

# Backup in the 21st Century

[No its not science fiction!]

We really have reached the 21st Century with all its new problems. If you have personnel information on your computer and it is stolen, you may be liable to criminal prosecution under the ECT act of 2002. Recent incidents overseas have shown that theft of computers specifically to acquire personal information for identity theft is quite likely to happen here soon. Theft of backup media is also a problem that must be considered as it could contain confidential data. One possible method of increased protection is the use of encryption applied to all data of a sensitive nature.

Advertising blurb:

"Dear Mr. Brock,

## **Back up your PC!**

Do you ever worry that your PC will crash and you'll lose all your work? Do you want to safeguard your vital work and information? Or maybe you want to save photos to disk to share with the family and friends?

Like all machines, computers can sometimes fail. Frequently, a system failure or the effects of a virus can destroy or partially delete vital information and cherished memories like family photos, or even bank details. **Back up copies are essential!**

**PC Backup 2005** will do it all for you! Files will be compressed to save you space and you'll be able to protect against their access. You can even split your files into packages of a specified fixed size before, if needed, you burn them onto a CD or DVD. More advanced users can even adjust the software performance through the option menu. **PC Backup 2005** really can do it all!"

[Like a great many other software applications, this promises everything but might not cover all the bases.]

There are support groups for you if you have backup problems...

Newsgroup: **alt.backup-software**

Where do you want to backup today? (Sorry Bill)

Quote: "**NEVER** would use an online backup, too much of a security risk."

A certain amount of paranoia is required in this industry - JB.

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# Forget the contents page, I need help NOW!

This is an 'eDocument' not a paper-based book. So I can put the immediate stuff right here where it is easy to get at. I considered using a Windows help format document, as I have in the past. But there are growing numbers of users out there that don't even use Microsoft Windows. Here are the questions with links to the answers (some of them).

## How do I backup right now (Today = 2011-06-17) ?

In this current day of 2011, usually a sudden and desperate desire to get a backup solution will appear. "But I need it NOW!" is the usual cry from the heart. The reply is also usually along the long the lines of "Don't Panic!". The current fashion is to buy an external USB hard disk of extremely large capacity (ridiculous) and to use the supplied "cruft-ware" / software. Sometimes the software is actually useful and sometimes no improvement over the operating system's supplied backup program.

First of all the drive capacity should be able to cover the source drives on whatever PC's you have in the household. So for a family of four, having 200GB hard disks each a drive of greater than 800GB.

### Only one drive? No!

If you consider that the same drive in your new PC is the same drive in the backup case, this drive can also fail spectacularly at the wrong time. Also since it is a moveable/carry-able drive, it can also be dropped, kicked or thrown. Drives when inert (not spinning) can be quite resilient and may not be damaged by heads scraping across the magnetic media. But a dropped drive can seize the bearing of the motor. This is almost impossible to fix for a variety of reasons.

In the USA today, a large chunk of the market is dedicated to "home backup". A pair of drives in RAID 1 or five drives in a RAID 5 array can be purchased in a box that connects to your network in a variety of ways. For example there is [DROBO](#). Take a look and you will probably be amazed at the solutions available. Even they recommend a UPS powering the external backup drive. So consider the first step – if you haven't already – buy a small UPS for the PC and to power the USB backup drive. A backup can take upwards of an hour so the chances of a mains failure is quite probable. With our power supply situation here in South Africa, you really should have your desktop powered from a UPS. The last thing you want to have happen during a backup is a power failure or a momentary failure. Momentary failures occur pretty much every day here and may or may not reboot your PC. If you have a laptop, consider the UPS for just the backup drive.

So the "right answer" is to have a networked backup 'machine' with a RAID set of drives connected to a UPS. You can lash out and buy one, for example the [Western Digital](#) "My Book World Edition II". If you consider the actual value of all your photos/pictures and movies and music then it is not a lot of money.

Or you can consider re-using the old PC of a few years ago, in exactly the same way. This is a "project", I decided upon a few years ago. The PC does NOT have to be 'top of the range' in performance. Nor does it have to have a lot of memory. There should be physical room for at least three drives and a have performed it's duties well for a number of years. So that it can be considered a 'reliable' computer system.

You can 'see' more of this on my web site.

## **I backed this up last century, now I can't read the tape/cd/floppy. What do I do now?**

Old tape backup programs that stored the data in proprietary formats still bug us. There has to be one file on the tape that you need desperately. [“Can you get it for me?” - Data recovery option 3](#). The recent data recovery exercise with the [Moon Dust Data](#) shows this as something we will be doing for quite some time.

## **How usable is the backup? [Why you should always verify the backup]**

The story of the blonde typist using a new computerised word processor with 8” disk drives is a nice example. She was told to make a “copy” of the data disk every night, before she went home. Well one day of course the data disk was unreadable. (Error message BDOS ERROR ON: B: - yes, it was that long ago!)

When asked for the copies, she went to the top drawer and handed the boss a pile of photocopies of the data diskette!

Always turn the verify option on. If necessary and you have the time, restore from the backup to another drive. Then do a compare, file by file of the original to the restored files.

## **What do you backup to?**

The media that was originally used for backup was tape or floppy disks. Later on in 1990's magneto-optical media was available. This was largely discontinued in this country (South Africa) due to cost considerations. It still provides the best 'archival' media with the longest guaranteed life of data storage. Various other tape varieties appeared and disappeared over the years. DAT tapes have been used successfully for some years but the wear and tear consideration is still with us. So the media must be replaced on a regular basis with an attendant cost. Some corporates made use of RAID systems, nowadays SAN devices to store their vital data. Each solution carries its own running cost.

## **What shouldn't you backup to?**

Old and worn floppy/'stiffy' disks. Paper tape. Paper. USB [memory sticks](#).

## **What do I need to backup and where are they?**

In the days of DOS, documents, spreadsheets and data files would be spread across the hard disk in a multitude of directory folders. Backup programs were quite sophisticated and could display a 'directory tree' to select files and folders for backup. If there is one thing Windows 95 did for us, it brought most of our data together in one place - the 'My Documents' folder.

As we (supposedly) have progressed in the IT industry, we have enlarged our problems. What used to take minutes to backup, now can take hours. Also the content has changed dramatically from small text files to large digital images or videos. Even cell-phones need to be backed up, as a young friend will testify after he had his phone stolen.

We now have huge hard disks that last century would have been beyond our imagination. I could cite well-known leaders in our industry, who stated publicly, that we would never need more than... memory/hard disk capacity/processing speed. Whilst reliability has improved, there are lots of other ways to lose data.

The loss of your family photo/video/music album would probably inspire you to look at data recovery. Once you have taken your medication and mortgaged your home to cover the cost. This you wouldn't have to do if you had a suitable backup stored somewhere. The costs

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involved in data recovery are time related and whilst the chances of recovery are very good these days, the costs are high. Certainly more than that external hard disk would cost.

Your computer or your backup store can be stolen. This removes any chance of data recovery. [Unless you have the computer 'phone home' via the Internet. It has been done.]

Like most problems of this nature, there is no 'one solution - fits all' answer. It is the application of risk management to this problem that gives us the appropriate solution.

## **Some programs make allowances for backup, does yours?**

Ironically MS Word has a backup option and an auto-recovery save option. These are mutually exclusive. So you could make a backup copy of the document every time you open it. But completely overwrite it, if you auto-save. This needs user intervention and training to achieve the desired function of both options. On opening an existing document, save it as a backup copy with its own name. Have the auto-save option enabled with a suitable time for background saving set. I have mine set to two minutes.

Database designers should have it 'trained' into them. **Backup is an essential part of the application.** However you are collecting data, you should safeguard that data either automatically or by user control. The database program I wrote for an educational establishment some years ago would prompt the user on exit to backup the database. This caused consternation and dismay, as "other programs don't do this". However when they 'lost' the database later on, they fully appreciated the reminder. The data collection/entry program simply checked the database file's archive attribute. If this hadn't been reset, the file hadn't been backed up. So tell the user that it should be backed up.

Excel spreadsheets for example have no backup option and it is a moment's distraction to overwrite the previous version of the worksheet. File, Save As, should be your mantra when saving the current work sheet.

## **On Office Backup**

Read the web page at:- <http://shop.office-watch.com/obh/> for more details.

## It's more likely that my notebook/desktop will be stolen. How do I back up the Operating System?



**Windows XP Activation Keys** - [yep, these can be replaced. But even a small change in hardware can require a new activation key from MS]

Once you have installed Windows XP, copy the wpa.bak and wpa.dbl files to an archive for restoration if you ever re-install the pc. You will find these files in the C:\Windows\system32 directory. They are about 12k bytes in size, so they can be backed up to floppy if desired.

As I said above, if you change the hardware significantly, you will need to re-activate the system. Changing a network adapter will definitely require it but a secondary hard disk will not.

If you wish to change the main hard disk, you will need to backup the volume id for the hard disk and to restore it on the new hard disk using a utility program. See:

<http://www.microsoft.com/technet/sysinternals/utilities/VolumeId.mspx>

**Application settings** - [Do you really want to have to spend a few hours resetting Word/Excel etc back to the right spelling etc?]

For example, Word's 'normal.dot' and Excel's 'personal.xls', certainly need backing up. How about the Word templates you so carefully crafted. Oh and what about the language settings and the custom dictionary.

**Email settings** - [Changing your isp can change your life!]

See chapter 5 – [Backing up email](#) for backing up procedures.

**Desktop settings** - [pretty, pretty, but what happened to all my icons?]

In XP and most late model Windows, its possible to save the theme as a file. But the Desktop is a folder, dependent upon the user, which again will have to be copied/backed up somewhere.

**System state** - [Scanreg - registry restore for Windows 9x]

Q183603 - How to Customize Registry Checker Tool Settings

Q183887 - Description of the Windows Registry Checker Tool (Scanreg.exe)

Q256419 - How to Back Up the Registry in Windows 98 and Windows Millennium Edition

Most of the system settings can be backed up using the NTBackup program which is provided with Windows NT, 2000 and XP. This can save you a lot of grief rebuilding a complete machine from scratch on new hardware. NTBackup has disappeared in Vista and Windows 7.

