Drive Backup™ Server Express 2008

User Manual

CONTENTS

1 Introduction 4

2 Key Features 5

3 Installation 6

3.1 Package Contents 6
3.2 Minimum System Requirements 6
3.3 Installation Procedure 6

4 Basic Concepts 8

4.1 Backup Operations 8
4.2 Differential Backup 8
4.3 Paragon Hot Processing & Volume Shadow Copy Service 9
4.4 Dynamic Disks 10
4.5 64-bit Support 11
4.6 Copy Operations 11

5 Interface Overview 12

5.1 General Layout 12
5.2 Main Menu 13
5.3 Tool Bar 15
5.4 Virtual Operations Bar 15
5.5 Common Tasks Bar 16
5.6 Disk Map 17
5.7 Explorer Bar 18
5.8 Legend Bar 19
5.9 Status Bar 19

6 Settings Overview 20

6.1 General Options 20
6.2 Backup Image Options 21
6.3 General Copy and Backup Options 21
6.4 CD/DVD Recording Options 22
6.5 Hot Processing Options 23
6.6 Partitioning Options 24
6.7 E-Mail Options 25
6.8 Run during Backup Options 26
6.9 Virtual Mode Options 28

7 How to Protect Data 30

7.1 Getting Information about Disks and their Images 30
7.2 Backup a Disk 35
7.3 Differential Backup 38
7.4 Backup a Dynamic Disk 39
7.5 Synthetic Backup 40
7.6 Storing Backup Images onto External Media 41
7.7 Storing Backup Images on a Network Drive 42
7.8 Using the Backup Capsule 42
7.9 Backup Capsule on a Disk with only one Partition 45
7.10 Restoring a Disk from the Image 46
7.11 Using the Simple Restore Wizard 50
7.12 Restoring the System Disk 51
7.13 Restoring Separate Files and Folders from an Image 52

7.14 Restoring Dynamic Volumes....52
7.15 Build Recovery Media....54
8 Copy Tasks....57
8.1 Copy Hard Disk....57
8.2 One Button Copy Wizard....59
8.3 Copy Partition....60
9 Scripting....63
10 Partition Management....65
10.1 Basic Partitioning Operations....65
10.2 Advanced Partitioning Operations....69
10.3 Changing Partition Attributes....71
11 Hard Disk Management....75
11.1 Update MBR....75
11.2 Convert to Basic....75
11.3 Change Primary Slot....76
11.4 Change SID....77
12 Extra Functionality....79
12.1 View Partition/Hard Disk Properties....79
12.2 Volume Explorer....79
12.3 File Transfer Wizard....80
12.4 Mount Partition....82
12.5 Mount Archive....84
12.6 Test Surface....84
12.7 Check File System Integrity....85
12.8 Check Archive Integrity....85
12.9 Check Recovery Disks....86
12.10 Clear Free Space....87
12.11 Edit/View Sectors....88
12.12 Send Log Files....89
13 Glossary....91

1 Introduction

Information that is stored on our disks can be much more valuable than the computer being used together with its software. –Then again, to what extent is something regarded as valuable? How much money would you ask for your favorite music collection, which you have been collecting your entire life? Or your disk may contain important financial data or results of scientific research. There are many things that are unique and therefore one has to be certain about security.

Our program provides the user with the most reliable data protection for the hard disk – the ability to create archive duplications (i.e. *backup images*). By storing such an archive onto external media the user is able to restore the data at any time it is required.

The second crucial function of the program is the ability to modify the hard disk structure. One day you realize that your hard drive cannot meet your requirements any more. Either its capacity is insufficient and it is time to think about a little upgrade, or you are to carry out some partitioning operations. Whatever the problem is, it requires solution. Our program provides a wide-range functionality in the field of managing disk layout structures. The key features of the program are listed in the special chapter.

Setting up any operation is accomplished by using practical wizards. Each step of the wizard includes in-depth information in order to allow the user to make the right choice. Graphical representations of the data help the user to gain a better understanding.

In this manual you will find the answers to many of the technical questions which might arise while using the program.

2 Key Features

Let us list some of the key features:

- User friendly interface. Easily understood icons accompany all functions of the program.
- Previewing the resulting layout of hard disks before actually executing operations (so-called virtual operations).
- Backup an entire disk including service data of the file system.
- Backup of dynamic disks. The user can back up all five types of dynamic volumes (simple, spanned, striped, mirrored, RAID-5).
- Archive database helps the user to easily manage backup images (get properties, add, delete, mount, etc.).
- Create and manage the backup capsule. This is a special secured place on the disk where backup archives are stored.
- Start up the computer from the image contained in the backup capsule in case of the operating system corruption.
- Restore an entire disk or separate files from the disk archive (image).
- *Restore with Shrink* function provides the possibility to restore a backup image to a free block of smaller size taking into account only the amount of actual data of the image.
- Copy Partition/Hard Disk Wizards that enable to successfully transfer all on-disk information including standard bootstrap code and other system service structures, thus maintaining the operating system's working capability, and that even beginners may understand.
- Easy-to-use One Button Copy Wizard provides a unique possibility to carry out such a technically complicated operation as cloning of hard disks just by pressing one button.
- Basic functions for initializing, partitioning and formatting hard disks. Instead of the standard Windows disk tools, the program supports all file systems.
- Recovering of any accidentally deleted partition by using the Undelete Partitions Wizard.
- File Transfer Wizard assists the user with copying of separate files/directories or burning of them to CD/DVD. Besides it provides access to Paragon backups as regular folders to browse through their contents or copy required files.
- *Shutdown After Apply* function enables to set the computer to automatically switch off on the successful accomplishment of any operation.
- Volume Explorer utility allows the user to browse and export contents of the local mounted/unmounted volumes of any file system as well as Paragon backups.
- Build external recovery media that help the user to restore the system even when the current operating system cannot boot anymore.

3 Installation

This chapter provides information which is needed to perform the correct installation of the program, and in addition, checks if the current installation is working correctly.

3.1 Package Contents

The installation package includes the following components:

- Launcher (with an embedded HTML browser)
- Partition Management
- Hard Disk Management
- Copy Partition/ Hard Disk Wizards
- Backup/Restore Wizards
- Recovery Media Builder
- Extra Functionality

3.2 Minimum System Requirements

To use the program on a computer satisfactorily, ensure that it meets the following minimum system requirements:

- Operating systems: Windows NT Server/2000/XP/2003 Server/Vista and XP/2003/Vista 64-bit
- Internet Explorer 5.0 or higher
- Intel Pentium CPU or its equivalent, with 300 MHz processor clock speed
- 128 MB of RAM
- Hard disk drive with 40 MB of available space
- SVGA video adapter and monitor
- Mouse

3.3 Installation Procedure

The installation process consists of the following steps:

1. **Run Setup Application**
From the folder, where the setup files are kept, run the *SETUP.EXE* file. This application will guide the user through the process of the program installation. The setup utility is compiled with the **InstallShield SDK**, hence it contains the standard user interface and set of installation steps.

In case there is some previous version of the program installed on the computer, the program will offer the user to uninstall it first.

2. **Starting Setup**
The Welcome page informs that the application is being installed. Click the *Next* button to continue.

3. **Confirm License Agreement**
The License Agreement page displays the Paragon License Agreement. Read the agreement and then click the *Yes* button to accept. If the user does not agree with any conditions stated there, the installation process will be interrupted.

4. **Select an Installation Folder**
The Destination Location page allows the user to choose the folder where the program will be installed. By default, the installation folder will be created as:

C:\Program Files\Paragon Software\Paragon Drive Backup. To select another folder, click the *Browse* button.

After you have selected the required folder, click the *Next* button to continue.

Do not install the program on network drives. Do not use Terminal Server sessions to install and run the program. In both cases, the program functionality will be limited

5. **Select a Program Group**

The Program Folder page enables the user to select the application's program group for the Start Menu. By default, it will be the program group:

Start > Programs > Paragon Drive Backup.

Click the *Next* button to continue.

6. **Verify Setup Settings**

The Start Copying page allows the user to verify settings, which have already been made and correct them if necessary. Press the *Back* button to return to the previous page and modify the installation settings. Click the *Next* button to complete the installation process.

7. **Copying Files**

The Setup Status page shows the overall progress of the installation. Click the *Cancel* button to abort the setup.

8. **Finishing the Installation**

The Final page reports the end of the setup process.

To accomplish online backup/copy of locked partitions/hard disks the program uses a kernel mode *hotcore driver*, thus the system reboot is required to complete the installation procedure.

4 Basic Concepts

This chapter explains terms and ideas that show how the program works. To understand these helps to obtain a general notion of the operation performance and makes it easier for the user to operate the program.

4.1 Backup Operations

Since the advent of the computer age the best way to protect valuable information was to store it in form of archives on external media. In case of hard disk malfunction, its contents could be restored from the archive. Then *backup* soon became a common term to mean making duplications of data for protection purposes.

Nowadays backup has become an essential routine operation for any serious information work. A modern backup archive uses the so-called *image*, a snapshot of the whole disk system (or its separate partitions). It not only includes the contents of all user-made files, but additionally contains the exact structure of directories, information about file allocation, file attributes and other related data. *A backup image* can be copied or moved like any ordinary file.

The user can store backup images on external media (CD/DVDs). This guarantees a high level of data protection as long as the backup media is kept secure. It is possible to store backup images on a local network drive as well. Special server-side software enables to secure and store backup images for the entire network. For this purpose computers named backup servers are used. Such a backup server provides nearly the same level of protection as external media.

However, should the user not have a local network and/or it is inconvenient to record data onto external media, then the backup images can be stored in a specially secured place on the hard disk. This place is referred to as the *backup capsule*, which has an independent system layout (e.g. a separate partition) that will stay operable should the active file system be damaged. To avoid an accidental removing or unauthorized access of the backup data, this partition is hidden and thus cannot be mounted in the operating system. A single hard disk may contain only one backup capsule. However, the user can attach another hard disk with an existing backup capsule to the computer and restore from that as well without any problems.

It is only possible to browse the contents of the backup capsule by using special software. The system of wizards that is implemented into the program is designed to work with the backup capsule. Thus, by storing disk images in the backup capsule the user obtains a reliable level of data protection.

The above-mentioned methods of storing backup images are implemented in the program. And all the necessary actions are performed by using the system of convenient wizards. This means that the user simply has to follow easy step-by-step instructions to make the appropriate settings.

4.2 Differential Backup

As you probably know a regular backup image includes all contents of a partition. In case the user needs to create multiple backup archives of the same partition, unchanged data is duplicated in all archives and takes additional space on backup media.

Our program enables to archive only changes in the partition’s contents with respect to a complete archive. The creation of a differential archive usually takes more time than the creation of an ordinary one. However, a differential archive requires much less space than the appropriate number of ordinary full archives or backup images, thus considerably saving your system resources.

Once the complete image of the partition is created, it can be used as a base or parental image for the differential backup. The program verifies whether the parental image corresponds to the partition being imaged or not. To distinguish between partitions, the program uses such partition's attributes as: *location*, *capacity*, *file system type*, and the *serial number*.

The program performs the exact bit-wise comparison of the previous partition's data (saved in the parental image) with the current data (that is actually the partition itself). The difference in contents is saved in the new volume of differential backup archive. The volumes of the archive can be stored in different locations.

This function is only available for single primary and logical partitions

4.3 Paragon Hot Processing & Volume Shadow Copy Service

4.3.1 Offline versus Online Backup

In the course of time there have been developed various methods of backing up data. Despite different work concept, all of them can be divided into two principal groups: *offline (cold)* and *online (hot)* backup techniques.

As the name infers, *offline backup* can only be accomplished when the data is in consistent state (the operating system and all the applications are completely shut down). Actually it is the most preferable way of image creation, since backup software obtains an exclusive right to process data that guaranties high level of operating efficiency. However an offline backup is absolutely out of question when dealing with 24/7 production environments.

In contrast, *online backup* enables to create a consistent snapshot even as the data is currently modified. Online backups are particularly useful for systems with high availability requirements, but they won't be accomplished until all active transactions are complete. The point is to provide a coherent state of all open files and databases involved in a backup, taking into account that applications may still keep writing to disks. As a result an online backup cannot boast high operating speed.

Our program supports both offline and online methods of image creation. As far as online backup is concerned it offers its own hot processing algorithm together with the possibility to use snapshot technologies provided by the Microsoft VSS framework.

4.3.2 Paragon Hot Processing Technology

Paragon Hot Processing is an online backup technology for Windows NT+ family operating systems. Developed back in 2001, nowadays it is integrated with all backup solutions offered by the company.

Paragon Hot Processing is not exactly a snapshot technology, though it has much in common with it. During an online backup, the program uses the kernel mode driver *HOTCORE.SYS* to intercept and control disk write activity of applications and the operating system. The *hotcore driver* as an integral part of the program is installed during the setup procedure (that's why the system reboot is required to complete the setup procedure). For the most part the driver is in the idle mode until it is activated with the program. While in this mode it bypasses any calls having no effect on the overall system performance, but a few kilobytes of the system memory.

Paragon Hot Processing technology offers backup of locked partitions and hard disks under Windows NT+ family operating systems providing both high operating efficiency as well as low hardware requirements.

It is not recommended to use Paragon Hot Processing with active SQL Server 2003, Exchange 2003 or Oracle databases since the backup image contents may be corrupted.

4.3.3 Volume Shadow Copy Service

Microsoft *Volume Shadow Copy Service* (VSS) is designed to provide the backup infrastructure for the Microsoft Windows XP/Server 2003 operating systems. It offers a reliable mechanism to create consistent point-in-time copies of data known as shadow copies. Developed by Microsoft in close cooperation with the leading backup solution vendors on the market, it is based on a snapshot technology concept.

Initiated by a VSS aware backup utility, VSS creates snapshots for the selected volumes and represents them as virtual read-only devices, called *volume shadow copies*. Once the shadow copies are created, the backup utility starts processing the data while applications keep writing to original volumes.

Unlike Paragon Hot Processing the VSS technology provides a unique possibility to make a synchronous snapshot of multiple volumes. This very feature can be particularly beneficial when backing up active SQL Server 2003, Exchange 2003 or Oracle databases located on multiple volumes the way it is recommended by Microsoft to improve the level of database performance and reliability, thus providing 100-percent data consistency.

To use VSS it is necessary to have a mounted 300 MB+ NTFS partition.

4.4 Dynamic Disks

One of the key features of our program is the possibility to process dynamic disks. As you probably know, MS-DOS, Microsoft Windows 95/98/Me/NT/2000/XP/Server 2003/Vista support four primary partitions per physical hard disk, one of which can be extended. Certainly there is the possibility to create logical drives within the extended partition. Such types of disks are called *basic*. Windows XP Professional, Windows 2000, Windows Server 2003 and Windows Vista follow the same strategy: You can have a maximum of four primary partitions, one of which can be an extended partition with logical drives. However, these operating systems also introduce a new disk configuration type - *dynamic* disk - which must be understood to effectively configure and manage hard disks.

Dynamic disk is a physical disk that doesn't use partitions or logical drives. Instead, it contains only dynamic volumes. Regardless of what format you use for the file system, only Win2K computers can access dynamic volumes directly. However, computers that aren't running Win2K can access the dynamic volumes remotely when connected to the shared folders over the network.

Dynamic disks can co-exist on a system with basic disks. The only limitation is that you cannot mix Basic and Dynamic disks on the same hard drive.

There are five types of dynamic volumes: *simple* (uses free space from a single disk), *spanned* (created from free disk space that is linked together from multiple disks), *striped* (a volume the data of which is interleaved across two or more physical disks), *mirrored* (a fault-tolerant volume the data of which is duplicated on two physical disks, and *RAID-5* volumes (a fault-tolerant volume the data of which is striped across an array of three or more disks).

With dynamic storage, you can perform disk and volume management without the need to restart Windows.

Limitations:

- Dynamic disks are not supported on portable computers.
- Dynamic disks are not supported on Windows XP Home Edition-based computers.
- You cannot create mirrored volumes or RAID-5 volumes on Windows XP Home Edition, Windows XP Professional, or Windows XP 64-Bit Edition-based computers.

Thus, the dynamic disk is a new way of looking at hard disk configuration. Dynamic disks offer you more management flexibility without the partition limitation of basic disks. Dynamic disks can contain an unlimited number of volumes, but they cannot contain partitions or logical drives. Dynamic storage can be particularly beneficial for large-scale businesses when dealing with many physical hard disks involving complex setup.

4.5 64-bit Support

The bulk of software today is written for a 32-bit processor. It can meet the requirements of almost any end user. However that is not the case when dealing with servers processing large amounts of data with complex calculations of very large numbers. That is where 64-bit architecture comes into play.

It can boast improved scalability for business applications that enables to support more customer databases and more simultaneous users on each server. Besides a 64-bit kernel can access more system resources, such as memory allocation per user. A 64-bit processor can handle over 4 billion times more memory addresses than a 32-bit processor. With these resources, even a very large database can be cached in memory.

Although many business applications run without problems on 32-bit systems, others have grown so complex that they use up the 4 GB memory limitation of a 32-bit address space. With this large amount of data, fewer memory resources are available to meet memory needs. On a 64-bit server, most queries are able to perform in the buffers available to the database.

Some 32-bit applications make the transition to the 64-bit environment seamlessly others do not. For instance, system-level utilities and programs that provide direct hardware access are likely to fail. Our program offers a full-fledged support of the 64-bit architecture providing fault-tolerant work for such system dependent modules as *Hot Processing*.

4.6 Copy Operations

Hard drive duplication nowadays is becoming highly popular among PC users. That is due to some definite advantages it can offer. First of all, many people clone hard disks just to back up data for security reasons. The present day copy utilities enable to successfully transfer all on-disk information including standard bootstrap code and other system service structures, thus maintaining the operating system’s working capability. In case of a system malfunction, the user can get the system back on track in minutes. No additional configuration is required, what is very convenient.

The second possible application is the upgrade of a hard disk to a new one. The capacity of a modern hard drive doubles every two years, thus opening up new possibilities for software developers. As a result programs become more complicated and require considerable amount of free space. One day the user realizes that there is no more free space left on the hard disk and the only way out is to upgrade. Usually that means that besides purchasing a new hard disk, the user is to face a large re-installation procedure spanning several days of tedious work. But all of this can be avoided just by copying the contents of the old hard disk to a new one proportionally resizing the partitions.

And the last but not least is the copying of hard disks for cloning purposes. It may be of great use when setting up similar computers. There is no need for a system administrator to install an operating system from scratch on every one of them. It is enough just to configure one and then clone it to the others.

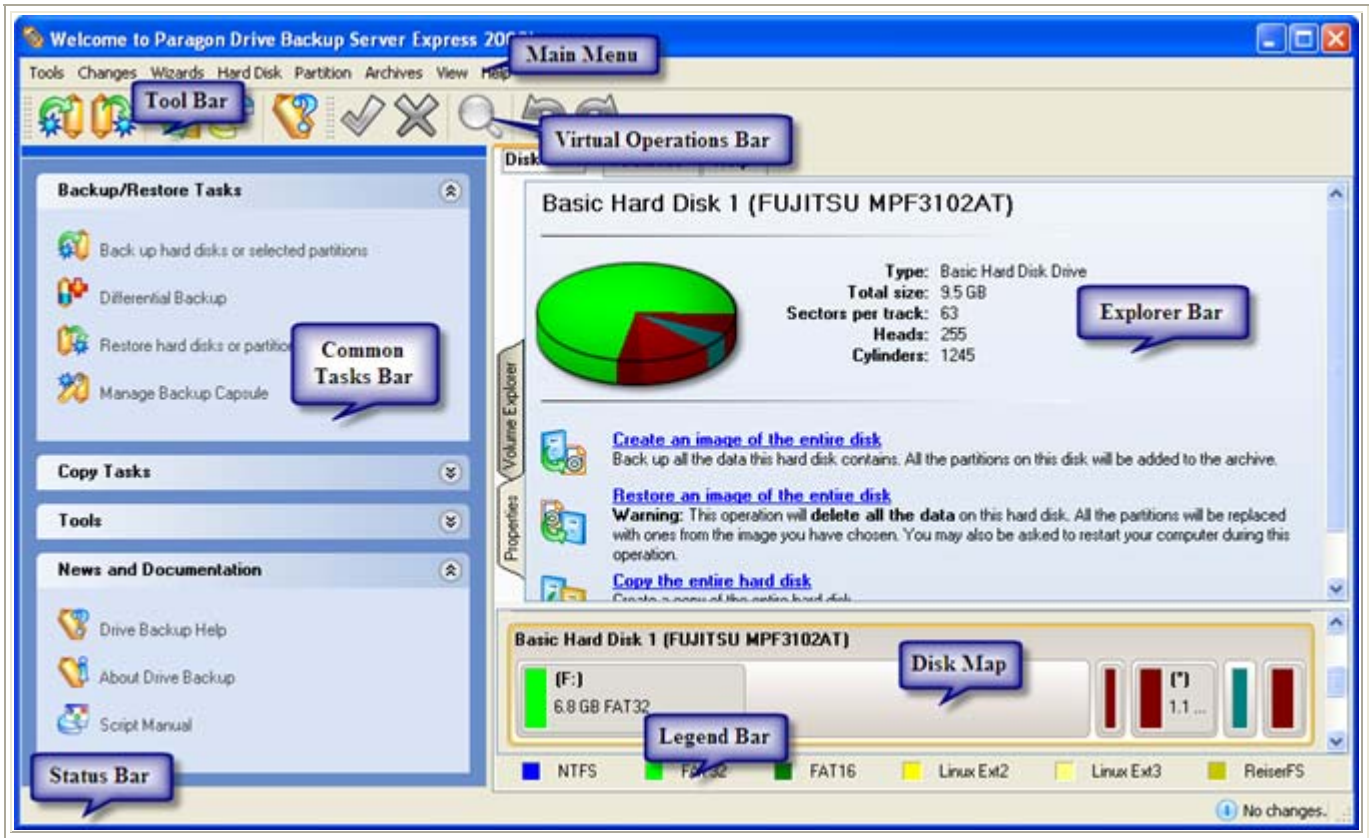
5 Interface Overview

This chapter introduces the graphical interface of the program to the user. The design of the interface precludes any mistake being made on the part of the user. Most operations are performed through the system of wizards. Buttons and menus are accompanied by easy understandable icons. Nevertheless, any problems that might occur while managing the program can be tackled by reading this very chapter.

5.1 General Layout

When the user starts the program, the first component that is displayed is called the *Launcher*. It enables the user to run wizards and utilities, to specify program settings, to visualize the operating environment and the hard disk configuration.

The Launcher's window can be conditionally subdivided into several sections that differ in their purpose and functionality:



1. Main Menu
2. Tool Bar
3. Virtual Operations Bar
4. Common Tasks Bar
5. Explorer Bar
6. Disk Map
7. Legend Bar
8. Status Bar

Some of the panels have similar functionality with a synchronized layout. The program enables the user to conceal some of the panels to simplify the interface management.

All panels are separated by vertical and horizontal expandable sliders, allowing the user to customize the screen layout.

5.2 Main Menu

The Main Menu provides access to the entire functionality of the program. The available functions are as listed below:

MENU ITEM	FUNCTIONALITY
Tools	
Generate Script…	Generate a script for the task
Send Log Files	Compress and send the log to the Paragon Support Team
Recovery Media Builder…	Restore the system even when the current operating system cannot boot anymore
Check Recovery Disks…	Verify the recovery media for integrity and ability to boot from
Settings...	Edit the general settings of the program
Exit	Exit the program
Changes	
Undo "the last virtual operation"	Cancel the last virtual operation on the List of Pending Operations
Redo "the last virtual operation"	Cancel the last undo virtual operation on the List of Pending Operations
View Changes…	Display the List of Pending Operations
Apply Changes	Launch the real execution of virtual operations
Discard All Changes	Cancel all virtual operations on the List of Pending Operations
Reload Disk Info	Refresh the current information about disks
Wizards	
Back Up Disk or Partition…	Create a new backup archive
Differential Backup…	Create a differential backup of the selected partition
Restore Disk or Partition…	Restore a disk from the backup image
Manage Backup Capsule…	Create or manage a backup capsule
Synthetic Backup…	Synthesize a new property modified archive based on the existed backup image (splitting, password protection, compression level, etc.) as well as rearrange its location
Check Archive Integrity…	Perform integrity check for the required backup image
One Button Copy Wizard	Create a hard disk copy just by pressing one button
Copy Hard Disk…	Create a hard disk copy
Copy Partition…	Create a partition copy
Undelete Partitions…	Recover any of accidentally deleted partition
Hard Disk	
Back Up Hard Disk…	Create a new backup archive of the selected hard disk

Burn Hard Disk to CD or DVD…	Back up and burn the selected hard disk to CD/DVD
Restore Hard Disk…	Restore the selected hard disk from a backup image
Update MBR	Update MBR (Master Boot Record) of the selected hard disk
Change Primary Slots…	Modify the primary partitions enumeration for the selected hard disk
Convert to Basic…	Convert a dynamic disk containing simple volume(s) into basic
Change SID…	Change SID (Security Identifier) value of any found Windows installation
Edit/View Sectors…	View/edit sectors of the selected hard disk
Properties…	Get in-depth information on the properties of selected hard disk
Partition	
Create Partition…	Create a partition of any file system with the Create Partition dialog
Format Partition…	Format a partition of any file system Format Partition dialog
Delete Partition…	Delete a partition of any file system Delete Partition dialog
Back Up Partition…	Create a new backup archive of the selected partition
Burn Partition to CD or DVD…	Back up and burn the selected partition to CD/DVD
Restore Partition…	Restore the selected partition from a backup image
Assign Drive Letter…	Assign drive letter to the selected partition
Remove Drive Letter…	Remove drive letter for the selected partition
Hide Partition…	Make the selected partition unavailable for the operating system
Unhide Partition…	Make the selected partition available for the operating system
Mark Partition as Active	Make the selected partition bootable by default
Mark Partition as Inactive	Make the selected partition non-bootable by default
Change Volume Label…	Change volume label of the selected partition
Change Serial Number…	Change serial number of the selected partition
Change Partition ID…	Change identifier of the selected partition
Clear Free Space…	Destroy any remnants of deleted files/directories left on disk without affecting the used data
Test Surface…	Test surface of the selected partition/block of free space
Check File System Integrity…	Check the selected partition for possible file system errors
Edit/View Sectors…	View/edit sectors of the selected partition
Properties…	Get in-depth information on the properties of selected partition
Archives	
Add an Archive to the Database…	Add a backup image to the Archive database
Delete the Archive from the Database…	Remove the selected backup image from the Archive database
Restore from the Selected Archive…	Restore a disk from the selected backup image
Check Archive Integrity…	Perform integrity check for the required backup image

Differential Backup…	Create a differential backup of the selected partition
Synthetic Backup…	Synthesize a new property modified archive based on the existed backup image (splitting, password protection, compression level, etc.) as well as rearrange its location
Mount the Selected Archive…	Assign drive letter to the selected backup image
Unmount the Selected Archive…	Remove drive letter for the selected backup image
View	
Toolbar	Manage the Tool Bar representation: show / hide standard and navigation buttons, text labels and large icons.
Status Bar	Display the Status bar
Common Tasks Bar	Display the Common tasks bar
Disk Map Legend	Display the Disk map legend
Disk Map Location	Select whether the Disk map will be located on the top of the main window or at the bottom
Help	
Help	Open the Help system
About	Open the dialog with information about the program

The Main Menu contents available at the moment may vary depending on the selected object.

