppresses messages, such as ‘Insert archive disc ..’, for disc 1 only. This is useful because the computer can perform a backup completely unattended – for example, backing up to a second hard drive in the middle of the night. However, if more than one disc is required, or something else goes wrong, then the program will display a prompt box, since there is nothing it can do about the situation without human assistance.

–wipe

This is useful for situations when `–autodisc` is used. It tells Backup to wipe the destination disc before it begins the backup operation, in the same way that this would occur if the user agreed to it via a prompt box. If it is not set, then the contents of the destination disc remain intact, although files named Backup and Keyfile (and Script if ‘Save script file on every disc’ is selected) in the destination directory will be overwritten.

–quit

This option tells Backup, in conjunction with `–autodisc`, to quit itself after a backup operation has finished. If any errors occurred during the operation, then Backup will stay in memory to warn that the backup failed in some way.

-fast

This option puts Backup into fast mode when an automatic backup begins, so the desktop is suspended and the backup operation is quicker.

-nostatus

This disables the status display for an automatic backup, thus speeding it up.

-help

This displays a brief description of these command line switches.

Using these options in conjunction with Andreas Barth's PD !iicAlarm, it is possible to have your computer itself turn on at a certain time, do a backup, and then turn itself off again, without any human assistance.

StrongArm and RISC OS 5 compatibility

Versions 2.700 of Backup and 2.500 of Restore and later are fully StrongArm compatible. If you have a StrongArm of revision less than 3, there is a bug in the chip which causes Backup to crash on loading. This is not serious, and can be fixed by loading Acorn's patch for this problem which is available from the RISC OS Ltd Web site. Whilst HardBack is believed to be RISC OS 5 compatible, this is as yet untested.

Version history

Backup

| | |
|----------------|----------------------|
| 0.010 – 0.575 | Development versions |
| 1.576 – 1.631 | Demo versions |
| 2.576 – 2.700+ | Registered versions |
| 3.000 – | Open source versions |

Restore

| | |
|----------------|----------------------|
| 0.010 – 0.367 | Development versions |
| 1.368 – 1.390 | Demo versions |
| 2.368 – 2.500+ | Registered versions |
| 3.000 – | Open source versions |

Known problems

Bugs in the PD Ram disc Memphis (v2.08) cause it to give Address Exception errors sometimes when using HardBack. No problems have been experienced to date with version 2.11

Appendix A

How to contact the author

The author can be contacted at the address below to make any comments, queries, donations, bug reports, etc.

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I can also be contacted by e-mail at theo@markettos.org.uk

There is also a HardBack World Wide Web site at
<http://www.markettos.org.uk/riscos/hardback/>

Appendix B

Copyright information

The “Artistic License”

Preamble

The intent of this document is to state the conditions under which a Package may be copied, such that the Copyright Holder maintains some semblance of artistic control over the development of the package, while giving the users of the package the right to use and distribute the Package in a more-or-less customary fashion, plus the right to make reasonable modifications.

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b) use the modified Package only within your corporation or organization.

c) rename any non-standard executables so the names do not conflict with standard executables, which must also be provided, and provide a separate manual page for each non-standard executable that clearly documents how it differs from the Standard Version.

d) make other distribution arrangements with the Copyright Holder.

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b) accompany the distribution with the machine-readable source of the Package with your modifications.

c) give non-standard executables non-standard names, and clearly document the differences in manual pages (or equivalent), together with instructions on where to get the Standard Version.

d) make other distribution arrangements with the Copyright

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