**[Alternatively you could '[ghost](#)' or save an image of the hard disk...]**

**This gets easier and easier as time goes by...see next page**

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## Backing up an 'image' of your hard disk.

Use a suitable boot CD/DVD, say "[System Rescue CD](#)". Connect your external USB hard disk drive. Use 'partimage' to copy and store the image on the external hard disk. If you have a problem with your CD drive, you can download the utility to a USB memory stick and boot from that. [Don't leave anything important on the stick! It will need wiping... A memory stick is NOT a backup device!]

**Warning!** This requires you to read and understand simple instructions. Take care when you do this, as you can destroy your PC's ability to work for you.

The process is as follows:-

1. Start by downloading an ISO image of the "System Rescue CD" to your hard disk.
2. Burn the ISO image to a blank CD.
3. Shut-down and set the BIOS to boot from CD/DVD.
4. Insert the CD in drive before the PC boots into Windows. Or insert it before you shut-down again.
5. Check the PC boots from the CD. You should get an 'opening screen' saying "System Rescue."
6. If you boot onto the CD and you have read the instructions, you should be able to back up the hard disk image to another device. Plugging the USB external drive into the PC at this point will (after a few seconds), allow you to "see" the drive. When you can "see" the drive, you can mount it and write to it.



## How do I backup my phone?

### **Will I lose my user data if I update my Nokia device firmware via PC? You Bet!**

User data (contacts, photos, messages and files) and add-on applications such as Java games or Symbian applications will be deleted during the software update. It is strongly recommended that you make a back-up of data such as contacts, messages, and images before updating the mobile device firmware.

When performing the update, and your Nokia device requires a data backup, the application will instruct you how to perform the back-up.

**Note:** Nokia device firmware cannot be downgraded. Once you have upgraded your device, you will not be able to restore to the earlier version. Nokia cannot guarantee compatibility with third-party add-on applications that are not supported by Nokia.

### **Do I really have to make a back-up of all my data? Yes! You MUST!**

User data (contacts, photos, messages and files) and add-on applications such as Java games or [Symbian](#) applications will be deleted during the software update. When performing the update, the application will inform you if your Nokia device requires a data backup.

You can back-up your device memory data to your device memory card or to your PC using Nokia PC Suite. See your device user guide for more detailed instructions.

To backup to your memory card:

1. Select **Tools > Memory** from the main menu
2. Select **Options > Backup phone memory**.

To restore data to phone memory:

1. Select **Tools > Memory** from the main menu
2. Select **Options > Restore from card**

## How do I back up my email?

First of all, which email client do you use?

Program	Versions	Operating System	Comments
<a href="#">Outlook Express</a>	All	Windows 9x to XP	Account settings can be saved/restored.
Outlook	Most	Windows 9x to XP	Part of MS Office. Has a Microsoft utility to backup and restore.
<a href="#">Thunderbird</a>	All	Windows / Linux	Open source - highly motivated. Various Add-In's exist for backup. Simply copying the 'profile' will save everything including the server settings.
Eudora	Some	Windows	Old but solid
Pegasus	Some	Windows	Outdated but still used by some. Recently it has become unsupported by the software writer.

[\[Hey wait a minute, why am I asking you? Let's ask the computer what you use.\]](#)

No matter which email client you use, the program usually does not have a 'backup' option. It is usually an afterthought applied as a 'patch' or enhancement. Even MS Outlook (part of MS Office) has a downloadable piece of software that attaches itself to the program and backs up the PST file on a regular basis. However this is limited to physically attached or networked drives. It doesn't write CD's or DVD's or tape.

After a few years of email both for personal and for business use, it would have been a good idea to store the emails in a database. This would have provided searching facilities to find that email that you received from the legal entity (bank, company, SARS, etc.). Unfortunately email programs don't store the emails in a "standard" way. Also many programs were designed in the days of Megabyte sized hard disks, so they quite often have size limitations on their 'storage' file. For example MS Outlook had a limit of 2GB, above which the program can't access any of your emails!

## Backing up Outlook Express

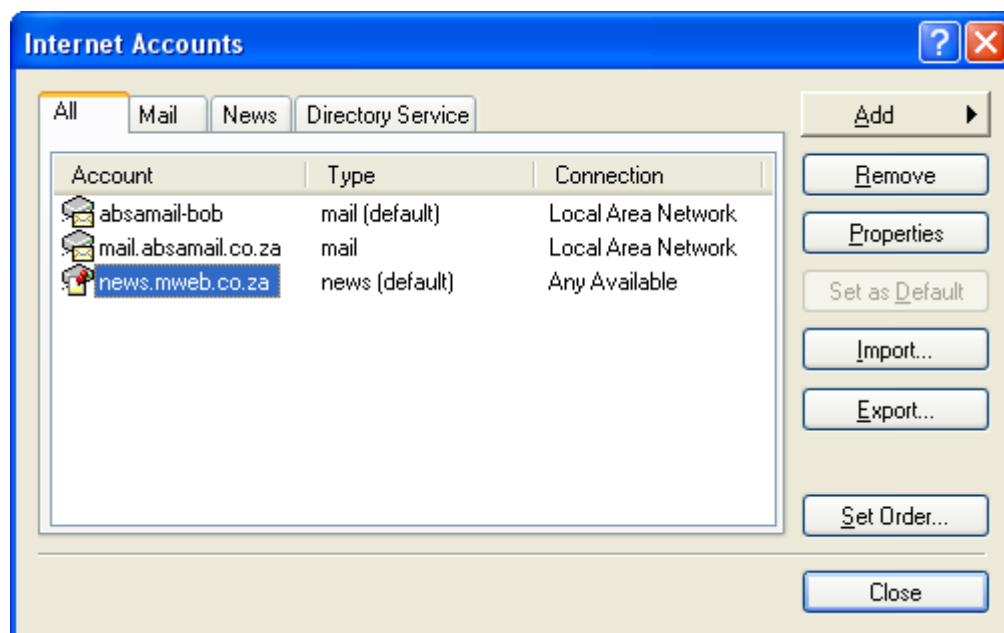
To completely back up Outlook Express we will use a checklist and deal with each aspect in turn. We need to back up the Account settings, the Contact list and the email and news information. We also need to back it up to a compressed archive so that it doesn't take up much room.

Tick	Action	Process	Comments
[ ]	Backup Internet connection settings	Tools   Accounts   Export.  Find the tools menu and go down to Accounts. On the accounts window, click on Export. Select 'Internet Connection File .iaf'	Outputs to a '.iaf' file. Lets see if we can automate this.
[ ]	Backup email messages	Find storage folder. Copy all files to store/zip archive.	Cannot be done simply. Use a script or batch program to backup the storage folders.
[ ]	Backup Contact details	Use the address book icon. Click on File then Export. Select Other address book. Then select Text File (CSV format). Type in a file name and save the data.	Windows address book (WAB) or comma separated variable file. This uses the Windows Address Book program.
[ ]	Verify backup	Restoring data	No built-in verification. We will have to use a utility.

The various notes above forced me to write a script to do the functions required.

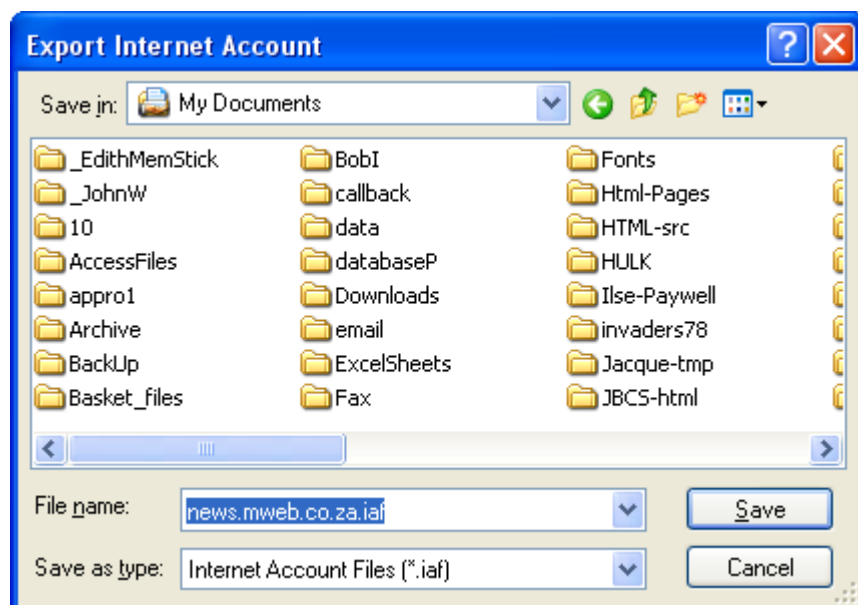
## Backing up Internet Account data

Select Tools | Accounts



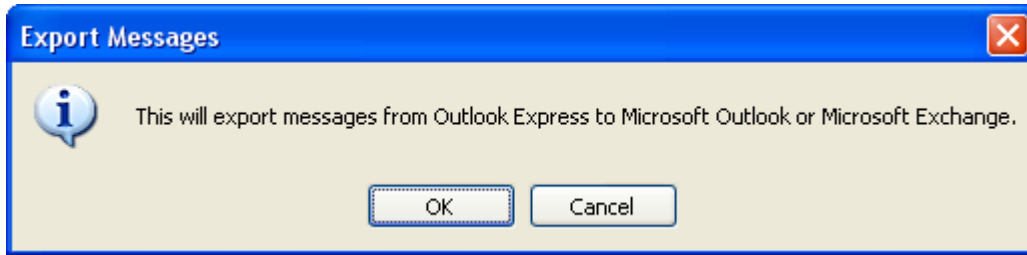
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Select what you want to back up. In this case the news group server settings. It is just the same as the email server settings. It is 'readable' by later versions of Outlook Express and Windows Mail.



The export file is an 'iaf' file a proprietary format file containing the data.

## Exporting Messages as a backup



Uh, oh! Wait a minute! I don't have Outlook or Exchange!