5.3 Tool Bar

The Toolbar provides fast access to the most frequently used operations:

BUTTON	FUNCTIONALITY
	Create a new backup archive
	Restore a disk from the backup image
	Copy a hard disk
	Copy a partition
	Open the Help system

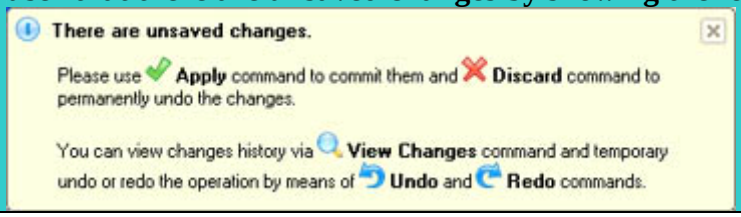
5.4 Virtual Operations Bar

The program supports previewing the resulting layout of hard disks before actually executing operations (so-called virtual mode of execution). In fact, when the virtual mode is enabled, the program does not accomplish operations immediately, but places them on the List of Pending Operations for later accomplishment.

The Virtual Operations Bar enables to manage pending operations.

BUTTON	FUNCTIONALITY
	Cancel the last virtual operation on the List of Pending Operations
	Cancel the last undo virtual operation on the List of Pending Operations
	Display the List of Pending Operations
	Launch the real execution of virtual operations
	Cancel all virtual operations on the List of Pending Operations

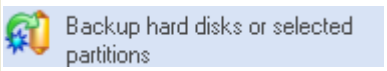
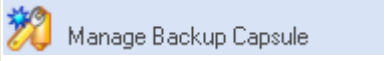
Virtual mode is an effective way of protection from any troubles, since no operations will be executed until clicking the *Apply* button for confirmation, thus giving a second chance to weigh all pros and cons of this or that particular operation. The program politely reminds the user that there are unsaved changes by showing the following window:

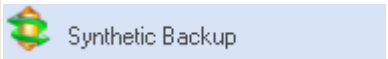
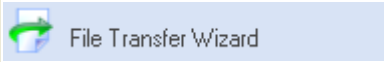
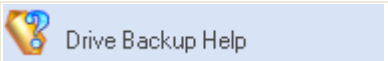
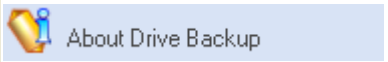


5.5 Common Tasks Bar

The Common Tasks Bar is located on the left side of the main window. It is intended for easy access to the program's wizards that provide all the functionality needed to manage copy operations.

The bar contains four tabs named *Backup/Restore Tasks*, *Copy Tasks*, *Tools* and *News and Documentation*. Each of these contains a separate button bar which can be folded by clicking it.

Backup/Restore Tasks	
	Starting the Backup Wizard. The Backup Wizard assists the user with the backup of the hard disk’s data.
	Starting the Differential Backup Wizard. The Differential Backup Wizard enables to create a differential backup of a partition.
	Starting the Restore Wizard. The Restore Wizard helps to restore data from a previously made backup image.
	Starting the Manage Backup Capsule Wizard. The Manage Backup Capsule Wizard helps to create, resize or delete the backup capsule.

Copy Tasks	
	Starting the One Button Copy Wizard. The One Button Copy Wizard assists the user with cloning of hard disks just by pressing one button.
	Starting the Copy Hard Disk Wizard that helps to make an exact copy of a hard disk.
	Starting the Copy Partition Wizard that helps to make an exact copy of a partition.
Tools	
	Starting the Recovery Media Wizard. The Recovery Media Wizard helps to create media which can be used for recovery purposes.
	Starting the Check Recovery Disk Wizard. The Check Recovery Disk Wizard assists the user with verifying the recovery media for integrity and ability to boot from.
	Starting the Check Archive Integrity Wizard. The Check Archive Integrity Wizard helps to verify whether the backup archive is valid or not.
	Starting the Synthetic Backup Wizard. The Synthetic Backup Wizard enables to synthesize a new property modified archive based on the existed backup images (splitting, password protection, compression level, etc.) as well as rearrange its location.
	Starting the File Transfer Wizard. The File Transfer Wizard allows copying of separate files/directories or burning of them to CD/DVD. Besides it provides access to Paragon backups as regular folders to browse through their contents or copy required files.
News and Documentation	
	Launching the Help system.
	Opening the page which contains information about the program. This page will be displayed in the Explorer bar.
	Opening a brief review on the Paragon Scripting Language.

5.6 Disk Map

The Disk Map is displayed in the *Explorer bar* when the *Disk View* tab is selected. It is located either at the top or at the bottom of the window, depending on the state of the *Disk Map Location* option (Main menu: *View > Disk Map Location*). The user can change the current location of the map with this option.

As the name infers, the Disk Map displays the layout of physical and logical disks. Physical disks are represented with rectangle bars that contain small-sized bars. These small-sized bars represent logical disks. Their color depends on the file system of the appropriate partition.

Large-sized bars display the following information about physical disks:

- Manufacturer,
- Model.

Small-sized bars display the following information about logical disks:

- Serial number,
- Drive letter,
- Total size,
- File system.

Furthermore, it is possible to estimate the used disk space by looking at the size of the bar's shaded area.

Disk Map is synchronized with the *Explorer bar*. When the user selects a disk on the Disk Map the Explorer bar displays detailed information of the selected disk.

The user can click a large-sized bar to display information about the appropriate physical disk in the Explorer bar. A click on a small-sized bar will lead to displaying information about the appropriate logical disk.

5.7 Explorer Bar

The Explorer Bar is located in the center of the main window which emphasizes its importance. The bar displays reference information including:

- User Manual,
- Information about the program consisting of the product's name, the version of the program and a list of helpful links,
- Detailed information about disks selected on the Disk Map,
- List of archives,
- Volume Explorer utility.

According to these categories the Explorer bar has several tabs:

- **Disk View**, which offers the user the following options:
  - *Volume Explorer* to browse and export contents of the selected partition/hard disk;
  - *Properties* to view detailed information on the selected partition/hard disk in the bright graphical form.
- **Archives**, which enables to manage the Archive database.
- **Help System**, which contains the User Manual and information about the program.

The user is able to access the desired information by clicking on the appropriate tab.

The Explorer Bar is a fully-functional embedded HTML browser, which enables the user to address, for example, our company's website to look through important technical notes or download the latest updates without having to close the program. The Help System of the program is HTML-oriented. The user can read the user manual and follow external links from to get additional information.

To easily navigate through browsed pages, the program provides the following functionality:

BUTTON	FUNCTIONALITY
	Return to the previously browsed page
	Open the next browsed page
	Stop loading the current page
	Refresh the contents of the current page

5.8 Legend Bar

The Legend Bar explains the color scheme used for disk and partition presentation. The user can hide (or show) the bar with the appropriate Main menu item: *View* > *Disk Map Legend*. When it is activated it can be found at the bottom of the *Explorer bar*.

The program distinguishes between the following types of known file systems:

- FAT16/32,
- NTFS,
- Linux Ext2/3,
- Linux ReiserFS.

5.9 Status Bar

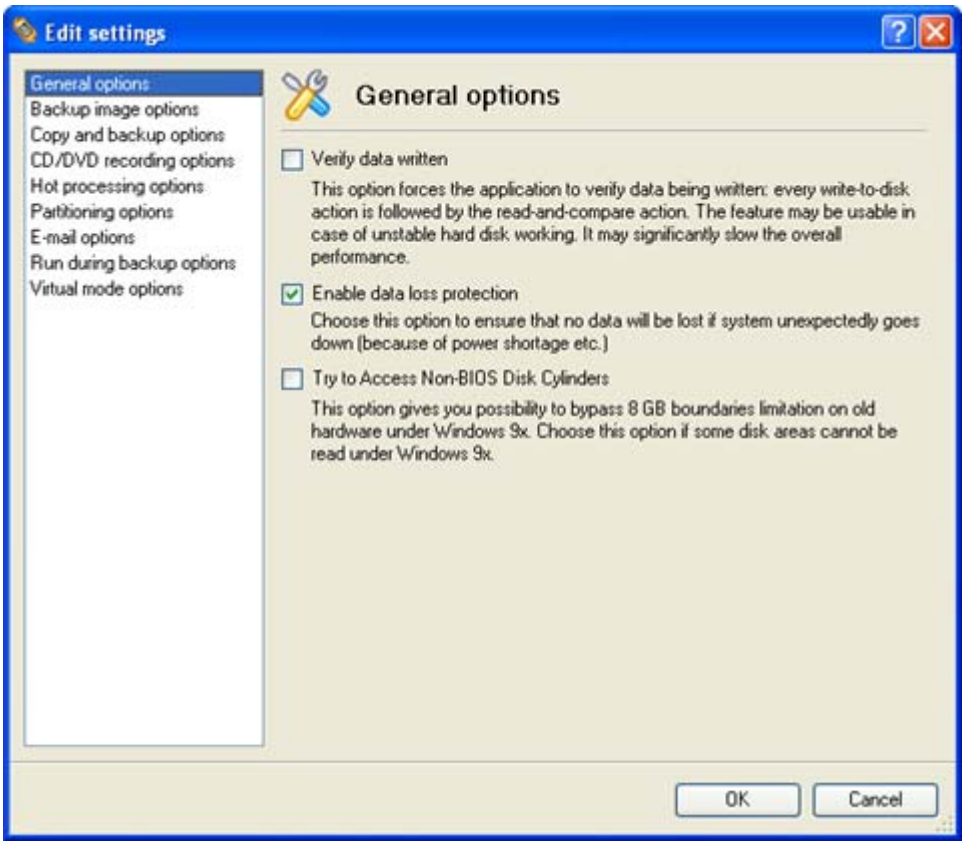
This is the bottom part of the main window. The status bar displays menu hints, for each item the cursor points to.

The user can hide (or show) the bar with the appropriate Main menu item: *View* > *Status bar*.

6 Settings Overview

The Settings dialog is available from the Main menu: *Tools* > *Settings*. All the settings are grouped into several sections of which the functions are described in the following paragraphs. The list of sections is placed on the left side of the dialog. By selecting a section from the list, the user opens a set of options.

6.1 General Options



This section contains a set of general options that will be taken into account during all the operations carried out with the program. The user can switch between the following modes:

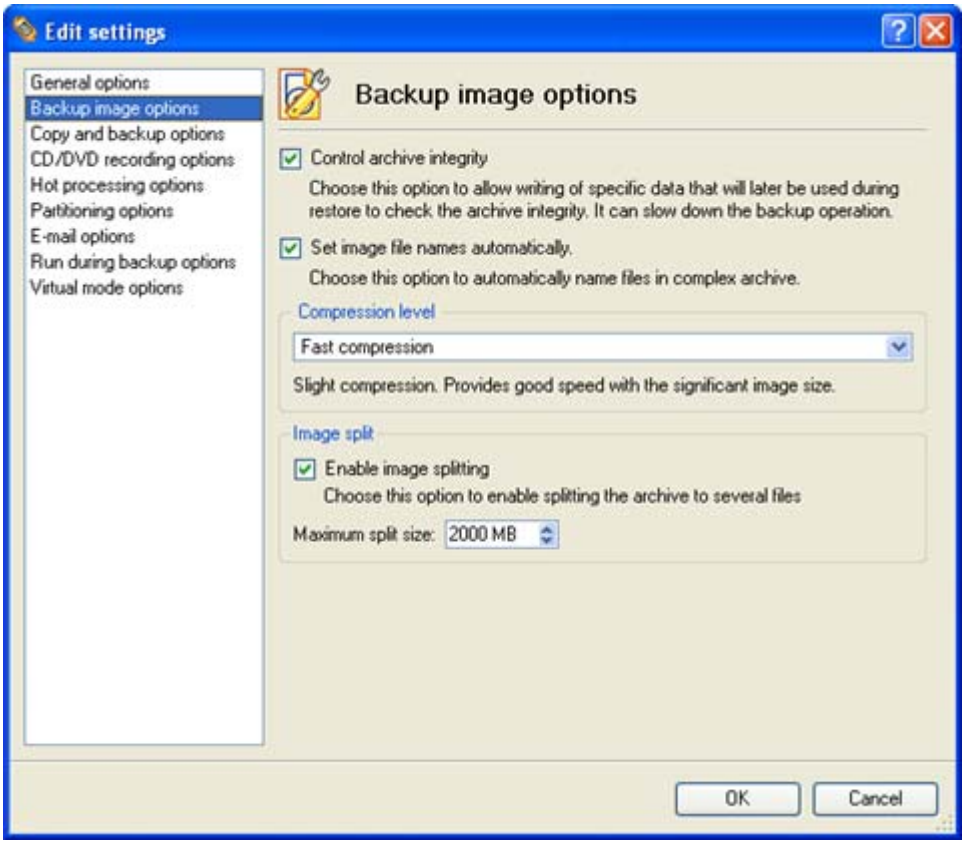
- **Verify data written**. If this option is marked, every write-to-disk action is followed by the read-and-compare action. This feature may be helpful in case of running an unstable hard disk, however it will negatively affect the overall performance.
- **Enable data loss protection**. Activate the option to force the program to work in the *fail-safe mode* (also referred to as *data-loss protection mode*), which ensures more safety for operations by maintaining the special journal of operations' progress. In case of hardware malfunction, power outages or operating system failure, the modified partition may become corrupted and non-operable. However, the program will be able to complete the interrupted operation, thus "reviving" the partition.

  If the system has crashed during the operation in the fail-safe mode, insert the bootable Recovery CD and restart the computer. The program will automatically detect the journal of the interrupted operation and complete the operation.

It is strongly recommended to enable this option.

- **Try to access non-BIOS disk cylinders**. The option works only under Windows 95, 98, ME. When activated, the program performs a special procedure to define the disk capacity and does not use the value that is returned by BIOS.

6.2 Backup Image Options



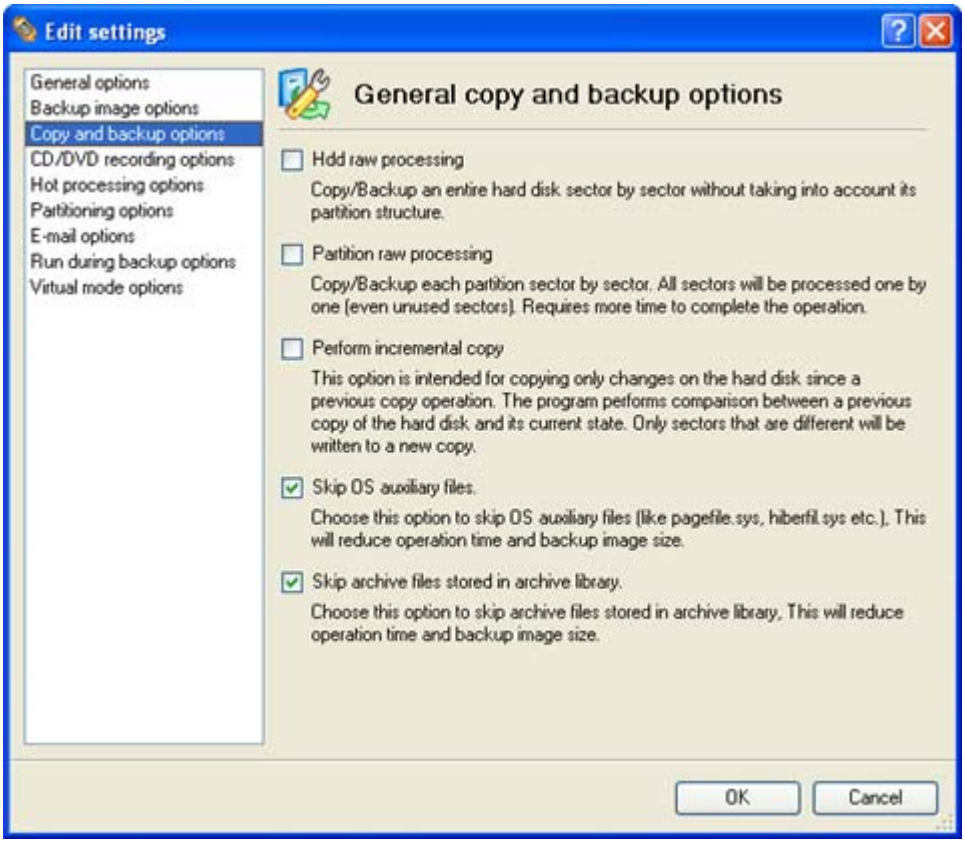
This section contains a set of options that will be taken into account during the creating backup images and restoring disks from them. The user can activate the following modes:

- **Controlling archive integrity,**

Checking archive integrity enables to guarantee that all backup images created with the program are 100 percent flawless. Nevertheless if you decided not to control the archive integrity, the backup operation would take about 3-5% less time.

- **Automatic setting file names in case of complex archives,**
- **Splitting images to several files,**
- **Compressing a backup image.** The user can also define the compression level.

6.3 General Copy and Backup Options

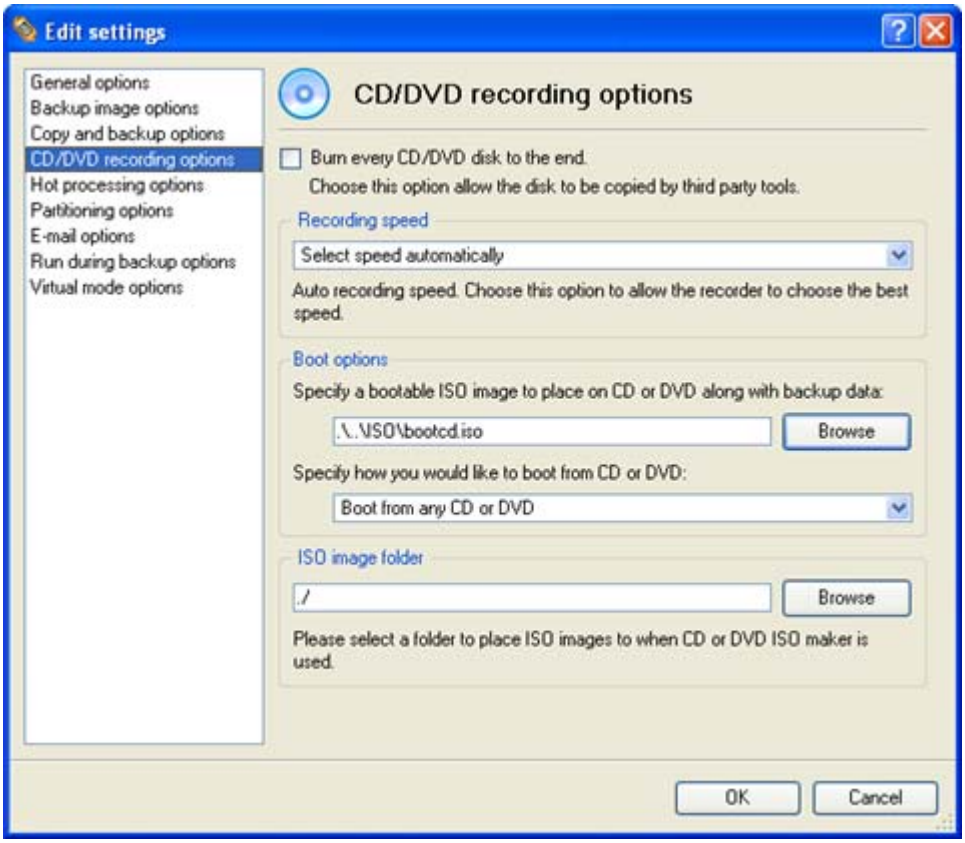


This section contains a set of options that will be taken into account during copy and backup operations. The user can switch between the following modes:

- **HDD raw processing**. Activate the option to copy a hard disk in the sector-by-sector mode to successfully process unknown file systems. However it is not recommended to enable this option when working with supported file systems as it takes more time to accomplish the operation.
- **Partition raw processing**. Activate the option to copy a partition in the sector-by-sector mode to successfully process unknown file systems. However it is not recommended to enable this option when working with supported file systems as it takes more time to accomplish the operation.
- **Perform incremental copy**. Once the complete copy of a hard disk is created, it can be used as a base for the incremental copy. Mark the option to make the program perform the exact bit-wise comparison of the previous data (saved in the parental copy) with the current data (that is actually the hard disk itself). After that only most recent information will be processed. It considerably decreases the amount of data written.
- **Skipping OS auxiliary files during backup operation**.
- **Skipping archives stored in the archive database**. If this option is marked, all backup images stored in the archive database will not be processed during the backup operation. It will considerably decrease the resulted image file and time to carry out the operation.

In order to activate an option the user should mark the appropriate checkbox.

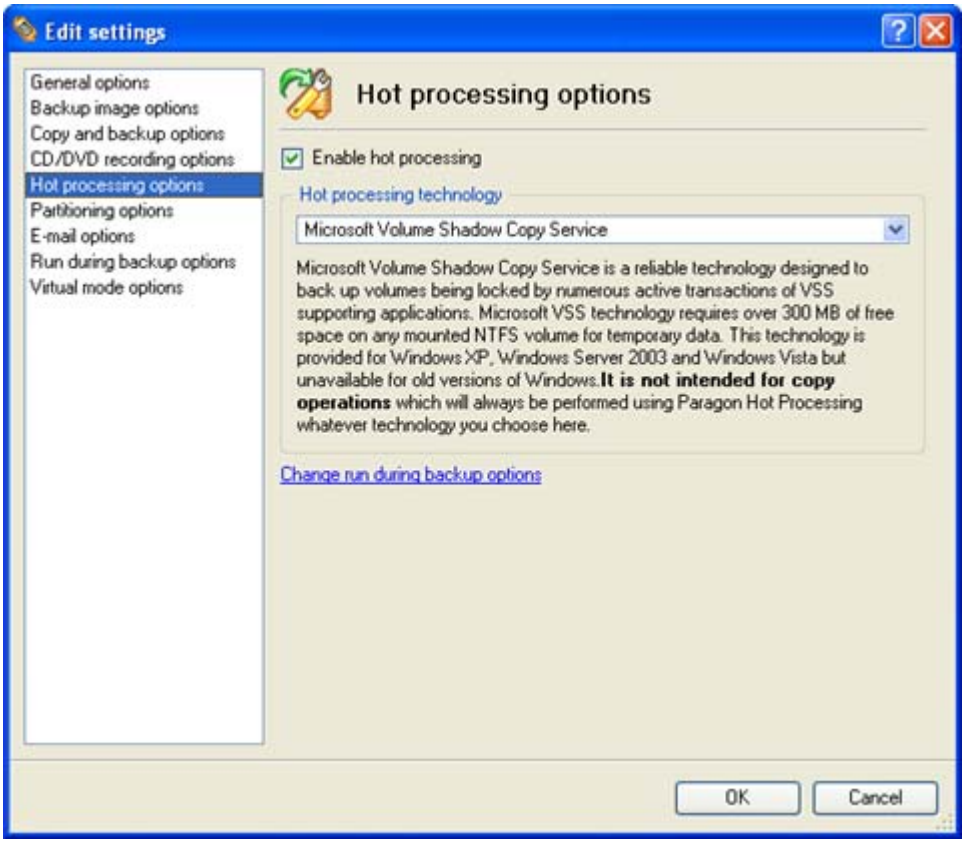
6.4 CD/DVD Recording Options



This section contains a set of options that will be taken into account during the CD/DVD burning operation. The user can define:

- **Recording speed**
- **Folder where the ISO image is to be placed.**

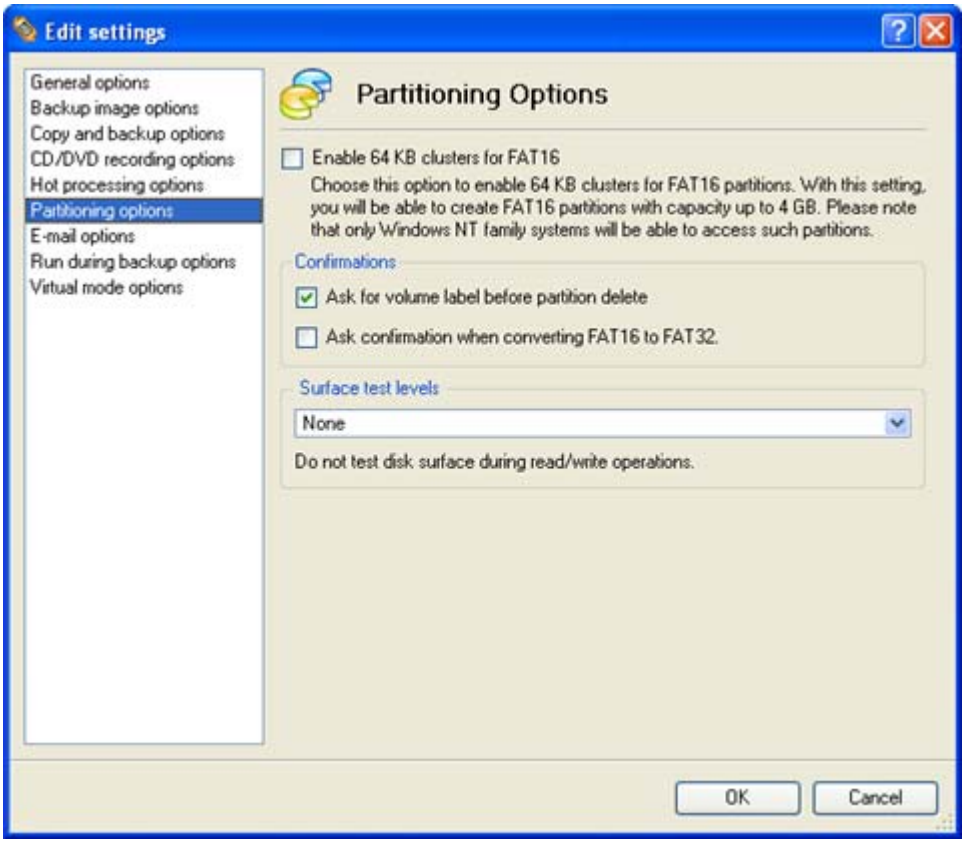
6.5 Hot Processing Options



This section contains a set of options that will be taken into account in case the *Hot Processing* mode is enabled. The Hot Processing mode is a part of the backup/copy operation that allows the program to process a disk without restarting the computer. The program forces the system to restart to obtain exclusive access to the processing data. The Hot Processing mode may be used to process locked partitions or any backup/copy operation. The user defines the method in this section.

