

STATIC

Statistics for Intensive Care

## **Database Administrator Manual**

by Michael Weisenberger

## STATIC Database User Manual

Version 6.5.x

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## Chapter 1 Introduction

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### 1.1.0 Introduction

Welcome to the world of Desktop, Cross-Platform, Client-Server computing--and welcome to the STATIC Cross-Platform Database Administrator's Handbook (DBAHandbook). This handbook has been several years in the making, and the author owes a debt of gratitude to all the developers and users who have shared their database administration experiences over the online services and in person.

### 1.1.1 What is Mission-Critical Data?

There is a great deal of talk these days about whether micro-computer databases are suitable for mission-critical data. Some say yes, others say no. Fine, but the first question is: what is mission-critical data? Here is one definition:

#### DBA Principle

Mission-Critical Data is Information which:

- a. must be accurate and timely; and
- b. is vital to the success of the organization.

### 1.1.2 Managing Mission-Critical Data

From that definition of mission-critical data, we can conclude that micro-computer databases, suitable or not, are being used every day to store mission-critical data. The number of mission-critical databases that are sitting on desktops in micro-computers is increasing every day, and the sheer size of those databases is also increasing.

As you will quickly find out when you become a DBA, the nursemaiden of a mission-critical database is a very demanding responsibility. When the database is down or the data gets corrupted, you have a potential disaster:

- a Medical Records does not receive the data requested;
- b Discharge instructions do not accompany the patient, or even worse, they're wrong;
- c Your collection of information lags behind, making it difficult to complete later!

The first time that happens to you, you will really begin to understand the implications of the term mission-critical .

### 1.1.3 The Pitfalls of Database Administration

There have been many times when a DBA literally slept in the office the entire evening, watching over the computer while it recovered data or posted transactions, so that customer statements or employee paychecks could go out the next day. It's lonely at the top; the chances are very good that you are the only DBA in your company or your division; in those wee hours of the morning, you are likely to feel very much alone.

Further you will never be thanked for keeping the system in good shape, woe betides you however if it does fail, the people who rely on it will suddenly change into a totally unreasonable version of our species.

Are we exaggerating? On the contrary. Those of you who are in charge of safeguarding the corporate memory-bank know that the job can be as lonely as the picture we paint, and then some.

### 1.1.4 ...and The Rewards

But on the other hand, there are few things in the world of computers that are more satisfying than the thrill of watching your pride and joy database performing as planned: collecting information, creating discharge information, printing monthly reports. All automatic, all on time. Information at your fingertips. That's Power

### 1.1.5 The Goal of This Manual

Our mission is to show you how to harness the power of your STATIC database, how to meet the challenges of Desktop, Cross-Platform, Client-Server computing.

If we have done our job, you won't feel so alone because you will know that help is near. The STATIC Cross-Platform DBA Handbook will be the first place you'll turn to in your trying times of STATIC database administration. And if we have really done our job, you will be so on top of things that you won't have very many of those trying times!

### 1.1.6 DBA Principles

The format of the DBA Handbook is simple enough so that you don't have to read the entire book to find answers, but yet it is comprehensive enough so that you can expect to quickly find the solution to nearly any STATIC or STATIC Server database administration problem.

Database administration problems, by the way, tend to be generic - meaning that there are certain principles that apply to all database administration regardless of software or platform. Although the details may change, the fundamental principles endure.

Whenever we state one of the enduring Principles of Database Administration, we will call your attention to it:

#### DBA Principle

Anytime you see this, it will be accompanied by one of the Principles of Database Administration.

### 1.1.7 Cross-Platform Notation

For the most part, this manual is self-explanatory; however, we want to bring one convention to your attention: cross-platform notation.

STATIC is a cross-platform application. That is, it is designed to run on Macintosh and Windows. This manual will try to cover all of these platforms. There are some differences in some conventions between them. For example, Windows file names end with a decimal and a 3-character extension that tells you the type of file. Macintosh files have their creator type embedded in the files, so there is no need for an extension. Therefore, when we mention the name of a file without the decimal and 3-character extension, that is a Macintosh file; if the file name includes the decimal and the 3-character extension, it is a Windows file.

When we need to mention the names of both files, we will give you the Macintosh name, followed by the Windows name in brackets. Here is an example: STATIC {STATIC.4DB}.

After a few pages, you should find this cross-platform notation easy to follow.

### 1.1.8 STATIC Pro and Lite

A note here about STATIC Pro and Static Lite.

As far as this manual is concerned there is no difference between the two products. In fact internally Pro and Lite are exactly the same. The only difference is that in the Lite version most of the features of Pro are unavailable.

So from now on, only when it is necessary will we refer to STATIC Lite specifically.

### 1.1.9 The DBA Survival Kit

Because the ideas we are covering here are so vital, we have chosen to call the chapters in this handbook your DBA Survival Kit. In each chapter, we will introduce you to items in the Survival Kit. We will tell you what they are; where they're found; and how to use them. The Survival Kit will help you prevent most disasters from happening; but if disaster does strike, the Survival Kit will tell you how to minimize the damage and the inconvenience.



Our goal is to make every one of your database administration days 'routine'. If we can save you just two or three frustrating days; if we can save you just two or three sleepless nights; then the effort will have been well worth it - for you and for us.



## Chapter 2 Hardware Requirements

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### 2.1.0 What You Will Learn in This Chapter

In this chapter, we will advise you on the hardware requirements for STATIC. Here are the subtopics in this chapter:

Hardware requirements for Single User

Hardware requirements for Server

Hardware requirements for Client

### 2.1.1 Hardware Requirements for Single User Installations

#### Mac OS Requirements:

Macintosh Requirements	Absolute minimum	Minimum	Comfortable
Chipset	Mac G3	Mac G4	Mac G5
Memory	128 Mb	256 Mb	512 Mb
OS	8.6	Mac OS 9.2.2	OSX with 9.2.2
Hard Disk	120 Mb free	200 Mb free	300 Mb free
Monitor	13" monitor 256 colors 800 by 600 pixels resolution	15" monitor Thousands of colors 1024 by 768 pixels resolution	17"-20" monitor Millions of colors 1152 by 870 pixels resolution
UPS		Any UPS that does line filtering	Any UPS that does line filtering

#### Windows OS Requirements:

Windows Requirements	Absolute minimum	Minimum	Comfortable
Chipset	Pentium II 266 MHz	Pentium III 600 MHz	Pentium IV 2.6 GHz
Memory	128 Mb	256 Mb	512 Mb
OS	Windows NT4.0 SP 6	Windows 2000	Windows XP
Hard Disk	120 Mb free	200 Mb free	300 Mb free
Monitor	13" SVGA monitor 256 colors 800 by 600 pixels resolution	15" SVGA monitor High Color (16 bit) 1024 by 768 pixels resolution	17"-20" SVGA monitor True Color (32 bit) 1152 by 864 pixels resolution
UPS		Any UPS that does line filtering	Any UPS that does line filtering

### Choosing Your Single User Machine

Ideally, your Single User machine will have the following qualities:

- d** It should be the **most powerful CPU** in your office;
- e** It should be running the **most stable operating system on the chosen platform**. As a general rule, you should not upgrade to the latest and greatest operating system until it has been available on the marketplace for at least six months. Nine months to one year would be even better. That is enough time for the major bugs to be identified and fixed by service releases.
- f** Your machine should have at least the minimum recommended RAM, but preferably more. Keep in mind that, over and above the RAM for STATIC, you should add enough RAM to run the operating system itself.
- g** Your server machine should have the **largest and fastest Hard Disk** that you can afford. The size of the hard drive should be at least three times the size of your structure and data. The reason for this is that sometimes, you will need to install a second copy of your application--structure and data--for testing. This parallel testing is especially important before you upgrade to a major new release of STATIC.
- h** If you will be creating a lot of Reports, you will prefer to have the largest monitor you can afford - we recommend at least 17" to 20". The larger your Real Estate, the easier it will be for you to create Reports. The Report Editor uses a Spreadsheet paradigm, any user of Spreadsheets knows the value of a larger screen.

### 2.1.2 Hardware Requirements for Server Installations

**Mac OS Requirements:**

Macintosh Requirements	Absolute minimum	Minimum	Comfortable
Chipset	Mac G3	Mac G4	Mac G5
Memory	128 Mb for 2 Clients	256 Mb for 2 Clients plus 35Mb for every extra client	512 Mb for 2 Clients plus 35Mb for every extra client
OS	8.6	Mac OS 9.2.2	OSX with 9.2.2
Hard Disk	200 Mb free	300 Mb free RAID to mirror drive	500 Mb free RAID to mirror drive
Monitor	13" monitor  256 colors  800 by 600 pixels resolution	15" monitor  Thousands of colors  1024 by 768 pixels resolution	15" monitor  Thousands of colors  1024 by 768 pixels resolution
UPS		Any UPS that does line filtering	Any UPS that does line filtering

#### Windows OS Requirements:

Windows Requirements	Absolute minimum	Minimum	Comfortable
Chipset	Pentium III 600 MHz	Pentium III 1.2 GHz	Pentium IV 2.4 GHz
Memory	128 Mb for 2 Clients	256 Mb for 2 Clients plus 35Mb for every extra client	512 Mb for 2 Clients plus 35Mb for every extra client
OS	Windows 2000 (does not need to be a Server version as STATIC does not use Windows Server services)	Windows 2000 (does not need to be a Server version as STATIC does not use Windows Server services)	Windows XP (does not need to be a Server version as STATIC does not use Windows Server services)
Hard Disk	200 Mb free	300 Mb free RAID to mirror drive	500 Mb free RAID to mirror drive
Monitor	13" SVGA monitor  256 colors  800 by 600 pixels resolution	15" SVGA monitor  High Color (16 bit)  1024 by 768 pixels resolution	15" SVGA monitor  High Color (16 bit)  1024 by 768 pixels resolution
UPS (Uninterruptable Power Supply)		Any UPS that does line filtering	Any UPS that does line filtering

## Choosing Your Server Machine

**Ideally, your Server machine will have the following qualities:**

- a** It should be the **most powerful CPU** in your office;
- b** It should be running the **most stable operating system on the chosen platform**. As a general rule, you should not upgrade to the latest and greatest operating system until it has been available on the marketplace for at least six months. Nine months to one year would be even better. That is enough time for the major bugs to be identified and fixed by service releases.

- c** Your machine should have at least the minimum recommended RAM, but preferably more. In the meantime, keep in mind that, over and above the RAM for 4D Server, you should add enough RAM to run the operating system itself.
- d** Your server machine should have the **largest and fastest Hard Disk** that you can afford. The size of the hard drive should be at least three times the size of your structure and data. The reason for this is that sometimes, you will need to install a second copy of your application--structure and data-- for testing. This parallel testing is especially important before you upgrade to a major new release of 4D Server.
- e** Your server machine should have **only the minimum number of applications running: the Operating System itself, and 4D Server**. You will get the safest, fastest, most stable performance if your server is truly a dedicated server. If you need any other network services--file-sharing, electronic mail, print sharing, and so on--you should use another machine for those services--not the machine that is running 4D Server.

### 2.1.3 Hardware Requirements for Client Installations

### Mac OS Requirements:

Macintosh Requirements	Absolute minimum	Minimum	Comfortable
Chipset	Power Macintosh 6100	Mac G3	Mac G4
Memory	128 Mb	256 Mb	512 Mb
OS	8.6	Mac OS 9.2.2	OSX with 9.2.2
Hard Disk	120 Mb free	200 Mb free	300 Mb free
Monitor	13" monitor	15" monitor	17"-20 monitor
	256 colors	Thousands of colors	Millions of colors
	800 by 600 pixels resolution	1024 by 768 pixels resolution	1152 by 870 pixels resolution

### Windows OS Requirements:

Windows Requirements	Absolute minimum	Minimum	Comfortable
Chipset	Pentium II 266 MHz	Pentium III 600 MHz	Pentium IV 2.4 GHz
Memory	128 Mb	256 Mb	512 Mb
OS	Windows NT4.0 SP 6	Windows 2000	Windows XP
Hard Disk	120 Mb free	200 Mb free	300 Mb free
Monitor	13" SVGA monitor	15" SVGA monitor	17"-20" SVGA monitor
	256 colors	High Color (16 bit)	True Color (32 bit)
	800 by 600 pixels resolution	1024 by 768 pixels resolution	1152 by 864 pixels resolution

## Choosing Your Client Machine

Ideally, your Client machine will have the following qualities:

## Data Entry Machine

It should be running the **most stable operating system on the chosen platform**. As a general rule, you should not upgrade to the latest and greatest operating system until it has been available on the marketplace for at least six months. Nine months to one year would be even better. That is enough time for the major bugs to be identified and fixed by service releases.

Your machine should have at least the minimum recommended RAM, but preferably more. In the meantime, keep in mind that, over and above the RAM for 4D Client, you should add enough RAM to run the operating system itself.

### **Report Creation Machine**

It should be running the **most stable operating system on the chosen platform**. As a general rule, you should not upgrade to the latest and greatest operating system until it has been available on the marketplace for at least six months. Nine months to one year would be even better. That is enough time for the major bugs to be identified and fixed by service releases.

Your machine should have **at least 128mb of total RAM**, but preferably more. Keep in mind that, over and above the RAM for 4D Client, you should add enough RAM to run the operating system itself.

If you will be creating a lot of Reports, you will prefer to have the largest monitor you can afford - we recommend at least 17" to 20". The larger your Real Estate, the easier it will be for you to create Reports. The Report Editor uses a Spreadsheet paradigm, any user of Spreadsheets knows the value of a larger screen.





## Chapter 3 Obtaining your Database

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### 3.1.0 What You Will Learn in This Chapter

In this chapter, you will learn how to obtain STATIC.

Here are the subtopics in this chapter:

Obtaining STATIC from the CD or the Web site

Updating STATIC

### 3.1.1 Obtaining STATIC from the CD or the Web site

You can obtain STATIC either from a CD supplied by us or from the Web site at <http://www.hxmedical.com>. If you are using the Web site navigate to the download area.

#### STATIC on the CD

If you are using the CD you should see something as follows in your browser window:

Netscape: HARROWEX - STATIC Software

Location: file:///BackupAll/STATIC%2019%2010%202000/STATICCD/index.html

**Hx**

Home  
Products  
About us

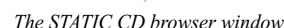
**STATIC - get more from your patient data**

For the latest updates go to: [www.hxmedical.com](http://www.hxmedical.com)

STATIC 6.5.6	Windows	MacOS
31/07/2000		
STATIC Pro Client Server		
Server Software	<a href="#">Exe - 12Mb</a>	<a href="#">hqx - 17Mb</a>
Client Software	<a href="#">Exe - 5Mb</a>	<a href="#">hqx - 6Mb</a>
STATIC Pro Single User	<a href="#">Exe - 10Mb</a>	<a href="#">hqx - 13Mb</a>
STATIC Lite	<a href="#">Exe - 10Mb</a>	<a href="#">hqx - 13Mb</a>
STATIC Utilities	<a href="#">Exe - 11Mb</a>	<a href="#">hqx - 7Mb</a>
Administrator Manual (Beta)	<a href="#">Exe - 3Mb</a>	<a href="#">hqx - 4Mb</a>
Users Manual (Beta)	<a href="#">Exe - 9Mb</a>	<a href="#">hqx - 12Mb</a>
AccessToStatic	<a href="#">Exe - 17Mb</a>	None
Postcode files	<a href="#">Exe - 1Mb</a>	<a href="#">hqx - 1Mb</a>
STATIC Flyer	<a href="#">pdf - 616Kb</a>	<a href="#">pdf - 616Kb</a>
STATIC License	<a href="#">pdf - 8Kb</a>	<a href="#">pdf - 8Kb</a>
Pricelist	<a href="#">pdf - 196Kb</a>	<a href="#">pdf - 196Kb</a>

The STATIC CD browser window

On the Web site you should see something as follows in your browser window, once you have navigated to the download area:



As already mentioned the CD NEVER has updates on it. It only ever contains the last major release of the product. But even if you do not require an update, the Web site contains a lot of extra information regarding STATIC and our company that you may require.

STATIC is constantly evolving. We estimate that there are at least 6 versions of STATIC per year. Most of these versions bring new features or enhance the current functions. At other times there may be a major (or minor) update to the underlying Database Engine and Utilities.

The STATIC CD always ships with the most current Base installers only. Due to updates of the Base Installer these may be out of date by the time they reach you. In order to ensure you have the most current version of STATIC you **MUST** check our Web site. We **DO NOT** ship updates on CD. On the Web site in the download section check the Update Date. This will tell you the date on which the most current update for the component you require was published.

You should be on our E Mail list if you have contacted us previously with regard to STATIC. If you are not on our list and want to be, just send us a request to [static@hxmedical.com](mailto:static@hxmedical.com). We always send a notification to all users that a New Update of the Base Installer is available on the Web site.

## Applying the update to STATIC

**WARNING:** Before Updating ANY files, make a COMPLETE backup of your WHOLE current installation. Move this backup to another physical location before proceeding.

**YOU HAVE BEEN WARNED!**

Running the Updater creates an Update directory. To update STATIC you need to replace the files in the current STATIC directory with the new files from the Updater directory. STATIC will handle any updating of your datafile once STATIC is relaunched.

## Automatic Updates

We never directly Update a current installation of STATIC. We consider this too dangerous - even though we could do so quite easily.

## Downloading files on a Windows PC destined for Macintosh

Macintosh files are different in structure internally from Windows files. Macintosh files have 2 parts to every file (called forks). Windows files have only one part. This can lead to problems when you are downloading Macintosh files using a Windows computer. The files will download as .hqx files. At this stage you are OK. But if you now decide to decode the .hqx file on the Windows computer you will have problems. The decoded .hqx file will be a Macintosh .sea file. This file is an Application that self extracts. This Self Extracting Application must have both forks present for it to operate properly. Unfortunately, there is NO WAY that the decoding on a Windows machine can preserve both forks (you will only get the Data fork and lose the Resource fork). So when the .sea file is sent to the Macintosh computer, it will fail to execute.

**In short, download the .hqx file, move this file to the Macintosh computer and decode it there.**



## Chapter 4 Installing your Database

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### 4.1.0 What You Will Learn in This Chapter

In this chapter, you will learn how to install your STATIC related files. Here are the subtopics in this chapter:

The STATIC Folder

Installing STATIC from the CD

Installing STATIC from the Web site

### 4.1.1 The STATIC Folder

For convenience we try to encourage all our users to keep STATIC related files in a folder we call the STATIC folder. This makes it easier for us to answer Technical calls because we have a mental map of where all the files are likely to be. Make your life easier (and ours!) by following this convention.

#### Windows

If you are on Windows, then running any STATIC related installer will create this folder for you automatically in the Program directory on the C: Drive - if you allow the installer to determine the destination of the installation.

#### Macintosh

The installers for Macintosh are simpler and are usually just compressed self extracting archives. We recommend that you create a Main Database Folder called STATIC to store any STATIC related folders and files.

**NOTE:** We recommend strongly that you place this folder at the root level of your Hard drive or very close to it - i.e. Do not nest this folder too deep. The reason for this is that STATIC has a maximum Path Length of 1024 characters and the deeper you nest the STATIC application the less space there is for the rest of the path to a document required in the STATIC directory.

**Here are the steps for creating and setting up this folder:**

- 1 Create a new Folder:**

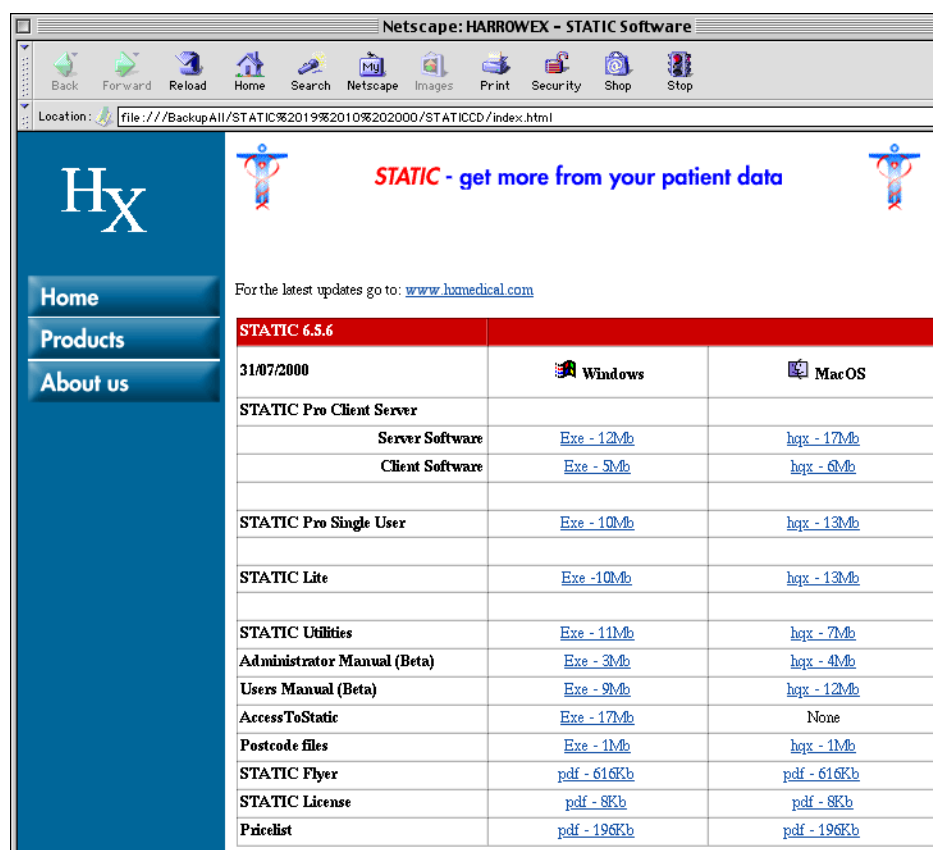


*Creating a New Folder Mac*

- 2** Name the folder STATIC.
- 3** Create or copy all STATIC related installers into this directory.
- 4** Self extract all the installers within this directory.
- 5** If required, discard the installers.

### 4.1.2 Installing STATIC from the CD

Insert the CD into your CD reader and after a while your default Web Browser will launch the CD and present you with the following window:



*The STATIC CD browser window*

In order to install the Installer file you require Double Click on the appropriate item.

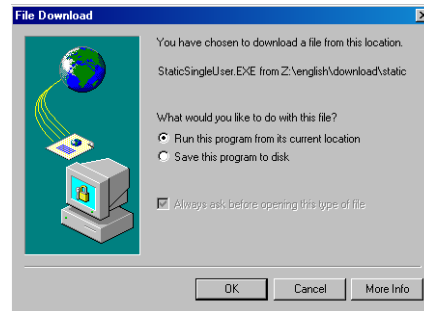
## Macintosh

On Macintosh this copies the Installer file to somewhere on your Hard Disk. The location of the file is determined by the settings in Preferences for your Browser.

All our Macintosh files are shipped as self extracting archives. In general you decide where you want to place the files, but please consider using the convention of creating and using a `STATIC` folder that contains all the files for `STATIC` as outlined in the last section.

## Windows

On Windows you are given the opportunity to run the Installer directly from the CD. We recommend that you do this rather than copying the Installer to the hard disk first:



*Run or Download window*

All our Windows files are shipped as .exe installers. They all have a very similar look to them and all automatically place files in the appropriate places. Windows Users know from bitter experience that files **MUST** be in the correct place for software installations to function properly!