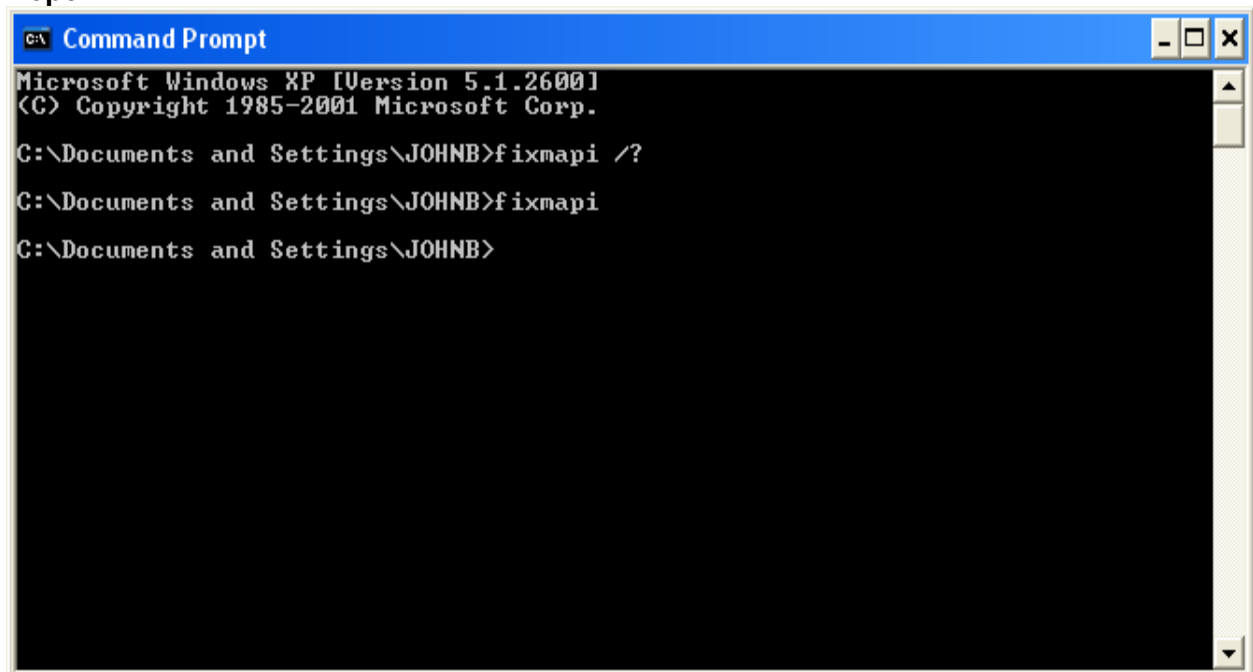
So it doesn't work, unless you have installed MS Office with Outlook. And only then if you have installed the 'workgroup' option NOT just the Internet option.



MAPI is Microsoft's 'Mail ApPlication Interface'. And up to today remains a proprietary 'standard'.

**Can it be fixed?**

**Nope**



```
c:\ Command Prompt
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\JOHNB>fixmapi /?

C:\Documents and Settings\JOHNB>fixmapi

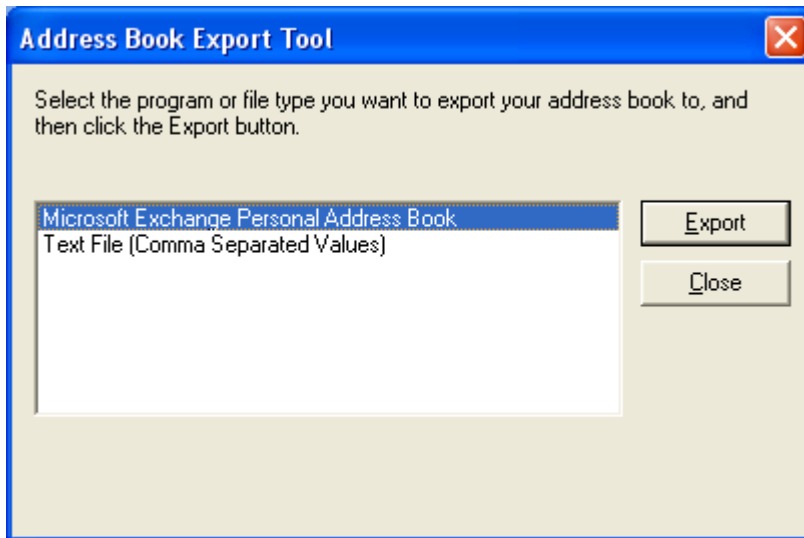
C:\Documents and Settings\JOHNB>
```

MAPI (Mail APplication Interface) used to be part of Windows. Nowadays its just not there without MS Office and Outlook in "Workgroup" mode.

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## Exporting the Address book (Outlook Express)

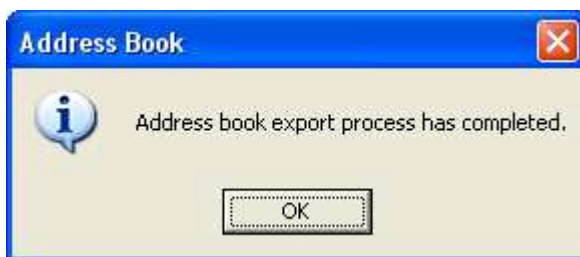
Note this is NOT really part of Outlook Express but the Windows Address Book. Its just that the clicking of the button in Outlook Express runs the WAB.exe.



**That is a .PAB file. Just doesn't tell you where it went...**

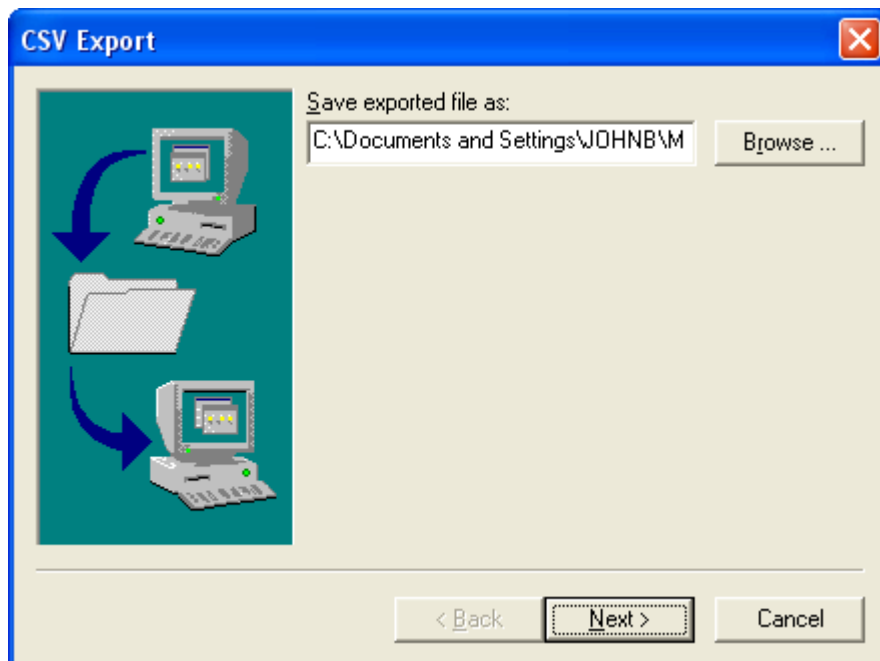
**Nor is it of any use to you unless you have MS Office installed for restoring. Choose the second item on the list.**

The best option is to backup/export to a text (CSV) file. This you can read / use with MS Excel and a whole host of other applications, including most database systems.



**Where, what, how???**

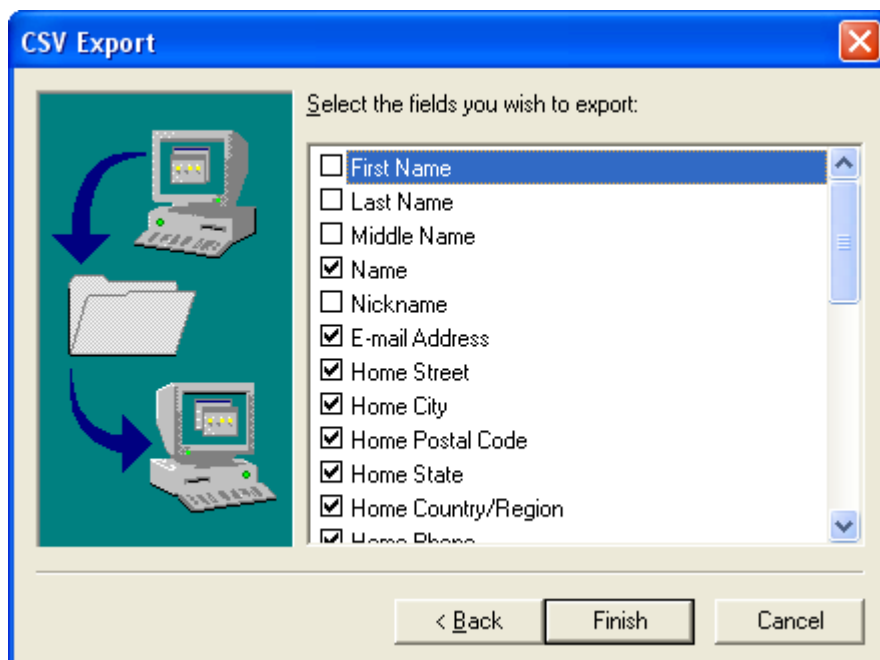
So I went looking for it...Couldn't find it. Backtracking, I got the path out of the text box on the previous window...