The user can also set a *Temporary drive*. This option defines a partition (by default – C:) for the Hot Processing temporary file. The temporary file will be deleted when the hot backup/copy is performed which may require a large amount of disk space. Should there not be enough space on drive C:, then another drive needs to be selected.

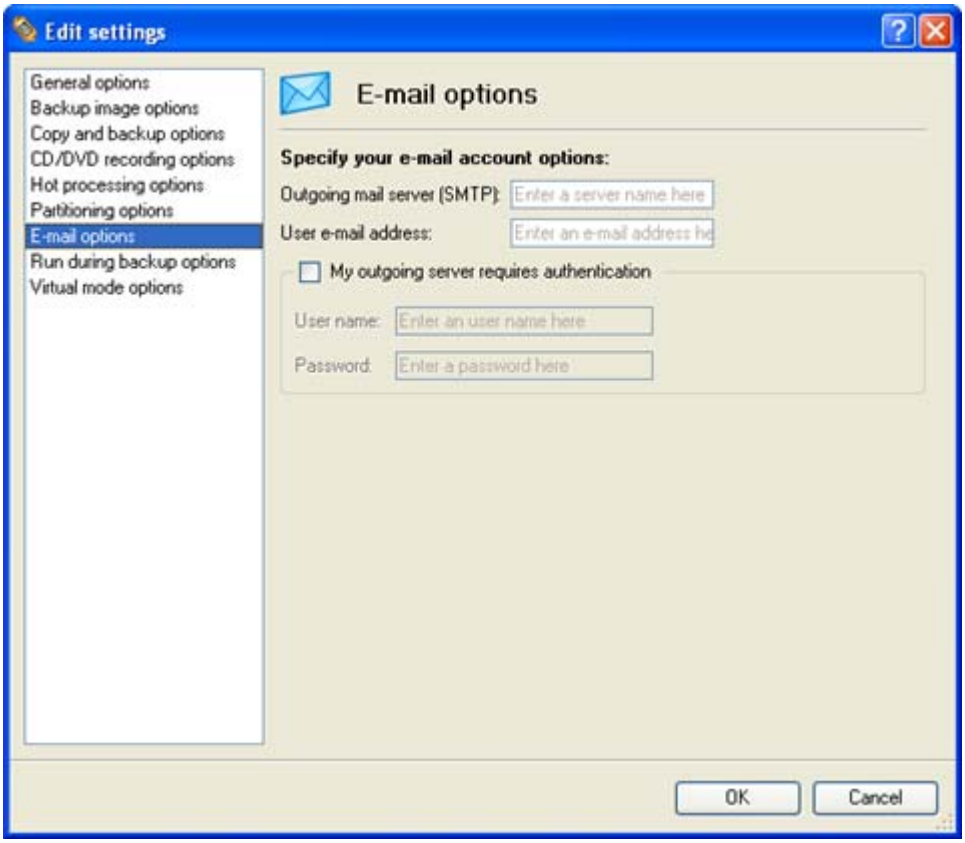
6.6 Partitioning Options



This section contains a set of options that will be taken into account during partitioning operations. The user can activate the following modes:

- **64 KB cluster size for FAT16 partitions.** Only Windows NT 4.0/2000/XP/2003 support 64 KB clusters.
- **Request confirmation before partition deletion.**
- **Request confirmation when converting FAT16 to FAT32** during such partitioning operations as copy disk/partition, restore disk/partition.
- **Surface test level.** The option affects the following operations: format partition, copy partition, restore partition, retest the surface. While performing the surface test, the program detects corrupted sectors and marks them as unusable.

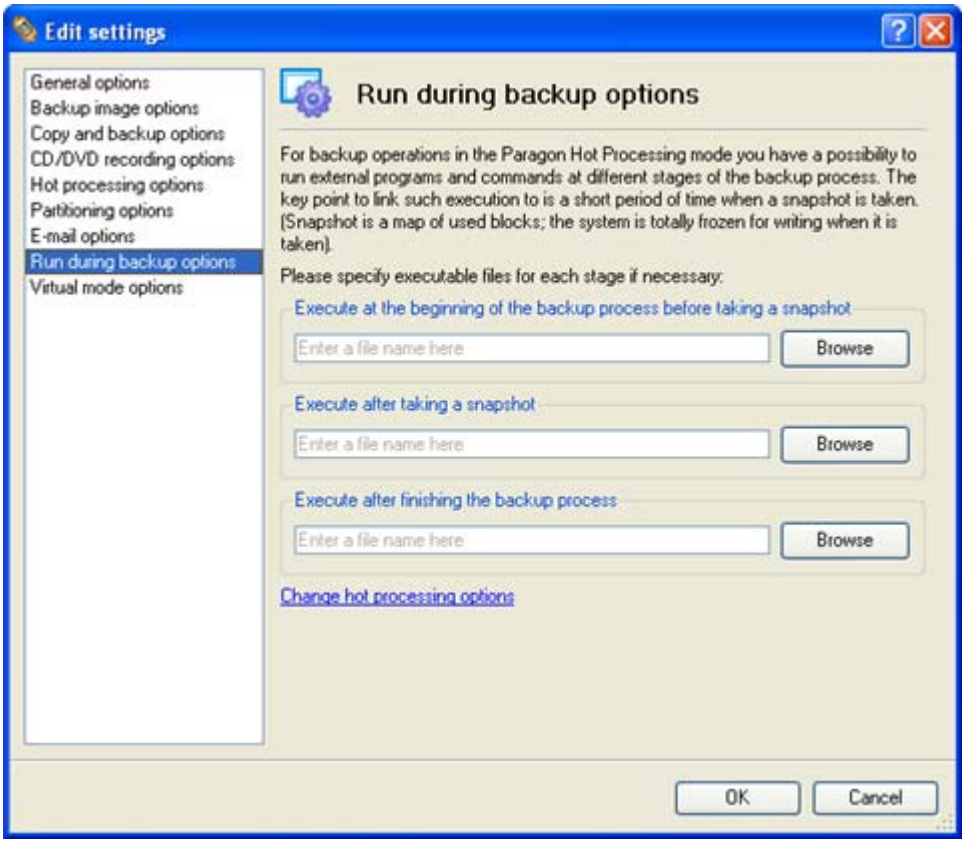
6.7 E-Mail Options



This section contains a set of options that will be taken into account during the *Send log files* and *Send e-mail notification* operations. The user can define:

- **Outgoing mail server (SMTP)**. To send messages by using the built-in mail client, it is necessary to have access to a computer running an SMTP (Simple Mail Transfer Protocol) server. All outgoing messages are first sent to the SMTP server, which in its turn delivers them to the required recipients. The address may be represented as a traditional Internet host name (e.g.: mail.com) or as an IP numeric address (e.g. xxx.xxx.xxx.xx).
- **User e-mail address**. Specify an e-mail address that has been assigned by the Internet Service Provider or organization's e-mail administrator.
- **My outgoing server requires authentication**. Activate the option to allow the program to make authentication on the server before sending messages.
  - **User name**. Enter the name that will be used to log in to the e-mail account.
  - **Password**. Enter the password that will be used to access the mail server.

6.8 Run during Backup Options



This section allows the user to specify external applications to execute at various phases of backup. It can be particularly useful when imaging systems with high availability requirements (MS SQL, MS Exchange, etc.), since it enables to create a consistent snapshot even as the data is currently modified. The point is to provide a coherent state of all open files and databases involved in a backup, taking into account that applications may still keep writing to disks.

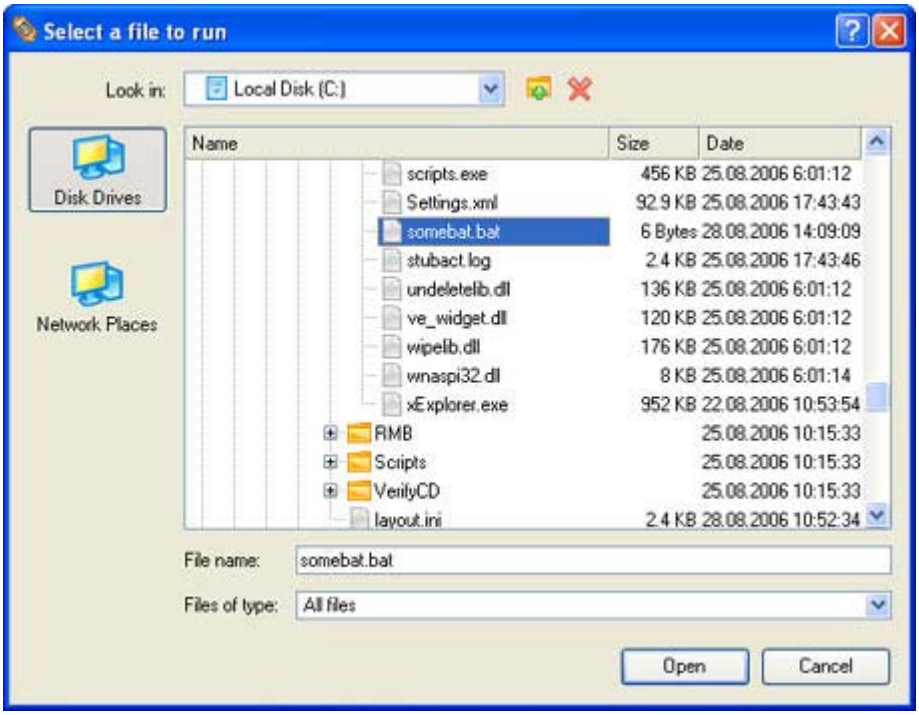
Actually the backup process consists of two phases: the preparation phase (snapshot) and the data-copying phase. There are three points of backup when external commands/programs can be launched:

- **Execute at the beginning of the backup process before taking a snapshot.** This option enables to prepare running applications for the backup process. Specific commands/programs to use depend on the particular application. It may be deletion of unnecessary files, services suspension, transactions or cashes flush, etc.

- **Execute after taking a snapshot.** Here the user can specify commands/programs to execute just after taking a snapshot. They also depend on the particular application and may include resuming of previously suspended services.

- **Execute after finishing the backup process**. Commands/programs defined in this option will execute just after the backup process is completed and may include those that move the backup archive to some particular location.

By clicking the *Browse* button the user can get into the browser-like window to choose a file of the required commands/programs.

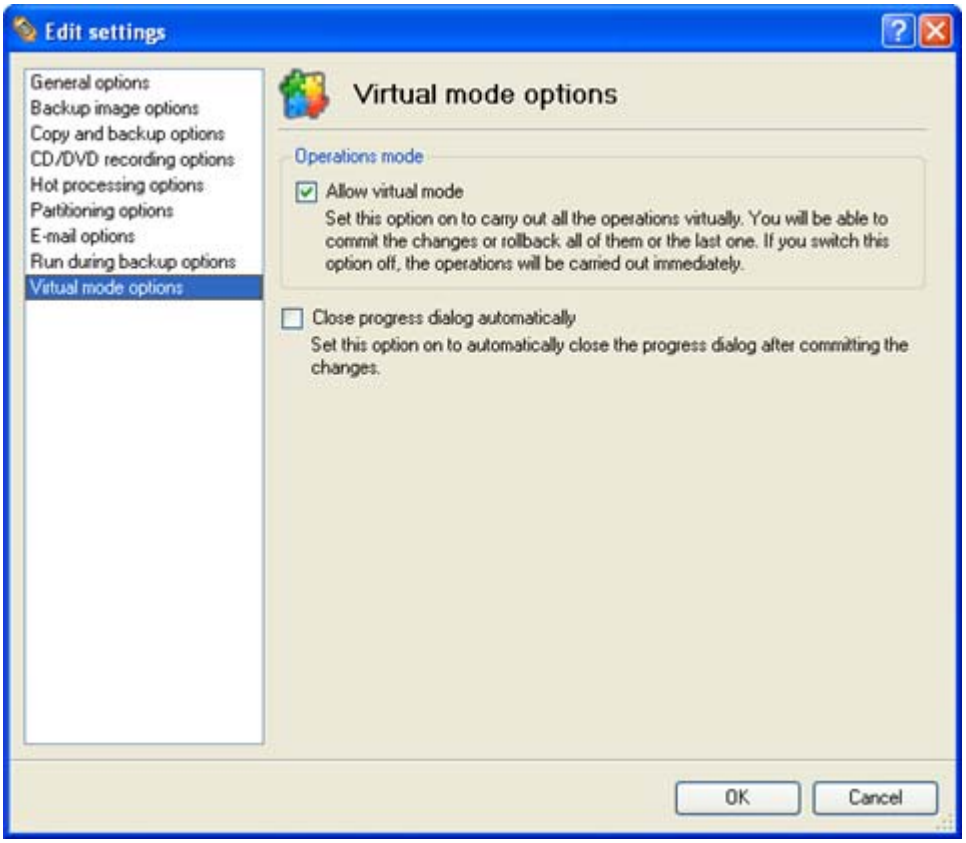


The program provides the ability to work with three types of executable files (**.exe**, **.bat**, **.cmd**). It is up to the user to write batch files to safely prepare applications for backup. There are some certain general requirements for that:

- All programs and commands must execute sequentially and finish before the **.bat** file completes its work.
- It is recommended to use external commands/programs in the following format - ***Start /wait program.exe***

	**This function is only available when the Hot Processing mode is enabled.** **The current version of the program allows the user to set parameters for executable files directly from the line. However if the path to the file contains word gaps it is necessary to enclose it in quotes in order to make the program distinguish between path and used parameters.** **The *wait* option enables to start an application and wait until it completes its work. This will guarantee that all included commands/programs complete their execution before the batch file does.**

6.9 Virtual Mode Options



- **Allow virtual mode**. In this section the user can choose whether to allow operations to carry out immediately or to place them on the List of Pending Operations for later execution. Just mark the option to enable virtual operations.
- **Close progress dialog automatically**. Mark the option to automatically close the progress dialog when the required operation(s) is completed.

Virtual mode can be particularly beneficial for such operations as *Generate script*…

7 How to Protect Data

This chapter lists various scenarios of data protection which may be accomplished by the program. This has already been reviewed in the Basic concepts chapter. Here the user will find more useful recommendations and descriptions of operations.

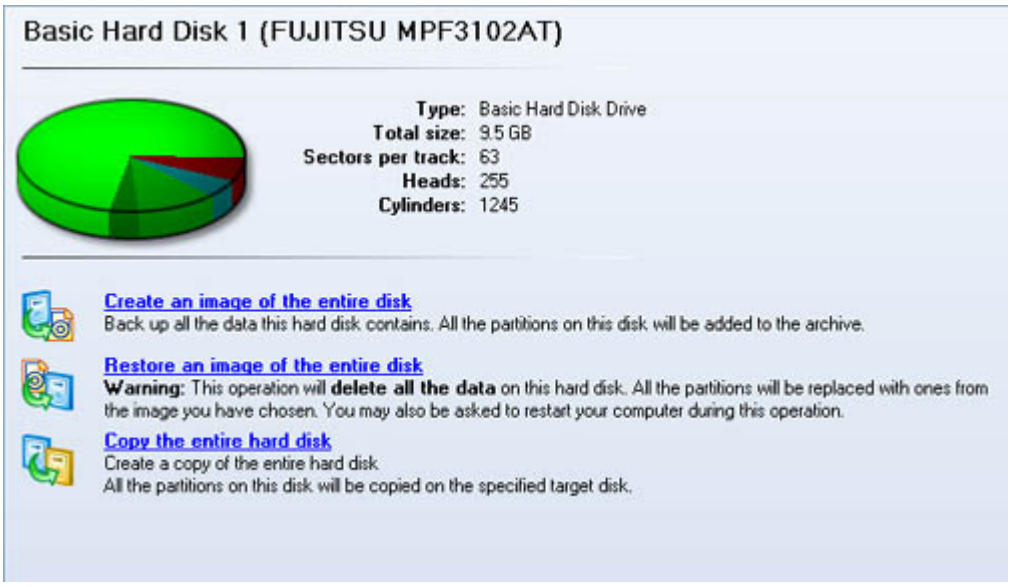
7.1 Getting Information about Disks and their Images

To begin with, let us examine the current situation of the available disk space. We look at the properties of our disks or peculiarities of existing backup images. The program provides some helpful tools for this purpose.

7.1.1 Viewing Disk Properties

The user is able to view in-depth information on the properties of hard disks. The main tool to extract this information is the Disk Map. It represents the actual state of the computer's hard disks. The Disk Map chapter is a detailed description on this topic.

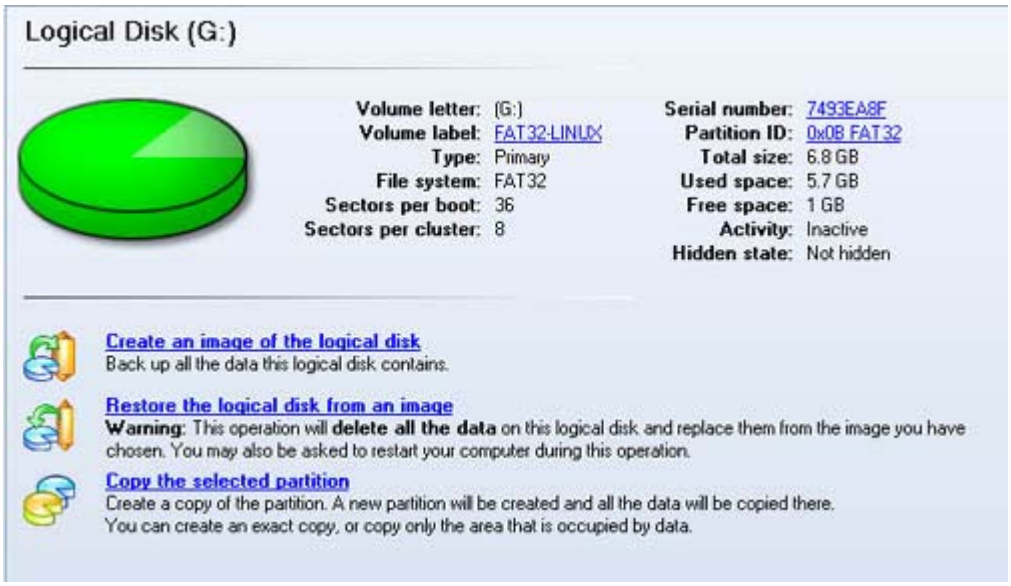
Generally the hard disks are represented on the map by rectangular bars, which also contain small-sized bars. The small-sized bars represent logical disks (partitions). When the user selects a large-sized bar, the Explorer bar displays information about the disk in a bright, graphical form.



The model and serial number of the disk serve as the title of the browsed page. The disk layout is shown in form of a circular graph, where the color of a sector corresponds to a file system of an appropriate partition. On the right the user may see a table, which contains the following information:

- Type of hard disk (basic or dynamic),
- Total size (in GB),
- Information on geometry of the disk (amount of sectors per track, heads and cylinders).

Below there is a list of wizards available for the user. If the user clicks a corresponding record the appropriate wizard will be started. All default values for the operation parameters will correspond to the disk's settings. The list of wizards contains a detailed description of tasks that can be performed by the wizard. This nullifies the possibility of selecting the wrong wizard.



When the user selects a small-sized bar (i.e. corresponding to a logical disk), the Explorer bar will display information on it as well. The page title will contain a drive letter, which is assigned to the disk. The disk layout graph will be colored in accordance with the volume ratio of the used space to the free space (the light colored sector). The table on the right will contain the following information:

- Volume label (if available),
- Type of the logical disk,
- File system (represented by the color of the graph and the selected bar),
- Total size, used space and free space (in GB or MB).

Below there is a list of wizards, which may be called for this disk. All default values of parameters will correspond to the disk settings.

7.1.2 Viewing Image Properties

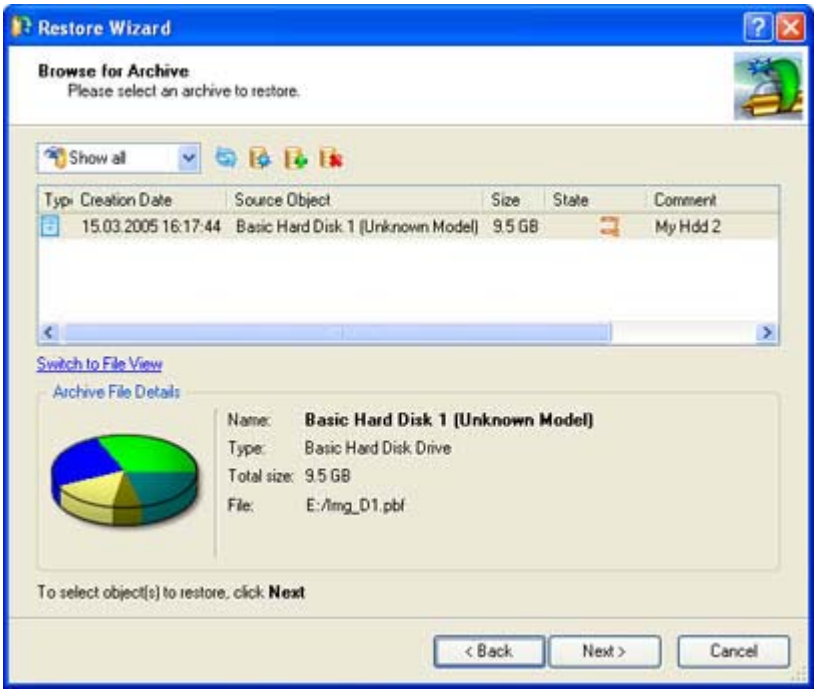
Before restoring a disk from an image it is necessary to be sure that it is the image you need. General information on backup archives can be obtained either with the help of the *Restore wizard* or the *Archive database*:

7.1.2.1 Using the Restore wizard

There are several ways to launch the Restore Wizard:

- In the Main menu: select Wizards > Restore Disk or Partition…
- In Common Tasks bar: click the Restore hard disks or partitions item of the Wizards menu
- Select a logical disk and then click the Restore the disk from an image link on the Explorer bar page.

At first, the wizard displays the Welcome page – simply click the *Next* button at the foot of the dialog window.



The next page refers to *Browse for Archive*. By clicking the *Switch to Archive List View* link, the user can see the list of images contained in the Archive database (if any). To get a clear-cut picture on properties of the required image, just click on it and the section below will (i.e. *Archive File Details*) display a short description, including:

- information on a type of the archive contents (whether it contains the entire disk or just a partition),
- whether the archive is compressed or not,
- whether the archive is password protected or not,
- the date, when the archive was created.

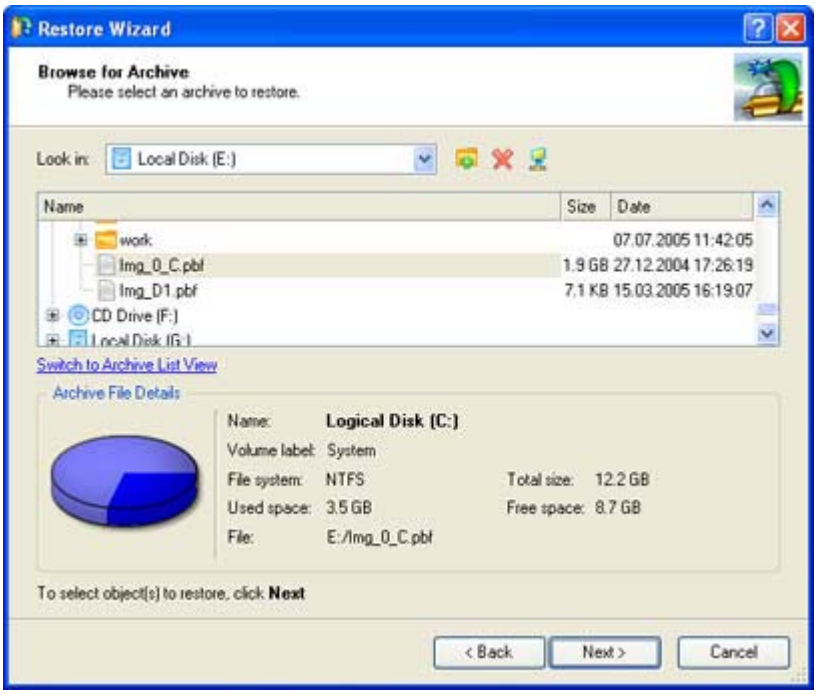
In addition, there are some special graphical flags to indicate crucial properties:

FLAG	FUNCTIONALITY
	System archive
	Encrypted archive
	Compressed archive
	Differential archive

To easily manage images in the Archive database, the program provides the following functionality:

BUTTON	FUNCTIONALITY
	Refresh the contents of the database
	Show only existing archives
	Add the selected archive to the database
	Delete the selected archive from the database

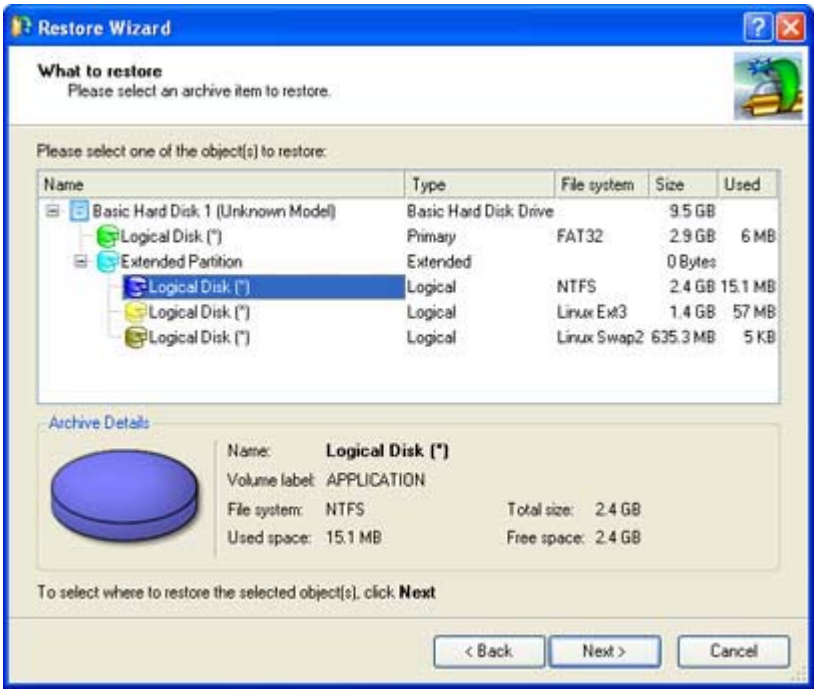
Besides, the user may differentiate images of partitions or hard disks by setting up the filter in the left top corner of the page.