If you allow the Installer to determine the destination of the installed files it will default to

C:\Program Files\STATIC\

### 4.1.3 Installing STATIC from the Web

On our Web site at <http://www.hxmedical.com> you should see something as follows in your browser window, once you have navigated to the download area:

STATIC 6.5.7	Base Installer		Updater of Base Installer	
20/10/2000	Windows	MacOS	Windows	MacOS
<b>STATIC Pro Client Server</b>				
Server Software	<a href="#">Exe - 12Mb</a>	<a href="#">hqx - 17Mb</a>	<a href="#">Exe - 5Mb</a>	<a href="#">hqx - 8Mb</a>
Client Software	<a href="#">Exe - 5Mb</a>	<a href="#">hqx - 6Mb</a>	None	
<b>STATIC Pro Single User</b>	<a href="#">Exe - 10Mb</a>	<a href="#">hqx - 13Mb</a>	<a href="#">Exe - 7Mb</a>	<a href="#">hqx - 10Mb</a>
<b>STATIC Lite</b>	<a href="#">Exe - 10Mb</a>	<a href="#">hqx - 13Mb</a>	<a href="#">Exe - 7Mb</a>	<a href="#">hqx - 10Mb</a>
<b>STATIC Utilities</b>	<a href="#">Exe - 11Mb</a>	<a href="#">hqx - 7Mb</a>	None	
<b>Documentation and Other Files - No Updater of Base Installer</b>				
Administrator Manual (Beta)	<a href="#">Exe - 3Mb</a>	<a href="#">hqx - 4Mb</a>		

*The STATIC CD browser window*

Because you are accessing the files from our Web Site, you will first have to have to download the Installers.

In order to download an Installer file, Double Click on the appropriate item. You do not need every file. Make a choice based on what you require for your installation. For instance, there is little point downloading Client Server files when you are only running the Single User version.

## Macintosh

On Macintosh this downloads the Installer file to somewhere on your Hard Disk. The location of the file is determined by the settings in Preferences for your Browser.

All our Macintosh files are shipped as self extracting archives. In general you decide where you want to place the files, but please consider using the convention of creating and using a STATIC folder that contains all the files for STATIC.

In order to install the files, Double Click the self extracting archive and the archive will decompress itself within the folder it is contained.

## Windows

On Windows the downloaded Installer file will be available somewhere on your Hard Disk. The location of the file is determined by the settings in Preferences for your Browser.

All our Windows files are shipped as .exe installers. They all have a very similar look to them and all automatically place files in the appropriate places.

In order to install the files, Double Click the Installer and allow the installer to determine the final location of files. If you allow the Installer to determine the destination of the installed files it will default to

C:\Program Files\STATIC\



## Chapter 5 STATIC File Organization

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### 5.1.0 What You Will Learn in This Chapter

This chapter documents the files that should be present within each STATIC related folder.

Here are the subtopics in this chapter:

File names for STATIC Databases

File organization in the STATIC Folder

#### 5.1.1 File names for STATIC Databases

To run and maintain any STATIC database, you need several files. Here is a list of the files and their names on each platform:

Type of File	Macintosh Name	Windows Name
Compiled Structure File	STATIC	STATIC.4DC STATIC.RSR
Data File	STATIC.Data	STATIC.4DD STATIC.4DR
STATIC Program	STATIC	STATIC.EXE STATIC.4DC STATIC.RSR
Database Repair Utility	4D Tools	4D Tools.EXE 4D Tools.RSR
Customizer Utility	Customizer Plus	CUSTO.EXE CUSTO.RSR

*Naming of Files for STATIC Installation*

Note that on the Macintosh, each file is a single file, and the data file is a single file. On Windows, however, STATIC needs to have most files split into two parts. We will talk about this splitting of files when we discuss the utility 4D Transporter later in this Handbook. We will also talk later about additional files that are needed on Windows.

When running STATIC Server on either platform, you need quite a few more files; when running cross-platform, you need still more. As we come to those topics, we will expand the above list and tell you exactly what files are needed.

#### 5.1.2 File organization in the STATIC Folder

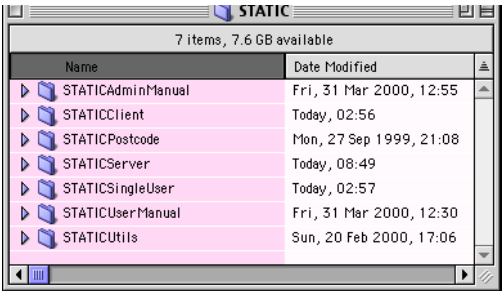
Be aware that the Installers on Windows will place the required files into the correct directories/folders without any help from you. On Macintosh this is not quite as important with the exception of the installation of the Server version of STATIC.

However sometimes files are accidentally moved or deleted - this, and the following section, will give you a map as to where the files should be.

The simplest way to manage your STATIC files is to install all the STATIC components into one folder, the STATIC folder. Within this main folder, you will then have several sub-folders to make things easier to find. In the next several paragraphs, we will step you through organizing the STATIC folder into folders and sub-folders.

### The STATIC Folder after installation

Below are two screen shots of a possible STATIC folder on Macintosh and Windows. The contents of your own STATIC folder may vary. If, for instance, you are only interested in the Single User version you will not need the Client or Server Installations.



Files and Folders within the main database folder Mac

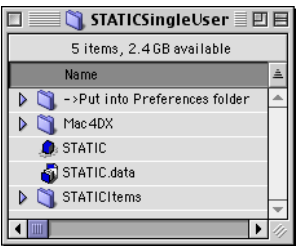
Name	Size	Type
STATICAccess		File Folder
STATICClient		File Folder
STATICPostcode		File Folder
STATICServer		File Folder
STATICSingleUser		File Folder
STATICUtils		File Folder
STATICUsersManual		File Folder
STATICAdminManual		File Folder

Files and Folders within the main database folder Win

As we continue with this discussion, we will also show you screen shots of the files within each of the sub-folders.

### The STATIC Single User Folder

This is only required if you will be running in Single User mode - either as STATIC Pro or Lite. The files should be organized as follows:



STATIC Single User Folder Mac

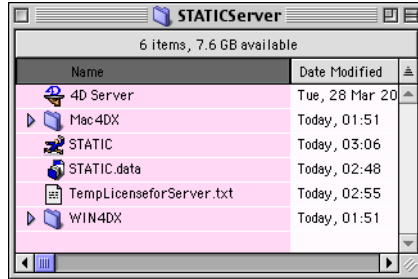
Name	Size	Type	Modified
Win4dx		File Folder	17/02/00 13
Asifont.fon	25KB	Font file	14/02/00 22
asifont.map	2KB	MAP File	8/12/99 2:36
Asintppc.dll	976KB	Application E...	14/02/00 22
Asiport.rsr	56KB	Structure	14/02/00 22
Journal.TXT	1KB	Text Document	18/02/00 23
Qtqp32.dll	25KB	Application E...	14/02/00 22
Static.4DC	9.637KB	4D Compiled ...	18/02/00 23
Static.4dd	10.880KB	4D Data File	18/02/00 23
Static.4dr	1KB	Data resourc...	17/02/00 21
Static.CMP	64KB	CMP File	17/02/00 21
Static.EXE	2.879KB	Application	14/02/00 22
Static.RSR	3.060KB	Structure	18/02/00 0:0
Static2.4DD	10.923KB	4D Data File	18/02/00 23
Static2.4DR	1KB	Data resourc...	18/02/00 23

STATIC Single User Folder Win

There may occasionally be some extra files - ignore them. The **HelpFiles** directory may also be present if you have opted to use the online Help System.

## The STATIC Server Folder

This is only required if you will be running in Multiuser Client Server mode. The files should be organized as follows:



The STATIC Server Folder Mac

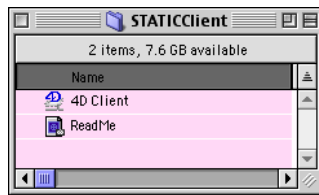
Name	Size	Type
Mac4DX		File Folder
Win4dx		File Folder
4DServer.exe	3,173KB	Application
4dserver.hlp	2,299KB	Help File
4DServer.rsr	2,136KB	Structure
Asifont.fon	25KB	Font file
asifont.map	2KB	MAP File
Asintppc.dll	976KB	Application E...
Asiport.rsr	56KB	Structure
Qtdp32.dll	25KB	Application E...
Readme.txt	4KB	Text Document
Static.4DC	17,479KB	4D Compiled ...
Static.4dd	10,761KB	4D Data File
Static.4dr	1KB	Data resourc...
Static.cmp	64KB	CMP File
Static.RSR	1,182KB	Structure

The STATIC Server Folder Win

There may occasionally be some extra files - ignore them. The **HelpFiles** directory may also be present if you have opted to use the online Help System.

## The STATIC Client Folder

This is only required if you will be running in Multiuser Client Server mode. The files should be organized as follows:



The STATIC Client Folder Mac

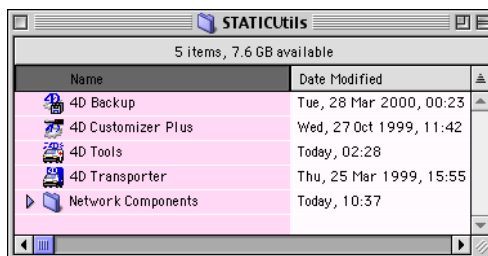
Name	Size	Type
4DClient.exe	3,181KB	Application
4DClient.rsr	2,056KB	Structure
Asifont.fon	25KB	Font file
asifont.map	2KB	MAP File
ASINTPPC.dll	976KB	Application E...
Asiport.rsr	56KB	Structure
oletools.dll	39KB	Application E...
Oletools.rsr	5KB	Structure
QTDp32.dll	25KB	Application E...
Readme.txt	4KB	Text Document

The STATIC Client Folder Win

There may occasionally be some extra files - ignore them.

## The STATIC Utilities Folder

Now, let's drill down into the STATICUtils folder and take a look at the files that you will keep there:



Utilities in the STATICUtils folder Mac

Name	Size	Type	Modified
Backup		File Folder	17/02/00 13:43
Customiser		File Folder	17/02/00 13:43
Diagnostics		File Folder	17/02/00 13:43
Other Programs		File Folder	17/02/00 13:43
Tools		File Folder	17/02/00 13:43

Utilities in the STATICUtils folder Win

Your Utility folder will be slightly different on Macintosh and on Windows. Since 4D Tools and Customizer Plus are represented by one file on Macintosh, you can store those utility programs directly in the Utility folder.



## The Other Programs folder on Windows:

Contains the installers for QuickTime. This is required to run STATIC successfully. If it is not installed on Windows you will be warned when you attempt to run STATIC. In that case run the Installers in this folder

We will discuss 4D Tools, Customizer Plus, BackUp, Diagnostics and QuickTime and the other utilities later in this manual.

## Other Folders

Other folders include the Manuals, Postcode files. Their contents are self explanatory.



## Chapter 6 STATICItems Folder

✱ ✱ ✱ ✱ ✱ ✱

### 6.1.0 What You Will Learn in This Chapter

In this chapter, you will learn about the STATICItems folder.

THIS FOLDER IS SO IMPORTANT THAT IT DESERVES ITS OWN CHAPTER

The STATICItems Folder

### 6.1.1 The STATICItems Folder

The STATICItems Folder is used by STATIC to store Reports, Information and any other STATIC generated output. The STATICItems Folder is located at the same level as the datafile that it uses to generate the contents of its output. We have centralized the output activity in order to make the location of any output consistent and easy to find.

This folder and its Subfolders is also the preferred source of Import documents. So if you need to import files into STATIC place them into the appropriate Subfolder in the STATICItems folder

**NOTE:** Remember that this folder is ALWAYS in the same directory as the datafile it refers to. It is not necessarily in the same folder as the Executable program (Application file).





## Chapter 7 HTML Help

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### 7.1.0 What You Will Learn in This Chapter

In this chapter, you will learn how to install the STATIC HTML Help.

Here are the subtopics in this chapter:

#### HTML Help

### 7.1.1 HTML Help

If you want to have the Users Manual available while running STATIC Single User or Client, then you will have to ensure that the files that contain help are located in the correct directory.

The Help files are located in a folder named HelpFiles. This can be downloaded separately from our Web site or obtained from the CD.

The architecture for STATIC ensures that if this directory is at the same level as the STATIC Program file (or Structure file for Client Server) then help will be available through the Help menu.

It goes without saying that you must have a Browser installed in order to use the Help system. The Help system has been tested with both Netscape Communicator and Microsoft Internet Explorer on both MacOS and Windows (2000, NT and 98)

#### Client Server

Place the HelpFiles folder into the directory that contains the STATIC.4dc file and the Win4dx directory. Launch Server. Whenever a Client now logs on the Client will be given the option of downloading the Help System. This can take some time (over 1 hour for slow networks). However the Client will work as usual.

#### Single User

Just place the HelpFiles folder into the same directory as the STATIC program. Launch STATIC.

#### Accessing the Help System

Macintosh - Press the F1 key or the Help key or select the menu item from the Help menu

Windows - Press the F1 key or select the menu item from the Help menu

In both cases the Help item in the menu bar will be called Help for STATIC.

Click on the Help Icon wherever it is available on a Form.



## Chapter 8 Launching Single User

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### 8.1.0 What You Will Learn in This Chapter

In this chapter, you will learn everything you need to know in order to teach your users how to sign on to a STATIC database in Single-user; whether you're running Macintosh or Windows. Here are the subtopics in this chapter:

The STATIC Single User Folder

Launching Your Single User Database

The Default STATIC Users

Do Not Double click the Datafile

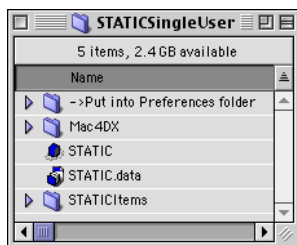
Memory settings Macintosh

Memory settings (Windows)

Minimum Memory Settings

### 8.1.1 The STATIC Single User Folder

If you will be running in Single User mode - either as STATIC Pro or Lite, your files should be organized as follows:.



STATIC Single User Folder Mac

Name	Size	Type	Modified
Win4dx		File Folder	17/02/00 13
Asifont.fon	25KB	Font file	14/02/00 22
asifont.map	2KB	MAP File	8/12/99 2:36
Asintppc.dll	976KB	Application E...	14/02/00 22
Asiport.rsr	56KB	Structure	14/02/00 22
Journal.TXT	1KB	Text Document	18/02/00 23
Qtdp32.dll	25KB	Application E...	14/02/00 22
Static.4DC	9,637KB	4D Compiled ...	18/02/00 23
Static.4dd	10,880KB	4D Data File	18/02/00 23
Static.4dr	1KB	Data resourc...	17/02/00 21
Static.CMP	64KB	CMP File	17/02/00 21
Static.EXE	2,879KB	Application	14/02/00 22
Static.RSR	3,060KB	Structure	18/02/00 0:0
Static2.4DD	10,923KB	4D Data File	18/02/00 23
Static2.4DR	1KB	Data resourc...	18/02/00 23

STATIC Single User Folder Win

### 8.1.2 Launching Your Single User Database

Now that you have your database folder organized, you are ready to launch the STATIC Single User database. We will first teach you the long way and then mention some shortcuts.

**This is how you launch your Single User STATIC Database:**

- 1 Open your STATIC folder.
- 2 Open the STATICSingleUser folder.
- 3 Double-click STATIC {STATIC.exe}.



*The Enter Password dialog Mac*

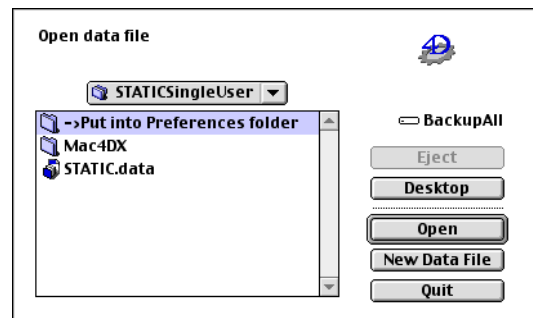


### The Enter Password dialog Win

- 4** Click on your user name, type your password, **HOLD DOWN THE OPTION KEY {Alt Key Windows}**, then click OK.

NOTE: Passwords - All our databases are shipped with the Administrator password set to (i.e. Blank or no password). So on first use any of our databases, you will NOT have to type anything in the Password field. But you still have to ensure that Administrator is selected.

Make sure you continue to hold down the Option key {Alt key} until the Open Data File... dialog appears.



*The Open Data File... dialog*

It is essential that you hold down the Option key {Alt key} until the Open Data File... dialog appears because the STATIC Program may already contain a default path to a datafile that you DO NOT want to open.

If there is a default path present in the program then without warning (and probably without you knowing) the wrong datafile may be accessed. This could lead to some very unfortunate consequences as you begin to enter data into the wrong datafile!

This method of launching STATIC MUST be done the first time you run STATIC, it does not need to be repeated each time you subsequently launch as the chosen datafile path is automatically embedded in the STATIC program file.

On the other hand if you are in a shared office environment and other members of staff use STATIC other than yourself, then it may be prudent to launch STATIC with the key down every time. In this sort of environment there is no guarantee that the correct datafile is being accessed if you just double click on the program file.

- 5** Click the name of your data file (in this case `STATIC.data {STATIC.4DD}`), then click the **Open** button. That's it, you're in!

### 8.1.3 The Default STATIC Users

Every STATIC database has at least two users, the **Designer** and the **Administrator**. Those are the default users, appearing in every password-protected STATIC database. We have added some extra default users and you may add still more. You may also change any of the names to something else. Regardless of the names, however, every STATIC database has a Designer and an Administrator.



*The Enter Password dialog Mac*



*The Enter Password dialog Win*

### 8.1.4 Do Not Double click the Datafile

The following section is a **MUST READ** as it is confusing and catches everyone!

STATIC is a database environment. So we could have used the environment to create a program that runs the manufacture of submarines (as has been done) or to run an Intensive Care facility (as we have done). In order to ensure that the correct datafile is associated with the correct program, the manufacturers of the database environment have arranged a few default behaviors:

**BEHAVIOR 1:** If a datafile resides in the same directory as the program and it has the correct name then this datafile is preferentially opened even if you have previously opened another datafile elsewhere. The correct name requires the same prefix for:

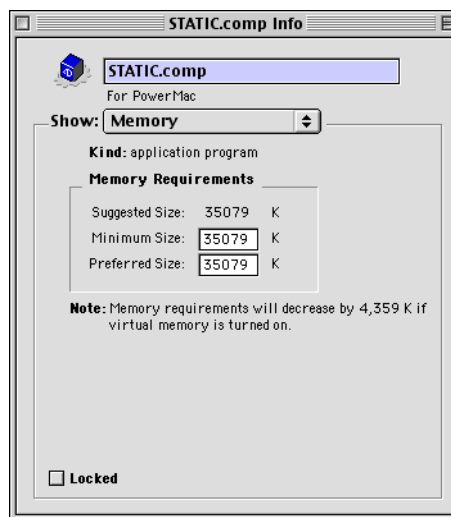
- a** The program files STATIC {STATIC.exe & STATIC.4dc} and the datafile STATIC.data {STATIC.4dd & STATIC.4dr} for Single User version.
- b** The Structure file STATIC.4dc {STATIC.4dc} and the datafile STATIC.data {STATIC.4dd & STATIC.4dr} for Server.

Reason: The database program will search the current directory for a suitable datafile bearing the same name as the executable file. If it finds one it will open this one and store the path to this datafile so it will be opened the next time.

**BEHAVIOR 2:** Double clicking on a datafile will launch STATIC BUT will not necessarily open the datafile you have double clicked on!!!!

Reason: The Double Click on the datafile will launch the Program file (STATIC or the Server software) but if the Program already has a path to a datafile embedded in it, it will forget about the file you have double clicked on and launch the datafile that it has embedded in it unless Behavior 1 applies. Another way of understanding this is that ALL datafiles merely behave like Aliases to the Program file. So as a general rule DO NOT DOUBLE CLICK ON DATAFILES.

**BEHAVIOR 3:**



### 8.1.7 Minimum Memory Settings

STATIC Single User will have at least 35079K of memory assigned to it.

Whatever your memory settings, STATIC will demand that you have at least these minimum settings.

In Single User if the settings are incorrect, STATIC will set them to the correct minimum and then force a Quit of the database.

None of the above prevent you from allocating more memory to any parts of STATIC, it only checks that there is a minimum available.

#### Why do we enforce Minimum memory settings?

Why? To relieve you and us of one more tedious Tech call.

Macintosh users like to run several programs simultaneously. Unfortunately the Macintosh memory manager does not dynamically allocate memory to running applications. Thus whatever the memory allocation to the program, ALL of this is allocated for the exclusive use of the Application, whether it uses it or not. You can see that given limited RAM, that a User may be tempted to reduce the memory requirement of some of the Applications, so that they will fit into the limited memory space. This is a disastrous practice for STATIC, so we have found an effective way of stopping it!





## Chapter 9 Launching Server

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### 9.1.0 What You Will Learn in This Chapter

In this chapter, you will learn everything you need to know in order to launch Server. Here are the subtopics in this chapter:

Multi-User Operations with 4D Server

Setting Up 4D Server

The STATIC Server Folder

Launching 4D server for the first time

Installing Your 4D Server Serial number

Launching 4D Server - Subsequent Launches

The Server Status Window

Do Not Double Click the Structure file

Do Not Double Click the Datafile

Memory settings Macintosh

Memory settings (Windows)

Minimum Memory Settings

### 9.1.1 Multi-User Operations with 4D Server

The most significant enhancement of STATIC multi-user operations has been the advent of **4D Server**. 4D Server is the multi-user engine for STATIC. To fully understand why the release of the Server was such an important event, you need to understand **Client/Server technology**. See the Appendix for an explanation of this.

### 9.1.2 Setting Up 4D Server.

#### Quick Checklist: Setting Up 4D Server

In order to ensure correct operation check the following:

- ✖ Use the operating system's Installers to install the appropriate Network Protocols (ADSP or TCP/IP) on the Server machine.
- ✖ Use the STATICServer Installer to install 4D Server {4DServer.exe} with all Network Components on the Server machine.
- ✖ If this is an upgrade from STATIC Single user to STATIC Client Server then copy the STATIC datafile(s) from your workstation to the Server.

#### All Installations

Resist the temptation of just copying the STATIC folder from another machine to the Server. The reason for this is that the Installers actually place a few extra files into the System folder (on Macintosh) or the Windows operating system folder (on Windows). These will NOT be transferred by simply copying files. The path to these files is as follows:

Operating System	Path
On Macintosh	MainDrive: System Folder: Preferences: ACI:
On Windows XP8	C:/Windows/ACI/
On Windows 2000	C:/WINNT/ACI/

*Paths to Extra Files*

### For Windows only (all versions):

1) Use the operating system's installers to install the appropriate Network Protocols (ADSP or TCP/IP) on the Server machine.

2) Use the operating system's installers to install the appropriate Network Protocols (ADSP or TCP/IP) on the Client machine(s).

Note: To enable 4D Clients to talk to 4D Server over a network, you need to have at least one **Network Protocol**, and you need a 4th Dimension **Network Component** for accessing each of those protocols. The two networking protocols that are currently supported by 4D Server are Apple's **ADSP** and the universal protocol **TCP/IP**. See Network on page 103 for more information.

### New Installations

If this is a new installation then run the STATICServer installer on the Server. This will install all the required STATIC components. We have made things easier for you by creating our own custom installers rather than relying on the installers supplied by the manufacturers of the database environment.

### Upgrading from a Single User Installation to a Client Server Installation

Do the Installation outlined in the New Installation section above. Now that this is done we will have to transfer your datafile to the Server. This will mean transferring your datafile files from the single-user workstation to the machine that will act as the Server. You could do that by connecting an external hard drive and copying the file(s) from the workstation to the external hard drive, then copying the file(s) from the external hard drive to the Server. Or, you could simply copy the file(s) across the network.