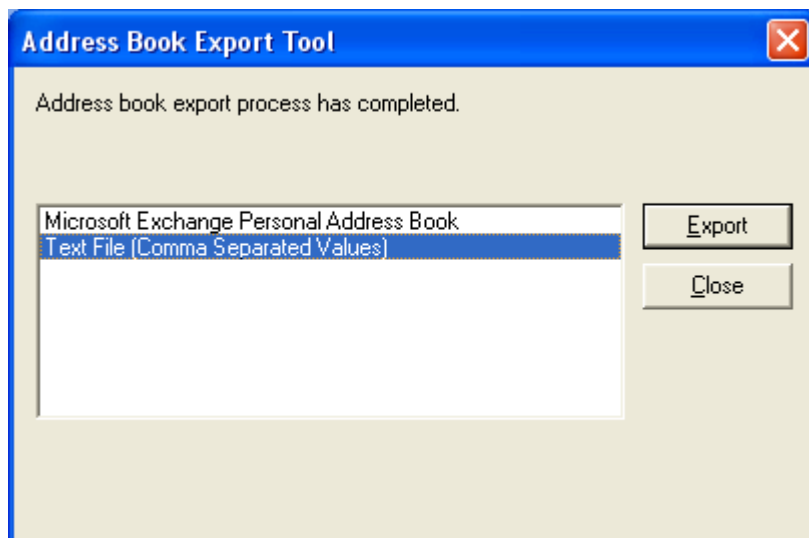
Once you have the CSV file, you can 'open' it with Excel or a CSV file reader. Or you can 'import' it into a database program such as MySQL or Access.

Unfortunately the 'reverse' is not so easy. Once you have a database with your contact email addresses, most email clients cannot 'read' them. So you cannot set up Outlook Express to email a newsletter easily to recipients in a database.

It is best to select all the fields because if you don't, it will come back to haunt you when you try to import the data file.

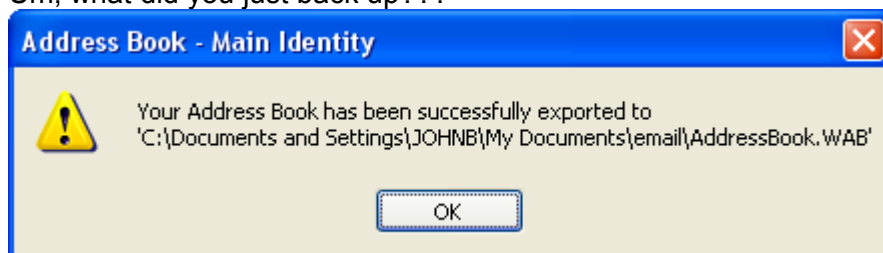


Tick 'em all! or miss out. Excel will import the 'headings' and if you use Access, it will use the headings as 'field names'.



Now close the window box. Well that's good isn't it?

Um, what did you just back up???



No that can't be right! I am sure I selected CSV file...

Well that's what you get if you select Windows Address Book.

Now take a look at the CSV file with Excel or Access...

WAIT A MINUTE! How come the three files I just exported from the three different folders are the same size?

When I came to inspect the file contents they were the same! So the 'Export' function isn't selective. It exports all the data in the whole address book. So don't try to select a mailing list for export this way. Use one of the many fields to select the data after the export.



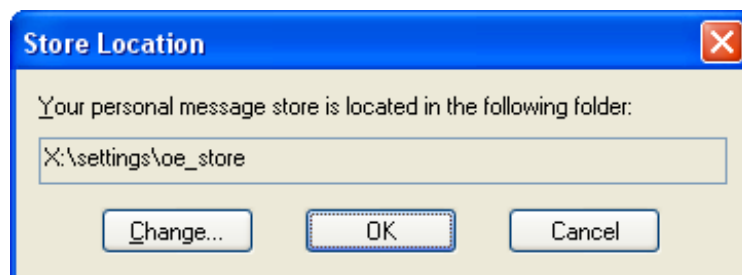
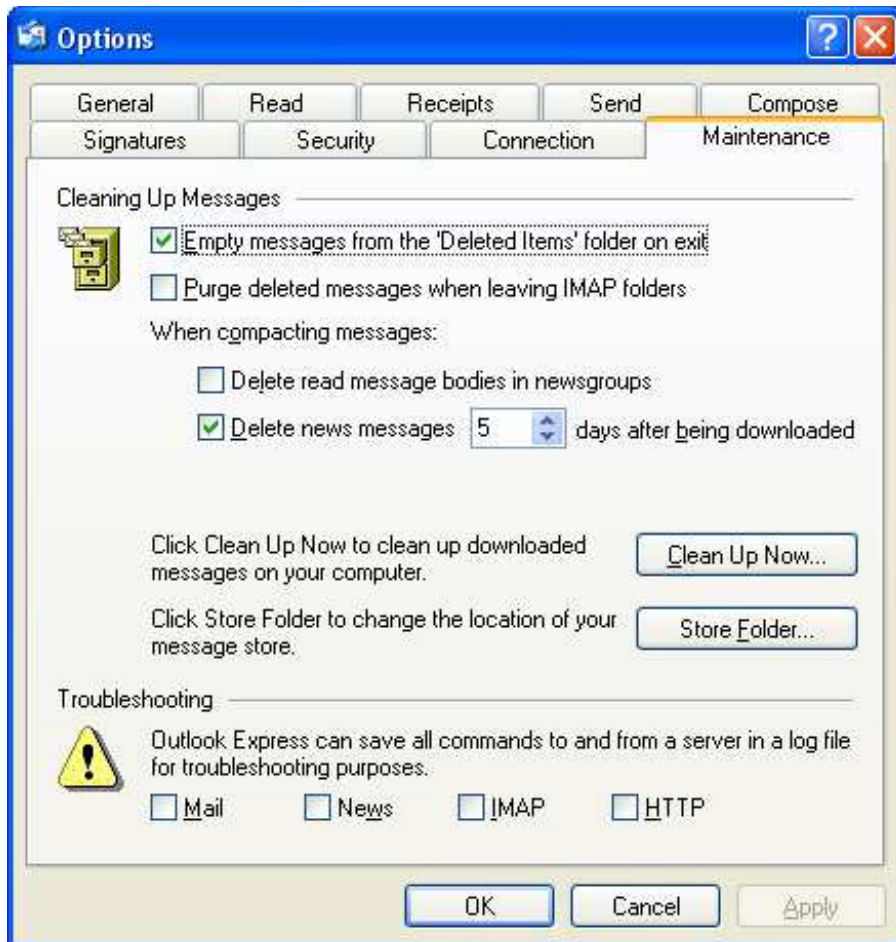
## So How do I backup my emails ?

Step 1, find where Outlook Express keeps the mail files.

Step 2, copy all these files to somewhere safe.

### Step 1

Open Outlook Express and click on 'Tools' and 'Options'. Select the 'Maintenance' tab. Click on the 'Store Folder' button. Open a copy of 'Notepad'.

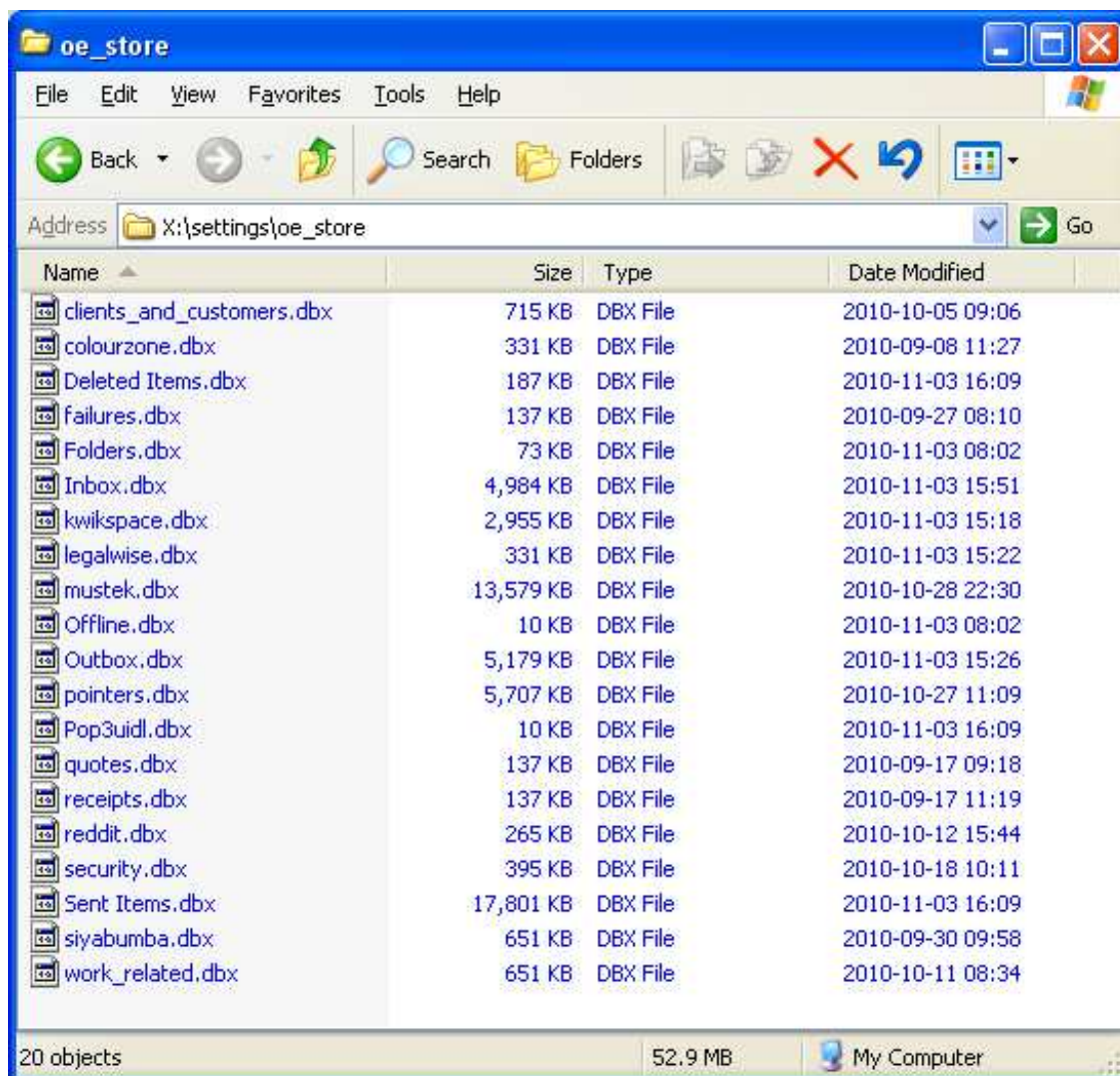


Select all the text in the box showing the path to the 'store folder'. Copy it to the clipboard by 'Control-C' and paste it into Notepad.