By clicking the *Switch to File View* link, the user can find the required image in the browser-like window. The section below (i.e. *Archive File Details*) displays a short description of the selected image, including:

- information on a type of the archive contents (whether it contains the entire disk or just a partition),
- whether the archive is compressed or not,
- whether the archive is password protected or not,
- the date, when the archive was created.

Moreover, on this page the user has the possibility to create new folders, delete existing files/folders or map network drives by clicking the appropriate buttons.

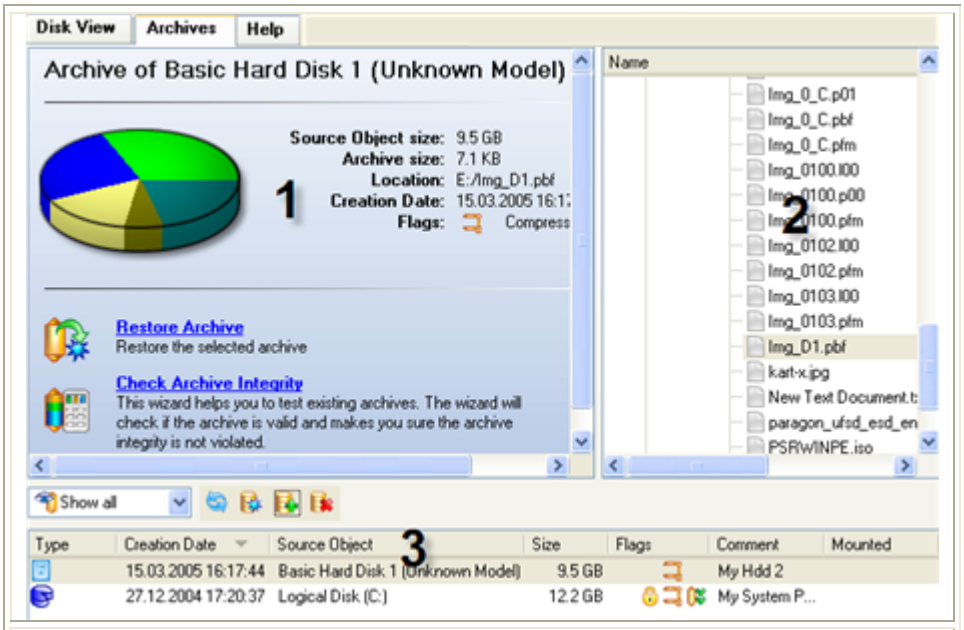


The next page (i.e. *What to restore*) displays detailed information about the contents of the archive. It includes a full description of properties about the archived disks or partitions.

If you want to restore the contents of the image click the *Next* button. In order to cancel, click the *Cancel* button.

7.1.2.2 Using the Archive database

To open the Archive database the user should click the appropriate tab in the Explorer Bar. The database window can be conditionally subdivided into several sections that differ in their purpose and functionality:

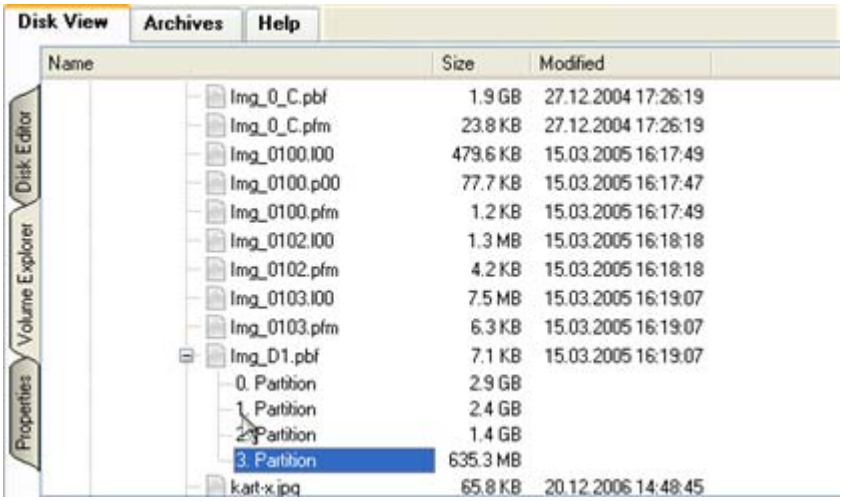


1. Explorer bar that displays properties of the selected image
2. Volume Explorer that enables to access the selected image as a regular folder to explorer its contents or to retrieve certain files
3. Archive list that displays the list of images contained in the Archive database (if any). Besides the program provides all the necessary functionality to manage backup images in the database (add, delete, mount, refresh, etc.)

All panels offer a synchronized layout and are separated by vertical and horizontal expandable sliders, allowing the user to customize the screen layout.

7.1.3 Viewing Image Contents

The user may browse the contents of the archives with a special utility called *Volume Explorer*. To launch the Volume Explorer the user should click the **Disk View** tab in the Explorer Bar and then choose **Volume Explorer**.



In order to view contents of an archive, open it by double click of the left mouse button.

Volume Explorer also provides the possibility to extract separate files and folders from archives without restoring the whole archive.

Volume Explorer can work with any kinds of archives created by the program. For example, it can browse the Backup Capsule which is hidden from any standard Windows program.

7.2 Backup a Disk

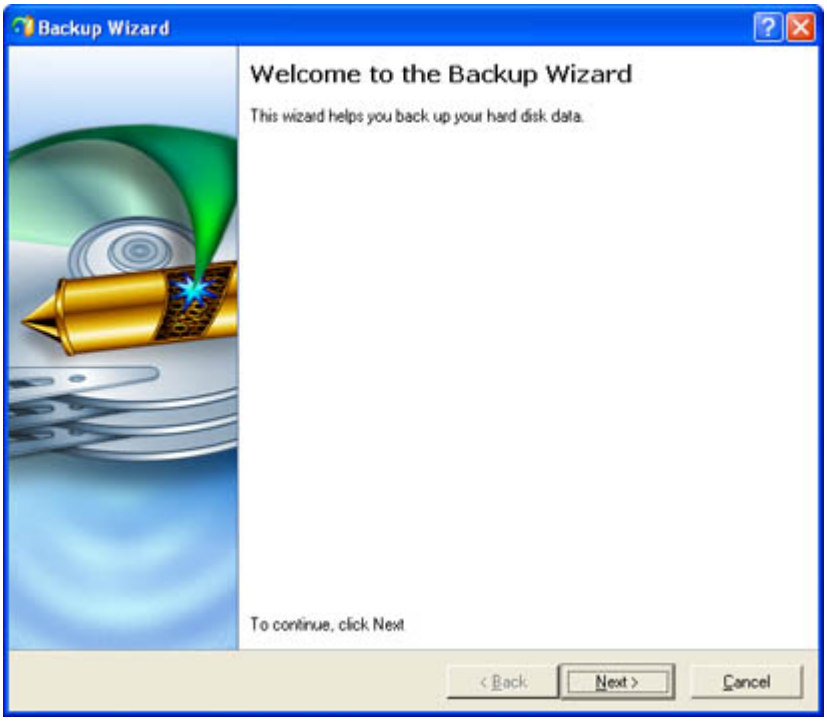
In the Basic concepts chapter we mentioned that the most prevalent way to protect valuable data is to create backup copies (*backup images* in terms of the program) of it. To meet the requirements of any user this operation can be accomplished either with the *Backup Wizard* or through the corresponding dialog.

7.2.1 Starting Wizard

There are several ways to start the *Backup Wizard*:

- In the Main menu: select Wizards > Back Up Disk or Partition…
- On the Common Tasks bar: click the Backup hard disks or selected partitions item of the Wizards menu.
- In the Toolbar: click the Back Up button.
- Select a disk on the Disk map and click the Create the image of the logical disk item on the page that appears in the Explorer bar (when the user selects an entire hard disk on the Disk map the item is named Create the image of the entire disk).

After following one of the above mentioned actions, the Welcome page of the wizard is displayed.



7.2.2 Starting Dialog

In order to start the operation the user should take the following steps:

1. Select a hard disk/partition on the Disk Map or on the List of Partitions.

2. Call the *Back Up Hard Disk/Partition* dialog to define appropriate settings:

- In the Main menu: select Hard Disk/Partition > Back Up Hard Disk or Partition…
- Call the popup menu for the selected hard disk/partition (right click of the mouse button) on the Disk Map, then select the menu item: *Back Up Hard Disk* or *Partition*…

7.2.3 Settings

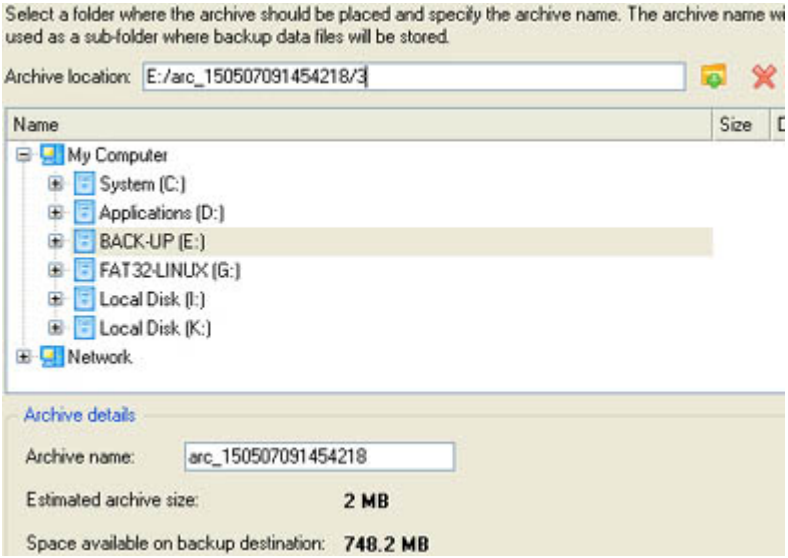
Despite different work algorithms, both the *Backup Wizard* and the *Back Up Hard Disk/Partition* dialog provide the same level of functionality, thus let us just take as an example the wizard version of the operation. Here the user sets the parameters of the backup operation defining:

- **The object to back up**. The user can backup either an entire disk or separate partitions of the disk (primary, extended or logical). In case of backing up an entire disk, the user has the possibility to include into the image such disk elements as the Master Boot Record (MBR) and the first track of the hard disk. This can be very helpful for serious disk recovery procedures.

- **Backup destination**. The Backup Wizard allows saving backup archives to local or network drives, to physical partitions (without drive letters assigned), or burning them to CD/DVDs. It is also possible to place the archives in the Backup Capsule. The user needs to select a destination, taking the estimated archive size and available space on the backup destination into account.

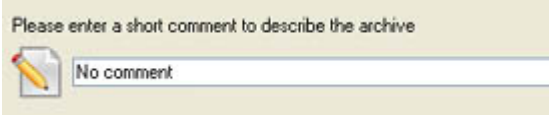
To use the Backup Capsule as a backup destination, first create it with the Manage Backup Capsule Wizard.

- **Name and location of the resulted image**. Provide a file name for the new image and its exact location. The program automatically offers an easy to understand name containing the date and the time of the archive creation, which can anyway be modified.



The program automatically calculates size of the future archive and informs the user about space available on the selected destination.

- **Archive Comment**. The user can add some additional description to the archive that will later help to distinguish it from the others.



In addition, there is the possibility to make further detailed settings (although the default values will do in most cases). To activate the advance mode, the user needs to mark the appropriate option on the second page of the wizard (i.e. the **What to back up** page). The checkbox is to be found at the foot of the page

. When it is marked, the next page allows the user to define:

- Whether the **archive integrity** will be controlled.

Checking archive integrity enables to guarantee that all backup images created with the program are 100 percent flawless. Nevertheless if you decided not to control the archive integrity, the backup operation would take about 3-5% less time.

- Whether **image file names** will be set automatically in complex archives.
- **Compression level** for the backup image (including the *No compression* variant).
- Whether the archive will be **split** (if this is the case the user can set the maximum size for the archive files).

Splitting images enables to tackle issues caused by a file size limitation of some file systems.

- Whether the archive will be **protected by password**.
- Whether the selected disk (or the selected partition) will be copied in the **sector-to-sector mode** (including unused sectors as well).
- Whether the **OS auxiliary files** (pagefile.sys, hyberfil.sys) will be included in the backup image.
- **Recording speed** when the user wants to burn the backup image onto CD/DVDs.
- **ISO image folder** where the archive that is to be recorded on a disc, is placed.
- Whether the operation will be performed **without rebooting the system**. The program needs to reboot the system in order to have exclusive access to processing data. In a Windows environment this is difficult to achieve because even when all the other applications are closed, the system service programs are still running. However, there is a way to avoid rebooting. The mode of processing the backup operation without rebooting is named **Hot Processing**. The user is also able to define specific parameters for the Hot Processing mode.

7.2.4 Results

Depending on the user's choice the Backup wizard:

- starts the backup operation
- or records the planned actions in form of a script.

After the backup operation is completed the user receives an image of the selected disk (or the selected partition). This image is placed into the specified destination (a local or network disk, the Backup Capsule, or a CD/DVD disc), its features defined by the wizard.

The program allows the user to back up all five types of dynamic volumes (simple, spanned, striped, mirrored, RAID-5).

7.3 Differential Backup

To update the image of the selected partition with the Differential Backup Wizard, simply do the following:

1. On the Common Tasks bar click the **Differential Backup** item of the Wizards menu.

2. On the Differential Backup Wizard's Welcome page, click the *Next* button.

3. On the **Browse for Archive** page, select the required base archive in the browser-like window. The *Archive File Details* section displays a short description of the selected image. Click the *Next* button.

4. The **Archive Content** page displays detailed information about the contents of the archive. It includes a full description of properties about the partition. In addition, there is the possibility to modify backup settings. To activate the advance mode, the user needs to mark the appropriate option at the foot of the page. Click the *Next* button.

5. On the **Backup Destination** page, select the necessary operation:

- Save data to local/network drives
- Save data to physical partitions
- Burn the data to CD/DVD

Click the *Next* button.
6. *Add comments* to the backup describing its contents.
7. Select how to perform the operation:

- immediately (the *Back up now* option)
- or *generate a script* in accordance with the entered settings

Click the *Next* button.

After the operation is completed the user receives differential backup of the selected partition. It is placed into the specified destination (a local or network disk, or a CD/DVD disc), its features defined by the wizard.

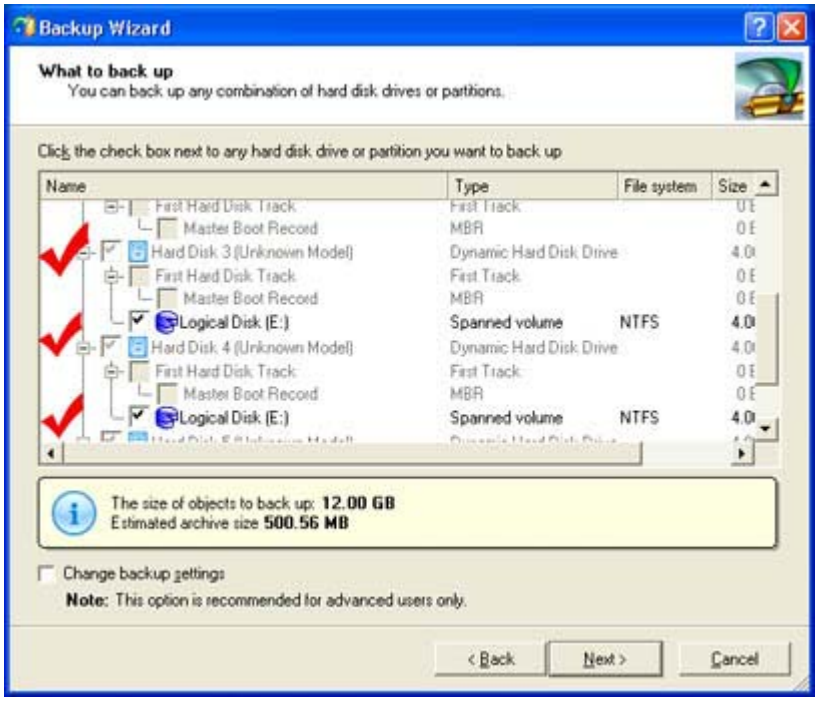
7.4 Backup a Dynamic Disk

To back up a dynamic disk with the Backup Wizard, simply do the following:

1. Click the **Back Up** button in the Tool bar (any of the ways described earlier can also be used here to call the Backup Wizard).

2. On the Backup Wizard's Welcome page, click the *Next* button.

3. On the **What to back up** page, mark the appropriate option opposite a dynamic disk. There is no need to mark all the constituents of the dynamic volume, the program will do it automatically:



Click the *Next* button.

4. On the **Backup Destination** page, select the necessary operation:

- Save data to local/network drives
- Save data to physical partitions
- Burn the data to CD/DVD

Click the *Next* button.

5. *Add comments* to the backup describing its contents.

6. Select how to perform the operation:

- immediately (the *Back up now* option)
- or *generate a script* in accordance with the entered settings

Click the *Next* button.

The program allows the user to back up all five types of dynamic volumes (simple, spanned, striped, mirrored, RAID-5).

7.5 Synthetic Backup

To synthesize a new property modified archive based on the existed backup images of the selected disk/partition with the Synthetic Backup Wizard, simply do the following:

1. On the Common Tasks bar click the **Synthetic Backup** item of the Wizards menu.

2. On the Synthetic Backup Wizard's Welcome page, click the *Next* button.

3. On the **Browse for Archive** page, select the required archive in the browser-like window.

The *Archive File Details* section displays a short description of the selected image. Click the *Next* button.

4. The **Archive Contents** page displays detailed information about the contents of the archive. It includes a full description of properties about the archived disks or partitions. Click the *Next* button.

5. On the **Synthesis Settings** page the user can define:

- Whether the **archive integrity** will be controlled.

Checking archive integrity enables to guarantee that all backup images created with the program are 100 percent flawless. Nevertheless if you decided not to control the archive integrity, the backup operation would take about 3-5% less time.

- **Compression level** for the backup image (including the *No compression* variant)
- Whether the archive will be **split** (if this is the case the user can set the maximum size for the archive files).
- Whether the archive will be **protected by password**.
- **Recording speed** when the user wants to burn the backup image onto CD/DVDs.

Click the *Next* button.

5. On the **Synthetic Archive Destination** page, select the necessary operation:

- Save data to local/network drives
- Save data to physical partitions
- Burn the data to CD/DVD

Click the *Next* button.

6. *Add comments* to the backup describing its contents.

Click the *Next* button.

After the operation is completed the user receives a new synthesized backup of the selected disk/partition. It is placed into the specified destination (a local or network disk, or a CD/DVD disc), its features defined by the wizard.

This function is currently unavailable for modification of entire hard disk backups.

7.6 Storing Backup Images onto External Media

To store backup images on CD/DVD with the Backup Wizard, simply do the following:

1. Click the **Back Up** button in the Tool bar (any of the ways described earlier can also be used here to call the Backup Wizard).

2. On the Backup Wizard's Welcome page, click the *Next* button.

3. On the **What to back up** page, mark the appropriate option opposite a hard disk’s name or

a partition's name depending on the chosen task. Click the *Next* button.

4. On the **Backup Destination** page, select the *Burn the data on CD / DVD* option. Click the *Next* button.

5. Select **a recordable device** on the list and edit the archive name, if necessary. Click the *Next* button.

6. *Add comments* to the backup describing its contents.

7. Select **how to perform the operation**:

- immediately (the *Back up now* option)
- or *generate a script* in accordance with the entered settings

Click the *Next* button.

7.7 Storing Backup Images on a Network Drive

To save a backup archive on a network drive with the Backup Wizard, simply do the following:

1. Click the *Back Up* button in the Toolbar (any of the ways described earlier can also be used here to call the Backup Wizard).

2. On the Backup Wizard's Welcome page, click the *Next* button.

3. On the **What to back up** page, mark the appropriate option opposite a hard disk's name or a partition's name depending on the chosen task. Click the *Next* button.

4. On the **Backup Destination** page, select the *Save data to local/network drives* option. Click the *Next* button.

5. Select **a network disk** (it must be mounted and be available in the system by a drive letter). Please take into account values of the parameters *Estimated archive size* and *Space available on backup destination* - if the archive size exceeds the available space, another network drive needs to be selected.

6. **Edit the archive name** if necessary and click the *Next* button.

7. *Add comments* to your backup describing its contents.

8. Select **how to perform the operation**:

- immediately (the *Back up now* option)
- or *generate a script* in accordance with the entered settings

Click the *Next* button.

7.8 Using the Backup Capsule

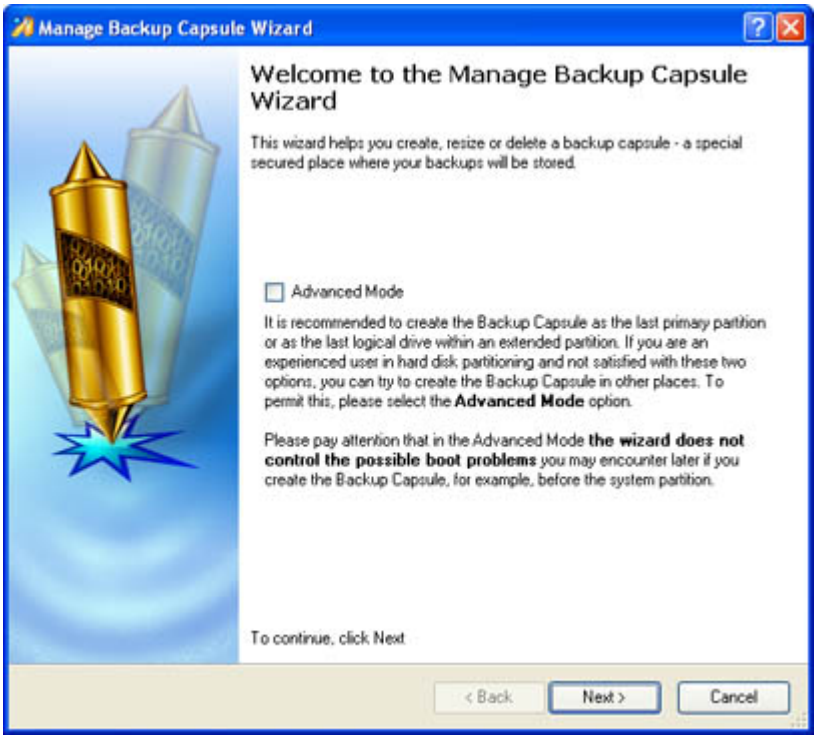
When the user starts the program, it checks whether the *Backup Capsule* exists in the system or not. If it has not been found, the user is offered to create a Capsule automatically. All operations related to the Backup Capsule, including its creating and managing, are performed with the *Manage Backup Capsule Wizard*.

7.8.1 Starting

There are several ways to start the *Manage Backup Capsule Wizard*:

- In the Main menu: select Wizards > Manage Backup Capsule
- On the Common Tasks bar: click the Manage Backup Capsule item of the Wizards menu.
- Select a bar corresponding to the hard disk on the Disk map and click the Create a Backup Capsule item on the page that appeared in the Explorer bar.

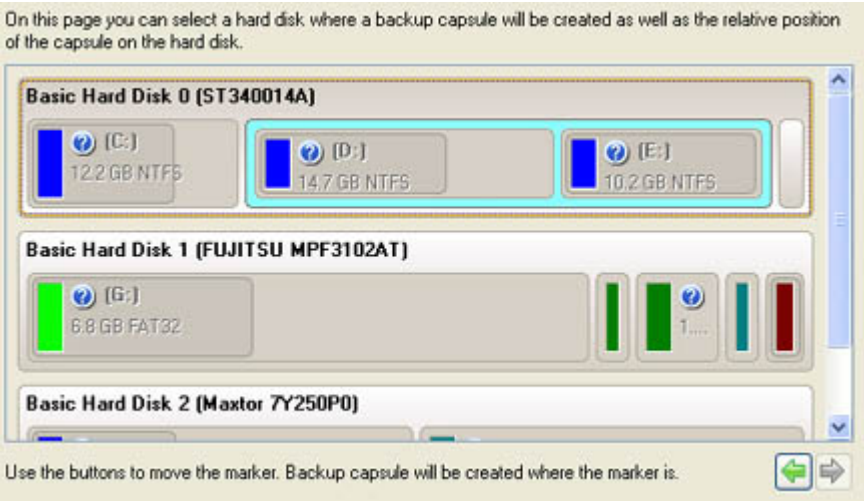
After any of the mentioned actions the Welcome page of the wizard will be displayed.



7.8.2 Settings

The Manage Backup Capsule Wizard allows the user to configure the settings and then start the operation in accordance with the entered parameters. In our case we set the following parameters of the backup capsule:

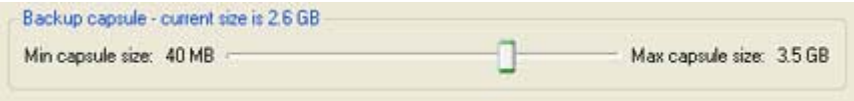
- **The place where the backup capsule will be created**. The user should select a hard disk (if the computer has several hard disks) and then select position for the future backup capsule on the disk.



The backup capsule can be created as a primary partition or as a logical drive within an extended partition. It can be inserted into any place on the hard disk: at the end (preferable), at the beginning or somewhere in the middle between other partitions.