#### NOTE:

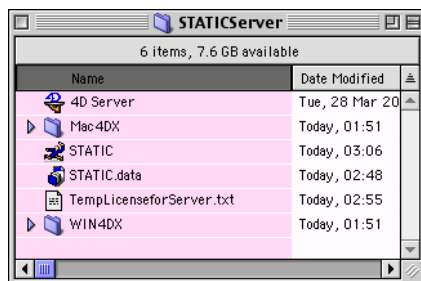
On Macintosh the datafile usually is called STATIC.data

On Windows the datafile is actually 2 files usually called STATIC.4dd and STATIC.4dr

That's it; you are ready to launch your server

### 9.1.3 The STATIC Server Folder

Your files should now be organized as follows for the Server folder:



The STATIC Server Folder Mac

Name	Size	Type
Mac4DX		File Folder
Win4dx		File Folder
4DServer.exe	3,173KB	Application
4dserver.hlp	2,299KB	Help File
4DServer.rsr	2,136KB	Structure
Asifont.fon	25KB	Font File
asifont.map	2KB	MAP File
Asintppc.dll	976KB	Application E...
Asiport.rsr	56KB	Structure
Qtdp32.dll	25KB	Application E...
Readme.txt	4KB	Text Document
Static.4DC	17,479KB	4D Compiled ...
Static.4dd	10,761KB	4D Data File
Static.4dr	1KB	Data resourc...
Static.cmp	64KB	CMP File
Static.RSR	1,182KB	Structure

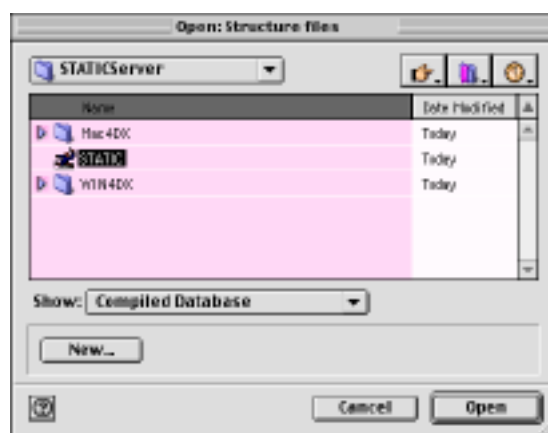
The STATIC Server Folder Win

### 9.1.4 Launching 4D server for the first time

This section describes what you have to do when you run Server for the very first time. This section covers the installation of codes to enable Server. When you have finished with this section it is wise to Quit {Exit} Server and launch again. This avoids occasional problems.

**To launch the Server for the very first time, follow these steps:**

- 1 In the STATICServer folder, double-click 4D Server.
- 2 The Open which database... dialog will appear:



The Open which Database Window

- 3 Double-click the Structure file STATIC {STATIC.4dc}.  
Note that you may have to click on the drop down list *Show* in order to see the compiled structure file.
- 4 The Identification Window

If this is the first time that you have attempted to run 4D Server on this machine you will almost certainly see the following window:



### Launching Server: Identification

You **MUST** fill out all the fields. If you have been supplied with a Temporary Serial number use this initially. Once you purchase STATIC Server you will be issued with a new serial number that you will be able to enter later.

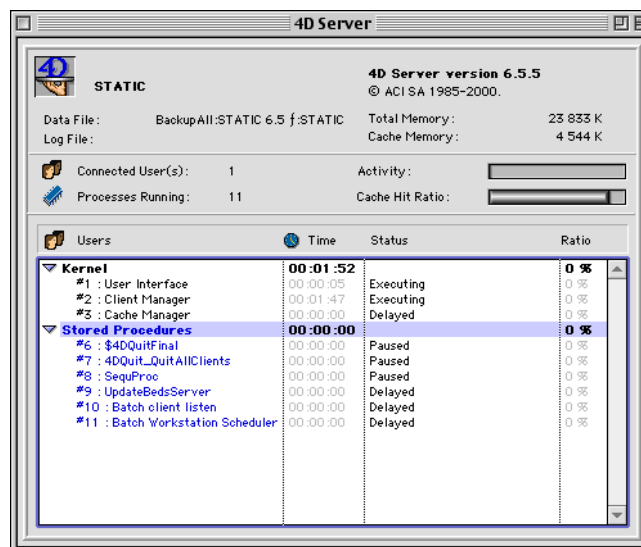
**Temporary License Number:** This can be obtained from us in order to make the Demo version of STATIC Server functional. Entry of this number will allow you to use Server with up to 50 Clients - for 1 month.

You cannot run STATIC in Demo mode. If you do, STATIC will attempt to Quit as soon as it can. This is always successful under Macintosh. Under Windows you will be warned to immediately shut down, but Windows does not always manage to actually Quit STATIC automatically as it does under Mac.

**NOTE: IF YOU DO NOT SHUT DOWN AND CONTINUE TO RUN IN DEMO MODE AND THEN ENTER DATA FROM A CLIENT YOU WILL DAMAGE YOUR STATIC DATAFILE.**

## 5 The Server Status Window

After a few seconds, the 4D Server Status Window appears:



### 4D Server Status Window

Note: The 4D Server Status Window looks essentially the same on Mac and Windows.

That s it! Server is running.

### 9.1.5 Installing Your 4D Server Serial number

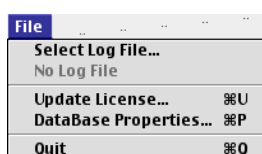
When running 4D Server you must ensure that you have the correct Serial and Expansion numbers entered in 4D Server itself.

This section has nothing whatever to do with the STATIC License number that you enter while STATIC is running from a Client in the File: Preferences: Registration button. That procedure is explained in the STATIC User Manual.

This is a bit confusing - it was for us as well so we will explain things step by step.

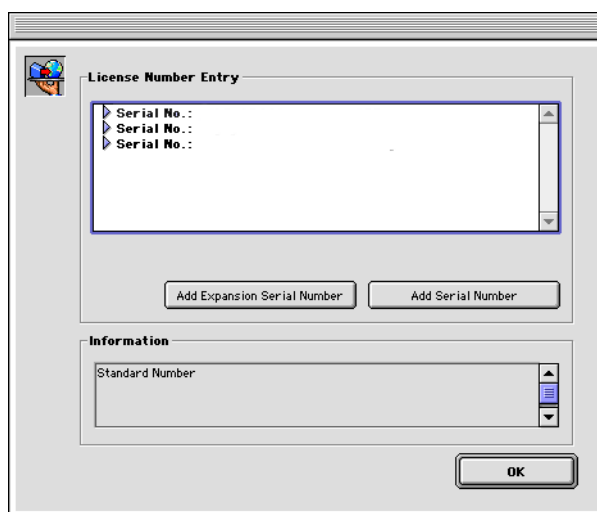
In order to make 4D Server and STATIC operational you will have to do the following:

- ¥ Launch the Structure with 4D Server.
- ¥ The 4D Server Status window appears.
- ¥ Choose Update License... under the File menu.:



*Choosing Update License in the File menu*

The License Number Entry screen appears:



*The License Number Entry screen*

If you have already entered Serial Numbers these will appear in the list. (Our own Serial numbers in the screen above have been erased).

**There are two types of Serial Numbers that you can enter for 4D Server:**

- a** Serial Numbers
- b** Expansion Serial Numbers

The scheme works by giving you an initial Serial number, in this case it would be for 4D Server. This serial number is registered under your name and forms the basis for all other Expansion Serial numbers issued to you.

Installing or Updating 4D Server Serial Numbers is essentially the same, regardless of the platform and regardless of the type of Serial Number you are entering: 4D Server itself, or a Productivity Module.

- 3** Click on Add Serial Number  
You will not usually have to enter numbers into this area as you did this already when you entered your number in the Identification window.
- 4** Click on Add Expansion Serial Number  
If you increase the number of Clients for STATIC we will send you an Expansion pack to increase the number of Clients. The Expansion serial number is linked to the initial Serial number and will not work with any other Serial Number (for another 4D Server for instance). Enter the Expansion Serial Number in the dialog.
- 5** The new Serial number will now display in the area provided.  
If you click on the small triangle below a Serial number, you will be able to find out what licenses the serial number gives you.
- 6** Click on OK to finish

Note: This completes the entry of Serial numbers to make 4D Server operational.

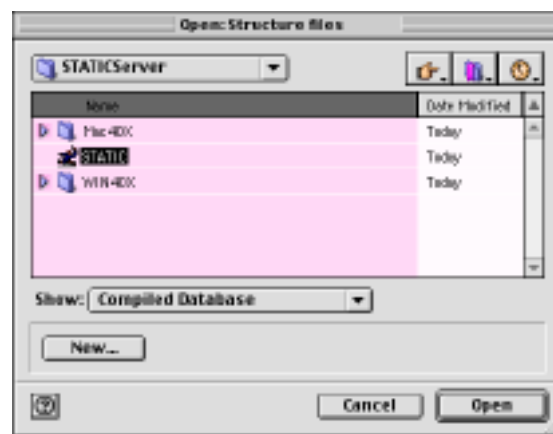
You may also need to add or edit the UNLOCK CODE for STATIC itself. This is done once you have logged onto the database with a Client. See the section under Registration in the STATIC Users Manual.

### 9.1.6 Launching 4D Server - Subsequent Launches

You are now ready to launch **Server** so that your **Client** workstations can use it. Except as noted, the steps are identical for **Macintosh** and **Windows**.

**To launch the Server, follow these steps:**

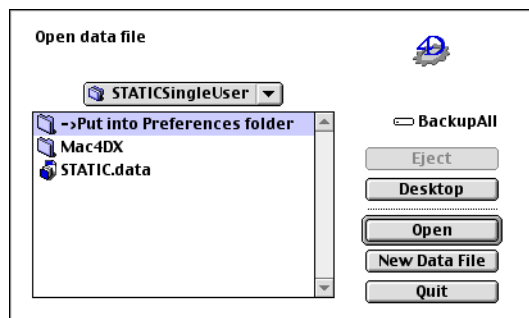
- 1 In the STATICServer folder, double-click 4D Server.
- 2 The Open which database... dialog will appear:



*The Open which Database Window*

- 3** Double-click the Structure file STATIC {STATIC.4dc}.  
Note that you may have to click on the drop down list **Show** in order to see the compiled structure file.
- 4** You can also drag the structure file onto 4D Server and drop it. This saves a step in the sign-on process.
- 5** As Server starts to launch, almost immediately HOLD DOWN THE OPTION KEY {Alt Key Windows}.

Make sure you continue to hold down the Option key {Alt key} until the Open Data File... dialog appears.



*The Open Data File... dialog*

It is essential that you hold down the Option key {Alt key} until the Open Data File... dialog appears because the Server program may already contain a default path to a datafile that you DO NOT want to open.

If there is a default path present in the program then without warning (and probably without you knowing) the wrong datafile may be accessed. This could lead to some very unfortunate consequences as you begin to enter data into the wrong datafile from Clients!

This method of launching Server MUST be done the second time you run Server, it does not need to be repeated each time you subsequently launch as the chosen datafile path is automatically embedded in the Server program file. However we consider it to be prudent to launch Server with the key down every time. It is the only way of insuring that the correct datafile is selected.

Anytime there are changes in paths, 4D Server will not know where to find things.

Here are some path-changing actions that can affect the datafile that will open:

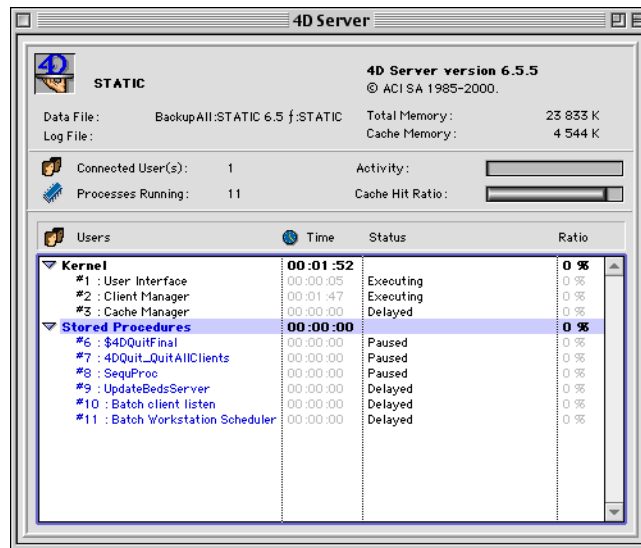
- ¥ Renaming the folder that contains the structure and the data file.
- ¥ Renaming the structure or the data file.
- ¥ Moving the structure or data file to a different folder.

Here are two more path-changing actions that affect only the Windows Program Group sign-on:

- ¥ Renaming 4D Server
- ¥ Having 2 or more copies of 4D Server on the same hard disk - not necessarily with the same version number!

## 6 The Server Status Window

After a few seconds, the 4D Server Status Window appears:

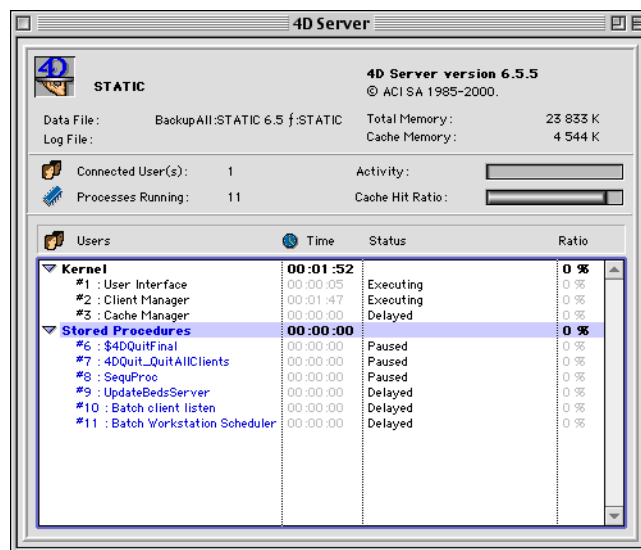


### 4D Server Status Window

That s it! Server is running.

### 9.1.7 The Server Status Window

This dialog contains quite a bit of information that is useful to understand:



### 4D Server Status Window

Note: The 4D Server Status Window looks essentially the same on Mac and Windows.

The top section of the window tells you:

- ¥ The name of the structure file
- ¥ The name of the data file
- ¥ The name of the Log File (if applicable)

Later, in the section on 4D Backup, we will explain the function of the Log File.



- ✖ The version of 4D Server
- ✖ The RAM allocations: Total RAM and Cache RAM.

The **Cache RAM** figure is very important. It will determine, to a great extent, the performance (the speed) that you get from 4D Server. The more cache RAM, the better the performance.

Why does Cache RAM play such a large role in performance? Simply because the Cache is what allows 4D Server to operate at RAM speeds instead of at Hard Disk speeds. This is significant, because RAM operates at 10-to-30 times the speed of the fastest of hard disks in the Personal Computer market today.

You can fine-tune the RAM settings, depending on the total amount of RAM allocated to 4D Server. For more information on customizing 4D Server, refer to the chapter on 4D Tools, Customizer Plus, and the Database Properties dialog.

The middle portion of the status window contains the following information:

- ✖ The number of connected users (in the above example, no users have connected yet).
- ✖ The number of Server Processes that are currently running.
- ✖ The activity level of the database (how busy it is at a given moment).
- ✖ The **Cache Hit Ratio**; that is, the percentage of requested data that was already contained in the server's RAM Cache. The higher the Hit Ratio, the better the performance of the database.

The listing at the bottom portion of the screen contains:

- ✖ The name of each process that is currently running.
- ✖ The total execution time, in seconds, that the process has used since it was launched.
- ✖ The current status of the process (Executing, Paused, Delayed, etc.)
- ✖ The ratio of the Server's execution time that is currently being allocated to that process.

### 9.1.8 Do Not Double Click the Structure file

When you double-click the Structure file on Macintosh, you cannot be sure which version of 4th Dimension, 4D Runtime or 4D Server will launch. For this reason, if you have several versions of 4th Dimension, 4D Runtime or 4D Server on a Macintosh, you should NOT double-click the Structure file to launch your program.

We only supply STATIC merged and compiled as a double clickable application or as a Structure file for 4D Server. So if you are not running other 4D applications (from another Vendor) this information should not be of any concern. However if you are in the habit of Hoarding old applications on your computer setup, then this may still apply, as you may inadvertently open up an old version of 4D Server giving you unpredictable results.

On Windows, you can avoid this problem by going to the File Manager, highlighting the Structure, and using the **Associate...** option under the File menu to associate that structure with a particular version of 4th Dimension, 4D Runtime or 4D Server. After that, double-clicking that structure will always launch the same version of 4D.

### 9.1.9 Do Not Double Click the Datafile

The following section is a **MUST READ** as it is confusing and catches everyone!

STATIC is a database environment. So we could have used the environment to create a program that runs the manufacture of submarines (as has been done) or to run an Intensive Care facility (as we have done). In order to ensure that the correct datafile is associated with the correct program, the manufacturers of the database environment have arranged a few default behaviors:

**BEHAVIOR 1:** If a datafile resides in the same directory as the program and it has the correct name then this datafile is preferentially opened even if you have previously opened another datafile elsewhere. The correct name requires the same prefix for:

¥ The program files STATIC { ST ATIC.exe & ST ATIC.4dc } and the datafile STATIC.data { ST ATIC.4dd & ST ATIC.4dr } for Single User version.

¥ The Structure file STATIC.4dc {STATIC.4dc } and the datafile ST ATIC.data { ST ATIC.4dd & ST ATIC.4dr } for Server.

Reason: The database program will search the current directory for a suitable datafile bearing the same name as the executable file. If it finds one it will open this one and store the path to this datafile so it will be opened the next time.

**BEHAVIOR 2:** Double clicking on a datafile will launch STATIC BUT will not necessarily open the datafile you have double clicked on!!!!

Reason: The Double Click on the datafile will launch the Program file (STATIC or the Server software) but if the Program already has a path to a datafile embedded in it, it will forget about the file you have double clicked on and launch the datafile that it has embedded in it unless Behavior 1 applies. Another way of understanding this is that ALL datafiles merely behave like Aliases to the Program file. So as a general rule DO NOT DOUBLE CLICK ON DATAFILES.

### **BEHAVIOR 3:**

To force the opening of a particular datafile:

¥ Single User version - hold down the Option key {Alt key} before you click OK on the Password screen.

¥ Server version - just keep holding the Option key {Alt key} key down as you drop the STATIC.4DC file on the Server Program file.

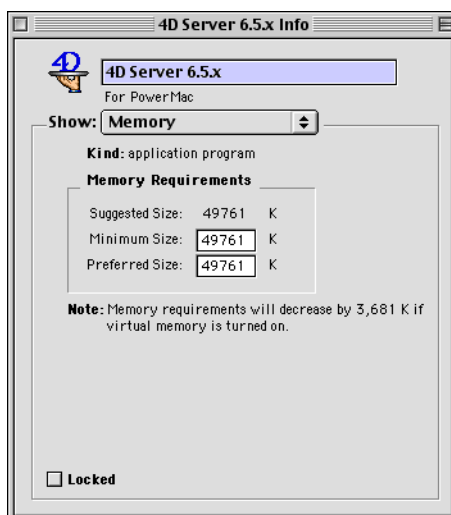
In both cases a dialog will appear requesting you to choose a datafile. Navigate to the appropriate datafile and select it.

Behavior 1 takes precedence, so this is only reliable for the one working session. i.e. you will have to repeat this the next time too, if you want to ensure that you are actually opening the desired datafile.

## **9.1.10 Memory settings Macintosh**

On Macintosh memory settings are set in the Get Info window. You can open this window by selecting the program file (4D Server) and then selecting the File menu in the menu bar. Look for Get Info and select this. A submenu will give you the option of displaying the Memory settings.

The Window that appears will look like this:



*The Get Info Window*

You can set the memory to be larger than the defaults displayed. They can never be smaller though.

### 9.1.11 Memory settings (Windows)

Windows has a completely different model for memory allocation. Later in the Customiser Plus section we will discuss the way memory is set for Windows.

### 9.1.12 Minimum Memory Settings

For Server the minimum memory settings are calculated by the simple formula:

Minimum Memory = Base Memory + (Number of Users x Memory per User)

Base Memory is set to 15 x 1048576 bytes i.e. approx 17Mb

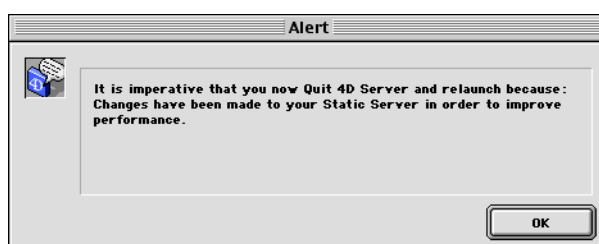
Memory per User is set to 15 x 1048576 bytes i.e. approx 17Mb

4D Server must have at least 49761K for a 2 User installation. For 4D Server this could be a lot more if the license specifies more users. A 7 User installation would require about 126 Mb for instance.

Whatever your memory settings, STATIC will demand that you have at least these minimum settings.

4D Server cannot know on Startup that you may intend to add more clients to the installation. It can only check the settings in the datafile and ensure that there is enough memory allocated for the current settings. Thus it is your responsibility, after changing the number of Users in the Registration area from a Client, to restart 4D Server in order to allow it to calculate the new minimum memory settings and if necessary make adjustments before Quitting.

If after that someone reduces the memory settings for 4D Server, then 4D Server will sense this at Startup, reset the memory, and display the following Dialog and usually Quit automatically.



*The Must Quit Dialog*

None of the above prevent you from allocating more memory to any parts of STATIC, it only checks that there is a minimum available.

### **Why do we enforce Minimum memory settings?**

Why? To relieve you and us of one more tedious Tech call.

Macintosh users like to run several programs simultaneously. Unfortunately the Macintosh memory manager does not dynamically allocate memory to running applications. Thus whatever the memory allocation to the program, ALL of this is allocated for the exclusive use of the Application, whether it uses it or not. You can see that given limited RAM, that a User may be tempted to reduce the memory requirement of some of the Applications, so that they will fit into the limited memory space. This is a disastrous practice for STATIC, so we have found an effective way of stopping it!

## Chapter 10 Launching Client



### 10.1.0 What You Will Learn in This Chapter

In this chapter, you will learn everything you need to know in order to teach your users how to sign on to a STATIC database in Multi-user from a Client; whether you're running Macintosh or Windows. Here are the subtopics in this chapter:

Setting Up Client Software

The STATIC Client Folder

Connecting to the Server with 4D Client

Memory settings Macintosh

Memory settings (Windows)

Minimum Memory Settings

### 10.1.1 Setting Up Client Software

To give your workstations access to the STATIC running on the Server machine, you need to install the Client software on every workstation that will access the database. 4D Client is not copy-protected; you may install it on as many workstations as you like. However the number of simultaneous users accessing the Server is limited to the number of Licenses you have purchased.

#### LICENSES

The number of simultaneous Users allowed is controlled by two separate factors:

1. 4D Server Licenses Installed: This is the license for 4D Server itself
2. STATIC Unlock Code: This Unlock Code contains information as to how many simultaneous STATIC Users you can run.

The Maximum number of simultaneous Users is controlled by the smallest number of 4D Server Licenses or STATIC Unlock Code Users.

#### Quick Checklist: Setting Up 4D Client

**In order to ensure correct operation check the following:**

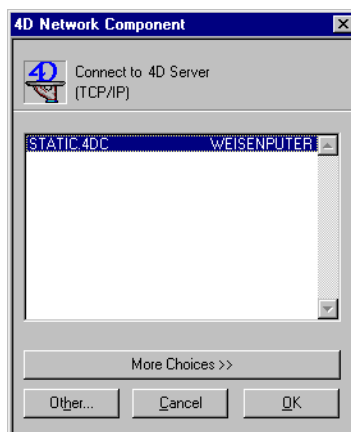
- a** Use the operating system's Installers to install the appropriate Network Protocols (ADSP or TCP/IP) on the Client machine(s).
- b** Use the STATICClient Installer to install 4D Client {4DClient.exe} on every workstation.