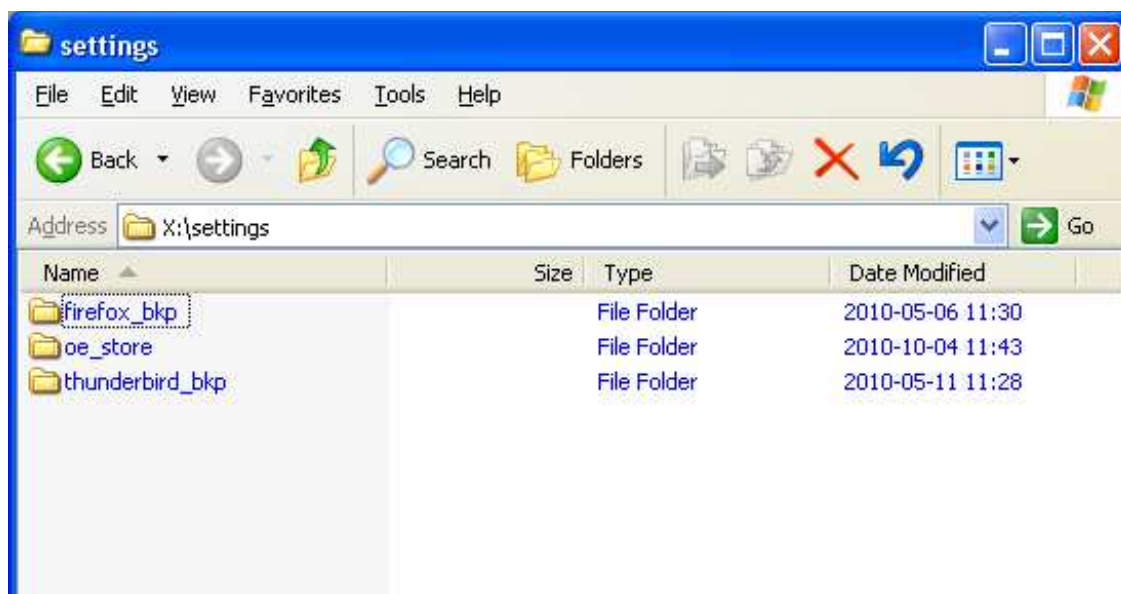
Now close Outlook Express. You will have to click OK a few times...

## Step 2

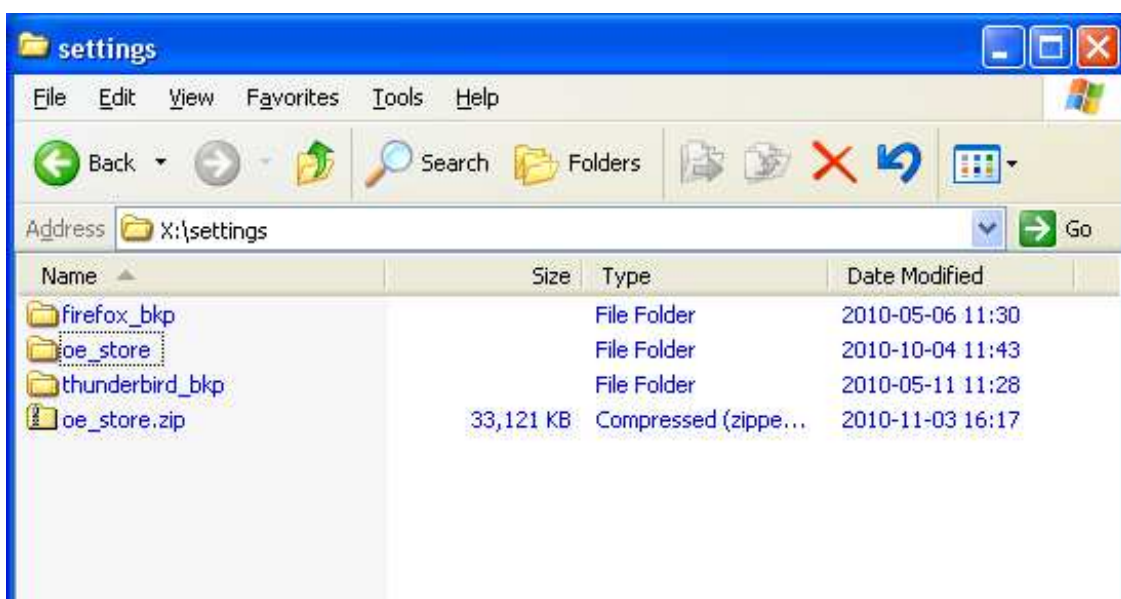
Open 'My Computer' or an Explorer window. Paste the path to the store into the address / path box at the top. Press Enter and the window should show the Outlook Express files.



All of those files need backing up. So Click the 'Up Arrow' button. So that you have the folder shown but not the files.



Right-click the folder (in this case, oe\_store) and 'Send To' a 'Compressed (zip) folder'. Wait for a couple of seconds and you should have a zip called 'oe\_store.zip' or similar.



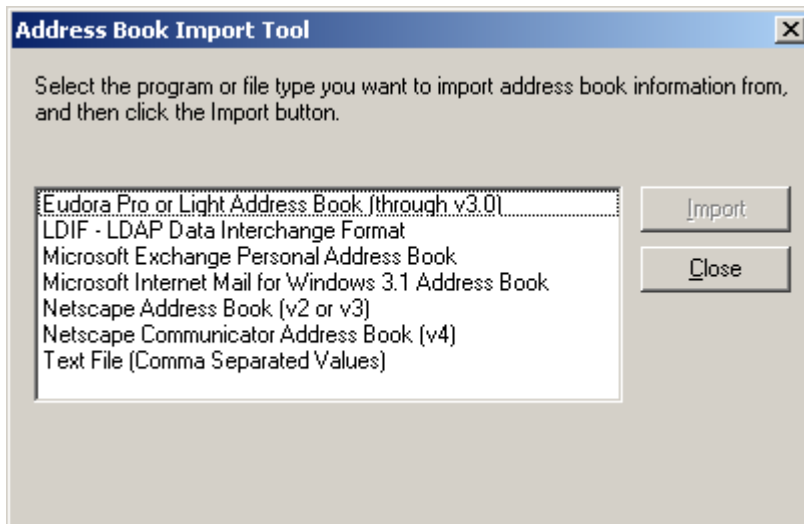
Now copy the zip file to somewhere "safe".

## Restoring Outlook Express files

If you have copied all of the Outlook Express files and folders to somewhere, it's a simple matter to restore the data by copying back to the 'storage' folder. Remember to close Outlook Express before restoring; otherwise the files will not copy.

## Importing to the address book

If you exported the data from Outlook Express, then you can import the data back into the files with very little problem.

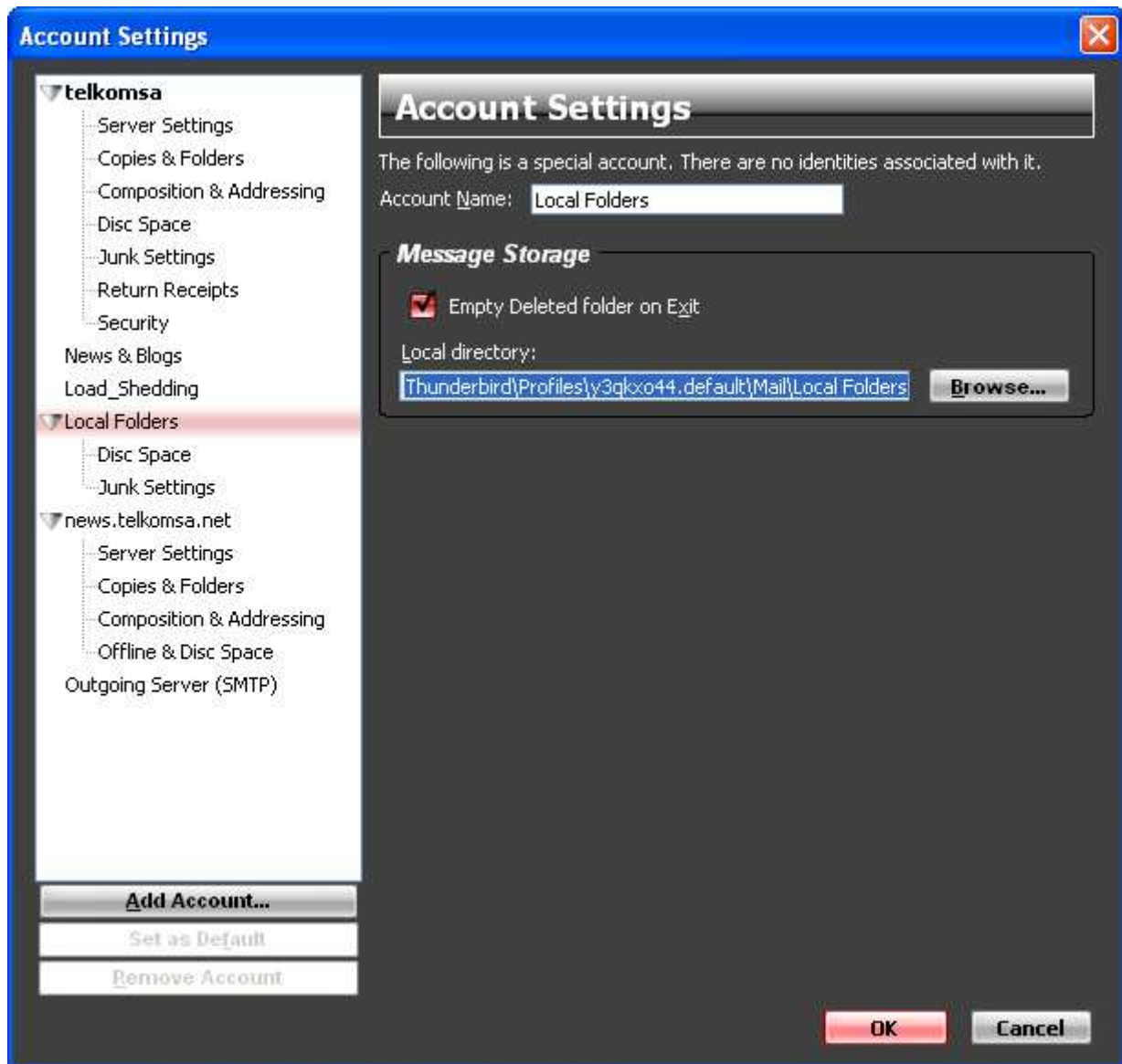


## Backing up Thunderbird

[refer to web page:- ]

You can try an 'add-in' for Thunderbird. There are several that offer backup facilities.