By default, the program allows the user to create the backup capsule only as the last primary or as the last logical drive within the extended partition. However, by activating the advance mode on the first page of the wizard you can remove this restriction that in its turn might result in some boot problems.

- **The size of the backup capsule**. It will be created at the expense of free space of the selected disk.

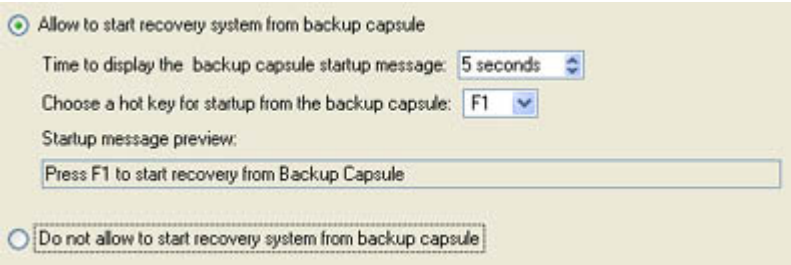


There is no restriction on the size of the backup capsule, merely depending on the available space of the hard disk and the capacity needed for the backup.

If the wizard cannot find enough free space in one block, it will redistribute free space, joining all free space blocks together into one united block and moving partitions when necessary. If the total amount of free space is still not enough, it is possible to split a fragment of space from one of the existing partitions, thus resizing it.

If the partition is locked and cannot be resized, the wizard makes the system reboot to create the backup capsule and automatically boots the system again. (The rebooting mechanism is different for different versions of Windows)

- **Possibility to boot the system from the backup capsule**.



The program enables the user to start up the computer from the image contained in the backup capsule. This may be of great use in case of the operating system corruption. There are the following additional parameters for this operation:

- *Time period* in seconds the startup message will be displayed;
- *A hot key* used to choose the backup capsule as the bootable device.

Besides the user can preview the startup message in the box below the settings.

It is recommended to create the bootable backup capsule, as it will help in case of the operating system corruption.

This operation will result in overwriting of the current MBR, thus in case of having a third side boot manager, it will be removed. To avoid that the user can save the current MBR with the help of the Edit/View Sectors tool.

The backup capsule can only be bootable if it is located on the bootable device (assigned in the BIOS).

7.8.3 Results

Depending on the user's choice the Manage Backup Capsule Wizard:

- Starts the operation
- Allows the user to return and correct the parameters mentioned above.

After the wizard has completed, the user will have created a secured place, i.e. the backup capsule, in which new backup archives can be stored.

7.8.4 Managing the Backup Capsule

All operations of the Backup Capsule management are performed with the Manage Backup Capsule Wizard mentioned above. The user can:

- Change the backup capsule size, if necessary
- Store multiple backup images
- View and control stored images

7.9 Backup Capsule on a Disk with only one Partition

Suppose that the user has only one hard disk with only one partition (the only partition is always system). Suppose that there is enough free space on the hard disk to create the backup capsule as well. It can be created with the Manage Backup Capsule Wizard:

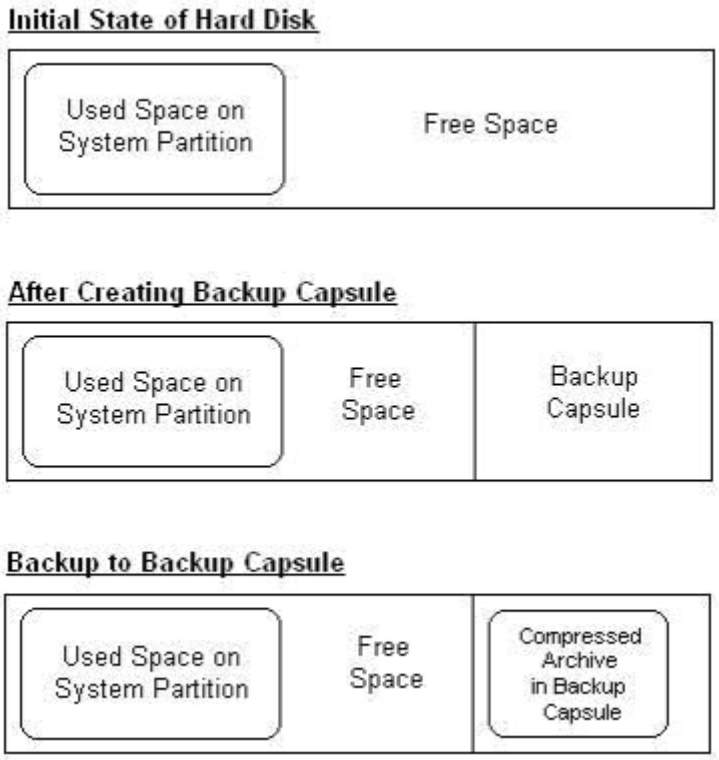
1. On the Common Tasks bar, click the **Manage Backup Capsule** button.

2. On the Backup Wizard's Welcome page, click the *Next* button.

3. Select **a place on the disk** where the backup capsule will be created (see the illustration below). Click the *Next* button.

4. **Set the size** for the backup capsule. Click the *Next* button

5. Start the operation (by clicking the *Next* button) or return to correct the settings.



After this, the user can place the backup archives into the created backup capsule. For example, one could take a full snapshot (with compression) of the system partition at monthly intervals and perform incremental backup on a daily basis.

7.10 Restoring a Disk from the Image

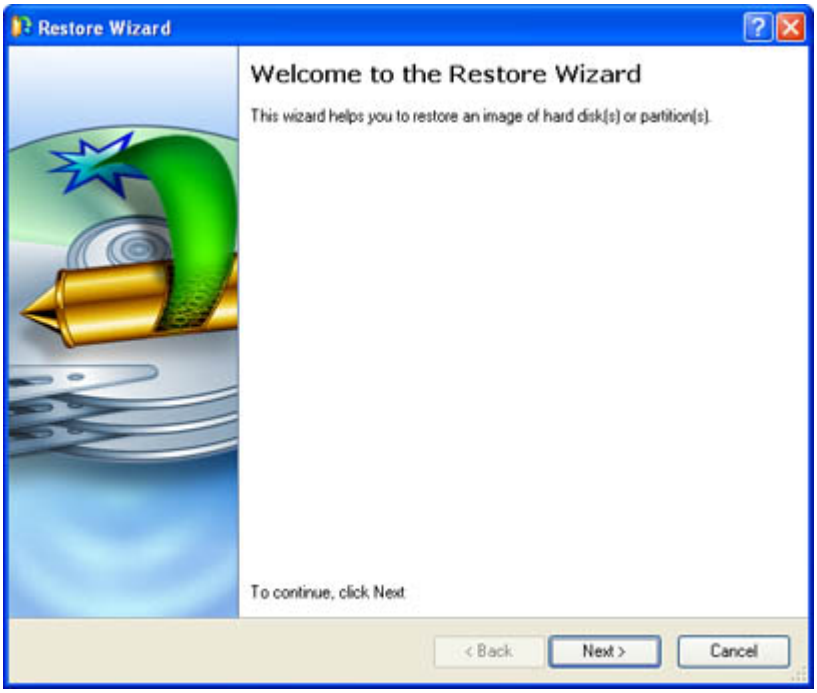
The restoring process is the reverse of the backup operation, and is performed less frequently. To meet the requirements of any user this operation can be accomplished either with the *Restore Wizard* or through the corresponding dialog.

7.10.1 Starting Wizard

There are several ways to start the *Restore Wizard*:

- In the Main menu: select Wizards > Restore Disk or Partition…
- On the Common Tasks bar: click the Restore hard disks or partitions item of the Wizards menu.
- Select a bar corresponded to a hard disk (or a partition) on the Disk map and click the Restore the entire disk from an image item (or the Restore an image of the logical disk from an image item in the partition case) on the page that appeared in the Explorer bar.

After any of the mentioned actions the Welcome page of the wizard will be displayed.



7.10.2 Starting Dialog

In order to start the operation the user should take the following steps:

1. Select a hard disk/partition on the Disk Map or on the List of Partitions.

2. Call the *Restore Hard Disk/Partition* dialog to define appropriate settings:

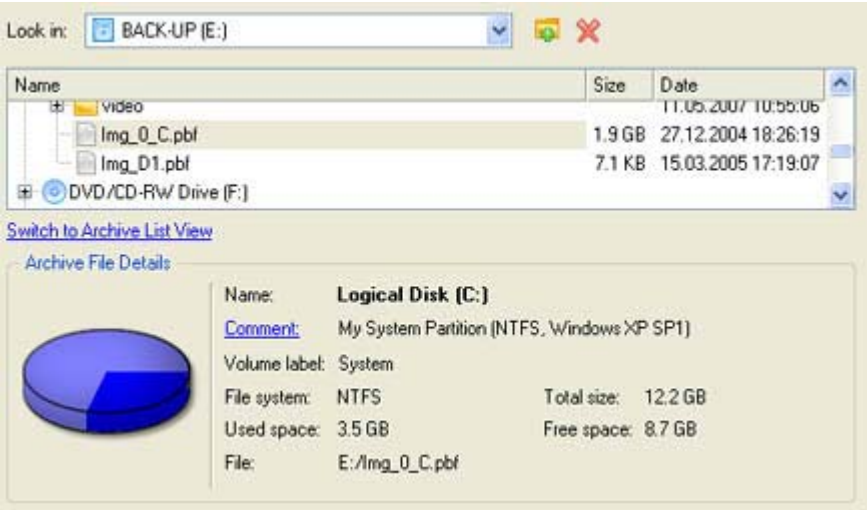
- In the Main menu: select Hard Disk/Partition > Restore Hard Disk or Partition…
- Call the popup menu for the selected hard disk/partition (right click of the mouse button) on the Disk Map, then select the menu item: *Restore Hard Disk* or *Partition*…

7.10.3 Settings

Despite different work algorithms, both the *Restore Wizard* and the *Restore Hard Disk/Partition* dialog provide the same level of functionality, thus let us just take as an example the wizard version of the operation. In our case we set the following parameters of the restore operation:

- **A backup image to be restored**. The *Browse for archive* page enables to browse disks for an appropriate backup image.

  By clicking the *Switch to File View* link, the user can find the required image in the browser-like window. The section below (i.e. *Archive File Details*) displays a short description of the selected image.



Moreover, on this page the user has the possibility to create new folders or delete existing files/folders by clicking the appropriate buttons.

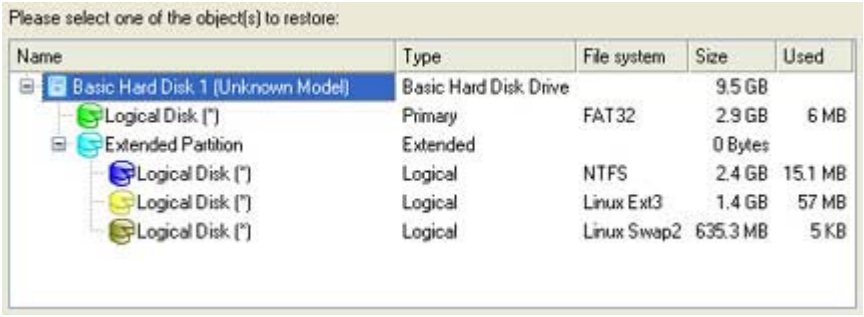
By clicking the *Switch to Archive List View* link, the user can see the list of all images created with the Backup Wizard. To get a clear-cut picture on properties of the required image, just click on it and the section below (i.e. *Archive File Details*) will display a short description.

Besides, the user may differentiate images of partitions or hard disks by setting up the filter in the left top corner of the page.

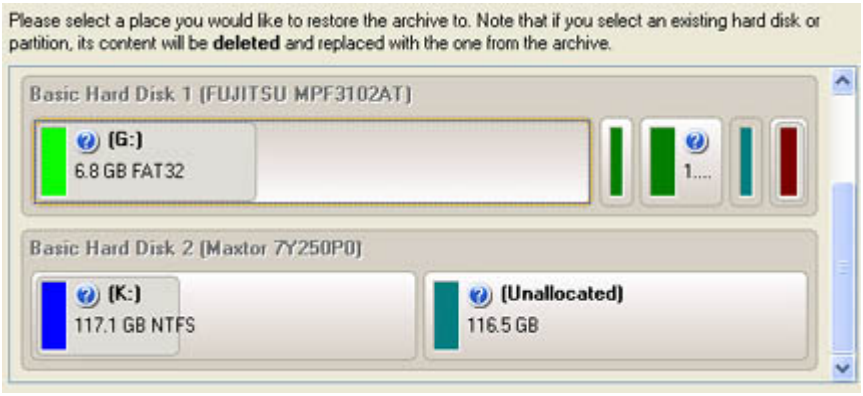
To restore a differential backup it is required to have at disposal both the necessary differential backup archive and its base image. Only the differential backup archive is to be selected. The Wizard then will automatically attempt to find the corresponding base image and start the operation.

In case the base image was burned to a CD/DVD or its location changed since the time of creation, the program would ask the user to provide the exact path to it.

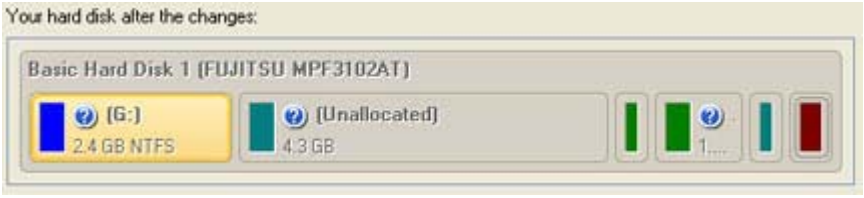
- **An item of the selected archive to be restored**. The program allows the user to restore not only an entire archive, but also separate items of the archive. It is very convenient in case of restoring separate partitions from the entire disk archive.



- **A place to restore the archive to**. Selecting the destination, please note - all contents on the disk selected for restoring purposes will be deleted during the operation.



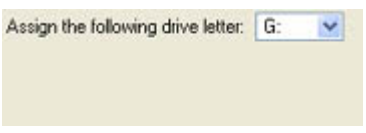
To help the user get a clear-cut picture of the operation outcome, the program allows inspecting the resulted disk layout.



7.10.3.1 Restoring Partition:

- **Size of the restored volume** and **free space before and after it** on the disk.

- **Drive letter assignment after restore**. The pull-down list contains vacant drive letters that can be associated with the restored partition.



7.10.3.2 Restoring Hard Disk:

- **Copy data and resize partitions proportionally**. If this option is activated, the program proportionally changes the size of partitions keeping their relative order intact. The option can be useful when restoring to a larger hard disk.

- **Perform surface test**. Define whether the surface test will be accomplished during the operation or not.

7.10.4 Results

Depending on the user's choice the Restore Wizard:

- Starts the restore operation,
- Allows the user to return and correct the parameters mentioned above.

The wizard will restore a disk (or partition) that has been archived, and make it available to use in the operating system.

The user has the ability to restore original dynamic volumes as dynamic volumes of any type, providing the targeted dynamic disk is of the appropriate size. Moreover the program enables to restore dynamic volumes as basic partitions and vice versa.

7.11 Using the Simple Restore Wizard

It can happen that the user cannot initiate the restoring process under Windows because the operating system is damaged in some way. In this case the *Simple Restore Wizard* is to be used.

7.11.1 Starting

In order to start the Simple Restore Wizard the user needs to boot from Recovery Media and then launch the wizard. Moreover, if the user should create bootable archives, the Simple Restore Wizard will run automatically when the user boots from the first CD/DVD of a backup archive.

7.11.2 Settings

The Simple Restore Wizard allows the user to set the parameters of the restore operation:

- **The backup image that contains the system partition to restore**. The user can browse disks for appropriate backup images. The wizard provides in-depth information on the selected archive.

To restore a differential backup it is required to have at disposal both the necessary differential backup archive and its base image. Only the differential backup archive is to be selected. The Wizard then will automatically attempt to find the corresponding base image and start the operation.

In case the base image was burned to a CD/DVD or its location changed since the time of creation, the program would ask the user to provide the exact path to it.

- **A place to restore the archive to**. All contents on the disk selected for restoring purposes will be deleted during the operation. The program enables the user to inspect the resulted disk layout.
- **Size of the restored volume** (if necessary). The program allows the user to inspect the resulted disk layout.
- **Size of the free spaces before and after the restored partition** on a disk.

7.11.3 Results

After the wizard has completed, the system partition which was stored in the backup image, will be restored and the operating system available to use.

7.12 Restoring the System Disk

The user can restore the operating system with a previously made recovery CD/DVD. It is assumed that the recovery CD/DVD was made with the *Recovery Media Wizard* (see the contents of the recovery media settings). The following steps are useful:

1. **Insert the Recovery CD/DVD** into a bootable CD/DVD device (the BIOS must be enabled to boot the system from the CD/DVD device).

2. **Restart** the computer.

3. The *Simple Restore Wizard* will be started automatically. Click the *Next* button on the Welcome page.

4. On the What to restore page, either type the **full path to the backup image of the system disk, which you are going to restore**, or click the standard browse button **[...]** to find it. Click the *Next* button

To restore a differential backup it is required to have at disposal both the necessary differential backup archive and its base image. Only the differential backup archive is to be selected. The Wizard then will automatically attempt to find the corresponding base image and start the operation.

In case the base image was burned to a CD/DVD or its location changed since the time of creation, the program would ask the user to provide the exact path to it.

5. On the *Image properties* page, **make sure that you select the correct image** viewing the provided information about the archive. When the archive has been chosen, click the *Next* button.

6. On the disk layout map, **select a system disk**, to be restored. Click the *Next* button.

7. **Set the size of the system partition**. The user can compress or expand it at the expense of available unused space. Click the *Next* button.

8. Click the *Finish* button to initiate the restoring process.

9. After completing the operation **eject the Recovery CD/DVD and reboot the computer**.

Now the restored file system is operable once again.

7.13 Restoring Separate Files and Folders from an Image

To restore separate files and folders from backup images with the Volume Explorer follow the steps below:

1. In the Explorer bar, click the **Disk View** tab and then choose **Volume Explorer**.

2. Browse for the required archive and then open it by double click of the left mouse button.

3. Select a file (or a folder).

4. Call the popup menu (right click of the mouse button).

5. Select the **Export** item.

6. Select a place on the disk where the file (or the folder) will be extracted to.

7.14 Restoring Dynamic Volumes

The user has the ability to restore original dynamic volumes as dynamic volumes of any type, providing the targeted dynamic volume is of the appropriate size. Moreover the program enables to restore dynamic volumes as basic partitions and vice versa.

To restore a dynamic disk as is with the Restore Wizard, simply do the following:

1. Click the **Restore** button in the Tool bar (any of the ways described earlier can also be used here to call the Restore Wizard).

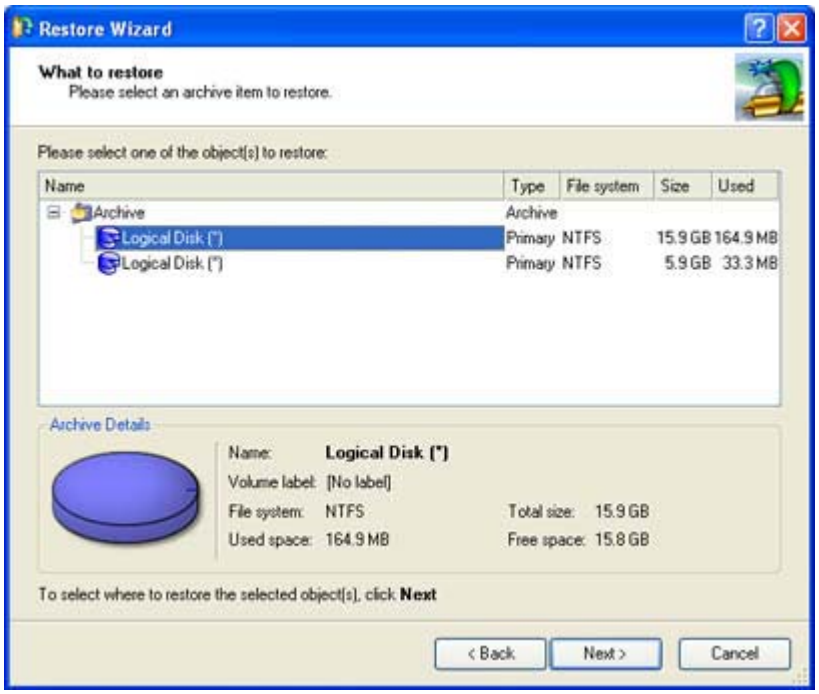
2. On the Restore Wizard's Welcome page, click the *Next* button.

3. On the **Browse for Archive** page, select the required archive in the browser-like window. The *Archive File Details* section displays a short description of the selected image. Click the *Next* button.

To restore a differential backup it is required to have at disposal both the necessary differential backup archive and its base image. Only the differential backup archive is to be selected. The Wizard then will automatically attempt to find the corresponding base image and start the operation.

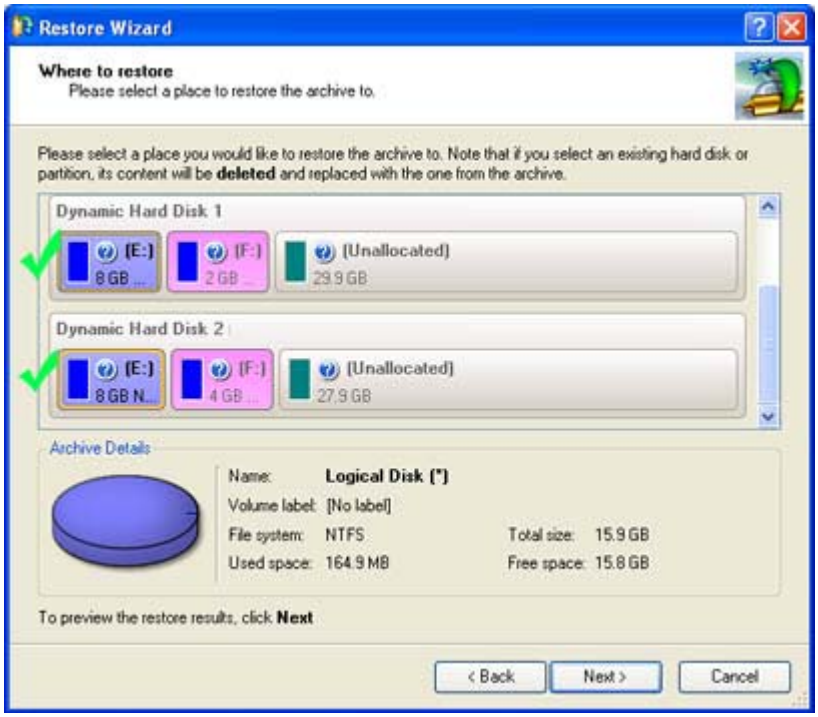
In case the base image was burned to a CD/DVD or its location changed since the time of creation, the program would ask the user to provide the exact path to it.

4. The **What to Restore** page displays detailed information about the contents of the archive. It includes a full description of properties about the archived disks or partitions. In case you have a complex archive, select the required item to restore.



Click the *Next* button.

5. On the **Where to Restore** page, select a place to restore the archive to similar in size to the original dynamic volume. There is no need to mark all the constituents of the dynamic volume, the program will do it automatically.



Click the *Next* button.

6. Depending on the user's choice the Restore Wizard:

- starts the operation
- reconsiders it

The wizard will restore the required dynamic disk and make it available to use in the operating system.

7.15 Build Recovery Media

In addition to the backup tools described above, the program provides the possibility to prepare a set of recovery tools on external media (CD, DVD or floppy disks). The tool set can be of assistance in case of operating system corruption, which means that the user is able to boot the computer even when the operating system is not able to do so. Creation of such recovery tools is performed with the *Recovery Media Wizard*.

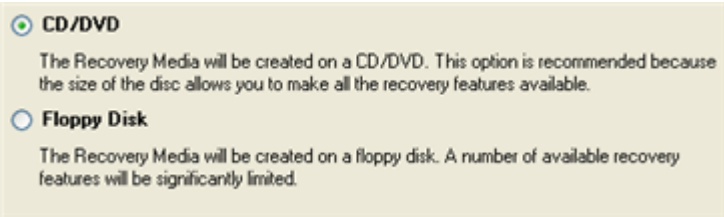
7.15.1 Starting

To start the *Recovery Media Wizard* the user needs to select the *Recovery Media Builder* item of the Wizards menu on the Common Tasks bar. Then the Welcome page of the wizard is displayed.

7.15.2 Settings

The Recovery Media Wizard allows the user to configure the settings and start the operation in accordance with the entered parameters. In our case we set the parameters of the future recovery tool by defining:

- **Type of the recovery media the user is creating**. The recovery tools can be placed either on a CD/DVD disc or on a floppy disk.



- **Contents of the recovery set**. The recovery tools can include the standard Recovery Media image (included in the installation package) or software defined by the user. In the last case the user can record a prepared image by setting the path to the image file on the disk.

- **A recording device**. The appropriate external media (CD/DVD or a floppy disk) needs to be inserted into the selected device.
- **CD/DVD writing parameters** (in case the user selects this kind of media). Writing parameters include writing speed (maximum or minimum) and the ability of ejecting the recorded disc after completing the operation.

The program supports CD-R, CD-RW, DVD-R, DVD+R, DVD-RW, DVD+RW and also DVD-R, DVD+R double layer discs. If the inserted disc is not empty, the Wizard suggests the user erasing its contents. When the user confirms the operation, the program deletes the re-writable disc's contents and begins the recording process.

7.15.3 Results

The Recovery Media Wizard starts the operation after completing the settings mentioned above. As a result, the user receives recovery media, which can be used in most emergencies.

When purchasing the program online, Recovery Media is available as ISO-image files. The Recovery Media Builder can then write these files onto physical CD/DVDs.

8 Copy Tasks

This chapter lists various scenarios of copy operations which may be accomplished by the program. This has already been reviewed in the Basic concepts chapter. Here the user will find more useful recommendations and descriptions of operations.

8.1 Copy Hard Disk

In the Basic concepts chapter we mentioned about possible applications of this operation. The program provides the ability to clone hard disks of any file system. During the hard disk copying process, the program moves controlling records of used *partitioning scheme*, the *bootstrap code* and on-disk partitions. This operation cannot be substituted by simply copying all on-disk partitions.

The operation can be accomplished with the *Copy Hard Disk Wizard*. The wizard is so well designed that the user simply needs to follow its easy instructions to make an exact copy of the disk.