#### All Installations

Resist the temptation of just copying the STATIC folder from another machine to the Client machine. As with the Server installation, the Installers actually place a few extra files into the System folder (on Macintosh) or the Windows operating system folder (on Windows). These will not be transferred by simply copying files. The paths to these files are:



- 2 The Connect to data server window will appear:

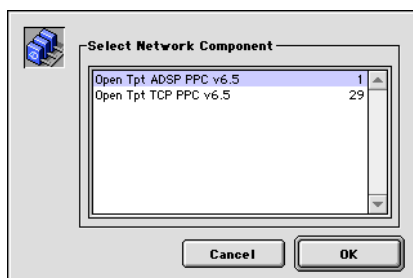


*The 4D Client Connect to Data Server dialog (TCP/IP)*

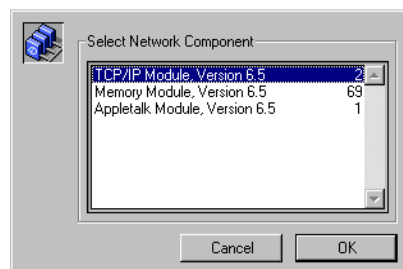
The above is an example of connecting with TCP/IP. In the chapter on Networking Options, we will talk about one other possible connection protocol: Apple's ADSP.

- 3 If you do not see the name of the database:  
Click the **Other...** button to check your Network Component.

The **Select Network Component** dialog appears



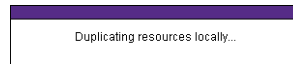
*The Select a Network Component dialog Mac*



*The Select a Network Component dialog Win*

- 4 Click on the correct Network Component and click OK.
- 5 If you still do not see STATIC in the Dialog box then there is something wrong with your installation. This could in order of likelihood be:
- ¥ Network Protocols not installed or active on the Server or Client machine. See Network on page 103 for more information.
  - ¥ Network Components not properly installed on Client or Server. Try reinstalling Client and Server from the original installers provided by us - they always install the latest files and delete old files.
  - ¥ Network Component mismatch - if there is a change in the version of Network Components and you have not upgraded all Clients and the Server, you may not see the Server from the Client. Try reinstalling Client and Server from the original installers provided by us - they always install the latest files and delete old files.
  - ¥ Physical network problem.
- 6 Double-click the name of the database that you want to connect to.

If this is the first time you have connected to this database with this name, or if the Structure has been updated since the last time you connected, the **Duplicating Resources** dialog appears:



*The Duplicating Resources dialog*

Depending on the size of your structure and the speed of your network, the resource duplication process could take several minutes.

User Tip: Although this process takes time, the ability to Duplicate Resources is one of the biggest advantages of 4D Server over other client/server products. The synchronization of resources on the Client machines is a big problem in the world of client/server. The fact that 4D Server takes care of this automatically will save you many, many headaches as the DBA.

- 7 Click on your user name, type in your password, and click the OK button.



*The Enter Password dialog Mac*

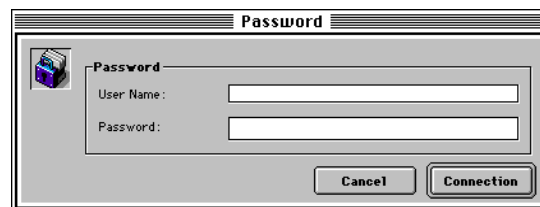


*The Enter Password dialog Win*

If your password was correct, you're in.

Note: Passwords - All our databases are shipped with the Administrator password set to (i.e. Blank or no password). So on first use any of our databases, you will NOT have to type anything in the Password field. But you still have to ensure that Administrator is selected.

Note: Sometimes, for added security purposes, a database is set up so that you do not see a list of users in the password dialog. You must type the user name and the password in order to gain access to the database. This is something you can request us to do but is not an option you can set yourself:



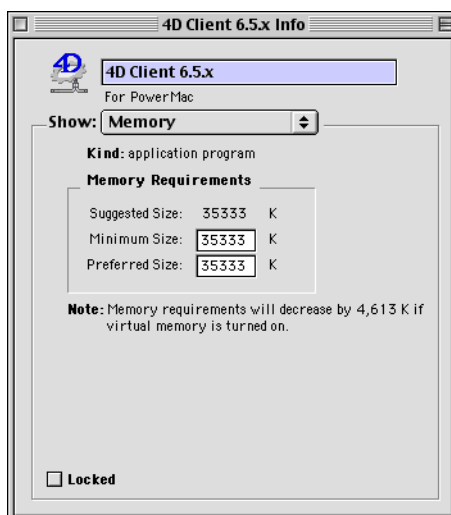
*Enter User Name and Password dialog*

#### 10.1.4 Memory settings Macintosh

On Macintosh memory settings are set in the Get Info window. You can open this window by selecting the program file (STATIC) and then selecting the File menu in the menu bar. Look for Get Info and select this. A submenu will give you the option of displaying the Memory settings.



The Window that appears will look like this:



*The Get Info Window*

You can set the memory to be larger than the defaults displayed. They can never be smaller though.

### 10.1.5 Memory settings (Windows)

Windows has a completely different model for memory allocation. Later in the Customiser Plus section we will discuss the way memory is set for Windows.

### 10.1.6 Minimum Memory Settings

Client will have at least 35333K of memory assigned to it.

Whatever your memory settings, Client will demand that you have at least these minimum settings.

In Client if the settings are incorrect, STATIC will set them to the correct minimum and then force a Quit of the Client.

None of the above prevent you from allocating more memory to Client - it only checks that there is a minimum available.

### Why do we enforce Minimum memory settings?

Why? To relieve you and us of one more tedious Tech call.

Macintosh users like to run several programs simultaneously. Unfortunately the Macintosh memory manager does not dynamically allocate memory to running applications. Thus whatever the memory allocation to the program, ALL of this is allocated for the exclusive use of the Application, whether it uses it or not. You can see that given limited RAM, that a User may be tempted to reduce the memory requirement of some of the Applications, so that they will fit into the limited memory space. This is a disastrous practice for STATIC, so we have found an effective way of stopping it!



## Chapter 11

### 4D Tools

✱ ✱ ✱ ✱ ✱ ✱

#### 11.1.0 What You Will Learn in This Chapter

In this chapter, you will learn everything you ever wanted to know about 4D Tools. You will find out why to use Tools, when to use Tools, how to use Tools, and what you can do to reduce the need for Tools.

Here are the topics that we ll cover in this chapter:

Why Do You Need 4D Tools?

How Do You Know If Your Database is Corrupted?

How Frequently Does Data Corruption Occur?

Possible Causes of Data Corruption

When To Run 4D Tools

How To Run 4D Tools

The 4D Tools Options

Preventing Data Corruption

#### 11.1.1 Why Do You Need 4D Tools?

4D Tools is a utility to repair database corruption problems when something goes wrong. Many people believe that computers are supposed to be perfect; only humans make errors. Unfortunately, that is not so; computers are not perfect. Computers may not make errors as often as people do, but computers **do** sometimes make errors. Let's look at some interesting numbers:

Although most STATIC data files start out small, it is not uncommon these days to see data files that have grown to 100, 250, 500, or even 1,000 megabytes in size. Let's suppose, for a moment, that your data file grows to a medium size: 125 megabytes. That means you have one hundred twenty-five **million** pieces of information stored in the file. This is quite a record-keeping task. If STATIC or your hard disk makes a single mistake and loses track of even one of those 125,000,000 pieces of information, you will have **Data Corruption**.

Since you might need to call on any one of those 125,000,000 pieces of information at any time, STATIC has to know, at all times, **exactly** where every single piece of information is located, and **exactly** how each piece relates to the other 124,999,999.

Consider: every time you create a new record, STATIC has to decide where to put the new record and how to keep track of it. Each time you change a piece of information, STATIC has to find the old, delete it, and save the new. And if the new information takes up more space than the old, STATIC has to find a new place to store it. This data-shuffling exercise takes place thousands of times a day in a heavily-used STATIC database.

#### 11.1.2 What is Data Corruption?

With several thousand data-shuffling operations per day, and 125,000 bytes of information to keep track of, it is small wonder that you will occasionally experience data corruption in your STATIC database. But just what is data corruption?

##### DBA Principle

Anytime your computer incorrectly stores data; or  
Anytime your computer incorrectly retrieves data;  
you have Data Corruption.

We as developers don't like data corruption; in fact, we're always looking for ways to reduce it or even eliminate it completely. And yes, we're getting better: STATIC databases today have far less data corruption than they had in the early days of STATIC. Someday we may even be able to completely wipe out corruption but don't count on it. There are just too many factors that might contribute to data corruption, and some of those factors are outside the control of STATIC and us as programmers.

### 11.1.3 How Frequently Does Data Corruption Occur?

When a client asks, how frequently does data corruption occur? our answer is: Not very often. For example, one developer reported having clients running databases in a total of 68 different locations. About one-half of those databases were multi-user. The largest and most heavily used database had over 750,000 records, and it was 500mb in size (500,000,000 pieces of information). At the time of the report, that database had gone for over 5 months with no corruption. In all the 68 databases combined, this developer reported seeing about one case of data corruption every other month. In most cases, the data was recoverable. In a few cases there was some data loss; and even in those cases, the data loss was always just a few records, never the entire database.

That kind of stability was achieved by following some common-sense guidelines for care and cleaning of the databases. In this chapter, we will share with you those common-sense rules for data stability.

Data stability is great; but when something goes wrong, it's nice to know that you have 4DTools to help you save the day. So let's talk about data corruption: how you can detect it, and how you can use 4DTools to fix it.

### 11.1.4 How Do You Know When You Have Corruption?

When you have a corrupted database, it will display one or more of the following five danger signals: Damage Message, Out of Memory Message, Incorrect Search or Sort, Deleted Records Showing, or System Freezes & Bombs.

#### Damage Messages

- ¥ The index file is damaged. Action: the record could not be saved.
- ¥ Error reading record number \_\_\_\_\_. Do you want to delete the record and recover the space?

The above are just two of the many variations of damage messages. Damage messages are clear, unmistakable signs of data corruption. Even if you answer yes to the delete-and-recover question, you will still need to run 4D Tools.

Reason: STATIC sometimes has trouble updating the indexes when it deletes a damaged record. This means that the indexes may still think that the record exists. So if you let STATIC delete a record that is 'unique' and then you try to re-input the same record, STATIC will not let you do it. It will tell you that the record already exists.

You're in a difficult situation: you can't find the record because it has been deleted, but you can't re-input it because it already exists. The only solution to this dilemma is to run 4D Tools (Recover by Tags or Compact), and then re-index the database.

#### Out of Memory message

Out of memory. Quit the program as soon as possible.

If you get this message, the problem may be exactly what the message says, or the problem may be corrupted data. The program may really be out of memory; but then again, it may have encountered some corruption in the data file that caused it to *think* it was out of memory.

The general rule for isolating the cause of an out-of-memory message is this: Give STATIC 50% more memory, launch the database, and repeat your actions as best you can remember. If you still get the same out-of-memory message at the same spot, it is probably due to data corruption, and **not** a memory shortage.

## Incorrect Sort or Search

If you perform a sort or a search and the results are incorrect, double-check and triple-check your sort and search logic. If your logic is OK and the results are still incorrect, you probably have an instance of corrupted data and/or a damaged index file.

## Deleted Records Showing

When STATIC deletes records, it blanks out all the fields and marks the space for later re-use. These blanked-out records are not normally displayed, you won't even know that they're there. So if you see any of these records with blanks and zeros on the screen, that may be an indication of data corruption. We say may be an indication because it is also possible that the blank records were created and saved by mistake. If you suddenly see blank records, go into that table and try to create similar records. If you cannot do it because certain fields are Mandatory, you know that the blank records you are looking at are the result of data corruption.

## Application Freezes and Bombs

If you suddenly start having frequent application freezes and bombs (message: The application 4D Server has unexpectedly quit or { General Protection Fault}), that's a sure sign that you either have--or will have--damage to your database.

### 11.2.0 Possible Causes of Data Corruption

Here is a list of the most common causes of data corruption. If you can avoid these situations, you will very seldom experience the frustration and time loss that results from database corruption:

- ¥ Bugs in STATIC
- ¥ Mixed versions of STATIC
- ¥ Mixed versions of the database structure
- ¥ Control characters (gremlins)
- ¥ Operating system incompatibilities

Let's discuss each of these items in greater detail.

#### 11.2.1 Bugs in STATIC

Major upgrades to STATIC are very likely to have bugs. This is not just true for us; it is true for all major software products that we have used. Software these days is so complex, involving so many hundreds of thousands of inter-related lines of code, that a brand new release or a major upgrade is almost guaranteed to have at least a few serious bugs.

We send out our databases to be § Tested by you our Users. But please remember it is a §Test Database - never intended for serious work.

May we suggest that you install a test version of your database, and do extensive testing before putting a new version of STATIC online with real users and live data.

Then let us know, using the Deficiencies section in STATIC, of your discoveries. We promise to fix any bugs as quickly as we can.

It may seem strange that we openly talk about Bugs like this (some software companies try to pretend they do not exist!).

**But we prefer to find and fix them and the only way to do this is to:**

- 1** Be brutally honest about the problem on both sides
- 2** Ensure that you think it worth your while in terms of time and effort to inform us
- 3** That you believe we will listen to you and fix it rapidly

- 4 Welcome your input and information
- 5 Thank you for taking the time to tell us.

Our principle in this is quite simple:

We love it when you find a Bug because it means we can find and plug another hole in our production process in order to make STATIC the best Intensive Care software anywhere.

### 11.2.2 Mixed Versions of 4D Server

In some cases, 4D Server may not be backward-compatible, meaning that a database that has been opened with a newer version 4D Server (e.g. 4D Server 6.5.5) should not be opened with an older version of 4D Server (e.g. 4D Server 6.0.6).

Some safeguards against opening structures with old versions are already built-into 4D Server; however, ultimately, it is up to you, as the DBA, to make sure that you don't corrupt your data file by opening it with an old version of 4D Server. When in doubt, try it first with a spare copy of your structure and data.

### 11.2.3 Mixed Versions of the Database Structure

Note: The Database structure referred to below is the STATIC.4dc file for Server and the STATIC {STATIC.4dc & STATIC.exe} for Single User.

Another common cause of data corruption, related to the above, is mixed versions of the database structure.

In the latest version of the structure, we may have added new tables, fields, subfiles, indexes, and so forth. If STATIC opens the data file with this updated structure, it immediately senses that there is a change and it re-organizes the data and the indexes to accommodate the new structure.

If a user later opens that database with an old structure, STATIC detects the differences and attempts to re-organize the data again to accommodate this new structure (which is actually the old structure). But STATIC has a hard time going backward to a smaller structure. Hence, data corruption. So an important part of the Database Administrator's job is Version Control. Here is the principle of Version Control:

#### DBA Principle

When you update to a new version of STATIC, 4D Client, and/or the Database Structure, update all users at the same time. Destroy all copies of the old versions from every user's hard disk!

Change the WEDD resource to a new unique value that makes sense to you and is not in use anywhere else in your organization

If you do not follow the principle of Version Control, we can guarantee you a great deal of data corruption and quite a few sleepless nights.

Note: See the discussion on the Wedd Resource later in this chapter, when we talk about 4D Customizer Plus. The Wedd Resource can help prevent the mixed-structure problem.

### 11.2.4 Control Characters

Control Characters (also called gremlins) are invisible characters. Try this: with the Helvetica font active, hold down the Control key and type asdfg. On the screen you will see three characters; when you print on a on your printer, you may see no visible characters at all.

In the Database community, it has been very well-documented that these Control Characters' can cause massive data corruption--especially in indexed fields. We have not heard so much about this problem lately, but that may be because most developers are aware of this problem and they have taken steps to guard against it. There are two known ways that control characters can get into your database:

✖ **Typographical Errors.** The user is intending to hold down the Shift key but holds down the Control key instead. If the resulting control character is invisible, the user is not likely to catch the typing error, so the Control Character is stored in the database.

✖ **Importing Data.** Some databases, spreadsheets and word processors may use certain control characters to store formatting information. This is especially true for data that has been imported from databases and spreadsheets across platforms (Mac-to-Win, Win-to-Mac, Unix-to-Win, mainframe-to-Win, etc.).

To avoid this problem, we have given you extensive tools to strip these Gremlins out of your Data. See the STATIC Users Manual under the Gremlins section.

### 11.2.5 System Incompatibilities

If you are using a version of the Operating System that is too old or too new, you may encounter incompatibility problems that can cause data corruption.

### 11.2.6 Mass Record Deletion

Occasionally, when you delete several hundred or several thousand records, STATIC will need to repair itself. Even if you don't see any symptoms of corruption, it is a good idea to run 4DTools after deleting a large number of records.

### 11.2.7 Mass Record Import

You will sometimes see corruption after you import thousands of records into a database. We have written the code for STATIC to largely avoid any problems. Even if you don't see any symptoms of corruption, it is still a good idea to run 4D Tools after importing a large number of records.

### 11.2.8 Power Fluctuation

If there is a power failure or a significant power peak or valley just at the moment when STATIC is doing a save operation on a record or on an index, this could cause corruption to that record or index.

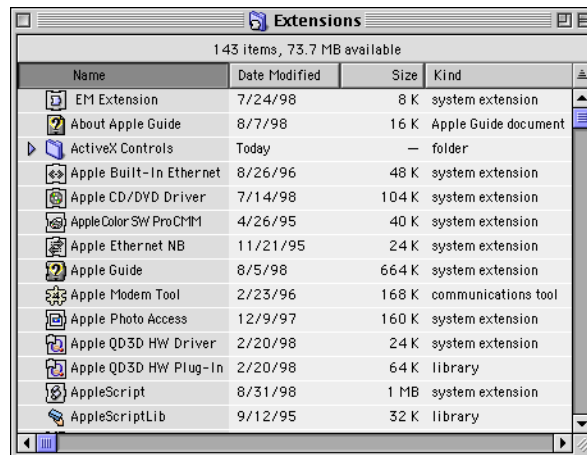
### 11.2.9 Computer Virus

Although the Computer Virus problem seems to have quieted down lately, there is always a chance that someone on your network will pick up a computer virus. A virus can quickly spread throughout the network and cause data corruption--or even complete erasure of files on your hard disk.

### 11.2.10 System Extension, Control Panel, or DLL Conflict

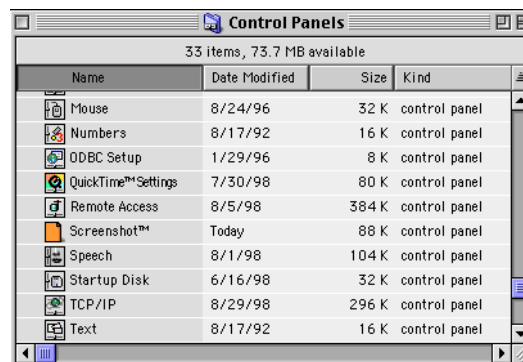
Last but certainly not least, is the System Extension, Control Panel, or DLL conflict.

A **System Extension** is a small utility program that extends the capabilities of your computer. Often, Extensions will install themselves into memory upon startup of your computer. In the Windows world, they call this type of extension a {TSR}, which stands for Terminate and Stay Resident. System Extensions are normally activated by putting them into the Extensions folder inside your System Folder (Macintosh) or by running an Installer {Windows}.



*System extensions, Macintosh*

A **Control Panel** is a utility program that allows you to customize some facet of the interface of your computer (Display, screen saver, network protocols, etc.). Control Panels are activated by putting them in the Control Panels folder inside the System folder (Macintosh) or by running an Installer (Windows).

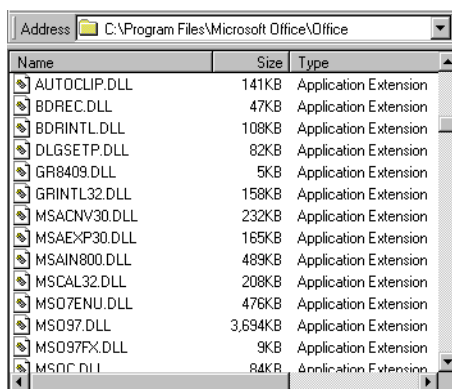


*Control Panels, Macintosh*

A **Dynamic-link Library (DLL)** is a shared library of programming code--this code can be shared by several different applications on Windows: for example, a word processor, a graphics utility, and a Visual Basic application might all share the same programming code to manage graphics. Many feel that DLL's are the cornerstone of Windows programming. While that is probably true, it is also true that the sharing of DLL's has caused many compatibility problems in the Windows environment.



For example, one program might override an old version and install a new version of a DLL. The problem, however, might be that other programs that relied on that DLL worked perfectly with the old version but are not compatible with the new version.



*DLL's on Windows.*

Notice that Windows call these DLL's application extensions.

There are literally hundreds of Extensions, Control Panels, and DLL's that add functionality to your computer: Alarm clocks, memory managers, virus detectors, screen savers, calendars, etc. However, because they alter your system's memory configuration, these Extensions, Control Panels, and DLL's are very much prone to conflicts with the currently active application software.

When you have inexplicable data corruption and system bombs, you should install a fresh copy of STATIC and a virgin system with all non-essential Extensions, Control Panels, and DLLs removed. If that solves your problem, start putting things back in, one by one, until you isolate the cause of the conflict.

### 11.3.0 When To Run 4D Tools

You should run 4D Tools on any of the following occasions:

**Anytime you see any of the five danger signals:**

- ¥ Damage message
- ¥ Out of Memory message
- ¥ Incorrect Search or Sort
- ¥ Deleted Records Showing
- ¥ System Freezes & Bombs.

**After you do any mass deletion or mass import of records in your database.**

**At least once a month, as a preventive measure.**

### 11.4.0 How to Run 4D Tools

Below is a checklist that you can use as a quick start if you are already familiar with 4D Tools operations. After the Checklist, the remainder of this chapter is a full explanation of each step in the process.

**This is how you do it:**

- 1 Back-up the entire STATIC installation - data file, structure, and executable program
- 2 Launch the copy of the database, delete records you want to purge.
- 3 Macintosh: Set 4D Tools RAM to 16000k, Mac Disk Cache to at least 2560k. (Windows: skip this step.)
- 4 Macintosh: Restart the computer to make the cache setting take effect. (Windows: skip this step.)

- 5 Check the amount of space remaining on your hard disk.
- 6 Open the STATICUtils Folder and find and double click 4D Tools {4D Tools.exe}.
- 7 Find the database structure file - STATIC or STATIC.4dc {STATIC.4dc}.
- 8 Click on the name of the database structure, HOLD DOWN THE OPTION KEY {Alt key}, then click Open.
- 9 Click the name of your data file, then click the Open Data File button.
- 10 Under the Utilities menu, choose the option Check & Recover data...
- 11 Select Check only and create a log (which is the default) and click OK.
- 12 Choose your next Tools option, depending on the nature of the problem.

### 11.4.1 Preparing to Run 4D Tools

**Before you run 4D Tools, you need to take some steps to prepare your database and your hard drive:**

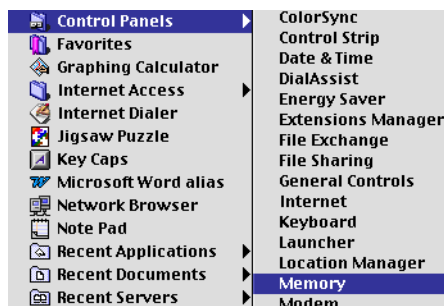
- 1 Back-up the entire STATIC installation - data file, the structure, etc. Store this backup set in a safe place.
- 2 Launch the database in Single-User from the File Server and delete any records that you want to purge;
- 3 Quit 4D.

*Windows: Skip Steps 4 and 5.*

- 4 Macintosh: Set the Disk Cache.  
4D Tools takes full advantage of the Macintosh Disk Cache. Therefore, if you have a large data file (50mb or greater) to put through Tools, we recommend that you set the Macintosh Disk cache as shown below.

¥ a. Under the Apple menu, choose Control Panels.

The Control Panels folder appears.



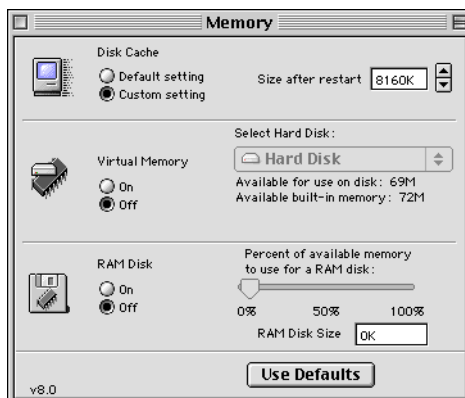
*Macintosh: Choosing Control Panel, Memory*

¥ b. Double-click the Memory control panel.