Then if you wish to 'do it yourself', take a look at this....



See where I highlighted the path? Do a control C and paste it into your favourite text editor.

```
C:\Documents and Settings\John\Application Data\Thunderbird\Profiles\y3qkxo44.default\Mail\Local Folders
```

profiles.ini - lives here :-

```
[
    \UserName\Application Data\
]
C:\Documents and Settings\John\Application Data\Thunderbird
```

and points to :-

```
C:\Documents and Settings\John\Application Data\Thunderbird\Profiles\y3qkxo44.default
```

### Contents of 'profiles.ini'

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[General]  
StartWithLastProfile=1

[Profile0]  
Name=default  
IsRelative=1  
Path=**Profiles/y3qkxo44.default**

This folder (on my pc) amounts to 792MB! How on earth do I back it all up? [WinZip](#) (originally from PkZip) is nowadays part of the operating system. So you could 'Send To' a compressed file/folder. Be careful, this operation does not always seem to be reliable. If necessary use a copy of [WinZip](#) or [GZIP](#) (GNU Zip) to secure the data.

## Backup of dictionaries (proofing tools)

Saving all those words you so carefully entered into the custom dictionary is not a simple task. Microsoft Word is not designed to save or backup your dictionary. So its up to you to do it.

1) Find the dictionary.

Option 1, do a search for 'custom.dic'

Option 2, get a program to search for it...

MS Word stores the custom dictionary here:

`%appdata%\Microsoft\Proof\`

What is `%appdata%` ? Well it's an environment variable. Its a short hand version of "application data."

## Backup solutions for various scenarios

### Why don't I [John Brock] have to backup every day?

Some years ago I supplied a company called INET with a Novell file server with two large (in those days +/- 200MB) hard disks. These were attached to two separate SCSI controller cards, plugged into the motherboard. The idea was called 'duality' and everyone else called it [RAID](#). It happens to be the simplest form of a RAID array of disk drives. If one drive failed the other "MIRROR" drive would carry on until the broken one could be replaced.

We didn't have 'hot swap' drives in those days, so a server shut-down would have to be done to disconnect the broken drive. Later we had RAID array units, which could be "hot swapped" with the power still applied. These could provide 100% server uptime for the client.

My first Pentium four machine taught me a lesson in its first few weeks of operation. [August 2003] Its hard disk failed, gradually. After a while re-installation of the operating system, applications and so on, becomes almost second nature. It's still a modern concept of hell - to be condemned to re-install Windows - for all eternity.

Serial interface (SATA) hard disk drives had not really 'arrived' then, so a parallel IDE solution would be needed. I well remember the 'microsoftie' praising the fact that NT had RAID in software built-in, remembering the preview; I went looking for the software in XP. The search proved almost fruitless. It is an example of yet another MS 'shrinkage' of system utilities. It is there in the server versions of the operating system but not in XP home or professional.

Sometimes it really pays to read the computer magazines. I re-read the article in Personal Computer World that details the 'kludge' used to convert drives into a RAID array. Not everyone will have access to a Server 2003 CD, so this will not work for everyone. Using the modules provided on the CD, I set up a mirrored pair of 80GB hard disks. These have performed well since then. It is a Murphy's Law corollary that says if you make absolutely sure, you won't have to replace the disks, ever! As an alternative to this kludge, I have used parallel IDE adapters made by Adaptec, which also have mirroring software provided.

Since then I have constructed several 'mission critical' machines for various clients. Most recent machines use SATA disk drives in a mirrored pair as the store for the valuable data. The only snag in installation is the supply of the mini-driver on a 3.5" disk. Not many machines these days use or need 3.5" disk drives. So copy the software to a USB disk drive before installation.

This last solution can be retro fitted, so an older machine can be upgraded. If the machine is of an age that SATA is not supplied on the motherboard, a PCI to SATA card can be fitted.

This concept was used by Google to store their valuable and ever changing data. Recently (2006) one disk drive manufacturer has started to make large dual hard drives in 'mirror' form for added reliability.



## Back up procedures

Network (shared by several users) data must be protected with a comprehensive and regular backup schedule. When a desktop system fails, the results are unfortunate. When a network fails, the results can bring down the company. Your backup procedures should include data on network and local (users) disks. [Mainly because the [users](#) won't backup their data...ever!]

Backup procedures can be as simple as copying data to floppy disks or as comprehensive as using an off-site storage of tape cartridges. You will also need to plan for recovering and restoring data.

## Backup Scripts

[Backup should be simple so that users have no excuse not to back up their data.]

e.g.: using XCOPY /m. Here is a simple batch file to backup all DOC files on the C: drive: -

```
Cls
Echo off
:LOOP
Rem Could be B: or a Network drive.
Echo Put blank disk in drive A:
Rem this puts "Press a key when ready..." on screen.
Pause
Rem XCOPY supports errorlevels and can search subdirectories.
Rem You could make it a network drive instead of A:
XCOPY C:*.DOC A: /E /S /M
Rem ErrorLevel 4 is disk full
If ErrorLevel == 4 goto LOOP
Echo All done!
```

## PkZip options for making a full and incremental backup

### Full backup

Use the -a+ option to create a full backup of files on your hard disk or network disk. For example:

```
C:\> PkZip a:fullback -&s -a+
```

This will backup the entire hard disk to a multi-disk Zip file called Fullback.zip on a set of disks in the a: drive

### Incremental backup

-a+ Turn off archive attribute of added files. By using this option you can create a complete backup of your disk, while clearing the archive attributes to make the way for incremental archiving. Incremental archiving makes use of the archive attribute to take only the files, which have been modified since the last backup. In order for this process to work smoothly you must first have a complete backup and a clearing of the archive attribute for all files. For example:

```
C:> pkzip f:backup.zip -a+ -rp
```

**There is always a better way of doing it - try Scripting it.**

## **Using VBScript for backup purposes**

I am going to give lots of examples here. The easy and less complex ones first.

Perhaps the simplest script is the basic copy script. This just copies the files in the 'My Documents' folder to a folder on another drive. The other drive could be a CD Writer, network disk drive or a storage unit that is network or Internet connected.

## **How do you backup to a 'compressed (zip) folder'?**

[Why would you want to do that? You can backup to a compressed folder on a disk.]

## Interrogate the 'registry' to find out which email client is being used.

It had been one of those peculiar occasions. A program I wrote to use the email client would roll-over and die claiming that there was 'no default email client installed'. The [user](#) was adamant that he used Outlook, only when [questioned more thoroughly](#), did we find out he was using Outlook Express. The program had been installed on many machines that should have been using MS Office and Outlook. His was 'different'. Microsoft's acceptance and use of the Internet was belated and was quickly impacted on Windows 95. There they started storing certain values and specification in the registry. It is a sort of database used by the system to 'look-up' what goes where and why programs shouldn't work when you want them to.

There is stored in the registry a default program for various Internet applications. The email client is one of them. The 'main' web browser is another.

If this 'eDocument' were a Windows help file, it would be possible to query the registry right now and show you, on screen, which email client you use. If the file were a 'compressed HTML help file', it would have been possible last year. Security and script execution have been tightened up considerably over the last few years. So running a script is no longer an easy way of automating a process on your pc. However as the 'user' on your own pc, you can create a script and run it. Try the example below; it will give you a new sense of power over your pc.

Not so long ago, the Portable Document File format was 'updated' to include multimedia and scripting. So the Adobe PDF can now be a scripted virus. Unfortunately this has become larger and more unwieldy than ever, so rather don't upgrade to the 'new' version.

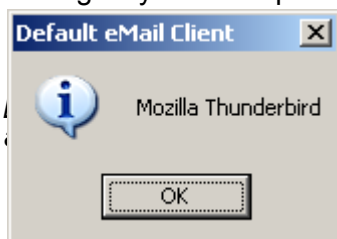
However here is a simple script that interrogates the registry that you can put into notepad: -  
[You may copy and paste it, cut it out and type it in if you wish.]

```
'
' RegTest1.vbs - JB 2006
'
' Test program to find Outlook Express' store
'
'
Dim WshShell, bKey, cKey

'--
Set WshShell = WScript.CreateObject("WScript.Shell")
'--
bKey = WshShell.RegRead("HKCU\Identities\Default User ID")
'--
Msgbox WshShell.RegRead("HKLM\Software\Clients\Mail\"), 64, "Default eMail Client"
'--
Msgbox bKey, 64, "Default User ID for Outlook Express"
'--
cKey = WshShell.RegRead("HKCU\Identities\" & bKey &
"\Software\Microsoft\Outlook Express\5.0\Store Root")
'--
Msgbox cKey, 64, "Storage folder for Outlook Express"
'--
```

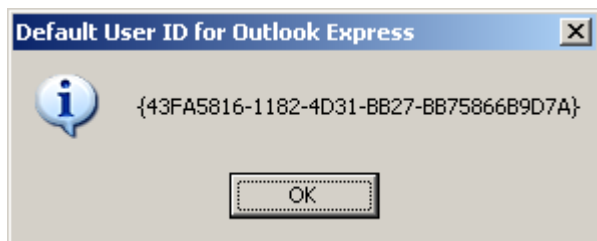
Just save it as "RegTest1.vbs" and double-click it. It will immediately tell you which email client your pc thinks it is running. The storage folder path is the last output and can be used to copy your files to a 'safe place'.