8.1.1 Starting

There are several ways to start the *Copy Hard Disk Wizard*:

- In the Main menu: select Wizards > Copy Hard Disk…
- On the Common Tasks bar: click the Copy Hard Disk item of the Wizards menu.
- In the Toolbar: click the Copy Hard Disk button.
- Select a disk on the Disk map and click the Copy Hard Disk item on the page that appears in the Explorer bar.

After following one of the above mentioned actions, the Welcome page of the wizard is displayed.

8.1.2 Settings

The Copy Hard Disk Wizard allows the user to configure the settings and then start the operation in accordance with the entered parameters. Here the user sets the parameters of the operation defining:

- **The hard disk to copy**. Select a hard disk you want to copy
- **Copy parameters**. The Copy Hard Disk Wizard allows the user to specify the following options:

- **Copy options**. This section enables to switch between two options:
HDD raw copy (allows to copy a hard disk in the sector-by-sector mode to successfully process unknown file systems).
Partition raw copy (allows to copy a partition in the sector-by-sector mode to successfully process unknown file systems).
Perform incremental copy (once the complete copy of a hard disk is created, it can be used as a base for the incremental copy. Mark the option to make the program perform the exact bit-wise comparison of the previous data (saved in the parental copy) with the current data (that is actually the hard disk itself). After that only most recent information will be processed. It considerably decreases the amount of data written).
- **Resize options**. This section enables to switch between two options:
Remove free blocks between partitions. If this option is activated, the program does not keep blocks of free space between partitions on the targeted hard disk.
Copy data and resize partitions proportionally. If this option is activated, the program proportionally changes the size of partitions keeping their relative order intact. The option can be useful when upgrading the hard disk to a larger one.
- **Verification options**. This section allows the user to define whether the Surface test and/or the Writing Verification test will be accomplished during the operation.

8.1.3 Results

Depending on the user's choice the Copy Hard Disk Wizard:

- starts the operation
- reconsiders it

After the operation is completed the user receives a fully functional duplicate of the existing hard disk.

8.2 One Button Copy Wizard

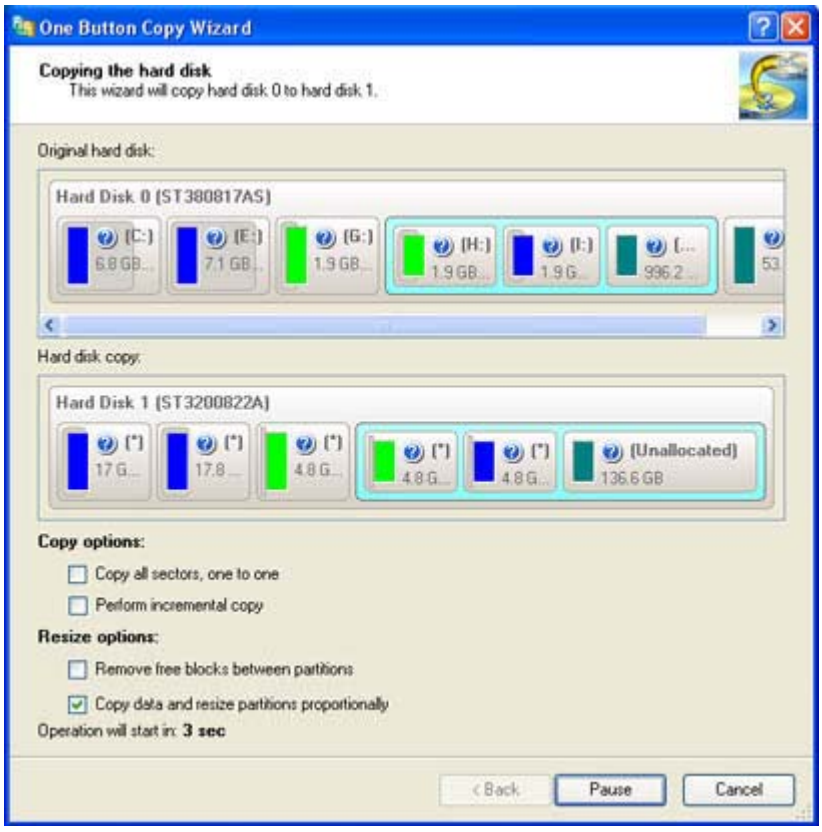
One of the fundamental features of the program is the ability to clone hard disks by pressing just one button, i.e. launching the *One Button Copy Wizard*. To successfully accomplish the operation your system should meet the following requirements:

- at least two hard disks, one of which should contain data and the other is empty
- the destination hard disk should have enough space to take contents of at least first partition of the source disk

8.2.1 Starting

There are several ways to start the *One Button Copy Wizard*:

- In the Main menu: select *Wizards* > *One Button Copy Wizard*
- On the Common Tasks bar: click the *One Button Copy Wizard* item of the Wizards menu.



Actually, that is all. The Wizard displays its main window, where you can see source and destination disks and three available options:

- **Copy all sectors one to one** (to process corrupted and unknown file systems - more time required)
- **Perform incremental copy** (once the complete copy of a hard disk is created, it can be used as a base for the incremental copy. Mark the option to make the program perform the exact bit-wise

comparison of the previous data (saved in the parental copy) with the current data (that is actually the hard disk itself). After that only most recent information will be processed. It considerably decreases the amount of data written)

- **Copy without free space blocks** (to arrange partitions one after another)
- **Resize proportionally** (to proportionally change the size of partitions keeping their relative order intact)

8.2.2 Results

The operation will be automatically accomplished after a ten-second pause. In case you are willing to modify some of the default options, press the *Pause* button, to continue execution press *Start*. To interrupt the operation, press the *Cancel* button.

By default the *Progress dialog* will be closed after the operation is successfully completed. In case there are some problems, the user can see it and find out what has happened.

8.3 Copy Partition

The copying of partitions can be used either for cloning *sample* partitions or for making backup copies of working partitions.

The user can duplicate partitions to protect oneself from downtime in case of a system malfunction. The partition can be copied back to the original place within a few minutes or can be used simply for copying separate files.

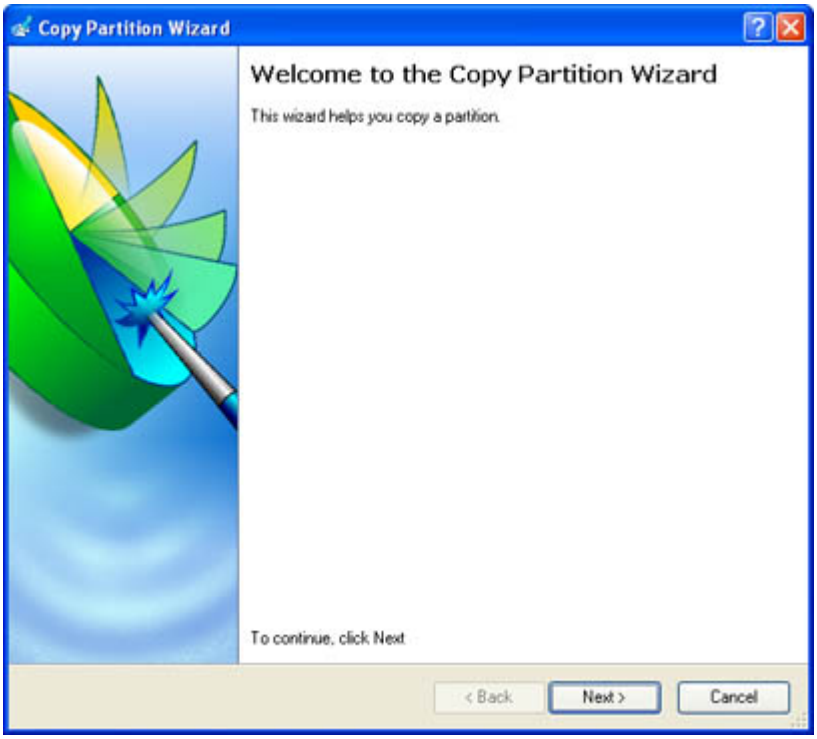
The program duplicates all usable partition data including files, the exact structure of directories and file system *metadata*: location of files, security information, access quotas and so on. The program allows to copy partitions only to blocks of free space.

8.3.1 Starting

There are several ways to start the *Copy Partition Wizard*:

- In the Main menu: select Wizards > Copy Partition…
- On the Common Tasks bar: click the Copy Partition item of the Wizards menu.
- In the Toolbar: click the Copy Partition button.
- Select a disk on the Disk map and click the Copy Partition item on the page that appears in the Explorer bar.

After following one of the above mentioned actions, the Welcome page of the wizard is displayed.

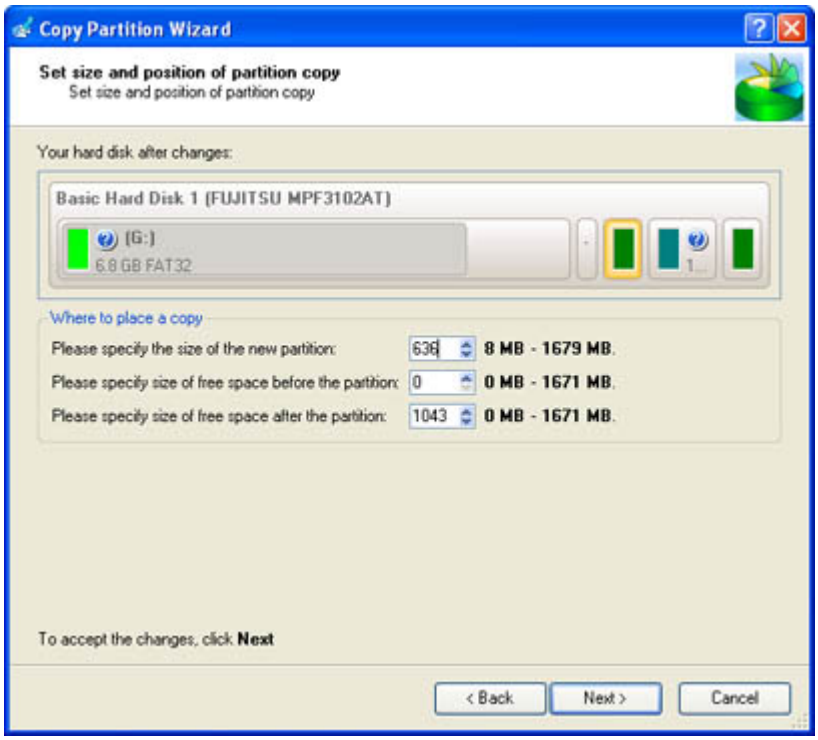


8.3.2 Settings

The Copy Partition Wizard allows the user to configure the settings and then start the operation in accordance with the entered parameters. Here the user sets the parameters of the operation defining:

- **The partition to copy**. Select a partition you want to copy
- **Destination disk**. Select a hard disk with free space enough for performing the copy partition operation
- **Copy parameters**. The Copy Partition Wizard allows the user to specify the following options:

  - **Copy the partition with resize**. This option gives the possibility to copy the partition to a block of free space, which is smaller than the partition itself.
  - **Partition size**. Define the size (in Mb) of the copied partition.
  - **Free space before**. Define the position (in Mb) of the copied partition relative to the beginning of the available range of disk space.
  - **Free space after**. Define the amount of trailing free space (in Mb) at the end of the available range of disk space.



8.3.3 Results

Depending on the user's choice the Copy Partition Wizard:

- starts the operation
- reconsiders it

After the operation is completed the user receives a fully functional duplicate of the existing partition.

9 Scripting

The program actions can also be represented in form of a script. The script describes the appropriate operation with macro-language commands. There is an interpreter utility - **SCRIPTS.exe**, which is included in the program installation package. This utility works in the unattended mode, which allows the user to automate operations.

9.1.1 Starting

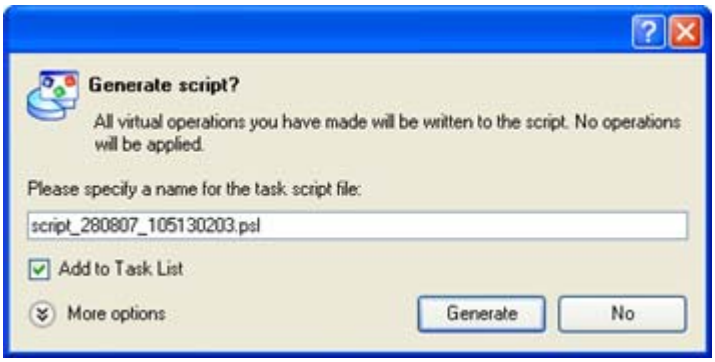
The user may not write a script since the program has a convenient interface for such a task. In order to generate a script on the base of the entered parameters of the required operation, the user should take the following steps:

- Select in the Main menu: *Tools* > *Generate Script*…

This command is unavailable if there are no operations on the List of Pending Operations.

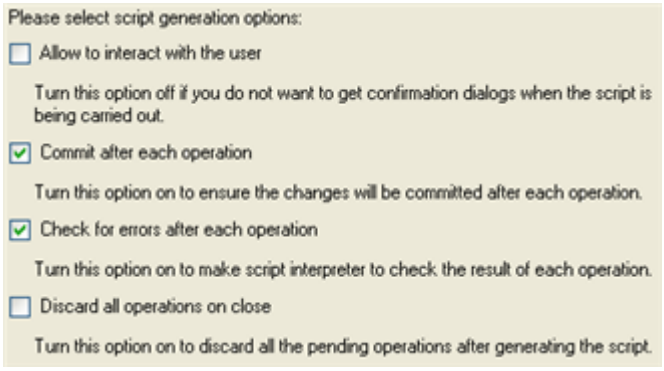
9.1.2 Settings

Define script generation options with the *Generate script* dialog.



- **Script file destination**. The program allows saving script files to local drives. Press the **Browse** button to define destination and a filename for a new script file. The default file extension that is reserved for scripting files is **.psl**. However, a script can be saved under any filename.

In addition, there is the possibility to make further detailed settings (although the default values will do in most cases). To activate the advance mode, the user needs to click the *More options* button at the foot of the dialog page. The following options become available:



- **Interaction with the user**. Mark the option to pause the script interpreter during the execution to prompt the user's confirmation or other input. Otherwise the program will not stop using default values for parameters if needed.
- **Commit after each operation**. Mark the option to commit changes after each operation.
- **Check for errors after each operation**. Mark the option to insert a special code in script, which checks the status of the last executed operation and stops the script processing if there are errors of any kind.

9.1.3 Results

After the operation is completed the user receives a new script file. It is placed into the specified destination, its features defined in the dialog.

To learn more about scripts please consult the Paragon Scripting Language manual.

10 Partition Management

In this chapter you will find all the information necessary to carry out partitioning operations supported by the program.

10.1 Basic Partitioning Operations

In this chapter you will find all the information necessary to carry out basic partitioning operations (create, format, delete) supported by the program. To meet the requirements of any user these operations can be accomplished either with the help of easy-to-use wizards or through the corresponding dialogs.

10.1.1 Create Partition

The program provides the ability to create new partitions by using the *DOS partitioning scheme*.

10.1.1.1 Restrictions

1. Do not use the *Create Partition* function in order to undelete the last deleted partition.
2. The program cannot create new partitions on *Dynamic Disks*. The current version of the program supports only hard disks that use the *DOS partitioning scheme* (in Windows 2000 and XP these disks are named *Basic Disks*).
3. According to the rules of the DOS partitioning scheme, the following combinations of partitions cannot be created:
   - Two Extended Partitions on one hard disk
   - Five or more Primary partitions on one hard disk
   - If there is an Extended Partition on the disk, only three Primary partitions are allowed
4. The program allows creating new partitions only within blocks of unpartitioned space. It cannot *convert* a free space on an existing partition to a new partition.

10.1.1.2 Starting

In order to start the operation the user should take the following steps:

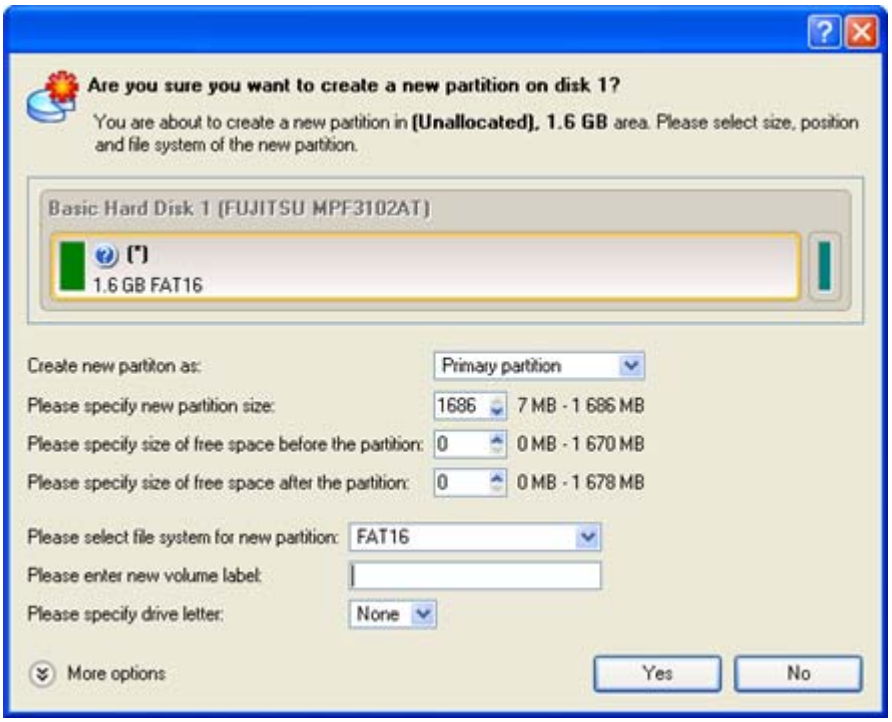
1. Select a block of free space on the Disk Map.

2. Call the *Create Partition* dialog to define appropriate settings. There are several ways to do it:

   - Select in the Main menu: *Partition* > *Create Partition*.
   - Call the popup menu for the selected partition (right click of the mouse button) then select the menu item: *Create Partition*.

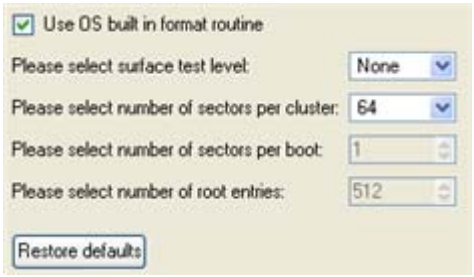
10.1.1.3 Settings

Define the future partition parameters with the *Create Partition* dialog. Initially the program suggests some consistent values for all parameters. In most cases, the user can just press the *Yes* button to confirm the operation.



- **Define whether the partition will be Primary or Extended one**. Select the desired type of the new partition in this pull-down list. As a matter of fact, the available alternatives fundamentally depend on the type of the selected block of free space - within the Logical free space, only Logical partitions can be created; Within the Primary free space, both Primary partitions or the Extended Partition can be created.
- **Partition Size**. This slider defines the size (in MB) of the new partition.
- **Free space before**. This slider defines the position (in MB) of the new partition relative to the beginning of the block of free space.
- **Free space after**. This slider defines the amount of trailing free space (in Mb) at the end of the new partition.
- **File system for new partition**. Mark the option in order to immediately format the newly created partition. Otherwise, the partition will remain unformatted (so that it will not be ready to use).

In addition, there is the possibility to make further detailed settings (although the default values will do in most cases). To activate the advance mode, the user needs to click the *More options* button at the foot of the dialog page. Depending on the file system, the following options become available:



- **Use OS built-in routine**. Mark the option to restrict the available values according to the used OS.
- **Whether the surface test will be performed**. Mark the option to make the program perform the surface test on the formatted partition. In this case, the program will find bad and unstable sectors and mark them unusable in the file system metadata.
- **The amount of sectors per boot**. This parameter is available exclusively for FAT16 and FAT32 file systems. Set the number of sectors to be reserved for the boot area on the partition with this spinner control.

- **The amount of root entries**. This parameter is available exclusively for FAT16 file system. Set the maximum amount of files/directories to be placed in the Root Directory on the FAT16 partition.
- **The amount of sectors per cluster**. Define the Cluster Size for the formatted partition with this spinner control.

10.1.1.4 Results

After the operation is completed the user receives a fully functional partition.

10.1.2 Format Partition

Any partition should contain some file system to be used for keeping data. The process of installing a file system is commonly known as formatting. A huge variety of file systems have been developed these days. The program can format partitions of the following file systems:

- FAT12 & FAT16
- FAT32
- NTFS
- Ext2
- Ext3
- ReiserFS
- Linux Swap v. 2
- HPFS

10.1.2.1 Starting

In order to start the format partition operation the user should take the following steps:

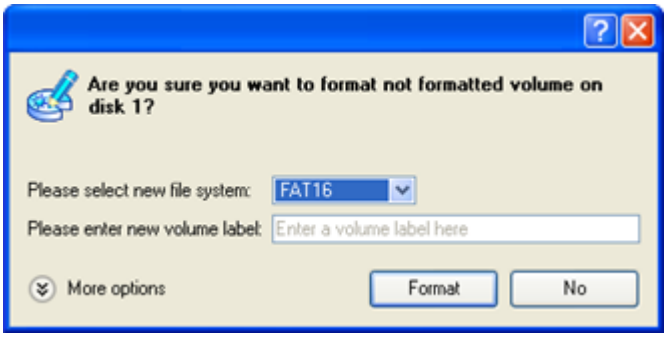
1. Select a partition on the Disk Map. The operation is disabled for the Extended Partition and for blocks of free space.

2. Call the *Format Partition* dialog to define appropriate settings. There are the following ways to do it:

- Select in the Main menu: *Partition* > *Format Partition.*
- On the Explorer bar: click on the current file system.
- Call the popup menu for the selected partition (right click of the mouse button) then select the menu item: *Format Partition.*

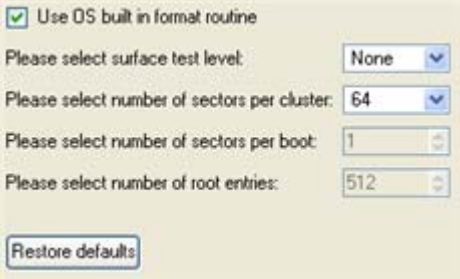
10.1.2.2 Settings

Define parameters of the formatting operation with the *Format Partition* dialog. Initially the program suggests some consistent values for all parameters. In most cases, the user can just press the *Format* button to confirm the operation.



- **File system**. Select the desired file system type from this pull-down list. In fact, the program displays only file systems that can be correctly placed to the selected partition, taking the capacity of the selected partition into account.
- **Volume label**. Enter a label for the selected partition in this textual field. The Volume label is an unimportant parameter of a logical drive that can be used for drive identification.

In addition, there is the possibility to make further detailed settings (although the default values will do in most cases). To activate the advance mode, the user needs to click the *More options* button at the foot of the dialog page. Depending on the file system, the following options become available:



- **Use OS built-in routine**. Mark the option to restrict the available values according to the used OS.
- **Whether the surface test will be performed**. Mark the option to make the program perform the surface test on the formatted partition. In this case, the program will find bad and unstable sectors and mark them unusable in the file system metadata.
- **The amount of sectors per boot**. This parameter is available exclusively for FAT16 and FAT32 file systems. Set the number of sectors to be reserved for the boot area on the partition with this spinner control.
- **The amount of root entries**. This parameter is available exclusively for FAT16 file system. Set the maximum amount of files/directories to be placed in the Root Directory on the FAT16 partition.
- **The amount of sectors per cluster**. Define the Cluster Size for the formatted partition with this spinner control.

10.1.2.3 Results

After the operation is completed the user receives a fully functional partition formatted to the file system specified.

10.1.3 Delete Partition

The program allows the user to delete partitions on hard disks partitioned with the *DOS partitioning scheme*. The program removes references to the partition from the *Partition Table*, so that the information from the deleted partition becomes inaccessible. The resulted disk space can be used to create new partitions.

Contents of the deleted partition do not disappear from the disk but merely are unavailable for the operating system.

10.1.3.1 Starting

In order to delete a partition the user should take the following steps:

1. Select a partition on the Disk Map.

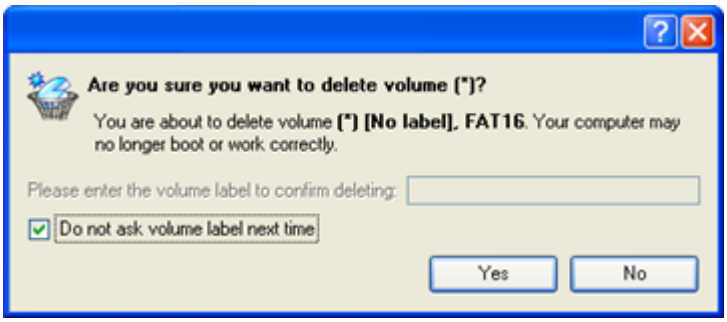
2. Call the *Delete Partition* dialog to define appropriate settings. There are several ways to do it:

- Select in the Main menu: *Partition* > *Delete Partition*.

- Call the popup menu for the selected partition (right click of the mouse button) then select the menu item: *Delete Partition.*

10.1.3.2 Settings

Define parameters of the delete operation with the *Delete Partition* dialog. Initially the program suggests some consistent values for all parameters. In most cases, the user may just press the *Yes* button to confirm the operation.



- **Enter the volume label to confirm deleting**. To confirm the deletion of the selected partition, enter its *Volume Label*. The actual Volume Label value is displayed above.
- **Do not ask volume label next time**. This checkbox allows the user to inhibit confirmation of the partition deletion.

10.1.3.3 Results

The deletion of a partition takes only a fraction of a second. However, the program waits until Windows completes the modification of the disk layout.

10.2 Advanced Partitioning Operations

In this chapter you will find all the information necessary to carry out advanced partitioning operations supported by the program.

10.2.1 Undelete Partition

When deleting a partition, disk management software only removes references to it in the *Partition Table* so that a previously deleted partition can still be recovered (in case of valid restoration of the record in the *Partition Table*). The program provides the ability to find and recover these partitions. This function minimizes the hazard of occasional partitions deletion and is usually known as *undelete.*

A restored partition will be fully functional, as long as other partitions were not created, moved or exceeded the disk space occupied by the partition. That is why the program enables the *Undelete Partition* function only for blocks of free space.