The Memory settings window will appear.

¥ c. Set the Disk Cache Size as high as possible.

In the example below, we have set the cache to 8,160k.



*Macintosh Memory cache setting*

- 5 Macintosh: Restart your computer so the Disk Cache setting will take effect.

### 11.4.2 Launching 4D Tools

Running 4D Tools is actually relatively simple. The program itself does all the work; all you have to do is select a menu option and name some files.

**Now that you have done all of your preparatory work, let's continue with the steps for actually running tools:**

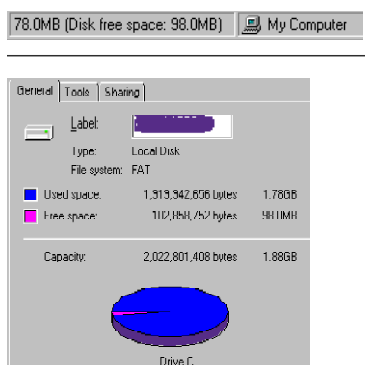
- 1 Check the amount of space available on your hard disk.
  - a. **Macintosh:** In the Finder, look at the disk info at the top of a Finder window.



*Macintosh: amount of disk space available*

- b. **Windows:** Go to the Explorer and click on the drive letter.

At the bottom of the window, you will see the amount of free space. If you do not see the amount of free space, you can right mouse-click and choose Properties in the contextual menu. This brings up the Properties dialog.



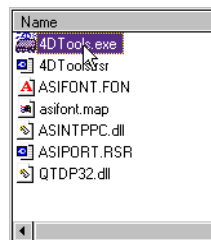
*Windows Explorer: amount of free space on disk*

- 2** Make sure you have enough hard disk space: compare the available space to the size of your file.

If you are going to run one of the Tools options that creates an entirely new data file, make sure the total size of your Structure file (STATIC) and your Data file (STATIC.4DD) does not total a number greater than the available space. If the total is greater than the available space, you need to tell 4D Tools to save the new copy to another hard disk, or you need to make more space on this hard disk before running 4D Tools.

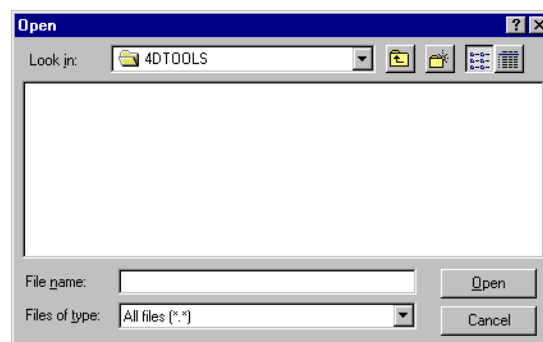
Note: In actual practice, you should make it a habit to leave at least 5% of open space left on your hard disk at all times.

Open your STATIC folder, open the Utilities folder, open the 4D Tools folder, and double click 4D Tools {4DTools.exe}.



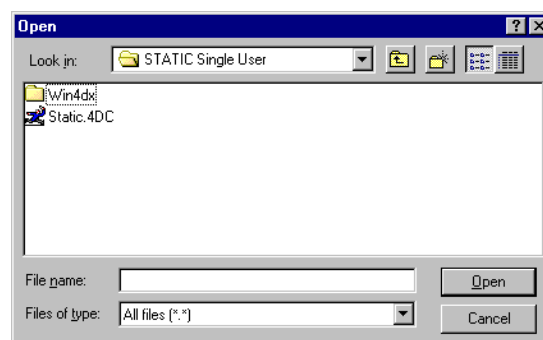
### The 4D Tools folder

You will see no files in the window, because you are currently within the 4D Tools or the Utility folder, which does not have any subdirectories or database structure files inside.



*The 4D Tools Open File dialog with no files visible*

- 3 Go several levels in your subdirectory to the STATIC folder that contains your actual STATIC Program file. The Choose File dialog will change to show the files and subdirectories in the STATIC folder.



### The Choose File dialog

- 4 Click on the name of the database structure, STATIC {STATIC.4dc}.  
The Password Dialog appears.



*The Enter Password dialog Mac*



*The Enter Password dialog Win*

**Note1:** Only the Designer and the Administrator are authorized to run 4D Tools.

**Note 2:** In your database, you may have to also type in your User Name rather than selecting it from a list.

- 5 Select your User Name, Type in your Password, HOLD DOWN THE OPTION KEY {Alt key}, then click Open.  
Be sure to hold down the Option key {Alt key} until the Open Data File... dialog appears. This will give you the opportunity to make sure that you open exactly the data file that you want to open.

- 6 Click the name of your data file, then click the Open Data File button.  
After you click the Open button, you will still see the desktop and other applications; other than a change in the menus and the addition of a tool bar, you will not see any other indication that 4D Tools is active. Our opinion is that 4D Tools should display a Splash Screen to give you noticeable visual feedback that you have launched the program.

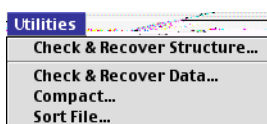
The first time you see this behavior, it may startle you, and you may think that something has gone wrong. Don't panic. 4D Tools, although it is a great little utility, has several strange user-interface quirks like this. We will point them out as we go through the process. (When we discuss 4D Customer Plus, you will learn that the Customizer also has the blank-screen user interface quirk.)

### 11.4.3 Examining the Data File with 4D Tools

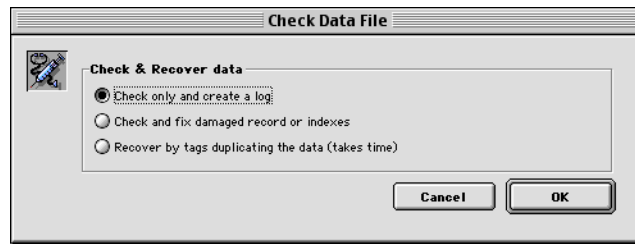
Now that you have opened your database with 4D Tools, you are ready to use Tools to examine your data file for problems.

**Here are the steps:**

- 1 Under the Utilities menu, choose the option Check & Recover...



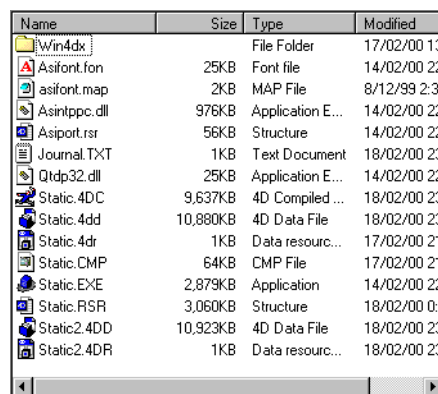
*The Check and Recover menu option*



### The Check and Recover dialog

- 2** Select **Check only** and create a log (the default) and click **OK**.  
As it examines your file, 4D Tools will display a progress thermometer on the screen. The checking process will take a few minutes.
- 3** Choose your next Tools option, depending on the nature of the problem. More on the other Tools options in a few moments.  
If the second option you chose was to **Compact** or to **Recover by tags**, continue with these instructions. Otherwise, you can stop here.

After 4D Tools has finished a Recover by tags or a Compact, you will see some new files in your STATIC folder:



4D Tools: New Data file after compact

The new datafile has the same name as the old one, but with the number 2 at the end of the name.

- 4 Quit 4D Tools, Launch your application.
- 5 Test the new database. Do some searches, sorts, perhaps even enter some new records.
- 6 Quit the program.

Assuming that everything is OK, retain or dispose of the files in your 4D subdirectory as shown in the table below.:

Mac File Name	Win File Name	Description	What to do
STATIC.Data	STATIC.4DD STATIC.4DR	Old data	Trash it (you have a backup, right?)
STATIC2.Data	STATIC2.4DD STATIC2.4DR	New data	Keep for use, remove 2 from the name
Journal File	Journal.TXT	Tools Report	Trash it--unless problems reported

### Disposal of Files

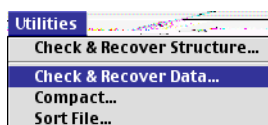
### 11.4.4 Running Tools on the Server

When your data file is on the Server, we do not recommend that you sit down at a workstation and run tools. It will be slow and it will be vulnerable to network communication errors. **You should place a copy of 4D Tools on the Server machine, and run tools directly on the server itself.**

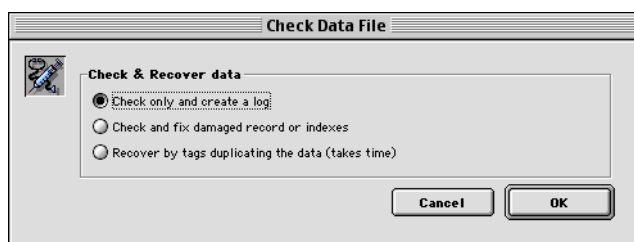
### 11.5.0 The 4D Tools Options

When running 4D Tools, you have a choice of five actions: three choices of action under the Check & Recover... menu option, one choice under the Compact option, and one choice under the Sort File... menu. Let's take a look at each of these options and find out when each is appropriate.

#### 11.5.1 Check only and create a log



*The Check and Recover menu option*



*The Check and Recover dialog*

Every time you run 4D Tools, you should start off with the Check only and create a log option. This is the fastest operation in 4D Tools. It will simply check your database and your indexes, and tell you exactly what records or indexes are damaged, if any. If there is no damage, 4D Tools will give you a message that says, Everything seems OK. This is an appropriate message because the Check & create a log routine is not able to detect certain types of data corruption. Therefore, everything may seem OK when it really isn't. This doesn't happen often, but it can happen.

When 4D Tools finds damage, it checks the entire database twice: once from front to back and then again in reverse order (back-to-front). As it is checking, 4D Tools creates a damage log called a **Journal file**. This journal is a text file that you can open with SimpleText {Notepad.exe} if the file is small, or with a full word processor if the file is large. You cannot read the journal from within 4D Tools.

Entries in the journal file might look something like this:

- ✖ Table #4, Record #1305, already occupied space.
- ✖ Table #5, Record #24, tags not corresponding.

Note: Because 4D Tools checks the database twice, each of the above entries would appear in the log twice: once when Tools was checking from front to back, and again when Tools was checking from back to front.

- ✚ **File #** corresponds to the order in which the files were originally created in the database structure.
- ✚ **Record #** corresponds to the order in which the record would appear on your screen if you searched for All Records in that file and did not sort the list.
- ✚ **Already occupied space** is an error message that is useful primarily to us the developers when we are troubleshooting data corruption problems.
- ✚ **Tags not corresponding** is also an error message that is useful to us the developers when we are troubleshooting data corruption problems.

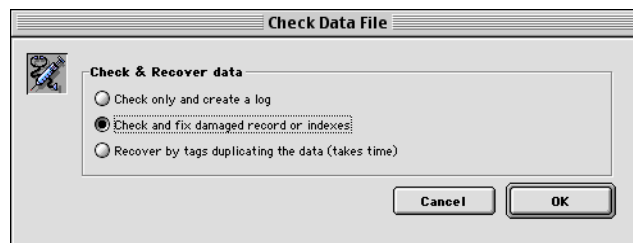
The bottom line for you is that the record is bad; you will not be able to access it; and the record will be completely deleted if you Compact your database without first using 4D Tools to repair the damage.

It's time to discuss the next option but before we do, let's point out a Principle of running 4DTools:

## DBA Principle

Whenever you are running 4D Tools, the first thing you should always do is Check only & create a log. After you examine the journal file and see the extent of the damage, you can make an intelligent decision about what to do next.

### 11.5.2 Check and fix damaged record or indexes



*4D Tools: Check and fix damaged record or indexes*

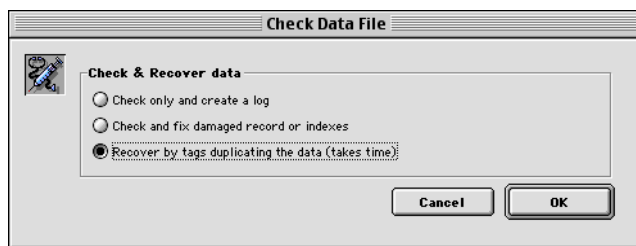
When you choose the **Check and fix damaged record or indexes** option, 4D Tools goes through the same process and creates the same log that it creates in the check-only option, but the difference is that it actually attempts to fix the damage. We say *attempts* because the effort is not always successful. Afterwards, if you launch your database and are still experiencing the same problems, you will know that the repair was not successful.

You may be wondering, Why don't I just execute this option first, instead of checking and creating a log and then having to run check and recover? The reason is that, after you see the log, you may decide that Check and fix... is not the appropriate next step. You should be very careful about running Check and fix... because, in the process of fixing damage, 4D Tools will actually **delete** records that it cannot repair. In that case, there will be data missing from your data file. You might say that 4D Tools destroyed your data to save it.

If the Journal log file indicated that you have quite a few damaged records, your next appropriate step should be to Recover by Tags.



### 11.5.3 Recover by tags



4D Tools: Recover by Tags

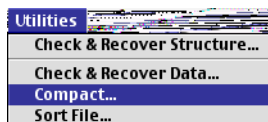
**Recover by tags duplicating the data file (takes time)** is the option you should choose when the list of corrupted records is quite long, meaning that the damage is so extensive that you would lose quite a few records if you used the Check & fix option. Just what number of records is quite a few is up to you.

Like the Check & fix option, recovering by tags will attempt to fix any records that are damaged, and will delete any records that it cannot fix. The difference is that Recover by Tags uses several 'tricks' to restore the damaged record, and therefore is more likely to fix damaged records than to delete them.

**WARNING:** When you Recover by tags, 4D Tools will recover all deleted records that have not already been over-written with new data. You should always Compact your database before Recovering by Tags.

Recover by Tags is the final option under Check & Recover... Now, let's talk about the Compact option.

### 11.5.4 Compacting Your Database



Choosing Compact in the Utilities menu

When it Compacts a database, 4D Tools creates a brand new data file and fills in all the blank spaces that have been left by deleted records. If you have deleted quite a few records, this can result in a significantly smaller data file and a significant improvement in performance.

Whenever you have a very stubborn corruption problem that **Recover by Tags** does not fix, try **Compact**. Sometimes, compacting fixes difficult corruption problems. Some records may be deleted during the Compact, but at least you will have a usable data file.

### 11.5.5 When to Compact

Aside from when you have symptoms of data corruption, there are three other occasions when you should Compact your data file:

¥ **After Deletion of Records.** When you have deleted a large number of records, there are many holes in your data file. These empty spaces have a direct effect on performance; your database is likely to slow down. Searches and sorts will be

appreciably slower. This fact is a well-documented feature of STATIC. Compacting will eliminate the empty spaces and result in a noticeable improvement in performance.

¥ **When you import a large number of records.** Upon importing, you may have introduced corruption. It's a good idea to Compact and give 4DTools a chance to thoroughly inspect your data file.

¥ **At least once a month.** Compacting once a month is good preventive maintenance. In the next chapter, we will introduce you to a procedure that we call the monthly tune-up . This procedure includes a Compacting of your database.

### 11.5.6 The Sort File... Option

When STATIC saves data, it does not care about sorted order of the data. STATIC will save a new record anywhere that it has space. If a record has been deleted, and the new record fits into the deleted space, STATIC will save the new record there.

The Sort File... option allows you to physically change the location of records in a table, so that the natural order of the records is also a logical sort order .

**Here are the steps in the Sort File... option:**

- 1** Choose Sort File... in the Utilities menu.  
The Choose a Table dialog appears.
- 2** Click on the table you want to sort, and click the OK button.  
The Order by wizard appears.
- 3** Click on the field or fields you want to order by, choose the sort direction (ascending or descending), and click the Order by button.

### 11.6.0 Other data recovery tools

We have several other tools and techniques that we can use to recover your data in the event that a catastrophe occurs.

If 4D Tools can not fix the problem - contact us and ask for our data recovery service. It is fairly rare that we really cannot help - in fact we cannot remember a single occasion where we have been unable to help!

Here is a very important Principle:

**DBA Principle**

**If you think there is corruption of your datafile.**

**Don t panic!**

There is an extensive suite of tools available inside STATIC itself that allows you to cure a lot of problems:

Gremlin Removal

Orphan removal

Unique field check and set

etc.

These options can be found under the Administrator menu.

### 11.7.0 Preventing Data Corruption

Now that you know all there is to know about running 4D Tools, we would like to give you some additional hints on how to avoid getting corrupted data in the first place. Many of these suggestions are already obvious, but it certainly won't hurt to repeat them.

#### 11.7.1 Take care with New Releases

##### System Software and other software

Proceed with caution with a new version of the System software, a new version of a Control Panel, Extension, DLL. New versions, especially major releases, are virtually guaranteed to have bugs and incompatibility problems. Before installing those new versions in a real-time production environment, you should always thoroughly test them on a spare copy of your database.

##### STATIC Software

We take great care to ship good quality software; but even we get it wrong sometimes. So any new version of STATIC should be thoroughly tested by you to ensure that it works to your satisfaction.

You should maintain enough space on your Server and Clients so that you can set up the test in your actual environment, with copies of your Structure, data, and of 4D Client that are clearly labeled as Test copies.

Then, ask some of the users to help you by sitting down and inputting real data; running real reports; doing real searches. Compare the results to what you get with the production system. Only after you are satisfied with the results of these tests, should you install the new release in your production system.

#### 11.7.2 Use a Dedicated Server

Perhaps it is just a coincidence, but we have noted more frequent instances of data corruption in offices that run on non-dedicated servers. A non-dedicated server is one that is doing double-duty: as a File Server, as a Print Server, or as a user's workstation, and at the same time as the server for the database. We can offer one theory as to why data corruption may be more prevalent in non-dedicated server environments: If the combination Workstation/Server happens to have a system crash [General Protection Fault] while running some other program, the crash will bring down the 4D database as well. If the database happened to be saving a record or updating an index at the precise moment of the crash, that record or index will probably become corrupted.

The only tried and true setup that we can recommend for a multi-user STATIC database is 4D Server, running on a Dedicated Server. You may think that you cannot afford a dedicated server, but when you see the higher incidence of data corruption that occurs with a non-dedicated server, you may come to the conclusion that you can't afford not to have a dedicated server.

#### 11.7.3 Get a UPS System or a Line Conditioner

A **UPS (Uninterruptable Power Supply)** system activates in a split-second whenever it senses a significant drop in power. Most UPS systems are intended to let you run your computer(s) long enough to shut down in an orderly fashion, thus avoiding data corruption. The ideal setup is to attach a UPS to your Server as well as to all workstations/clients. If that setup is too expensive, then you should attach a UPS to your Server and to the most active workstations. UPS units have different time-operation capabilities. Fifteen minutes are usually sufficient time to allow for an orderly shutdown.

A **Line Conditioner** is a less expensive alternative that provides protection against the peaks and valleys of commercial power sources. The line conditioner does not provide backup power, but it stabilizes your power at a constant voltage. This stabilization is especially vital if you have a network. If you can't afford a UPS, at least make sure you put the Server on a line conditioner. A line conditioner costs about 1/4 the price of a UPS unit. A UPS unit also serves as a Line Conditioner, so you don't need both.

#### 11.7.4 Do Heavy Posting & Mass Record Deletion in Single-User

Transaction Posting is a particularly vulnerable time: the program is accessing and updating several records in several files in rapid succession. The more users who are on-line during this operation, the more things that could go wrong. The same is true for mass record deletion: the more users who are on-line during this operation, the more things that could go wrong. The safest course is to do your mass posting and mass record deletion in Single-user mode.

#### 11.7.5 Install Virus Protection

STATIC has conflicts with many of the real-time virus detection software programs, and for this reason we don't normally recommend that you have a virus detection program active when you are running STATIC.

However, you should install virus protection software that scans your system folder on startup, and scans newly-inserted floppy disks and backup cartridges, and scans files that are downloaded from the Web. There are several effective virus protection programs available: SAM<sup>®</sup>, Virex<sup>®</sup>, Norton Anti-Virus, and MacAfee, just to name a few.

## Chapter 12 Backup and Recovery Strategies

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### 12.1.0 What You Will Learn in This Chapter

Previously, we were talking about a database that contained 125,000,000 different pieces of information. Your Server hard disk is the device that does the real work in keeping track of each and every one of those pieces of information. Hard disks are the unsung heroes of every personal computer database system that is running smoothly, but hard disks are also the suspected cause when things go wrong. One of the worst things that can go wrong is a hard disk crash.

In this chapter, we will discuss the care and cleaning of your hard disk and how to prevent or to recover from a hard disk crash. Here is a list of the topics:

What is a Hard Disk Crash?

The Wisdom of Backups

Keep Incremental Backups

Managing Your Incremental Backups

Off-site Storage of Backups

Making Self-Contained Backups

Using Data Compression to Save Space

Reliability - the Most Important Factor

Choosing Your Backup Media

Our Backup Media Recommendation

The Monthly Tune-up

Why Do a Monthly Tune-up?

When Should You Do a Monthly Tune-up?

Monthly Tune-Up Step 1: 'Clean Up' Your Data

Monthly Tune-up Step 2: Run Disk First Aid {ScanDisk}

Monthly Tune-up Step 3: Optimize Your Hard Disk

Choosing a Disk Optimizing Utility Program

### 12.2.0 What is a Hard Disk Crash?

Three of the most dreaded words in the computer world are hard disk crash. Just what do those words mean, and why are they so dreaded?

#### DBA Principle

When your hard disk malfunctions to the point that  
it is no longer able to read or write information, it has crashed.

Interestingly enough, a hard disk crash does not necessarily mean that the information on the hard disk has been totally destroyed; rather, it may mean that just a few vital pieces of information on the hard disk have been lost. Those pieces of information are collectively called the disk directory. When the directory becomes corrupted, the hard disk cannot find your files - even though the files are still there!

If you think about it, you will realize that this is not so different from other things in real life. If you want to call a business associate on the phone, you must get the phone number from a directory. That directory might be stored in your head, but it is still a directory. If you have forgotten the number, you can't call your associate. You know that the business is still there, and you know that the business has a phone, but you can't call because you don't know the number!

But I can still call, you say. I have my Rolodex, I have the Phone Book, and I can even call Directory Assistance. To which we say, Exactly!

### 12.2.1 The Wisdom of Backups

Your Rolodex, the Phone Book, and the telephone company's DirectoryAssistance service are the three backups to your mental directory of your business associate's phone number. This system is pretty much foolproof; you will always be able to find out your associate's business phone number from at least one of the three backup sources.

If we wanted to classify those three backups in a way that means something to us in the computer world, we would say that you had an **on-site snapshot backup** (the Rolodex), an **on-site full backup** (the Phone Book), and an **off-site full backup** (Directory Assistance). And so we can state a Principle of backups:

#### DBA Principle

Keep three levels of incremental hard disk backup:

A snapshot backup, on another disk within your office, of the structure & data;

A full backup, within your office, of all files required to run your application;

and

A full off site backup, on another disk outside your office, of the files on the disk.

### 12.2.2 Keep Incremental Backups

You will notice that we used the word **incremental** when giving you the principle of hard disk backups. By **incremental backups** we mean backups that reflect the status of the data at specified points in time. Unlike telephone numbers, which are usually static and unchanging, most **STATIC** databases are dynamic and ever-changing. For that reason, you need to keep incremental backups. There are two good uses that you can make of these incremental backups: Record Recovery, and Glimpses of History.

¥ **Record Recovery.** There are certain records in your database that are more or less permanent. An example might be Patients who have been discharged. If 4D Tools deletes any of those permanent records because it could not repair them, you can go back to an old copy of your database and retrieve those records.

¥ **A Glimpse of History.** Once in awhile, you will need to know the status of your data as-of a specific date. If you have incremental backups, you can go to the backup that is closest to that date and get a very close approximation of what the data looked like on that date.