It will give you an output window like this:-



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I use 'Mozilla Thunderbird' for my main email client.



Outlook Express is 'part of' Windows, so its there anyway. Here the script tells you the main identity.



Here the script tells you where Outlook Express keeps its emails. That's right, its on the second hard disk drive.

## FullBack.vbs - script to backup documents

```
' --- FullBackup.VBS ---
' JB last modified: 2006-06-23
' VBScript version
'
Dim WD          '-- working directory
Dim WP          '-- working path
Dim FSO         '-- file system object
Dim Wfolder '--
Dim Wfiles, Wfile
Dim DestFolder '-- destination folder
'---
Dim n
Dim WhoAmI '-- person logged in using this program
Dim Net      '-- network object
Dim CurTime, CurDate '-- current time and date
'---
Dim FileSys
'-- Name of Zip file
Dim strZipName '--
Dim oArgs
'---
Dim ScriptPath
Dim TextWhere
'---
Dim iRes, MT, TT
'-- Shell
Dim SH, SC, DPath, WshShell
'-- Registry key
Dim bKey

'---
Set SH = WScript.CreateObject("WScript.Shell")
'---
TextWhere = SH.RegRead("HKCU\Software\JBCOMPUTING\BackupScript\Config")
'---
DPath = SH.SpecialFolders("Desktop")
'-- Get the command line args
set oArgs = Wscript.arguments
'-- If no command line arguments provided,
' continue as normal
If oArgs.Count <> 0 Then
    '-- is it /I ? initialise.
    If Ucase(oArgs.item(0)) = "/I" then
        '---
        TextWhere = InputBox("We need to know Where to Backup the files." )
        '---
        If Right(TextWhere, 1) <> "\" then
            '---
            TextWhere = TextWhere & "\"
            '
        End if
        '---
        MsgBox "TextWhere=" & TextWhere
        SH.RegWrite "HKCU\Software\JBCOMPUTING\BackupScript\Config", TextWhere,
"REG_SZ"
        '---
    Else
        MsgBox "Usage: FullBack.vbs /I - initialise program.", 64
        wscript.quit(0)
    End if
    '

```

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```

End if
'--
CurTime = "Current time: " & Time
CurDate = "Current date: " & Date
'--
If ReportFileStatus(DPath & "\FullBack.lnk") = 0 Then
'--
    MT = "OK to create a shortcut to this Backup Script on your desktop?"
'--
    TT = "WHS - Create Shortcut"
'--
    iRes = MsgBox(MT, vbOKCancel + vbInformation, TT )
'--
    If iRes = vbCancel Then WScript.Quit
'--
    Set SC = SH.CreateShortcut(DPath & "\FullBack.lnk")
'-- Path to FullBack and drive\path Parameter
    ScriptPath = Replace(Wscript.ScriptFullName, Chr(34), "")
'--
    SC.TargetPath = ScriptPath '-- & " '" & TextWhere & "'
'
    MsgBox "Target=" & SC.TargetPath, 64
'-- NOTE The missing space!!!
    SC.WorkingDirectory = SH.Specialfolders("MyDocuments")
'--
    SC.WindowStyle = 4
'--
    SC.IconLocation = "wscript.exe, 0"
'-- save the shortcut
    SC.Save
'--
    WScript.Echo "A shortcut to FullBackup now exists on your Desktop."
'
else
'--
    Set Net = CreateObject("WScript.Network")
'--
    Set WshShell = Wscript.CreateObject("Wscript.Shell")
'--
    WhoAmI = "Logged in as " & net.UserName
'--
    Set FileSystem = CreateObject("Scripting.FileSystemObject")
'-- Log to File
    WshShell.Run "Command /C Echo " & WhoAmI & " > BkupLog.txt", 2, TRUE
    WshShell.Run "Command /C Echo " & CurTime & " >> BkupLog.txt", 2, TRUE
    WshShell.Run "Command /C Echo " & CurDate & " >> BkupLog.txt", 2, TRUE
'-- Remark this next line to stop message box
    'MsgBox "FullBackup.VBS Program" & chr(13) & WhoAmI, 64, "BACKUP SCRIPT
PROGRAM"
'--
    WD = GetWorkingFolder
'--
    WP = GetWorkingPath
'-- work out the destination folder & path. Set as X:\
' And in case the folder has spaces in it, put " around it.
    DestFolder = TextWhere
'--
    'MsgBox "Xcopy *.* " & DestFolder & " /M /S "
'-- use WinZip to backup according to date
' WshShell.Run "Command /C D:\util\WinZip32 " & DestFolder & DATE &
".Zip *.*", 2, TRUE
'-- Use Xcopy to copy all files and folders
    WshShell.Run "Xcopy *.* " & DestFolder & " /Y /M /S ", 2, True
'--
End if
'--

```

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```

CurTime = "Completed at Current time: " & Time
CurDate = "Completed at Current date: " & Date
'--
Sh.Run "Command /C Echo Completed at " & CurTime & " >> BkupLog.txt", 2, TRUE
Sh.Run "Command /C Echo Completed at " & CurDate & " >> BkupLog.txt", 2, TRUE
'-- Quit with no errors (0)
Wscript.Quit 0
'----->>>

```

```

Function GetWorkingFolder()
'=====
' Function: GetWorkingFolder
' Purpose:
' This code gets the current directory or path
' to the currently executing script
'=====
Dim strDir

'-- this gives the current path or PWD.
'Wscript.Echo FileSystem.GetAbsolutePathName(".")
'--
strDir = FileSystem.GetAbsolutePathName(".")
'-- this gives just the working directory/folder
'Wscript.Echo right(strDir, Len(strDir) - instrRev(strDir, "\"))
'-- return the value
GetWorkingFolder = right(strDir, Len(strDir) - instrRev(strDir, "\"))
'--
End Function
'=====

```

```

Function GetWorkingPath()
'=====
' Function: GetWorkingPath
' Purpose:
' This code gets the current path
' to the currently executing script
'=====
Dim strDir

'-- this gives the current path or PWD.
'Wscript.Echo FileSystem.GetAbsolutePathName(".")
'--
strDir = FileSystem.GetAbsolutePathName(".")
'-- this gives just the working directory/folder
'Wscript.Echo right(strDir, Len(strDir) - instrRev(strDir, "\"))
'-- return the value
GetWorkingPath = strDir
'--
End Function
'=====

```

```

Function ReportFileStatus(filespec)
'=====
' Function: ReportFileStatus
' Purpose: Checks existance of filespec
' Returns true or false.
'=====
Dim fso, msg