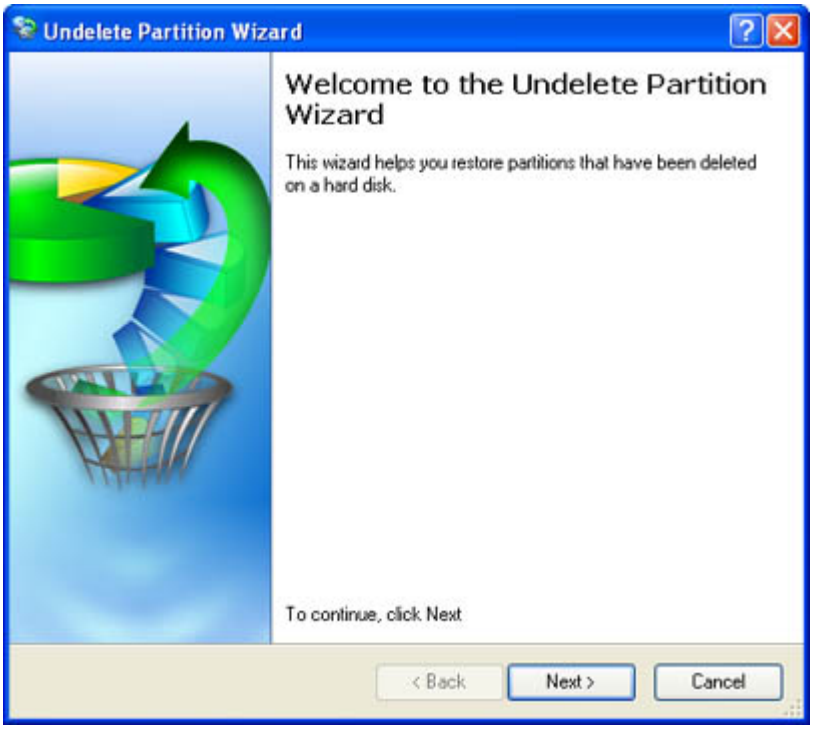
The operation can be accomplished with the *Undelete Partition Wizard.*

10.2.1.1 Starting

There are several ways to start the *Undelete Partition Wizard*:

- In the Main menu: select *Wizards* > *Undelete Partitions…*
- Select a disk on the Disk map and click the *Recover Lost Partitions* item on the page that appears in the Explorer bar.

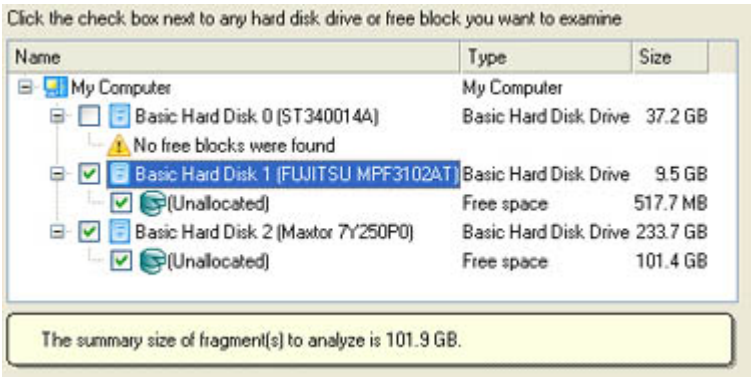
After following one of the above mentioned actions, the Welcome page of the wizard is displayed.



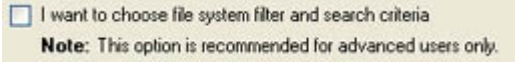
10.2.1.2 Settings

The Undelete Partition Wizard allows the user to configure the settings and then start the operation in accordance with the entered parameters. Here the user sets the parameters of the operation defining:

- **Free blocks to scan for lost partitions**. Choose a free block from a tree-like list of available disks and their partitions.

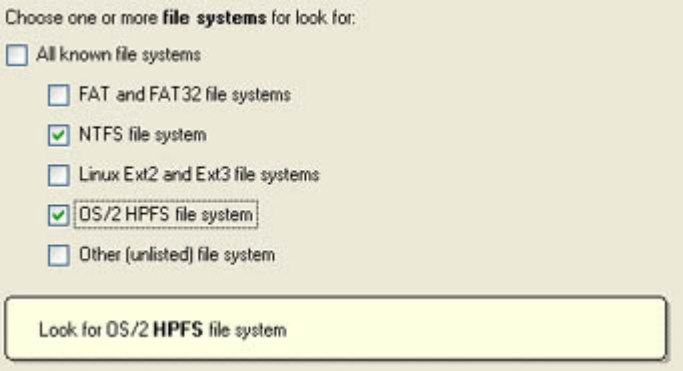


- **Manual setting of search criteria**. Activate the advance mode

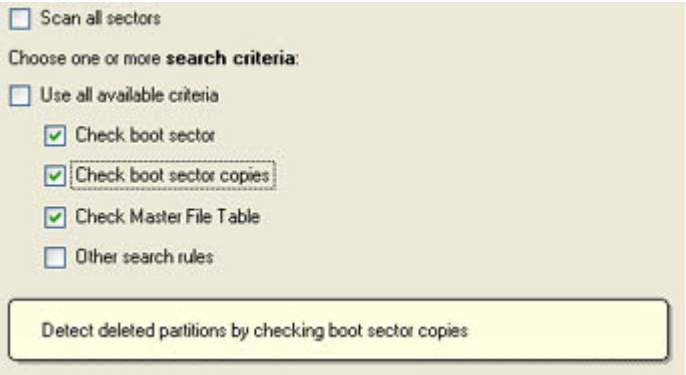


to manually specify:

- A particular file system to look for;



- *Required search criteria*.



To use the advance mode, a good knowledge of hard disk structure is required.

10.2.1.3 Results

Depending on the user's choice the Undelete Partition Wizard:

- starts the operation
- reconsiders it

After the operation is completed the user receives a fully functional partition.

10.3 Changing Partition Attributes

This chapter explains how the user can change partition attributes (*Active* flag, *Hidden* flag, *Partition ID*, *Volume Label*).

10.3.1.1 Mark Partition Active/Inactive

The program enables to set *Active/Inactive* flag for primary partitions of the hard disk. By default the operating system will boot from the active (bootable) partition at startup.

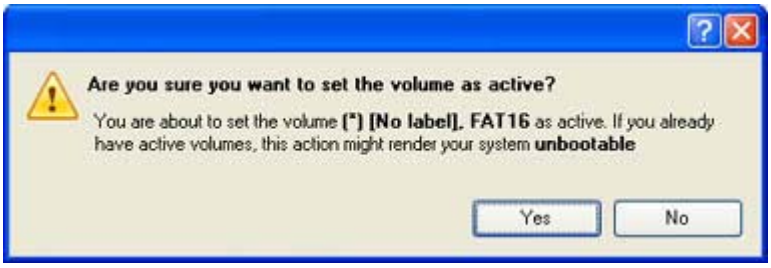
In order to mark partition Active/Inactive the user should take the following steps:

1. Select a primary partition on the Disk Map.

2. There are several ways to *Mark Partition Active/Inactive*:

- Select in the Main menu: *Partition > Mark Partition Active/Inactive.*

- Call the popup menu for the selected partition (right click of the mouse button) on the Disk Map, then select the menu item: *Mark Partition Active/Inactive*.



There can only be one active partition on a hard disk, otherwise the operating system will fail to boot.

3. The operation will be performed immediately after confirmation.

10.3.2 Hide/Unhide Partition

The program allows the user to *Hide/Unhide* primary and logical partitions. The operating system does not mount *hidden* partitions, thus preventing access to their contents.

In order to *Hide/Unhide* a partition the user should take the following steps:

1. Select a partition on the Disk Map.
2. There are several ways to *Hide/Unhide* partitions:

- Select in the Main menu: *Partition > Hide/Unhide Partition*.
- Call the popup menu for the selected partition (right click of the mouse button) on the Disk Map, then select the menu item: *Hide/Unhide Partition*.

It is strongly recommended not to hide the system partition, otherwise the operating system will fail to boot.

3. The operation will be performed immediately after confirmation.

10.3.3 Set Label of a Partition

The Partition Label is a small textual field (up to 11 characters) that is located in the *partition's boot sector*. This value is detectable by any partitioning tool; it is used for notification purposes only.

In order to change a partition label the user should take the following steps:

1. Select a partition on the Disk Map.

2. Call the *Change Volume Label* dialog to define appropriate settings. There are several ways to do it:

- Select in the Main menu: *Partition > Modify > Change Volume Label*.
- On the Explorer bar: click on the current *volume label*.
- Call the popup menu for the selected partition (right click of the mouse button) on the Disk Map, then select the menu item: *Change Volume Label*.

3. Define the label of the partition with the *Change Volume Label* dialog:

New volume label. Enter the new value of the Partition Label. The length of the Label is limited to 11 characters.

The dialog also displays the current partition label.

4. The operation will be performed immediately after confirmation.

10.3.4 Change Partition ID

Partition ID is an identifier of a file system that is placed in the partition. Partition ID is saved in the *Partition Table*; it is used to quickly detect partitions of supported types. By manually changing the Partition ID value, it is possible to manipulate the accessibility of partitions.

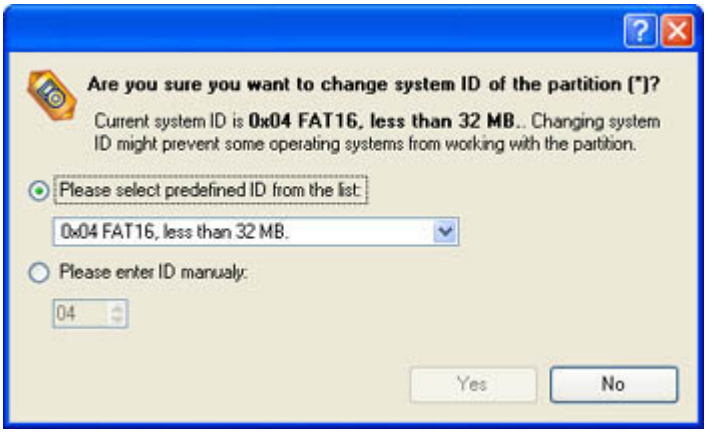
In order to change a *Partition ID* the user should take the following steps:

1. Select a partition on the Disk Map.

2. Call the *Change Partition ID* dialog to define appropriate settings. There are several ways to do it:

- Select in the Main menu: *Partition* > *Modify* > *Change Partition ID*…
- On the Explorer bar: click on the current *partition ID*.
- Call the popup menu for the selected partition (right click of the mouse button) on the Disk Map, then select the menu item: *Change Partition ID*…

3. Define the ID of the partition with the *Change Partition ID* dialog:



- **Predefined ID**. Select from the pull-down list ID values for various file systems.
- **Enter ID manually**. The textual field contains a hexadecimal presentation of the Partition ID. Generally, the Partition ID should be presented as 1-2 digits hexadecimal number; only hexadecimal digits {0..9, A..F} are allowed to be used.

4. The operation will be performed immediately after confirmation.

10.3.5 Change Serial Number of a Partition

FAT16, FAT32, HPFS and NTFS file systems include the *Serial Number* parameter. The partition's Serial Number is saved in the *boot sector*; its value is generated while formatting a partition.

The program enables to modify the partition's Serial Number on formatted FAT16, FAT32, HPFS and NTFS partitions without re-formatting.

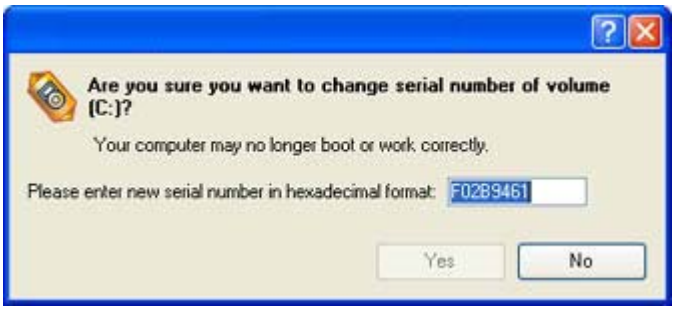
In order to start the operation the user should take the following steps:

1. Select a partition on the Disk Map.

2. Call the *Change Partition Serial Number* dialog to define appropriate settings. There are several ways to do it:

- Select in the Main menu: *Partition* > *Modify* > *Change Serial Number*.
- On the Explorer bar: click on the current *serial number*.

3. Define the parameter value with the *Change Partition Serial Number* dialog.



New serial number. The user can enter the new *Serial Number* value in this textual field. The Serial Number should contain 8 hexadecimal figures (0..9 or A..F). The operation cannot be accomplished until the user enters all 8 symbols.

4. The operation will be performed immediately after confirmation.

11 Hard Disk Management

This chapter lists various scenarios of hard disk operations which may be accomplished by the program.

11.1 Update MBR

The program allows the user to overwrite the current *bootable code* in the MBR (Master Boot Record) by the standard *bootstrap code*.

This feature can repair corrupted bootable code on a hard disk as a result of *boot virus* attacks or malfunction in the boot managing software.

In order to start the operation the user should take the following steps:

1. Select a hard disk on the Disk Map.

2. There are several ways to run the operation:

- Select in the Main menu: *Hard Disk* > *Update MBR*.
- Call the popup menu for the selected hard disk (right click of the mouse button) on the Disk Map, then select the menu item: *Update MBR*.

3. The operation will be performed immediately after confirmation.

11.2 Convert to Basic

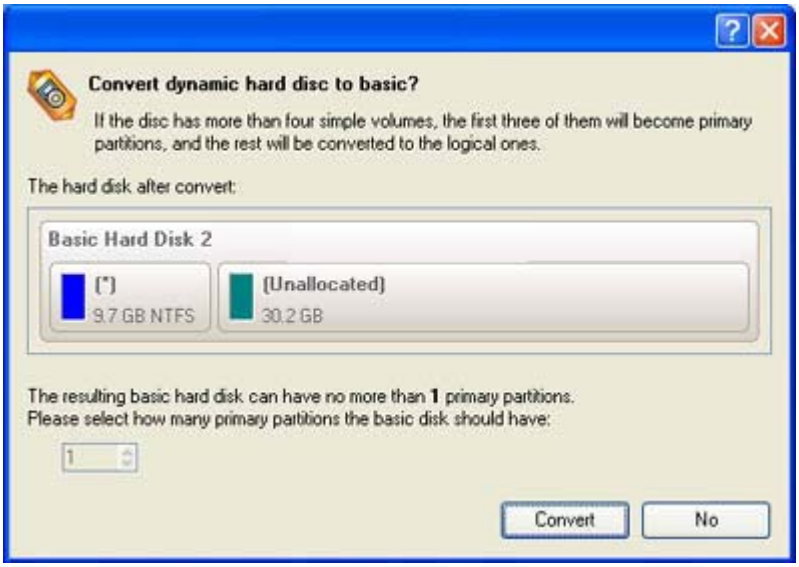
The program provides a unique possibility to convert a dynamic disk containing simple volume(s) into basic keeping its contents intact.

In order to start the operation the user should take the following steps:

1. Select a dynamic disk containing simple volume(s) on the Disk Map.

2. Call the *Convert to Basic* dialog selecting in the Main menu: *Hard Disk* > *Convert to Basic…*

3. Define parameters of the operation with the *Convert to Basic* dialog.



Number of primary partitions. According to the *DOS partitioning scheme* a hard disk can only have no more than four Primary partitions. If there is an Extended partition on the disk, only three primary partitions are allowed. That is why if a dynamic disk contains several simple volumes the program allows the user to choose the number of primary partitions. The rest of them if any will automatically be converted to logical disks within the Extended partition.

The program can only process dynamic disks containing solid simple volumes (without extension).

11.3 Change Primary Slot

Operating systems use the following partitions enumeration:

In Linux:
In Linux, every partition has a special symbolic name that encodes a hard disk containing a partition, and a partition itself. Partitions are addressed and accessed by using their symbolic names. Symbolic names are automatically generated by Linux in accordance with the order of hard disks in BIOS and the order of partition records in the *Partition Table*. The modification of primary partitions enumeration can lead to the changing of paths to some important resources.

In DOS:
The last versions of MS-DOS use a rather sophisticated algorithm for drive letters assignment. A drive letter, which is assigned to a partition, depends on the order of records in the *Partition Table*. The modification of primary partitions enumeration affects the drive letters assignment. In early versions of MS-DOS, it can even lead to the unavailability of a partition. In any case, the user may want to change the enumeration of primary partitions.

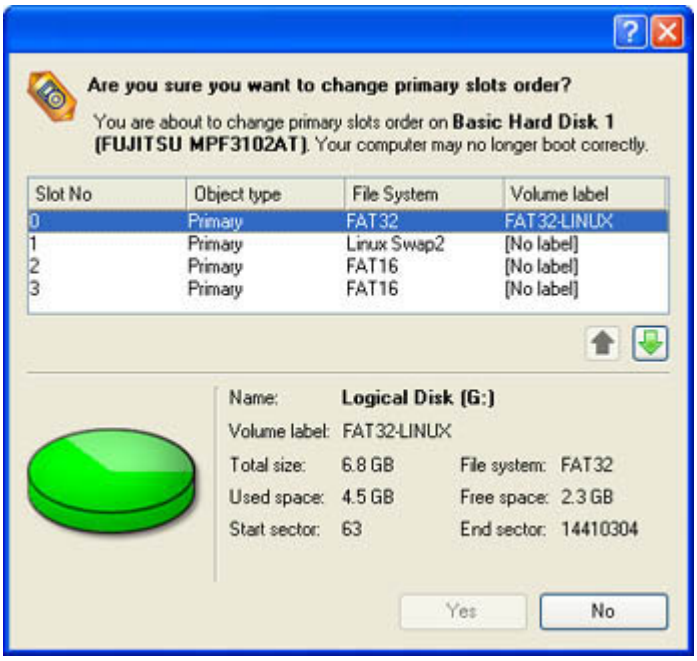
The program provides the ability to change the enumeration of primary partitions. This feature allows the user to fix problems concerning the inappropriate order of partitions.

In order to modify the enumeration of partitions the user should take the following steps:

1. Select a hard disk on the Disk Map.

2. Call the *Change Primary Slot* dialog to define appropriate settings. There are several ways to do it:

- Select in the Main menu: *Hard Disk > Change Primary Slot*.
- Call the popup menu for the selected hard disk (right click of the mouse button) on the Disk Map, then select the menu item: *Change Primary Slot*.



3. The dialog displays the actual enumeration of Primary Partitions in the *Partition Table* (it exhibits the order of appropriate records, which refer to primary partitions in the primary part of the *Partition Table* referencing records. The top part of the dialog displays the enumeration order of partitions with the parameters that can help to distinguish partitions:

- Slot
- Volume
- Partition type
- File system
- Partition size
- Volume label

There are two buttons on the right of the list of primary partitions, which allow the user to move the selected partition up and down within the primary part of the *Partition Table*.

4. The operation will be performed immediately after confirmation.

11.4 Change SID

SID - Security IDentifier, the binary structure that is associated with some object in the system, is used to distinguish between user access privileges in workgroup local networks. By default, the SID Changer searches Windows installations and then changes SIDs in the found Windows instances to automatically generated random SID values.

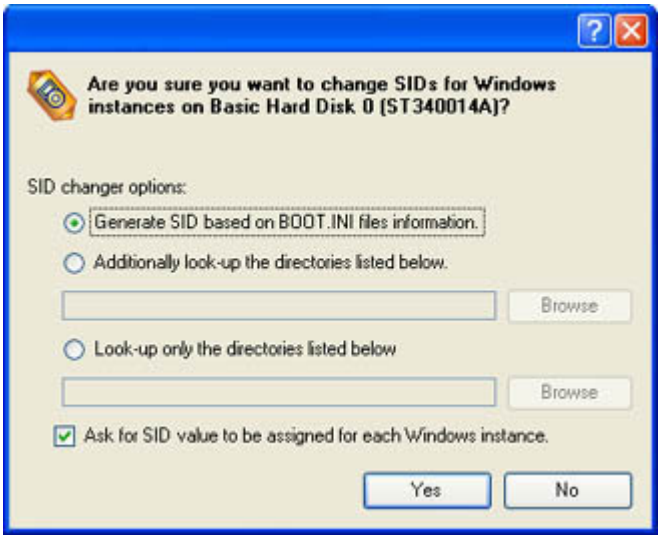
The program provides the ability to change SIDs:

1. Select a hard disk on the Disk Map.

2. Call the *Change SID* dialog to define appropriate settings. There are several ways to do it:

- Select in the Main menu: *Hard Disk > Change SID*.

- Call the popup menu for the selected hard disk (right click of the mouse button) on the Disk Map, then select the menu item: *Change SID*.



3. **Generate SID based on BOOT.INI files information**. By default, the utility searches for BOOT.INI files on all partitions to extract information on Windows installations and then performs modifying of the found SIDs by automatically generated random values.

The user can specify some definite directories for search in addition to ones set in BOOT.INI files, or inhibit analyzing BOOT.INI files at all. It is also possible to set a SID value manually.

The SID changer utility can be applied only to NT and Win2k installations.

12 Extra Functionality

This chapter describes the supplementary functionality available in the program.

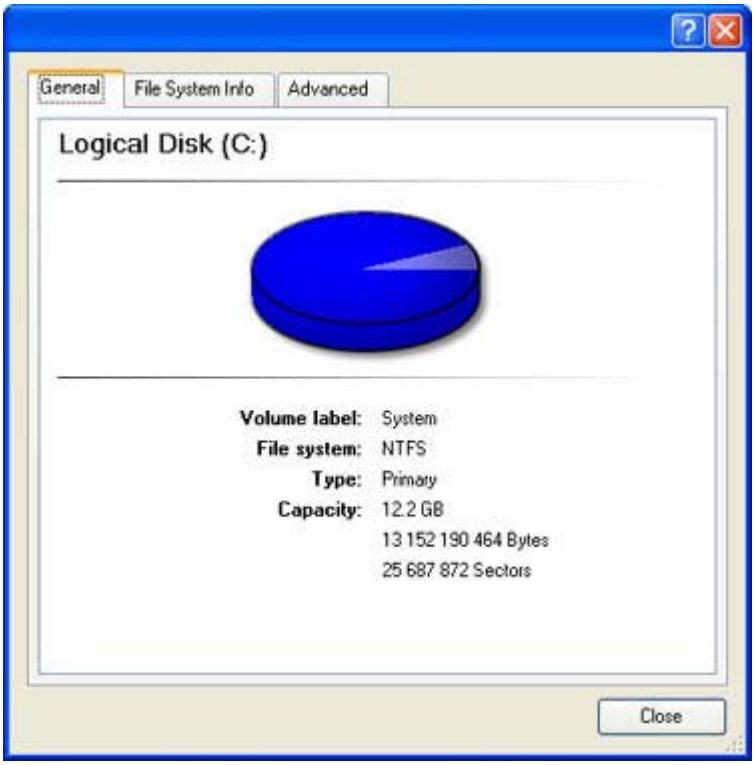
12.1 View Partition/Hard Disk Properties

The program enables to obtain in-depth information on the properties of hard disks/partitions. Besides the general information, such as capacity, used space or file system type it provides the possibility to get info on a hard disk geometry, cluster size, exact partition location, etc.

In order to view properties of a partition/hard disk the user should take the following steps:

1. Select a partition/hard disk on the Disk Map.

2. Call the popup menu for the selected partition/hard disk (right click of the mouse button) on the Disk Map, then select the menu item: *Properties…*

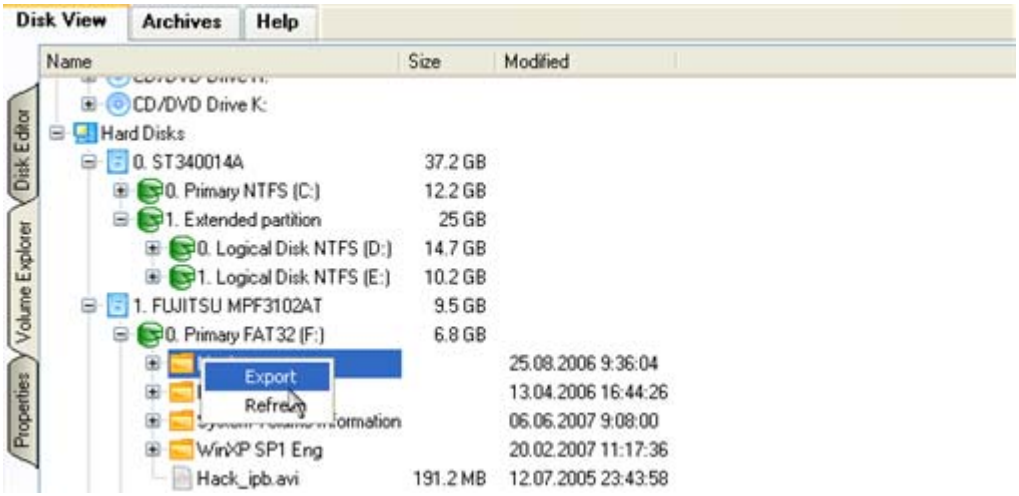


3. The provided information is grouped according to its properties, thus select the required tab and get the information you need.

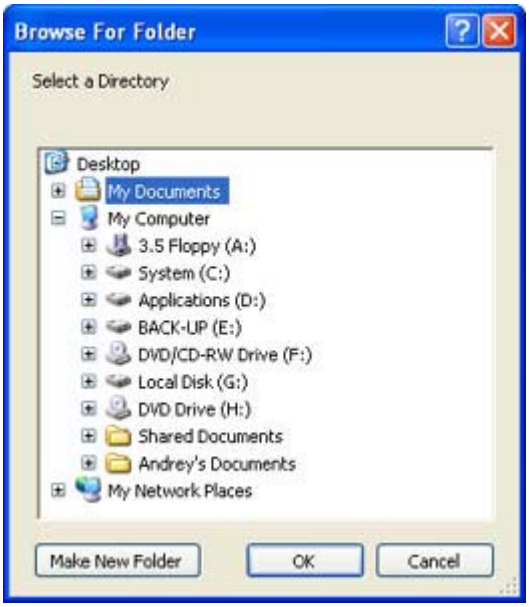
12.2 Volume Explorer

Volume Explorer is a special tool providing the ability to browse and export contents of the local mounted/unmounted volumes formatted to FAT16, FAT32, NTFS, Ext2FS, Ext3FS, ReiserFS file systems. Besides it allows the user to access Paragon backups as regular folders to explorer their contents or to retrieve certain files.