Here is a Principle for keeping backups as glimpses of history:

#### DBA Principle

Make daily incremental backups, keep them for a week;

Make weekly incremental backups, keep them for a month;

make monthly incremental backups, keep them for a year.

### 12.2.3 Managing Your Incremental Backups

In the computer world, many DBA's use the following schedule for making incremental backups:

- ¥ For your **Daily backups**, create five disks labeled Monday, Tuesday, Wednesday, Thursday, and Friday. On Monday, at the end of the day, after you have done your end-of-day tasks and printed the daily reports, use the Monday disk to make a new Monday backup. Then do the same on Tuesday, Wednesday, Thursday, and Friday. If your hours of operation include Saturday and/or Sunday, you should add those days to the backup schedule.
- ¥ For your **Weekly backups**, create five disks labeled Week 1, Week 2, Week 3, Week 4, Week 5. On Friday, at the end of the day, after you have done your end-of-day tasks and printed the daily reports, use the appropriate week's disk to make a new backup. Some months have four Fridays, other months have five. That is why you need five disks.
- ¥ For your **Monthly backups**, create twelve disks labeled January, February, March, and so on through December. At the end of January, after you have done the end-of-month posting and you have printed the month's hard copy reports, use the January disk to make the new January backup. Do the same at the end of February, March, and so on through December.

### 12.2.4 Off-site Storage of Backups

One good philosophy of backup management is to hope for the best but plan for the worst. Perhaps the worst that could happen to you as a DBA would be a fire or a natural disaster that completely destroyed your office, all of your equipment, and all of your computer files. If that happened and you had off-site backups of your data and software (meaning you had backups that were stored at a different location in a different building), things wouldn't be so dismal. You could buy new computers, move to a different location, and be fully operational within a few days. But if you didn't have backups and you had to re-input all that data, you still might not be fully operational after several months!

So here is another principle of database administration:

#### DBA Principle

- ¥ Once a week, make an extra copy of a daily backup and store it off-site;
- ¥ Store copies of your monthly incremental backups off-site;
- ¥ Make sure you have off-site access to a computer and a disk drive that can read your off-site backups.

### 12.2.5 Making Self-Contained Backups

Another important principle of backups is that they must be **self-contained backups**. By this we mean that you should assume, when making a backup, that your entire office has been destroyed, including all File Servers, Workstations, and Disk Drives. If that happened, what would you need, along with a new computer, in order to get back in business? Obviously, the answer is that you would need every file and utility that it takes to run your database: 4D Runtime, 4D Tools, Structure, Data, Calc/Draw/Write Formats, Report formats, Search formats, proc.ext files, disk utilities,, and yes, even your system files.

Keep in mind that this self-contained aspect is even more important for monthly incremental backups, which are historical. A year from now, when you need to open that data file, your current structure, system, and version of STATIC may all be different from the versions that were current at the time that you made the backup. For compatibility, you should open the file with the same version of STATIC and the System that you were using when you created the backup.

Here is one more principle of database administration:

#### DBA Principle

- ¥ When you make historical backups, include everything it takes for the backup to run as a self-contained unit: STATIC, 4D Server, Client, your Structure, Data, Templates (4D Write, Calc, Draw, Chart, Quick Report), and even a copy of the Operating System root directory--in short, everything that you would need in order to turn on the computer and run your application.

### 12.2.6 Using Data Compression to Save Space

Although your database may start out small, it can eventually grow to the sizes we talked about earlier: 50, 125, or even 1,000 megabytes. In order to make all the back-ups that we have recommended, you would have to spend quite a bit of money on back-up disks. A highly recommended way to save disk space is to use a data compression utility program. The savings in STATIC databases are quite substantial. The 125mb database that we have mentioned, for example, would probably compress down to around 34mb.

The exact size will vary, depending on which compression utility you use and which options you select. There are several data compression utilities that are considered standards; here is a partial list:

#### Macintosh

¥ **4D Backup**“. This utility, as you probably guessed, is specific to STATIC. It is designed to create interactive backups of all changes to your data file, by saving the changes in a Log File. Since this log file only contains the changes, it is very fast; you will not notice any difference in performance when you install 4D Backup. We will discuss 4D Backup in more detail later in this chapter.

*Note: Although the Full Backups created by 4D Backup are not compressed, we included the product in this discussion of compression utilities because the Log File is very much compressed, containing only the changes to data.*

¥ **Stuffit**“. There are several versions of Stuffit in the Stuffit Family. Stuffit as a stand-alone program is available from Aladdin Systems.

¥ **ZipIt**“. This can be obtained from the various online Shareware sites.

#### Windows

¥ **4D Backup**“. See above discussion of 4D Backup.

¥ **Microsoft Backup**. Versions of this utility come with every version of the Windows operating system and, since it is free, it may be the most widely-used backup tool on Windows.

¥ **PK ZIP**. This is a shareware utility for compressing files. It is the standard for sharing files on On-Line services. There is also a freeware utility called MacZip that allows you to read Zipped files on the Macintosh.

¥ **WINZIP**. This is the most widely-used commercial, non-Microsoft compression utility for Windows.

¥ **Norton Backup**“. This is another popular favorite of the commercial Windows backup utilities. It carries the famous Peter Norton name, even though the company has been purchased by Symantec.

### 12.2.7 Reliability - the Most Important Factor

Although you may find yourself attracted to the neat features of the various compression programs, keep in mind that the most important thing about backup and compression utilities is that they must give you back your data when you need it! After all, what good are neat features if, at the time you need it, something goes wrong and the backup is not usable?

Here is a Principle for choosing hard disks and backup/compression software.

#### DBA Principle

*Although Speed, Size, and Features are important considerations in the choice of hard disks and backup/compression utilities, the most important consideration is Reliability.*



## 12.2.8 Choosing Your Backup Media

In addition to deciding on a data compression utility, you also need decide on the physical media that you will use for backup. Will you use floppy disk? tape? tape cartridge? optical cartridge? Below is a chart of the backup media that are widely available, along with a the pros and cons of each. As technology changes some of these recommendations will quickly be out of date.

Medium	Advantages	Disadvantages
Floppy Disks	Inexpensive for small files. Convenient. Portable.	Highest rate of failure. Many required for 1 backup. The slowest medium. Cannot be alternate drive.
Zip and Jazz	Cartridges are inexpensive. Good for long-term storage. Relatively fast. Drive relatively inexpensive.	Slower than a hard disk. Weak in error-prevention. Long-term reliability unknown.
Hard Disks	The fastest medium. Can be an Alternate drive.	The most expensive option. Uses the most storage space.
Tape Backup	Tapes relatively inexpensive. Best for long-term storage.	Somewhat slow. Drive is relatively expensive. Cannot be alternate drive. Sequential Access-not random.
Removable Tape Cartridges	Cartridges are inexpensive. Good for long-term storage. Relatively fast. Drive relatively inexpensive.	Slower than a hard disk. Weak in error-prevention. Long-term reliability questionable.
Optical Cartridges	Cartridges are inexpensive. Good for long-term storage.  Very durable. Drive relatively inexpensive. Can be alternate drive.	Slower than a hard disk More expensive than removable tape cartridge drive.
Writable CD-ROM	Best choice for long-term storage. Light yet durable. Portable. Cannot be modified.	Drive mechanism relatively expensive.
Re-Writable CD-ROM	Can erase and re-write.	Drive mechanism expensive Media 5 times more expensive than write-once. Slower than write-once CD.

## 12.2.9 Our Backup Media Recommendation

As you can see, every backup media alternative has its pros and cons. In certain situations, each has a place. The backup setup that we prefer and recommend for STATIC databases is a combination of the Hard Disk option and the Writable CD-ROM options:

- ¥ A **backup hard disk** that can be activated immediately if the Primary hard disk goes down. Back up to this hard disk at least once a day. That way, the most you would ever lose would be one day's data and the most downtime you will ever have is a few minutes. If you are very concerned about down-time, you can even set real-time mirroring with 4D Backup.
- ¥ A **Writable CD\_ROM** with at least 17 CD's: one for each daily backup, and one for each monthly backup.

### 12.3.0 The Monthly Tune-up

When you make the monthly incremental backup, that is also a good time to perform some preventive maintenance on your hard disk. We call this preventive maintenance a Monthly Tune-up.

### 12.3.1 Why Do a Monthly Tune-up?

You need to do a monthly Tune-up if you want to:

- ✖ Keep your hard disk and STATIC database operating at peak efficiency.
- ✖ Reduce the likelihood of data loss and corruption.

### 12.3.2 When Should You Do a Monthly Tune-up?

Normally, you should do the Tune-up at the beginning of a new month, you should back-up your database and then do a Tune-up.

Also, since the monthly Tune-up processing can take some time, several hours, it is a good idea to start it in the late afternoon and leave it running overnight. If you leave it running, remember to dim your monitor in order to avoid burning the image into your screen. You could protect the screen with a screen-saver utility, but our experience has been that screen-saver utilities interfere with the operation of disk optimizing utility software. Therefore, we recommend that you dim your screen and turn your screen-saver OFF.

### 12.3.3 Monthly Tune-Up Step 1: 'Clean Up' Your Data

The first step in the monthly tune-up process is to clean up your data-- users may have entered records which are in error or duplicated records for patients. Some DBA's clean up their data every day week, month, others do it every quarter. The schedule is up to you; however, you should definitely have a routine of cleaning your data.

This step is clearly in addition to the normal practice of checking data on a constant basis for accuracy and completion.

As STATIC is not an extremely active database (compared to say an accounting system) we recommend that this procedure be done once per month or once per quarter. However keep in mind that if (and when) we create a link to CIS's, then the activity of STATIC would justify doing this procedure at least once per month (or more often).

**This is how you clean your data:**

- 1 Back-up all the whole installation.  
This means the whole contents of the installation folder, onto disk(s) and store this backup in a safe place, preferably off-site.
- 2 Launch the database in single user and do the following:
- 3 Delete any records that you want to purge; edit any records that need to be changed.
- 4 Quit from the database.
- 5 Free enough space on a mounted hard disk to hold a second copy of the Data and the Structure.
- 6 Run 4D Tools: First Check & Create Log, then Compact.  
**Note: The 4D Tools options, and the steps in running 4D Tools, have already been explained and illustrated in the previously, so we won't show the illustrations again here. If you need a refresher on any step of the 4DTools process, please refer to 4D Tools on page 53.**
- 7 Leaving the old copy of the database intact, launch the newly compacted database.
- 8 Do some searches, sorts, data input. Make sure everything is OK.
- 9 Delete the old copy of the data file.

### 12.3.4 Monthly Tune-up Step 2: Run Disk First Aid {ScanDisk}

Most disk optimizing software programs recommend that you run Apple's Disk First Aid or Microsoft's {ScanDisk} utility before optimizing your hard disk. Disk First Aid {ScanDisk.EXE} is included in the system software with every Macintosh {Windows} machine sold, so you should have no trouble locating it.

**Note:** Some Disk optimizing software cannot optimize the startup disk. Therefore, you may need to startup from a floppy disk or from a different hard disk than the one that contains the 4D data file.

Launch Disk First Aid {ScanDisk} and follow the instructions to check your hard disk for errors.

There are many utilities on the market today for performing this step. Some are better than others.

On Macintosh we have found that Norton Disk Doctor for Macintosh can, in the hands of the casual user, can lead to disaster. The problem with Norton s is that it will often diagnose a problem BUT will not know how to fix it. Despite this, it will try, and in the process render your disk unusable. Our advice is: if Norton s comes up with an error to note the text of the error, tell Norton s to NOT FIX THE ERROR and call us to confirm if it is safe to continue.

That said, we have never had a problem with Norton Speed Disk. We hope that in future versions of Norton s that it will become Smarter .

**Note:** We have other applications In House that will recover your Hard disc safely .

### 12.3.5 Monthly Tune-up Step 3: Optimize Your Hard Disk

Assuming that Disk First Aid {ScanDisk} gave your hard disk a clean bill of health, you can go on to the next step, which is to run a disk optimizing utility.

### 12.3.6 Choosing a Disk Optimizing Utility Program

There are several utility suites available on the market that you can use to repair and optimize your hard disk. Ideally, a disk optimizing utility should have the capability to perform all of the following maintenance activities on your hard disk:

- ✖ **Lock out bad sectors.** Bad Sectors are portions of the physical hard disk that have been damaged, and cannot be relied upon to accurately store and retrieve data.
- ✖ **Repair directory errors.** The utility should be able to compare the hard disk's directory to the actual files that are on the hard drive. If there are discrepancies, the utility should point them out and repair them.
- ✖ **Recover deleted files.** For those instances when you accidentally delete a file, you need a utility which can make an attempt to recover those files. We say make an attempt because it is not always possible to recover a deleted file completely enough so that is usable.
- ✖ **Optimize the hard disk.** Data on a hard disk is not stored in one continuous stream. As the disk is used, segments of the data get spread around on the hard disk. To optimize the hard disk is to bring those segments back together , so that disk access times are greatly improved.

The utility packages that we have used successfully are:

#### Macintosh

✖ **Our favorite is DiskExpress** from Alsoft <http://www.alfsoft.com/>

This is a Disk Optimiser

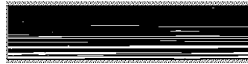
✖ **and our other favorite is DiskWarrior** from Alsoft <http://www.alfsoft.com/>

This is a Disk Recovery and Protection tool. It has NEVER let us down.

✖ **Norton Utilities** for Macintosh by Symantec <http://www.symantec.com/>

This includes an Optimiser application called SpeedDisk.

A Disk Optimizer will first show you a graphical representation of the fragmentation of your hard disk. Here is a sample:.



*Graphical representation of Hard Disk fragmentation: before Defragment*

Here is what the same hard disk looks like after Optimization:.



*Graphical representation of Hard Disk fragmentation: after Defragment*

This is how your hard disk will look after Optimization is complete: fragmented files have been rejoined, so that all files are contiguous. As a result, disk access times will be faster and more reliable.

## Windows

¥ Norton Utilities® for Windows by Symantec Corporation.

## ¥ Disk Maintenance Utilities by Microsoft.

What you get depends on the OS that you purchase - the disk optimiser that comes with Windows 2000 for instance is excellent

**¥ Diskeeper by Executive Software International**

This is a Disk optimization tool that works very well.

## Chapter 13 Backup

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### 13.1.0 What You Will Learn in This Chapter

In this chapter, we will also discuss backup and recovery for STATIC. Here is a list of the topics:

Backup & Recovery with STATIC

The Concept of Backup

Installing and registering Backup

Configure Backup

Creating a New Log File - Single User

Creating a New Log File - Client Server

Activating Backup

Backup status

Restoring from a Backup

Integrating the Log File

Backup Mirroring

### 13.1.1 Backup & Recovery with STATIC

Backup facilities are integrated within every STATIC application that we ship. There is also a standalone application from the database manufacturers called 4D Backup. This application is used to revert to a previous version of your datafile and to integrate the Log File with this recovered datafile.

Under Client Server, the Backup process is controlled by an active running Client. In other words NO BACKUP WILL OCCUR UNLESS THE CLIENT THAT IS CONTROLLING THE BACKUP IS ACTIVE.

Once the Backup has concluded, the Archive can be retrieved by the normal offline backup mechanisms you have in place. In large institutions, this would probably be an institution wide backup service that retrieves and stores designated directories in the daily backup cycle.

**Note:** You cannot successfully back up an open running STATIC Datafile using the normal backup programs available - whatever they claim. The reason for this is that STATIC maintains various additional files that need to be integrated with the datafile before the datafile is actual complete. The Backup service we have created will do this.

### 13.1.2 The Concept of Backup

The concept of Backup is that you can maintain a safety net backup of your data in three very simple steps:

**Here are the 3 Steps:**

- 1** Make a backup of your datafile using Backup. This becomes your starting point.
- 2** As the users make changes to the database, those changes are stored in a Transaction Log File.
- 3** If you need to recover from a mishap, you can open the original backup data with the 4D Backup application, apply the sequential changes from the Transaction Log File, and end up with a new copy of your data file that is completely up-to-date.

In addition to those basics, the 4D Backup application also allows you to do a **Partial Recovery**, which means that, if a series of changes were made to your data file in error, you can recover just up to the point before the mistakes were made. Then, you can put that data file on-line and continue from there. In other words this utility allows you to Roll Back changes. BUT it cannot selectively Roll Back changes. That is you cannot Skip some steps as you roll back the changes.

**Getting started with Backup is a two-step process:**

- 1 You make a full backup of your datafile;
- 2 You start a Log File for the database.

### 13.1.3 Installing and registering Backup

Backup is installed into every STATIC application that we ship; you just need to activate it, this is explored below.

For 4D Server, Backup does not require a registration code.

Backup for STATIC Single user normally asks you to enter a registration code. This is embedded in the EngV6Prf {EngV6Prf.prf} file discussed in an earlier section. This file can be found in the ACI folder:

Operating System	Path to File
Windows XP	C:\Windows\ACI\EngV6Prf.prf
Windows 2000	C:\Winnt\ACI\EngV6Prf.prf
Macintosh	MainDrive:System:Preferences:ACI:EngV6Prf

### Path to Prefs File in the ACI Folder

If for some reason you have deleted or lost this file (System upgrade or moved the STATIC Single User folder to another machine), then all you need to do is reinstall a fresh copy of STATIC Single User and it will place the file into the location above. Then just delete (NOT uninstall as this will remove the prefs file also) the newly created STATIC Single User folder and all its contents. If you do not do this you will see the following screen every time you run your application:



### The Registration Dialog for 4D Backup

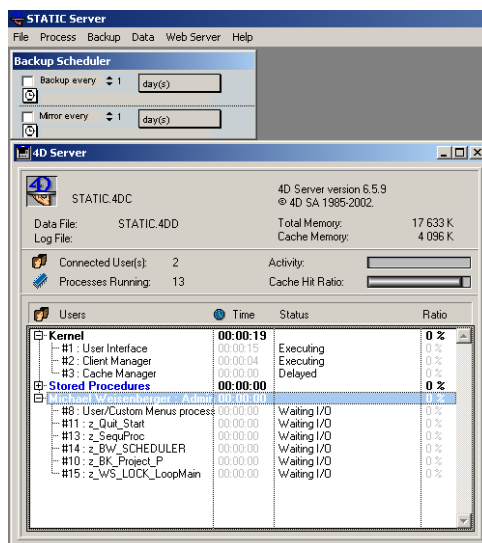
## Switch Off Backup Scheduler on Server

Because STATIC does not use the Server Backup Scheduler we must ensure that this is switched Off. If this is not done, the datafile could be damaged as a result of a deadlock between the Server Scheduler initiated backup and active Clients.

**Here are the steps:**

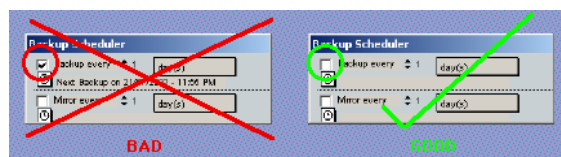
- 1** Launch 4D Server and open your database (STATIC).

If Backup is properly installed, you will see two windows: The 4D Server window and the Backup Scheduler window. We have re-arranged our screen so that both are visible:



4D Server with the Backup Scheduler window

- 2 Ensure that the Backup Scheduler window looks exactly as below.

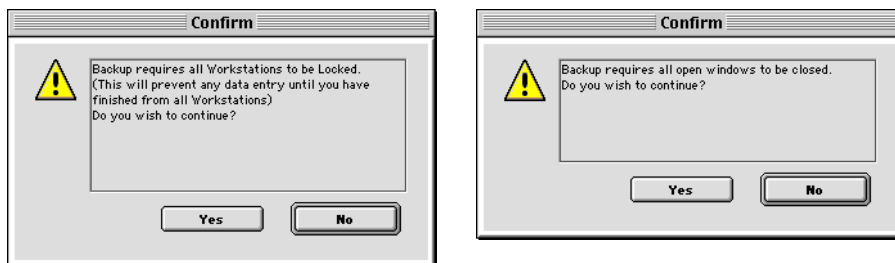


Backup Scheduler window setting

### 13.1.4 Configure Backup

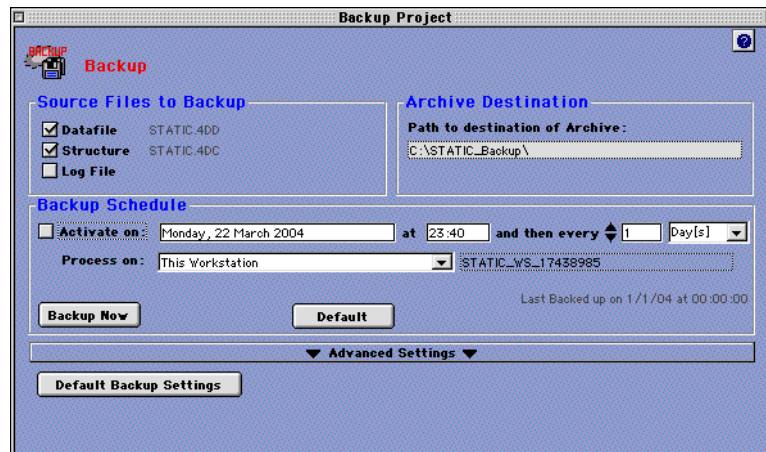
Backup is configured from the File: Prefs: Backup button.

To configure Backup, click on the Backup button in the Preferences window and the following window will display:



Backup: Confirm Lock DB

Click on **Yes** to proceed. STATIC will now close all windows and Log Off all Clients and eventually display the following window:



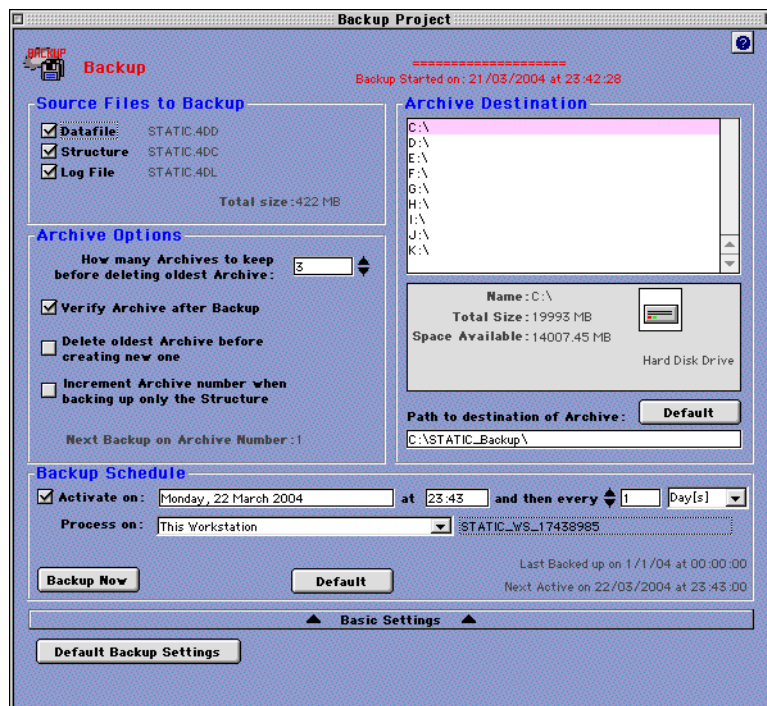
Backup: Basic Settings window

Window Items	Purpose
Source Files to Backup	<p>Three check boxes to select what is to be backed up. Datafile and Structure file set to backup as default:</p> <p>Datafile - Tick this to enable backup of your Datafile. Displays the path to this file in Single user or the name of the file on Client.</p> <p>Structure file (contains the actual STATIC program) - Tick this to enable backup of your program file. This is useful for archival purposes. Displays the path to this file in Single user or the name of the file on Client.</p> <p>Log File. - Tick this to enable backup of your Log File. If a Log File is not currently active, ticking this box will initiate the generation of a Log File. Displays the path to this file in Single user or the name of the file on Client.</p>
Archive Destination	Displays the path to the destination of the archive that will contain the files when backed up. The default path is the root of the startup drive in a folder called STATIC_Backup.
Backup Schedule	<p>Contains the controls to activate backup and the schedule to determine when and where this is to occur.</p> <p>Activate on - Tick this box to activate the Backup Schedule. The date, time and the interval on which it repeats can be set from here also.</p> <p>Process on - The Backup is initiated and controlled by a client in Client server. This client can be any client you choose here. The name of the Client appears next to the choice.</p> <p>Backup Now button - Click this to initiate an immediate Backup.</p> <p>Default Button click this to set the Schedule to the default settings.</p>
Advanced Settings	Click this to expand the window to set more options - see below.
Default Backup Settings Button	Click this to reset all the Backup settings to the defaults.
Close Box	To close the area just Click the close bow in the window.