```

```
Set fso = CreateObject("Scripting.FileSystemObject")
```

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```
If (fso.FileExists(filespec)) Then
'   msg = filespec & " exists."
   ReportFileStatus = -1
Else
'   msg = filespec & " doesn't exist."
   ReportFileStatus = 0
End If
'
End Function
'=====
```



# The Practical Stuff

Finding and re-using old hardware is what I do – sometimes for a living. Re-using an old 8” disk drive on an IBM PC compatible is feasible. It was at one time the only way to get the CP/M source code files across to the new IBM PC XT [1984]. You will have a major problem today (2011) as most PC's sold now do not have printer ports or even floppy disk drive controllers.

## Data Restoration from old media

Nowadays referred to as a “challenge”. But quite possible. Care and servicing of veteran hardware has been a part of my philosophy for a great many years. Usually referred to by the fairer sex as “junk”! That is until one of her clients desperately needed data restoration from 3.5” disks.

## The Use of “old” software on new computers

One of the obstacles found in recent times has been the running of “legacy” software on newer operating systems. Most of the Windows NT derived systems will not allow access to hardware directly and will terminate the program with prejudice. So the MS-DOS Restore utility for DOS 3.3 will definitely not work under Windows XP. There are several ways to solve this problem.

Look around you, can you see an “old” computer? Is there one in the garage? If there is, blow the dust out and plug it in to the power. Check it out. Most computers from the latter half of the 1990's have network adapters built-in. With a short CAT5 cable, it will be possible to network the old and the newer PC's. This allows you to do backup at a high speed automatically or manually. As well as use the old software and transfer results, data or information over the network to the new PC.

You can call the old PC a “slave” PC, if you like. Since you won't be sat in front of it for any length of time, you won't get frustrated by its lack of speed. Most likely it will have serial and parallel ports as well. These allow you to connect “veteran” peripherals. Data from these devices / peripherals can then be transferred over the network.

# The Theoretical Stuff

In theory you should backup your data on a regular basis by copying the data to a medium that will last as long as you will need to restore it. Or for as long as it is relevant. Backing up to media that lasts as long as required by law is generally ignored by companies. This has been legislated in quite a few countries recently (in this century). Backing up to paper media or using paper records is a storage and safety nightmare. It is still in use by a lot of companies and service companies make lots of money storing your data for you.

Company data is probably the most misunderstood and ignored. It is also lost, misfiled, sold to competitors or placed on the Internet for a laugh. Included in this data is usually the personnel records, payroll data and human resource data which is supposed to be company confidential.

## The Difference between Backup and Archiving

The difference is your definition of “short term” and “long term”. Yes it is up to you entirely. “Short term” might mean your lifetime or your company's life time. “Long term” could very well mean your grandchildren restoring or examining your data. Also your requirements for length of time might be a legal one. The South African Revenue Service has a legal right to examine company payroll records going back a minimum of five years. That would actually mean six financial years of records. As tape media is really only guaranteed for around two years, this could mean that your company might not be able to comply with a SARS audit.

## Where do you put it?

Putting your vital data onto media and storing it on the same premises, is quite normal. But the real world will put a stop to this. It can be stolen, set fire to, or lost in the stores. Most serious backup regimes use an off-site storage method. Putting the backup tapes in a home environment has also been found to be a bad idea. Especially when the house floods or the tapes go mouldy because of moisture in the cellar. Magnetic media (tapes, floppy disks etc.) need to be stored in a cool and moisture free environment.

## What do you put the data on?

The choice of media is great and growing by the year. Current favourites are CD/DVD write once, read-many disks. Most personal computers today come with a CD Writer or DVD Writer. Last century's favourite, tape is still in use at most medium sized companies. Tape has cost and re-usability on its side. Though re-using tapes will wear them out to the point of unreliability. For similar reasons, backup to floppy/'stiffy' magnetic media has fallen into disuse.

The external backup drive is now (2010) the “flavour of the month”. This is usually connected by a USB 2.0 connecting cable. Though a better (faster) option is an external eSATA connection. Drive capacities have gone above the one Terabyte in the last year. Backing up a whole Terabyte will take hours, so incremental backups will be your best option.

[Do not leave the backup drive connected, as this will be the first thing the thieves steal. Also store the drive in a locked and hidden cabinet.]

[Connect both the PC and the backup drive to a UPS when doing a backup.]

## What should I backup?

This question is a complex one and will take a while to answer. You might think you wouldn't want to back up your music CD collection or your LP vinyl record collection. You have the right to do so under “fair use” law.

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Your holiday snapshots (pictures) are now digital in form. These require backup as well. Losing the picture of the kiddies second birthday party will earn you negative "brownie points".

Similarly the home movies must be backed up. Hopefully they are in digital format. If they are on 8mm film, companies exist to copy to digital format.

# Full, Incremental and Differential Backup (definitions)

## Full backup

The Full backup backs up all selected files, regardless of whether or not they have changed since the last backup, and resets the archive bit.

## Incremental backup

The Incremental backup backs up all selected files that have changed since the last full or incremental backup, and then resets the archive bit. Use this backup type for the partial backups in your backup cycle if you work with different files each day, or if you need to save each day's version of the files you work with.

Note: You must save all incremental backup sets between full backups, since the files backed up in one incremental backup will not be included in the next unless they are changed.

## Differential backup

The Differential backup backs up all selected files that have changed since the last full backup, and does not reset the archive bit.

Since the archive bit is not reset, the backed-up files will be backed up again in the next differential backup. Use this backup type if you generally work with the same files each day.

{---}

## Tape Streamers

For backup of data at low to medium cost nothing comes close to tape backup. Tape storage has been used in the industry since the early days. Very large amounts of data can be stored on tape. However, tape has a limited useful life in storage (1 to 2 years) and is susceptible to magnetic fields and temperatures.

Tape capacities vary, for example, a data cartridge such as the Teac 60, which is similar to the popular Philips-type audio cassette, holds only 60 mega Bytes; the 20-year-old quarter-inch 3M data cartridge can hold up to 250 mega bytes; and its smaller brother the DC2080 holds 80 mega Bytes. Though with data compression techniques these figures can be doubled or tripled.

DAT tapes have capacities in the 10's of Gigabytes. They cost little and the drives are reasonably priced. However if the directory area of the tape is damaged, restoration is almost impossible. [*Data recovery option 4.*]

## Digital Audio Tape [DAT]

DAT drives use helical-scan recording technology to increase storage density by creating diagonal rather than longitudinal tracks on the tape. Helical scan technology has been used to record to video tape in all the Beta and VHS recorders.

Most tape unit manufacturers use the Digital Data Standard (DDS) format for storing data. DDS is a de facto standard endorsed by the DDS Manufacturers' Group coalition.

DAT-drive heads require occasional cleaning to keep them working properly, and only data-grade cleaning cartridges should be used. Some drives are self-cleaning. [um, maybe?]

## Helical scan recording [as used by DAT tape drives]

Rather than locating a set of fixed heads in a tape path, helical scan recording uses a set of three heads mounted on a drum that rotates at 1800 r.p.m. The tape is then wrapped around the rotating drum in the shape of a distorted 'C' (C wrap) at an angle of about 5 degrees to the face of the drum. The recorded data is no longer a longitudinal path across the tape, but a track that extends at an angle from the bottom of the tape to the top of the tape. The recording of helical tracks, or stripes, offers several distinct technical advantages that otherwise must be overcome in conventional longitudinal recording.

The actual recording pattern on tape utilises a series of very narrow stripes (0.000098 inch) written acutely across the tape. Each stripe (3 inches approx.) represents a single rotation of the head. With the head travelling at 1800 r.p.m., data density increases dramatically. Each track can hold about 130 k bits, and there are 820 tracks per linear inch of tape. A 346 foot tape can store over 2 Gigabytes of data.

## Optical & Magneto-Optical storage backup

Optical disks have many advantages over traditional magnetic media for backup storage and network data management systems. An optical disk is less susceptible to environmental extremes than a magnetic disk or tape, provides better long-term data integrity and is removable for data security. Optical disks have an estimated shelf life of 10 to 50 years, compared to two years for magnetic tape. Write once read many (WORM) disks have large capacities and are designed for archival storage; erasable optical disks arrayed in 'juke boxes' can provide up to 50Gbytes of on-line storage and faster information transfer than tape drives. Optical disk systems are far more expensive than tape systems but nevertheless attract users because they provide random access. Magnetic systems nevertheless cost less per megabyte than optical media. These 'juke boxes' find application in looking up telephone numbers for the telephone company system.

## Disk Mirroring, Disk arrays

As the requirement for more disk storage increases the chance of something going wrong with the hard disks increases. To cope with hard disk failures various schemes may be used such as disk mirroring and disk arrays using RAID technology. Disk mirroring uses two identical hard disks which have identical data written to them. If one disk fails the other continues operation until the faulty unit can be replaced. Disk arrays are usually made up of RAID units. RAID stands for **R**edundant **A**rray of **I**nexpensive **D**isks.

Modern PC's (after 2003) have SATA (Serial ATA) drives and can be arranged as RAID or Mirrored drives. Most modern operating systems have the facility built-in and can provide

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sophisticated control of the hardware. Alternatively the hardware suppliers provide a system 'device driver' to aid in the use of the drives.

At the price of the newer drives, it makes sense to order your PC with two hard disks arranged as a mirror set. So that if one fails, you can continue with the other drive. Replacing the faulty drive at your leisure. For the ultimate in performance and reliability you could use a Solid State Disk as the boot drive and two large SATA drives as a RAID 1 array for data storage.

# Data Recovery Options

To get to use these options, you don't have to be a longhaired guru or very rich but you will need a lot of patience and attention to detail. Technical details will be provided and veteran hardware will probably be required.

## Getting Data off old floppies/'stiffies' - Data recovery option 1

All floppy media can be frozen overnight to improve the magnetic domains of the iron oxide particles. Remember to seal the floppy in a moisture proof container or plastic bag. Also the use of specially written data recovery programs, which re-read the sectors several times will ensure maximum data reliability.

[One example of a utility to do this is the Norton Disk Utilities, Disk Test (DT for short) or Norton Disk Doctor (NDD). It became ScanDisk in MSDOS 6.0 and later DOS versions. It is probably no longer available in the computer stores but you probably can download it from an Internet site. Alternatively you could adapt it from one of the C/C++ example programs also available on the Internet.] The DOS 6.0 version of ScanDisk doesn't care which DOS it runs under but the later ones complain about "Incorrect DOS version".

Quite a few modern day "hackers" have contributed to the ever growing 'Linux disk utils' suite of programs. This seems to be the current favourite with a lot of data recovery service companies. As they can inspect and edit the source of the utility and modify it to their unique requirements.

Taking 'old' floppies and capturing their data, as an image is now a popular method of storing veteran software and operating systems. Simple DOS based programs can store images as files onto hard disk for later transfer to CD/DVD/web sites. This allows some geeks and hackers to restore to useful condition old computer systems. Such as 1980's vintage CP/M systems.  
[\[Take a look at this site to see what I mean.\]](#)

## Getting Data off hard disks that have failed or crashed - Data recovery option 2

Dependent upon whether it is a physical/mechanical problem or an electronic problem, the data can be extracted from the magnetic media usually with great success. If it was a mechanical "head crash", the media might have suffered damage in a small area. This area can still be 'read' on another set of heads that the platters have been transferred to.

To get data off a broken hard disk today is relatively easy. Boot on a rescue CD that 'boots' the PC into Linux. Then run the Linux 'disk utils' if the drive is badly damaged. If the drive contains just a few files and the disk is relatively undamaged, mount the drive under Linux and copy the files to some other media such as a USB memory stick.

## "Can you get it for me?" - Data recovery option 3.

The short answer, "yes". The long answer, "for a price". It very much depends on the amount of data (in bytes), the media and the perceived value of that data. It is a time intensive process and takes several hours to pick through the structure of the damaged disk. Older, smaller disks don't take too long so the cost is usually low. Late model disks of Gigabyte sizes, take longer and will cost "an arm, leg and a vital organ".

## **Recovering data from tapes - Data recovery option 4.**

Tapes can be recovered, even when “crunched”. A winding operation with careful application of heat and cold can remove the wrinkles. A hair dryer on low can be useful here.

## **What's a 'stiffy' or 'stiffies' ?**

A 'stiffy' is a South African slang term for a 3.5" disk drive. The term has caused great amusement overseas, especially in the U.K. Try looking it up on [www.theregister.co.uk](http://www.theregister.co.uk)

## **Disclaimer**

No 'user' was harmed, hurt or injured during the compilation of this document.

## **Definition of 'user'**

Look it up in the 'Jargon File'.

## **'Ghost'ing the hard drive**

'Ghost' is a popular utility especially with assemblers and manufacturers. On the whole it performs as required with a minimum of fuss. What you do with your image file is critical to the process. DO NOT store it on the same disk!

## **Restoring a 'ghosted' disk drive**

The utility program will require a basic operating system to function. So some means of booting is required.



# A memory stick is NOT a backup device!

A USB memory stick is an electronic device (solid state) that can be damaged, lost, grounded to a pulp, run over by a bus or used to ignite a gas lighter with static electricity. Do **NOT** consider it a suitable long term storage device. It is a short term transfer device.