*Window Items*



Clicking on advanced settings displays the following window:



Backup: Advanced Settings window

Window Items	Purpose
Source Files to Backup	<p>Three check boxes to select what is to be backed up. Datafile and Structure file set to backup as default:</p> <p>Datafile - Tick this to enable backup of your Datafile. Displays the path to this file in Single user or the name of the file on Client.</p> <p>Structure file (contains the actual STATIC program) - Tick this to enable backup of your program file. This is useful for archival purposes. Displays the path to this file in Single user or the name of the file on Client.</p> <p>Log File. - Tick this to enable backup of your Log File. If a Log File is not currently active, ticking this box will initiate the generation of a Log File. Displays the path to this file in Single user or the name of the file on Client.</p> <p>The total size of the data to be backed up is also displayed here.</p>
Archive Options	<p>Set how many archives to keep before the oldest is deleted. This is set to a default of 3.</p> <p>Verify that the archive is complete and error free after Backup. Set as default.</p> <p>Delete oldest archive before creating new one. Important if your datafile is very large and there is limited disk space. Not set as default.</p> <p>Increment Archive number when backing up only the Structure file. Not set as default.</p> <p>Next archive number is displayed.</p>

Window Item



## 13.1.6 Creating a New Log File - Client Server

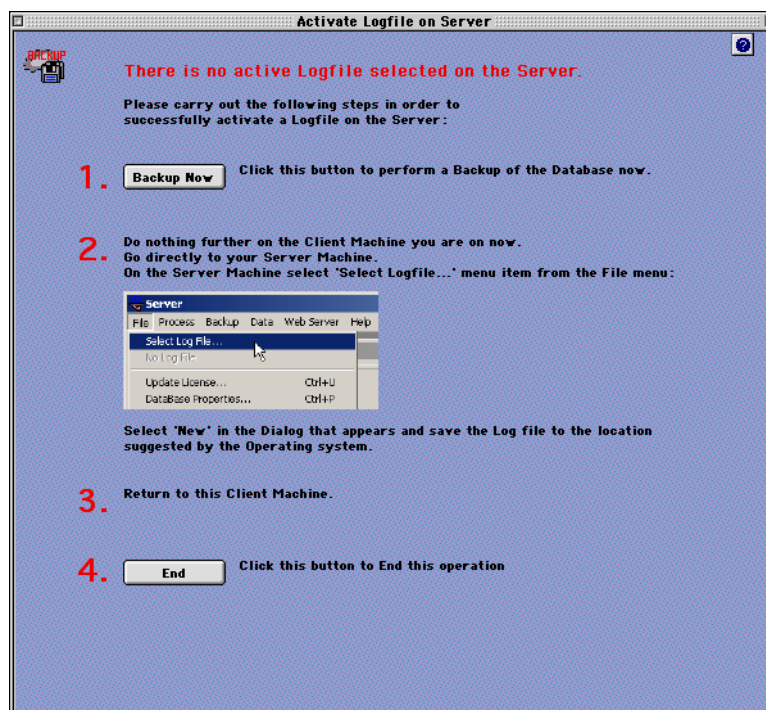
To create a Log File follow these steps:

- 1 Click the Log File checkbox in the Source files to Backup area. A Dialog box will appear as follows:



Backup: Create Log File confirm

- 2 Clicking on Yes will take you to the following screen.

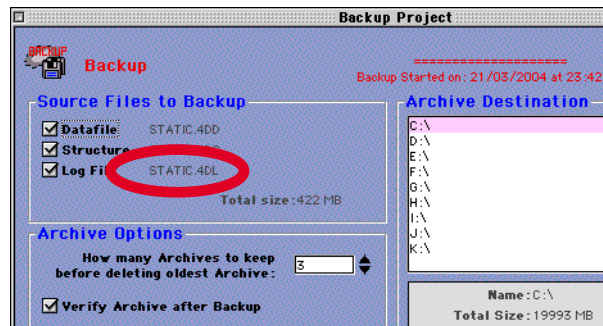


Backup: Create Log File steps

- 3 Follow the steps as indicated in the dialog:  
Click on Backup Now to initiate a full backup.



After a few seconds the Backup Project screen will appear. To ensure that the Log File is still active check that the Log File name now appears next to the ticked Checkbox:



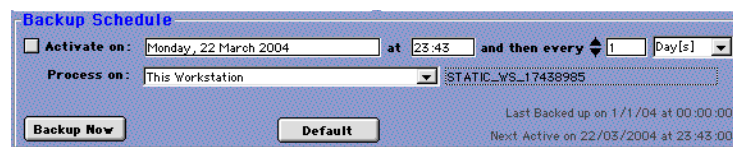
*Log File is active on the Server - confirm on Client*

- 6** Now you have a Log File running.  
Every time any user makes a change to your data, the change will be recorded in the 4D Backup Log File.

### 13.1.7 Activating Backup

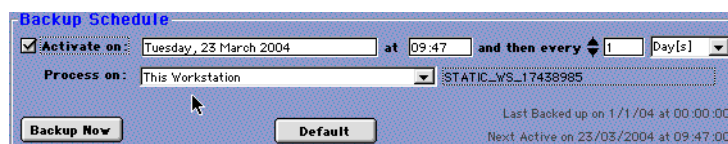
**To activate Backup follow these steps:**

- 1** Enter a Date and Time on which you want the Backup to occur:



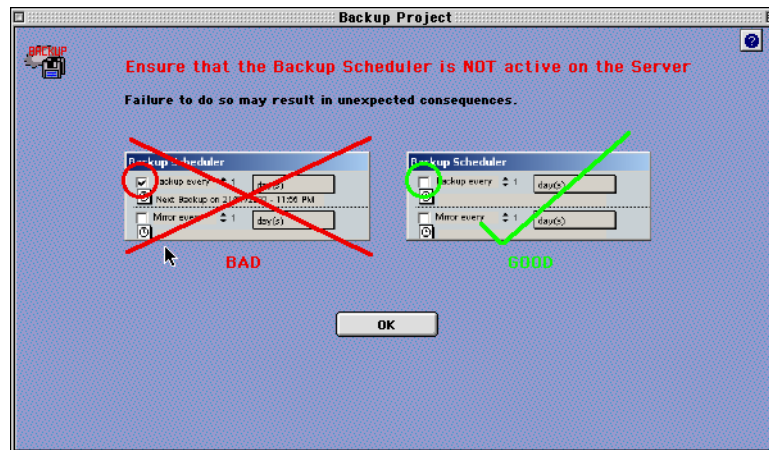
### Backup: Setting the Schedule

- 2** Select the frequency with which you want the backup to occur.  
The backup will occur with respect to the Date and Time specified.
- 3** Select the Client from which the Backup will be controlled.  
Unless you have chosen Any Workstation the selected workstation **MUST** be running when the backup process is to run in order for the backup to proceed.
- 4** Tick the Checkbox to activate the backup:



### Backup: Setting the Schedule

The following warning screen will display for Client Server:



Backup: Warning on Client Server

Ensure that the Server is set as specified in the window.

- 5** Close the Backup Project window and return to the splash screen.

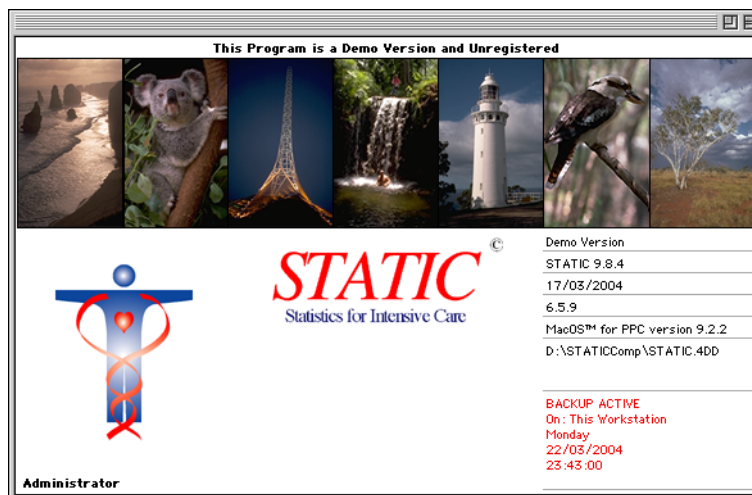
### 13.1.8 Backup status

Backup is not active when the Client or Single User Splash screen looks like this:



*Backup: Not Active*

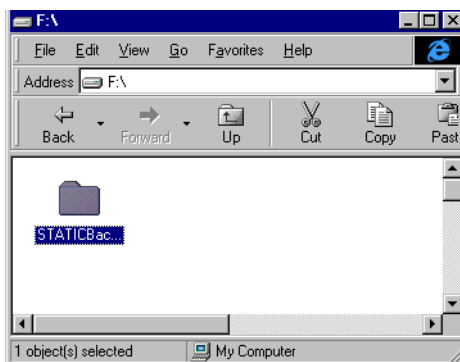
And is active when it looks like this:



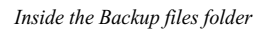
*Backup: Active*

### 13.1.9 Restoring from a Backup

Suppose your hard disk crashed and you need to restore from the backup. You will need to restore from your backup, integrate the Log File, and get the database running again. Here is how your backup hard drive looks before the Restore. You have been using this hard drive only as a backup to your database. You do not store any other data or files on this hard drive.



*STATIC Backup files in own disk*



The above advice is so important, let's repeat it as a DBA Principle:

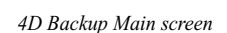
At least once a day, copy the Log File to a separate hard disk--preferably the same hard disk on which you stored the most recent Backup.

- 1 Check the Memory Settings of 4D Backup application.  
The following refers to the 4D Backup application in the STATiCUtils folder NOT the 4D Backup plug-in which runs when STATiC is running.

If you recall, you check the Finder Memory settings of an application by clicking one time on the application and choosing Get Info in the File menu.

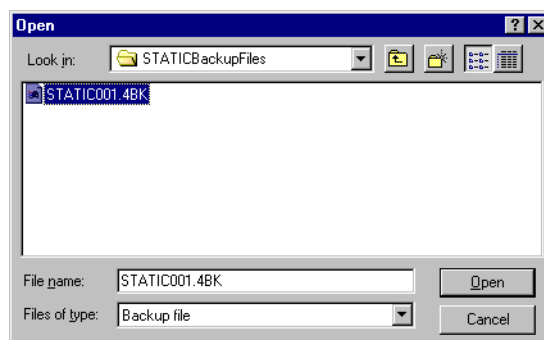
## Windows

**2** Double-click 4D Backup.  
The 4D Backup main screen appears.



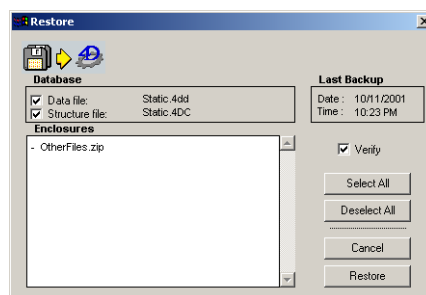


- Click the Restore button.  
The Choose File dialog appears.
- Navigate to the backup file that you want to restore.



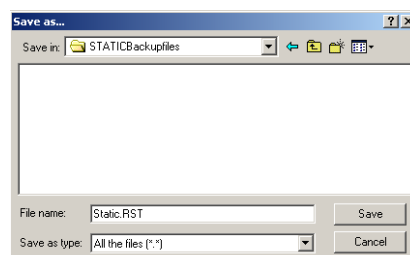
*Choose File Dialog*

- 5** Click the Open button.  
The Restore dialog appears. As the default, all files are selected for restoring.



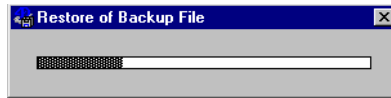
### The Restore Window

- 6** Click the Verify checkbox then click the Restore button.  
A dialog appears asking you to designate the name and location of the new file.



### Destination of Restored Files

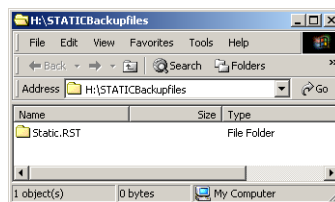
- 7** Click the Save button.  
A progress thermometer appears.



*Restore Thermometer*

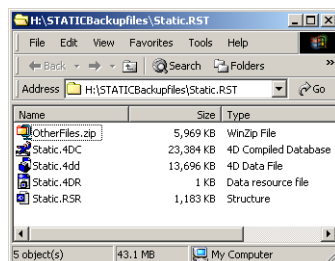
Note: If you get an error during the Restore process, it will either be due to low memory, or due to some damage on the drive that you are using for the Restore. If the error is an out of memory error, you may see non-sense characters in the Alert dialog that reports the error, and the 4D Backup dialog may display strange characters. In this case, you need to increase the memory allocation again. If the problem is with the disk media, copy your backup file to another hard drive and try again to restore to that drive.

When the Restore operation is complete, 4D Backup returns to its main dialog. If you look at your hard drive, you have a new folder.



*Location of New folder containing restored files*

Double-click the new folder to make sure all the files are there.



*Contents of New restored folder*

That's it; now you are ready to Integrate the Log File into your most recent backup.

### 13.1.10 Integrating the Log File

The only thing that you need to do now, to get the database up and running again, is to Integrate the Log File.

You are working with your restored STATIC or STATIC.4dc Structure file and the restored datafile. You are NOT working with your current STATIC Installation except for when you choose the Log File to integrate.

**Here are the steps:**

- 1 Check the Memory Settings of the 4D Backup application.  
The following refers to the 4D Backup application in the STATICUtils folder NOT the 4D Backup plug-in which runs when STATIC is running.

**Macintosh**

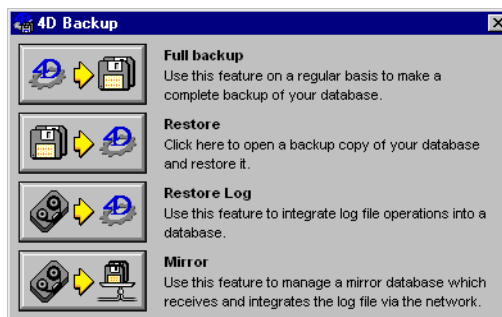
If you recall, you check the Finder Memory settings of an application by clicking one time on the application and choosing Get Info in the File menu.

Change the Minimum and Preferred settings to at least 4,000k.

## Windows

Use Customiser Plus to set the memory requirement as previously described. Set the number of Blocks to 10 of 1024K each.

- 2** Double-click 4D Backup.  
The 4D Backup main screen appears.

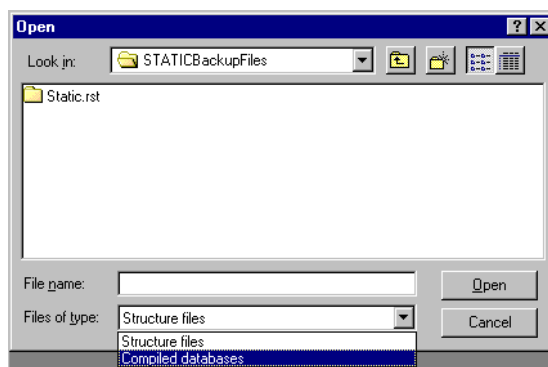


4D Backup Main screen

- Click the Restore Log button.  
The Choose File dialog appears.

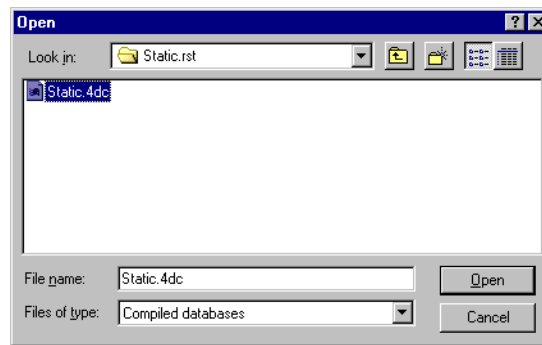
We need to find the `STATIC.4dc` file we have restored in the previous section.

Note that the default type of file the dialog displays is `Structure files`, we need to change this to `Compiled databases` as shown below.



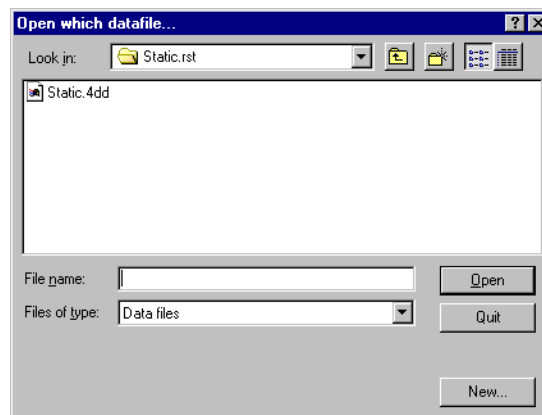
*Choose File Dialog and change Files of Type*

- 4** Navigate to the restored STATIC structure file that you want to integrate with a Log File.



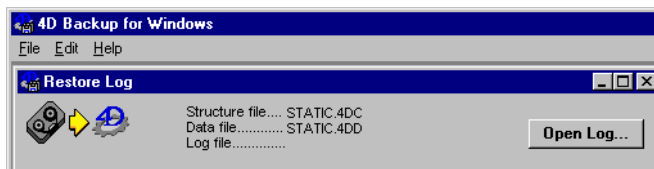
*Choose File Dialog and the restored STATIC.4dc file selected*

If you hold the Option key {Alt key} down as you click on Open the Open which datafile dialog will show . If you do not do this, all the normal conventions regarding which datafile is associated with a Structure file apply. This was discussed earlier. We recommend that you hold the key down to be sure that the correct datafile is selected.



*Choose the Datafile to open*

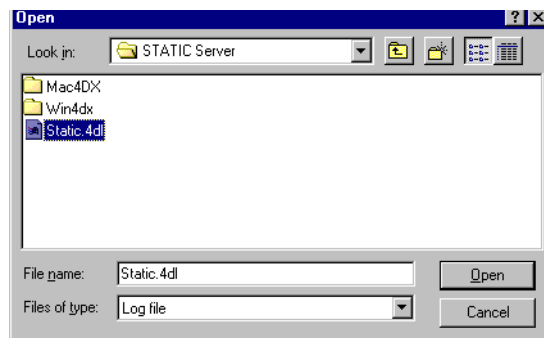
- 5** Click the Open button.  
The Restore Log dialog appears.



### The Restore Log Dialog

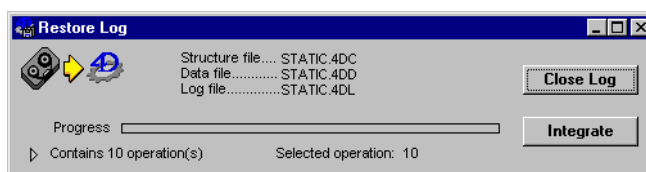
- 6** Click the Open Log button.  
A dialog appears asking you to open a Log File.

Navigate to the CURRENT Log File of your CURRENT STATIC installation. This file contains the changes you have made to your database since the last full backup. Note we have already navigated to this file in the dialog below



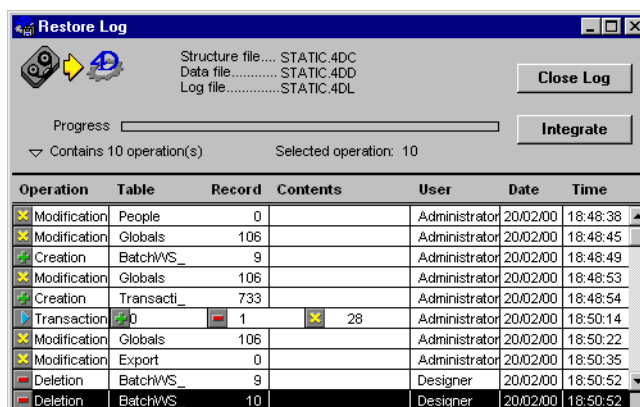
The Open Log File Dialog

- 7 Click the Open button.  
The Restore Log Dialog changes to something like the one below:



Restore log after Log File found

If you now click on the small triangle you will be able to see the operations:

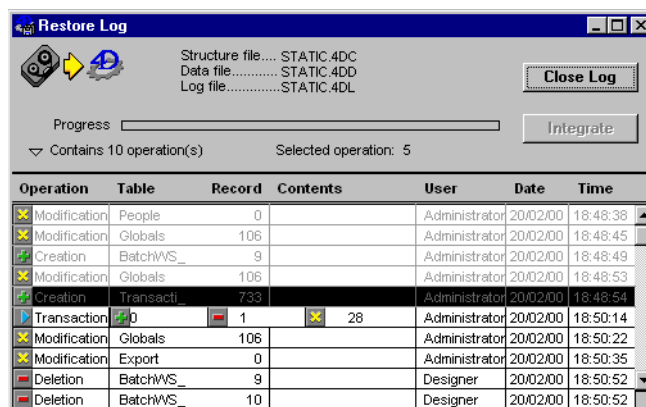


Restore Log showing Operation details

In our case we have 10 Operations to integrate, there could be thousands. These Operations could be integrated one by one and the result on the datafile checked. (Remember to make a copy of a partially integrated datafile as using it will add new changes making it unsuitable for further integration).

You control the extent of integration by selecting an Operation. Integration will stop when the selected Operation and all the ones before it have completed. They will then dim to show completion.

- 8 Select the Operation you would like to stop on and click the Integrate button.  
Integration completes up to and including the point specified and then stops:



You can later choose more Operations to complete.

This is reasonable because the skipped Operation may be required for a subsequent Operation. We have found this facility very useful in the past when an Administrator deleted a whole years worth of patient details. We went back to the last Full backup, restored and Integrated the Log File, up to, but not including the Deletion event, saving many hours of patient detail reentry.

### 13.1.11 Backup Mirroring

To find out how to do this, consult the **4D Backup User Manual**.

## Chapter 14

### Going Cross-Platform: An Example

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#### 14.1.0 What You Will Learn in This Chapter

Let's suppose that you have STATIC running on Macintosh under 4D Server. You want to move this database from a Macintosh server to a Windows Server, and you want to connect Macintosh and Windows clients.

In this chapter, we will work our way step-by-step through this problem; and, in the process, you will learn about the different options that you have for copying files across platforms, and for connecting 4D Clients to 4D Server. The topics in this chapter:

Moving from Macintosh to Windows

Using 4D Transporter

Converting the Datafile

Copying the Datafiles to Windows

Removable Cartridge Drive

Windows Server, Services for Macintosh

MacLAN Connect

#### 14.1.1 Moving from Macintosh to Windows

**To do this, you will have to:**

- 1 Convert files to Windows format;
- 2 Copy the files from the Macintosh to the Windows server machine;
- 3 Install 4D Server and 4D Client software;
- 4 Connect the Mac & Windows Clients to the 4D Server running on Windows.

#### 14.1.2 Using 4D Transporter

There are differences between file formats on the Macintosh and Windows. Macintosh files are comprised of two parts or Forks: the **Resource fork** and the **Data fork**. The Resource fork, however, is unique to the Macintosh; the Windows operating system does not understand this file format. Windows files have only one fork--a Data fork.

**4D Transporter** is the tool that you will use to compensate for this difference in file formats between Macintosh and Windows. 4D Transporter takes a Macintosh file and splits it into two separate files: the Resource Fork becomes one file, and the Data Fork becomes a separate file. This means that a single file on the Macintosh will be split into two separate files before you transport it to Windows. 4D Transporter can be found in the STATICUtils folder.

4D Transporter is not available on Windows because the Macintosh is the only platform that understands both the Macintosh format and the Windows format.

Using 4D Transporter, we will convert the datafile so it is compatible with Windows. All other required files are available by using STATIC installers.

**Note:** The Windows operating systems do not understand Macintosh file formats; they cannot read the Resource Fork of Macintosh files. Therefore, 4D Transporter will only run on the Macintosh.

#### 14.1.3 Converting the Datafile

We will begin by using 4D Transporter to convert the Datafile to a format that can be read by Windows.

**Here are the steps:**

- 1 Select your Data (STATIC.data), drag it onto the 4D Transporter icon.





Control	Action
Give a DOS File Name:	Traditionally, MS-DOS and Windows 3.1X allow only eight-character file names with a three-character extension. Windows allows longer file names. Since STATIC and 4D Server Version 6.X and higher are not warranted to be compatible with Windows 3.1X, you should not have to worry about the length of your file names, Windows versus Mac. Therefore, you can leave blank the checkbox Give a DOS file name .
Show Preferences:	<p>This option tells 4D Transporter to display the above window whenever you launch 4D Transporter. If you turn off this option, 4D Transporter will use the options stored on disk and immediately begin Transporting, instead of showing the Preferences window.</p> <p>Note: Even if you have deselected Show Preferences, you can still display the Preferences window by holding down the Option key {Alt key} while launching 4D Transporter. When you do that, the Preferences window will appear.</p>
Use Creator:	The Macintosh uses a four-character <b>Creator Code</b> as the method for knowing automatically how to associate a file with the program that created the file. This four-character creator code serves the same purpose as the three-character File Extension on Windows; except that the creator code on Macintosh is stored in the Resource Fork of every Macintosh file that was created by some other program. The Creator Code for 4th Dimension Version 6, which is the default assigned by 4D Transporter, 4D06.
The Store Settings button:	If you want 4D Transporter to store your current settings so that they become the default settings when you launch 4D Transporter, click this button. The next time you launch 4D Transporter, your settings will be the defaults.
Transport: Mac to PC	Choose this option when you are splitting files to transport them from Macintosh to Windows.
Transport: PC to Mac	Choose this option when you are joining files to transport them from Windows to Macintosh.
Transport: Move the Original File	4D Transporter performs the transport operation on the original file; it does not make a backup copy. This is not the recommended method; however, sometimes, when disk space is limited, you may have to use this option.
Transport: Move the Original File	4D Transporter performs the transport operation on the original file; it does not make a backup copy. This is not the recommended method; however, sometimes, when disk space is limited, you may have to use this option.
Transport: Make a copy first	4D Transporter leaves the original of the file intact; it creates a folder (see below) for the newly-created files. Here is the way 4D Transporter decides on the names of the folders:

*Naming of Folder by Customiser*

Naming of Folder by Customiser:

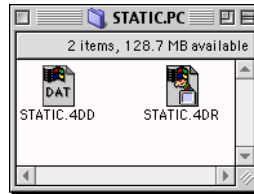
Situation	Folder Name
Transporting from Mac to PC	DatabaseName.PC
Transporting from PC to Mac	DatabaseName.Mac
Mac to PC, DatabaseName.PC already exists	DatabaseName.PC.1
PC to Mac, DatabaseName.Mac already exists	DatabaseName.Mac.1

*Naming of Folder by Customiser*

If DatabaseName.XX.1 already exists, then the next folder will be named DatabaseName.XX.2, and so on.

To continue with the transporting operation:

- 2 Click the Move button  
4D Transporter displays messages as it splits the files. After it is done, you see a new folder, FolderPC.
- 3 Double-click the folder STATIC.PC.  
You see your transported data file:



*4D Transporter: Macintosh files split for transporting to PC*

As you can see, 4D Transporter has split the data into two files - STATIC.4DD & STATIC.4DR

### 14.2.0 Copying the Datafiles to Windows

Now that you have your datafile in Windows format, you need to copy the files from your Macintosh to the Windows machine that will be running your 4D Server application.

If the files were small and would fit onto one diskette, you could use PC Exchange on the Macintosh to mount a DOS-formatted floppy disk, copy the files onto that disk, and then insert the disk into your Windows machine. However, in the case of your datafile, the files are too large to fit on a floppy disk. Therefore, you need to find a method to copy large files across platforms. In the next few paragraphs, we will be talking about your options for copying large files between Macintosh and Windows.

#### 14.2.1 Removable Cartridge Drive

One of your options is to use a removable cartridge drive (Syquest, Zip Drive, etc.) to copy large files between Macintosh and Windows.

**Here are the steps in this process:**

- 1 On the Macintosh, use the software that came with the drive to format a removable cartridge as a DOS volume.
- 2 Compress the files created if they do not fit onto the cartridge.  
STATIC datafiles generally compress down to about 20% of their original size. If they still do not fit, split the files - this is an option for all compression programs we have seen.
- 3 While still on the Macintosh, copy the Transported files to this DOS volume.  
You can miss the next 3 steps if there is an equivalent drive already installed on the Windows machine.
- 4 Install a SCSI interface card or a parallel-to-SCSI converter cable on your Windows machine, so you will be able to mount SCSI drives on that machine.
- 5 Install the appropriate removable cartridge driver software (Syquest, Zip, etc.) onto your Windows machine.
- 6 Connect the removable cartridge drive to the Windows machine and mount the drive.
- 7 Copy the DOS files from the removable cartridge onto the internal hard drive of the Windows machine.  
That's it; you have moved the files from Macintosh to Windows.

#### 14.2.2 Windows Services for Macintosh

Another option you have for copying files across platforms is to install Services for Macintosh. This option allows you to mount Window volumes from a Macintosh and read/write files as if you were reading and writing to another Mac. This is an especially good option, because Windows has the ability to store Macintosh files in their native Macintosh format.

Teaching you the basics of Windows is beyond the scope of this text; therefore, these instructions assume that you are already familiar with Windows. If you are not familiar with Windows, you should go through the tutorials and learn to use the Help system of Windows.

**Below are the steps for using this option:**

- 1** Install the Windows Server software on a Windows machine.  
Server is the Fileserver version of the Windows software; it is approximately triple the price of Workstation.
- 2** Create an NTFS Partition on the Server machine.  
Server supports two volume file systems: FAT (File Allocation Table) file system and NTFS (New Technology File System). FAT is the system that normal DOS and Windows volumes can read and write. NTFS is a more powerful file system that was developed for Windows.
- 3** Install the AppleTalk Networking Protocol on your Windows Server machine.
- 4** Set up the NTFS partition as a Shared Windows Volume.
- 5** Go to the MacFile menu, create a Macintosh volume, and create Permissions.  
You now have a file server volume that Macintosh and Windows 95 or better machines can access. Use this volume as the transfer point for copying files back and forth between Macintosh and Windows.  
To mount these types of Volumes on the Macintosh use the Appleshare icon in the Chooser.

**14.2.3 MacLAN Connect**

Another option that you have for Filesharing between Macintosh and Windows is a product called MacLAN Connect by Miramar Software. Just as the name implies, MacLan enables Windows machines to sign on to a Macintosh LAN (Local Area Network). This is available for all flavors of Windows.



## Chapter 15 Network

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### 15.1.0 What You Will Learn in This Chapter

In this chapter we will examine Network Protocols and Components in more detail.

Network Protocols and Network Components

Network Protocols

Network Protocols on the Macintosh

Network Protocols on Windows

Network Components

Network Components on Macintosh

Network Components on Windows

### 15.1.1 Network Protocols and Network Components

Now that you have copied the application to the Windows machine, you are ready to connect 4D Server and 4D Client across platforms. This discussion will tell you the pieces of the software puzzle that you will need in order to make the connection. In the process of explaining the connection options, we will sometimes suggest that you refer to the appropriate documentation in order to get more details.

The first thing that you need to understand is the role of **Network Protocols** and **Network Components** in helping you to make the connection.

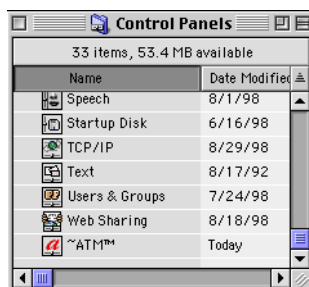
### 15.1.2 Network Protocols

The first type of software that you need in order to connect 4D Server and 4D Client is a Network Protocol. In the English language, a protocol is an agreed-upon code of behavior or etiquette. Just as the name implies, a Network Protocol is an agreed-upon method for computers to communicate across a network. It would be correct to say that the network protocol allows the clients and the server to speak the same language. 4D Server and 4D Client support TCP/IP.

**TCP/IP (Transport Control Protocol/Internet Protocol)** is the most widely-used protocol. It is the protocol-of choice in Universities, large Government organizations, many large corporations, and of course, the Internet.

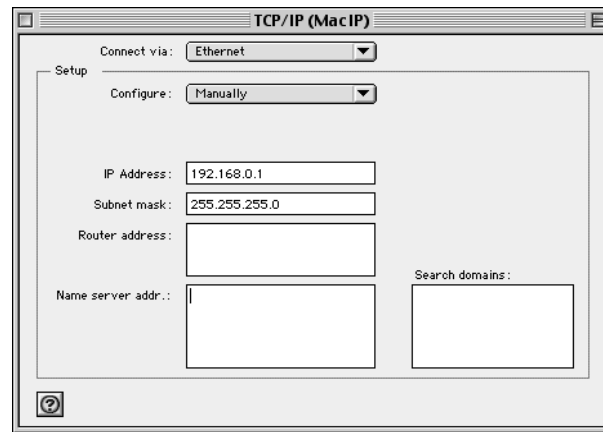
### 15.1.3 Network Protocols on the Macintosh

**TCP/IP** is automatically installed as a part of the System software. It is located in the System folder, Control Panels folder.



*TCP/IP in the Control Panels folder*

When you double-click the TCP/IP icon, the following dialog appears:



*TCP/IP setup dialog*

The IP Address is this machine's unique identification number for TCP/IP. If your organization is connected to the worldwide Internet, this IP Address should be unique in the entire world. This is accomplished through a central Registry of IP Addresses.

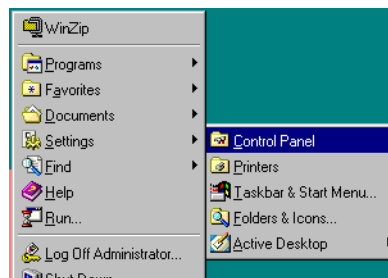
A detailed explanation of TCP/IP is beyond the scope of this manual; for more information about TCP/IP and 4D Server, see ACI's **Network Components Addendum**

But if the above Macintosh is set with the displayed IP Address and Subnet mask then a Windows or Macintosh Server set with the same Subnet mask and an IP address that is different in the last digit will work.

### 15.1.4 Network Protocols on Windows

**Here is how you access the TCP protocol.**

- 1** To access the networking protocols on Windows, go to Start menu and select Settings, Control Panel:



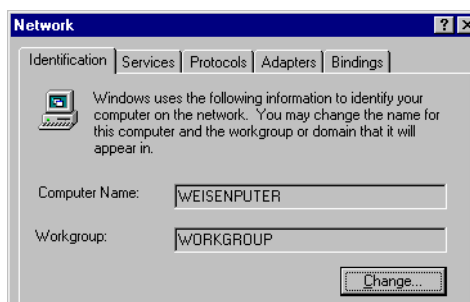
### Windows Control Panel

- ## 2 Open the Network Control Panel



*Windows Network Control Panel*

The Network window appears:



*Windows Network window*

## TCP/IP under Windows

To install and configure the TCP/IP protocol under Windows, proceed as follows:

### Installing the Protocol

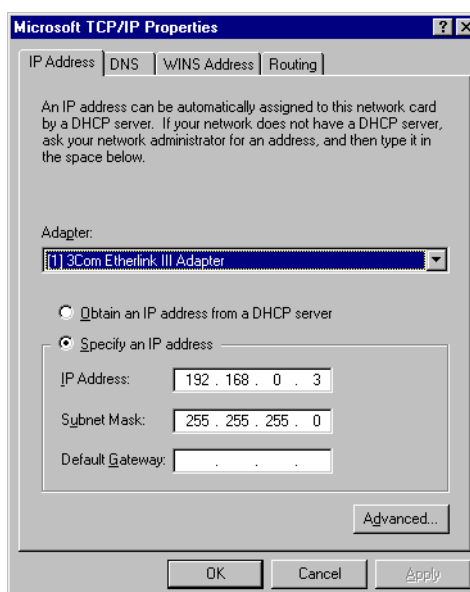
- 1 Select Protocol, then click the Add button.  
The Select Network Protocol dialog box appears.
- 2 Select TCP/IP Protocol as Network.
- 3 Click OK and proceed with the installation.

### Configuring the Protocol

After the installation is complete (you may need to restart your machine), you can configure the protocol.

- 1 Return to the Network Control Panel window.
- 2 Select the TCP/IP line showing the binding to your network adapter. Double-click on this line or click the Properties button.

The TCP/IP Properties window appears:



*TCP/IP Properties window*

- 3 Set the options according to your hardware and network configurations.





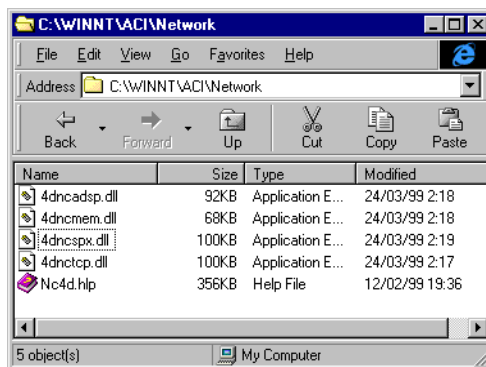
### 15.1.6 Network Components on Windows

Unlike the Macintosh, network components on Windows are not installed within the 4D Server or 4D Client application; rather, they are installed in the System directory/ACI folder/Network folder.

In other words, if your System Root subdirectory is named WINNT, this will be the path to the Network Components:

C:\WINNT\ACI\NETWORK

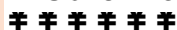
All of these network components will be installed automatically using our installers. Here is a screen shot of the components already installed in Windows:



*Network Components location for Windows*



## Chapter 16 Other Topics



### 16.1.0 Understanding Client/Server Technology

What is Client/Server Technology? How does it work? Why do we need it? To understand, let's take a brief look at the history of simultaneous-user database computing.

#### 16.1.1 Mainframe Concept

The first databases to allow access by several simultaneous users were based on the Mainframe concept of **smart server, dumb terminals**. The terminals had no intelligence; they were merely devices to communicate with the server. It (the server) did all the work: validating, calculating, searching, sorting, and storing data. This concept is still widely used in mainframe and mini-computer database computing today. Although it is very appropriate for certain situations.

**The Mainframe concept has three major drawbacks:**

- a Expense.** Mainframes and mini-computers are very expensive to acquire, to develop applications for, and to maintain.
- b Development Time.** Because the development cycle is so long for mainframe-based applications, the development response time from the perceived need for an application to the delivery of that application, can be several years. In highly competitive industries, where the market conditions can change radically in very short periods of time, this is a major drawback.
- c User Interface.** To minimize the computing-power-drain on the Server, the user interface of mainframe databases must be very primitive. As a result, many mainframe databases are difficult to learn and very limited in user-definable options. This often results in the users becoming very dissatisfied with the lack of the responsiveness of the mainframe application to their real-world needs.

#### 16.1.2 File Server Concept

The second evolutionary step in simultaneous-user databases has been the File Server concept of **dumb server, smart terminals**. The Server has very little intelligence; it is merely a device to feed data to the terminals. They (the terminals) do most of the work: validating, calculating, searching, sorting, and reporting. The terminals request data from the File Server; then, after processing, the terminals send the data back to the File Server for storage.

**Compared to mainframes, the File Server concept has three major advantages:**

- a Inexpensive.** The File Server solution is far less expensive to acquire, to develop, and to maintain than a mainframe or mini-computer, thus addressing problem a. In addition, you have the flexibility that any terminal can, in an emergency, become the Server. This means that you can maintain an inexpensive backup Server machine.
- b Rapid Development.** With the application-development tools that are available in the world of file-server, Information Systems (I.S.) departments can deliver an application much more quickly than they could in a Mainframe environment: weeks or months, instead of years. We have solved problem b.
- c Easy User Interface.** The presence of computing power on the desktop makes it possible to create a graphical application that more naturally interacts with the user, thus addressing problem c. The database is easier to learn, easier to use, and at the same time more flexible than mainframe databases.

**But in solving a, b, and c, we have created a new problem:**

- a Network traffic.** In a File Server environment, an incredible amount of information is flying back and forth across the network between the File Server and the terminals.

- ✚ In order for a terminal to do its job, the File Server must send the terminal all the information: the entire index table for an indexed search or sort; entire records for display on a listing screen or in a report.
- ✚ The Server and the terminals are constantly exchanging record-locking and record-unlocking information.
- ✚ Whenever a terminal makes a change to a record, it must send the updated version of the record back to the File Server for storage.

### 16.1.3 Client/Server Concept

**So let's take a fresh look at our problems and the Client/Server solution:**

The above improvements combine to give you a 100% to 400% speed improvement when you move from a File Server Multi-User to a Client/Server Multi-User environment.

In addition to the above advantages that are shared by all Client/Server database software, 4D Server has two other advantages that will make a difference to you as the DBA: Client machine multi-tasking, and Client Structure Version Control.

**Client Machine Multi-Tasking** means that 4D Server allows each workstation to run several tasks ( Processes ) at one time. A process is the equivalent of one single-user STATIC session. Each process has its own menu bar; its own current selection for each file; its own current record for each file; its own runtime window. This means that a user can literally do several things at once: input a new record in one window, display a list of records in a second window, modify a record in a third window, view a different record in yet another window, and print a lengthy report in the background.

Imagine a ward where a doctor is updating patient information: they need to have the ability to interrupt the routine work in order to attend to a phone call about another patients details. The operator needs to be able to leave the update task, attend to the query, and then come back to exactly the same spot to continue entering patient information.

**Client Structure Version Control** means that 4D Server is taking care of updates to the Client machine's copy of Structure information (layouts, programming code, etc.). This advantage of 4D Server is often overlooked, but it is a real advantage. For example, suppose you are a DBA responsible for a total of 35 workstations: 22 in your own building, 8 in another building, and 5 mobile users.

In most Client/Server environments, you would have to take your own precautions to make sure that every Client workstation always has the latest version of the front-end data access program that you have written. This could be one of your biggest headaches as a DBA.

4D Server will relieve you of this headache; it will automatically update all Client copies of the front-end data access program. Each time a user signs on, 4D Server compares that user's Update Resource against 4D Server's Update Resource. If the numbers do not match, it means that there have been structural changes since that user last signed on--so 4D Server downloads new structure information to that user.

**Tightly-integrated Server & Client:** Unlike other client/server configurations, where you need a Translation layer between the Server and the Clients, 4D Server and 4D Client speak the same language. This fact results in a significant savings in time and money during the development and deployment of applications. For example: instead of two distinct development efforts--one for the Client application and another for the Server application--there is only one development effort. This can save as much as 50% in the development and--more important, the maintenance--of a large client/server installation.

As you can see, 4D Server offers several major advantages over File Server; and indeed, over other Client/Server computing configurations.

## 16.2.0 Configuring TCP/IP

### 16.2.1 IP Address

For an internal network, with no global Internet connections, you can assign unique addresses as long as they conform to the class naming conventions.

The network address range 192.168.0.0 - 192.168.0.255 is reserved by the IANA for use with non Internet connected networks.

Example:

192.168.0.1 would be a class C address.

192.168.0 defines the network.

1 would be the host.

Additional hosts would have the same network number 192.168.0 and different host numbers up to 254.

**NOTE:** The numbers 0 and 255 are reserved for the network and are not valid host addresses.

Example:

192.168.0.2 could then belong to Linda's Intel P133 with Windows 95.

## 16.2.2 Subnet Masks

Example:

IP Address: 192.168.0.1

Linda's Intel P133 with Windows 95 has

IP Address: 192.168.0.2

Subnet Mask: 255.255.255.0

They have the same network address 192.168.0 with different hosts -.1 and.2

The same Subnet mask - 255.255.255.0

### 16.3.0 STATIC and the Year 2000

STATIC is fully year 2000 compliant.

## 16.4.0 Improving Windows Performance

**1** Page Swap File:

- ✚ Use a fixed size; set the minimum and maximum to the same number. Apparently making the OS resize the pagefile introduces a lot of overhead.

¥ If you have 2 drives on the machine, either 2 SCSI drives or 2 DMA33 or better IDE drives, put the large pagefile on the second drive. If you want to be able to debug a memory dump, you will also need one of the minimum size on the C drive. I have a 300 meg pagefile on C, and a 1 gig pagefile on my second drive. Apparently NT will automatically asynchronously use the pagefile that is on the disk it isn't currently using for most of everything else, which is usually the system volume.

## 2 Hard Drives

Enable DMA for your Hard Drives.

### 3 System.Ini file

Open Notepad and open your System.ini file, which is kept in your Windows directory. In the section headed [386Enh] add the following lines (not including the description in brackets):

**PageBuffers=32** (Page Buffers store read and write information)

**MinTimeSlice=40** (Time in milliseconds before Windows runs another Virtual Machine)

**DMABufferSize=64** (Size for all DMA devices of the 16 - bit buffer.64 is the max size)

**ConservativeSwapFileUsage=1** (Tells Windows to only use the Swap file when absolutely necessary)

Save and close the file and restart your computer.

- 4 Role of Machine  
Set this to Applications .

## 16.5.0 ERROR-10001 to -10003

Typically, a 4D -10001 error means that the connection between Client and Server has been terminated or interrupted. First the good news. The way we have written STATIC means that it is very rare that your data will be corrupted if you encounter this error. The bad news is that all unsaved data is lost when you encounter this error.

### Introduction

Networking is fragile. There are many factors, including your cabling, hub and in some cases, NICs as well as software. I would insure the integrity of the server's ability to network properly then move to clients, and then check the hardware elements.

To track down and rectify this problem do the following:

### Ensure that the Client and Server machines can see each other

Use a PING utility that is available on both Macintosh and Windows.

The server machine you are trying to reach can be a Windows or Macintosh platform. If the two machines cannot communicate via TCP/IP, you will not be able to run 4DClient/Server.

If the PING utility successfully finds the server machine and if you cannot establish a Client connection, reinstall the Client software.

### Software compatibility

Check for conflicting versions of Client and Server software. This can happen when the Server is upgraded and the Clients are not.

### Reinstalling Software

It is always a good option to download the latest version s of STATIC (Server, Client or Single User) and reinstall the software from scratch. It does not take long and ensures you have the latest software installed. Just remember to save your current installation to a safe place - burn it to CD or DVD. The only thing we cannot replace is your data file - make sure that this is safe!

### Software settings

After the TCP.opt file is created for TCP/IP, edit with Customizer Plus (in Utilities of the Installer) and check the timeout settings. 4D creates the new.opt file with 0 time-outs. (You need to increase time-outs. 180=3secs, 500=8secs, 1000=16 secs and so on. i.e. the values are in Ticks = 1/60 sec)

Less likely, but be sure you have enough available disk space for caching. On Windows check the Temp Directory in the startup volume and delete things that may not have been deleted because of a crash. Move the Page swap file to another partition if the free space is low.

### Hardware

Routers are among the most common sources of this kind of problem. If the network has a number of routers, check if the affected clients are on one particular node or set of nodes passing through one router.

Check the Switch connectors and the Switch itself (try different ports on the Switch)

Check the wiring.

## **Last resort**

Do a clean reinstall of the OS and all software.



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\*\*\* \*\*

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