To launch the Volume Explorer the user should click **Disk View** tab in the Explorer Bar and then choose **Volume Explorer**:



Call the popup menu for the selected file/folder (right click of the mouse button) to export it to some other location (local or network drive, etc.).

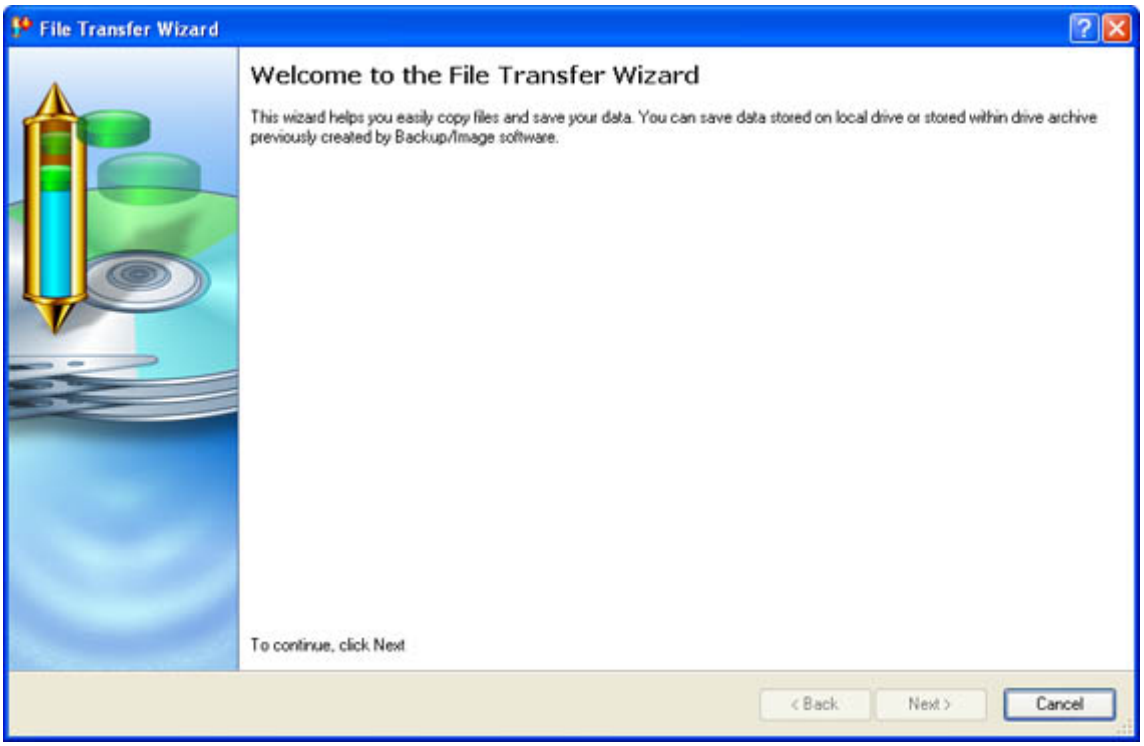


12.3 File Transfer Wizard

File Transfer Wizard is designed to make such operations as copying of separate files/directories or burning of them to CD/DVD as easy and convenient as possible. It may be of particular use in case of a system malfunction, caused either by a virus attack or files corruption, in order to get the system back on track again. Besides it provides access to Paragon backups as regular folders to browse through their contents or copy required files.

12.3.1 Starting

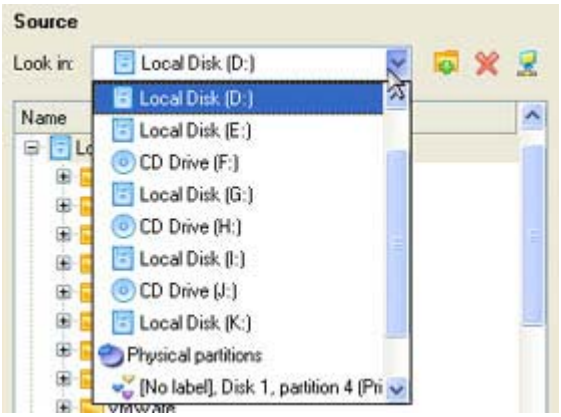
To start the *File Transfer Wizard* the user needs to select the *File Transfer Wizard* item of the Wizards menu on the Common Tasks bar. Then the Welcome page of the wizard is displayed.



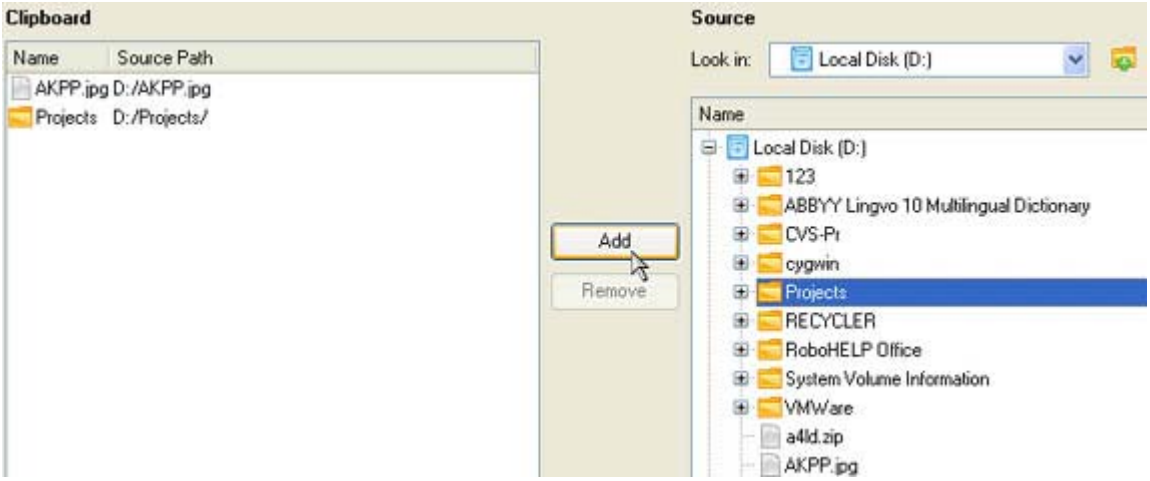
12.3.2 Settings

The File Transfer Wizard allows the user to configure the settings and then start the operation in accordance with the entered parameters. Here the user sets the parameters of the operation defining:

- **Place to look for files/directories**. Select a source disk from the pull-down list in the left pane of the page. The program enables to process both mounted and unmounted (without drive letter assigned) partitions. Besides it is possible to map a network drive.

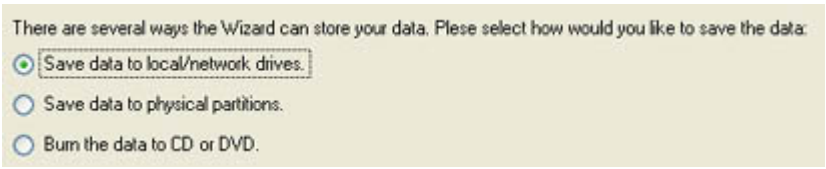


- **Object(s) of operation**. Choose files/directories you want to copy and place them to Clipboard by pressing the *Add* button. To delete a file/directory from the Clipboard, select it in the Clipboard pane and press the *Remove* button. You can also create a new folder, rename or irreversibly delete existing files/directories of the left pane by pressing the appropriate buttons.

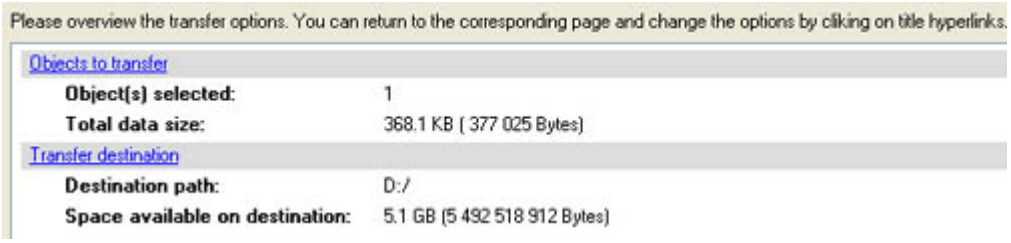


Files/directories deleted from the Clipboard remain intact on source disks.

- **Destination to store the object(s)**. The File Transfer Wizard allows copying data to local or network drives, to physical partitions (without drive letters assigned), or burning them to CD/DVDs. Choose the way the data will be stored.



- **Revision of changes**. The *Operation Summary* page provides structurally divided information on all the actions made in the wizard. Check the changes and come back to any of the steps of the wizard to correct them (if necessary) by following the required hyperlink.



12.3.3 Results

The File Transfer Wizard starts the operation after completing the settings mentioned above.

12.4 Mount Partition

The program allows the user to assign or remove drive letters of existing formatted partitions.

12.4.1 Assign Drive Letter

In order to mount a partition the user should take the following steps:

1. Select a partition on the Disk Map.

2. Call the *Add Drive Letter* dialog to define appropriate settings. There are several ways to do it:

- Select in the Main menu: *Partition* > *Assign Drive Letter…*
- Call the popup menu for the selected partition (right click of the mouse button) on the Disk Map, then select the menu item: *Assign Drive Letter…*

3. Define a drive letter for the selected partition with the *Add Drive Letter* dialog. Initially the program suggests some consistent value for this parameter. So the user may just press the *Yes* button to confirm the operation.

Assign the following drive letter. The pull-down list contains vacant drive letters that can be associated with the selected partition. Assign a drive letter to a non-mounted partition, or change the existed drive letter for already mounted partition.

4. The operation will be performed immediately after confirmation.

12.4.2 Remove Drive Letter

In order to unmount a partition the user should take the following steps:

1. Select a partition on the Disk Map.

2. Call the *Remove Drive Letter* dialog to define appropriate settings. There are several ways to do it:

- Select in the Main menu: *Partition* > *Remove Drive Letter*.
- Call the popup menu for the selected partition (right click of the mouse button) on the Disk Map, then select the menu item: *Remove Drive Letter*.

Modifying drive letter of the system partition will result in inability to boot the operating system.

After having processed partitions with installed software, some programs may not run properly.

3. The operation will be performed immediately after confirmation.

12.5 Mount Archive

The program provides the possibility to assign a drive letter to a backup image of a separate partition. As a result of the operation the user gets a new read-only partition in the system to easily browse its contents and copy the required information even with the standard Windows tools.

In order to mount an archive the user should take the following steps:

1. Select a backup image in the Archive database.

2. Call the *Mount Archive* dialog to define appropriate settings. There are several ways to do it:

- On the Explorer bar: select the *Mount Archive* item.
- Call the popup menu for the selected image (right click of the mouse button), then select the menu item: *Mount the selected archive…*

3. Define a drive letter for the selected backup image with the *Mount Archive* dialog.

Assign the following drive letter. The pull-down list contains vacant drive letters that can be associated with the selected archive. Initially the program suggests some consistent value for this parameter. So the user may just press the *OK* button to confirm the operation.

4. The operation will be performed immediately after confirmation.

	**The current version of the program does not allow the user to mount backup images of an entire hard disk, complex archive (containing e.g. MBR and a separate partition, etc.), MBR or First Track of a hard disk. However it enables to mount separate partitions from a backup image of a hard disk or complex archive.** **There is no possibility to mount archives located on physical (unmounted) partitions or in the Bootable Capsule.** **Archives will only be mounted for the current session and won't be available after the system restart.** **It is strongly recommended not to unmount backup images with Windows Disk Manager or other third side software.**

12.6 Test Surface

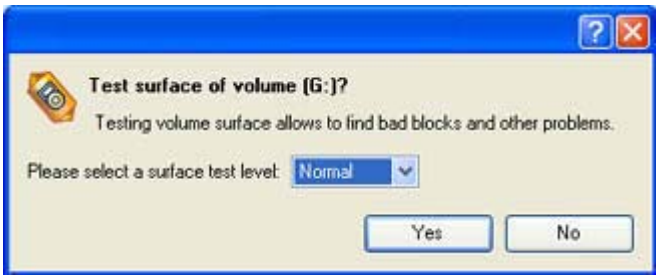
The program allows performing additional surface tests on existing partitions and blocks of free space.

In order to start the surface test the user should take the following steps:

1. Select a partition or a block of free space on the Disk Map.

2. Call the *Test Surface* dialog to define appropriate settings. There are several ways to do it:

- Select in the Main menu: *Partition* > *Test Surface*…
- Call the popup menu for the selected partition (right click of the mouse button) on the Disk Map, then select the menu item: *Test Surface*…



Surface test level. Choose the level of the test procedure.

3. The operation will be performed immediately after confirmation.

12.7 Check File System Integrity

The program can check the file system integrity on existing partitions. This function can be used for detecting file system errors before performing operations on a partition.

Most useful operations require the targeted partition to have a valid file system to be processed.

In order to start the system integrity check the user should take the following steps:

1. Select a partition on the Disk Map.

2. Call the *Check File System Integrity* dialog to define appropriate settings. There are several ways to do it:

- Select in the Main menu: *Partition* > *Check File System Integrity*.
- Call the popup menu for the selected partition (right click of the mouse button) on the Disk Map, then select the menu item: *Check File System Integrity*.

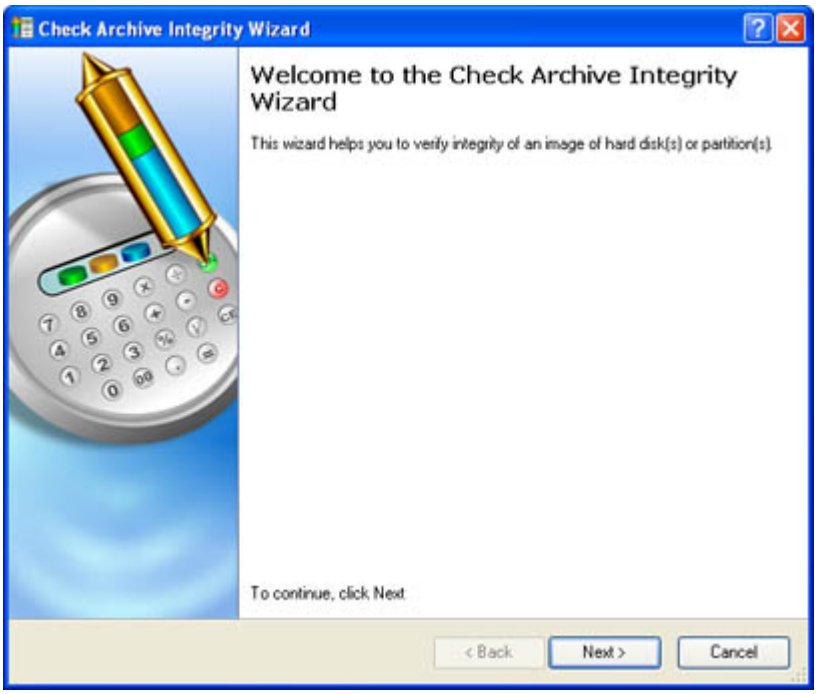
3. The operation will be performed immediately after confirmation.

12.8 Check Archive Integrity

The program provides the ability to perform integrity check for the backup images. The function allows distinguishing between valid and corrupted images before using them. The *Check Archive Integrity Wizard* will help you do that.

12.8.1 Starting

To start the *Check Archive Integrity Wizard* the user needs to select the *Check Archive Integrity* item of the Wizards menu on the Common Tasks bar. Then the Welcome page of the wizard is displayed.



12.8.2 Settings

The Check Archive Integrity Wizard allows the user to configure the settings and then start the operation in accordance with the entered parameters. Here the user sets the parameters of the operation defining:

An archive to verify. Select an image on your disk in the browser-like window. The *Archive File Details* section displays a short description of the selected image, including:

- information on a type of the archive contents (whether it contains the entire disk or just a partition),
- whether the archive is compressed or not,
- whether the archive is password protected or not,
- the date, when the archive was created.

12.8.3 Results

The Check Archive Integrity Wizard starts the operation after completing the settings mentioned above.

12.9 Check Recovery Disks

The user has the ability to check whether backup media created with the program is 100 percent error-free and ready to use. The *Check Recovery Disk Wizard* will help you do that.

12.9.1 Starting

To start the *Check Recovery Disk Wizard* the user needs to select the *Check Recovery Disks* item of the Wizards menu on the Common Tasks bar. Then the Welcome page of the wizard is displayed.

12.9.2 Settings

The Check Recovery Disk Wizard allows the user to configure the settings and then start the operation in accordance with the entered parameters. Here the user sets the parameters of the operation defining:

- CD/DVD drive to use from the pull-down list
- Whether eject the disk after the operation is completed or not.

12.9.3 Results

The Check Recovery Disk Wizard starts the operation after completing the settings mentioned above.

12.10 Clear Free Space

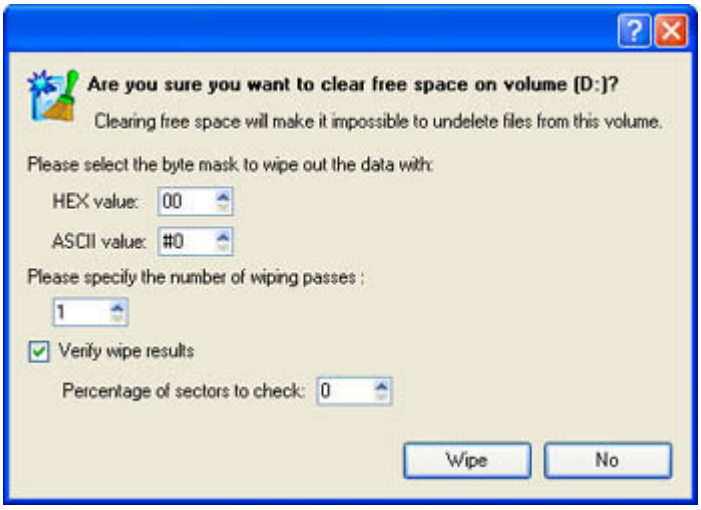
The program allows the user to destroy any remnants of deleted files/directories left on disk without affecting the used data by overwriting contents of unused clusters with certain patterns. Besides providing high level of data protection this function can be particularly useful when dealing with certain non-standard protection/registration/deactivation hidden marks made by some software.

In order to start the operation the user should take the following steps:

1. Select a partition on the Disk Map.

2. Call the *Clear Free Space* dialog selecting in the Main menu: *Partition* > *Clear Free Space…*

3. Define parameters of the operation with the *Clear Free Space* dialog. Initially the program suggests some consistent values for all parameters. In most cases, the user may just press the *Wipe* button to confirm the operation.



- **HEX value**. The **Hex value** spinner control allows the user to set a two-figure hexadecimal character value ("00" by default). The available range is from "00" to "FF". It is synchronized with the **ASCII value**.
- **ASCII value**. The **ASCII value** spinner control enables to set the symbolic presentation of the character to use according to the 7-bit American Standard Code for Information Interchange ("#0" by default). It is synchronized with the **Hex value**.
- **Number of passes**. The user can choose number of passes for the wiping pattern (1 by default). The available range is from 1 to 100.
- **Verify wipe results**. The user can also choose whether to carry out residual data verification or not specifying the percentage of sectors to check.

The Clear Free Space operation is only available for Logical and Primary partitions of known file systems.

12.11 Edit/View Sectors

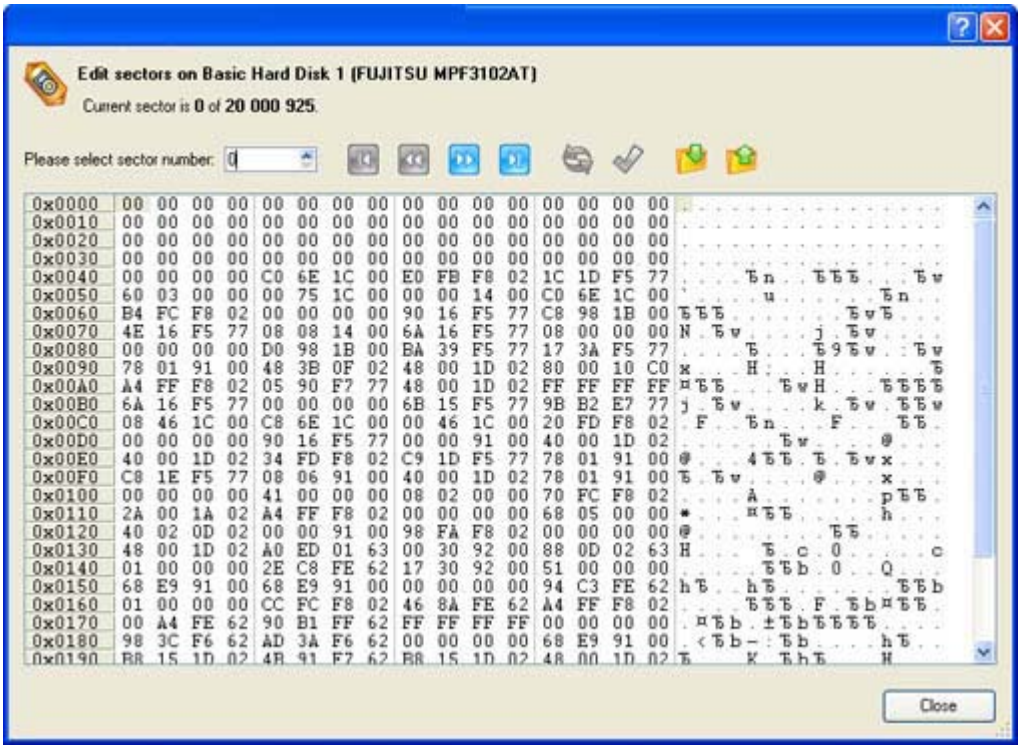
With the built-in *Edit/View Sectors* tool the program enables to view/edit sectors on existing partitions/hard disks providing the possibility to directly access and modify sectors, save and restore sectors from specified files, navigate through the system metadata, etc.

In order to start the *Edit/View Sectors* operation the user should take the following steps:

1. Select a hard disk/partition on the Disk Map.

2. Call the *Edit/View Sectors* dialog to define appropriate settings. There are several ways to do it:

- Select in the Main menu: *Partition/Hard Disk > Edit/View Sectors*.
- Call the popup menu for the selected partition/hard disk (right click of the mouse button) on the Disk Map, then select the menu item: *Edit/View Sectors*.



Careless use of the Edit Sectors function may result in the irreversible data corruption.

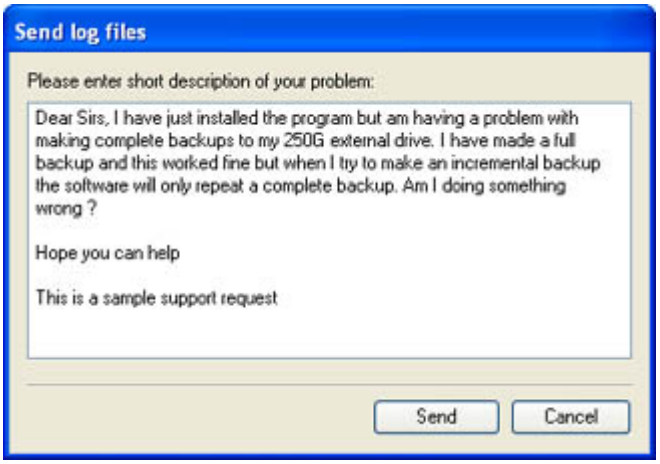
12.12 Send Log Files

The program allows the user to simplify the procedure of sending support requests to the Paragon Support Team. In case of having difficulties with handling the program, the user, with the help of this very function, can address the company support engineers and provide them with all the information they need such as disk layout, performed operations, etc. in order to tackle the encountered problem. Information of that kind is stored in Log files.

In order to start the operation the user should take the following steps:

1. Call the *Send Log Files* dialog in the Main menu: *Tools* > *Send Log Files*

2. Give a detailed description on the encountered problem.



By clicking the *Send* button the built-in mail client will generate a template request with attached compressed log files and then send it to the Paragon Support Team.

12.12.1 Log Files

Log files are simple textual files that can be opened by any text editor. There are several log files automatically generated by the program:

Stubact.log	Contains in-depth information on parameters and performance of all operations carried out by the program
Pwlog.txt	Besides brief overview on operations it also contains detailed information about the state of all hard disks
Cdb.log	Contains low-level information on the CD/DVD devices used in the system
BioNTlog.txt or Bio95log.txt	It is an OS-dependent supplementary log file derived from Bioxx.dll. It may contain valuable information on Windows family operating systems

Log files do not contain any confidential information on the operating system settings or the user documents.

The Send Log Files function is only available when outgoing mail server (SMTP) and the user e-mail address are properly set. To learn more about it please consult the Settings Overview chapter.

13 Glossary

Active partition is a partition from which an x86-based computer starts up. The active partition must be a primary partition on a basic disk. If you use Windows exclusively, the active partition can be the same as the system volume.
In the *DOS partitioning scheme*, only Primary Partitions can be active due to limitations of the standard bootstrap.

Backup Capsule is a specially secured place on the hard disk which is used to store backup images. The backup capsule has an independent system layout (e.g. a separate partition) and is even operable when the active file system is damaged. To avoid a removal or unauthorized access to the data, this partition is hidden and cannot be mounted in the operating system. The content of the backup capsule is only available for browsing when using special software.

Backup Image is an archive of the disk, which includes all the on-disk files and service information on the disk layout. To restore disks from such an archive means retrieving all informational components of the disk (e.g. a hard disk image consists of its partitions, the Partition Table and even bootstrap code).

Bootable Archives are created by adding a special bootable section when the user is backing up the data to CD/DVDs. The user is able to restore the data from these archives without having to run the program, but by simply booting from these CD/DVDs.

Cluster is the smallest amount of disk space that can be allocated to hold a file. All file systems used by Windows organize hard disks based on clusters, which consist of one or more contiguous sectors. The smaller the cluster size, the more efficiently a disk stores information. If no cluster size is specified during formatting, Windows picks defaults based on the size of the volume. These defaults are selected to reduce the amount of space that is lost and the amount of fragmentation on the volume. A cluster is also called an allocation unit.

Extended Partition is a type of partition that you can create only on basic master boot record (MBR) disks. Extended partitions are useful if you want to create more than four volumes on a basic MBR disk. Unlike primary partitions, you do not format an extended partition with a file system and then assign a drive letter to it. Instead, you create one or more logical drives within the extended partition. After you create a logical drive, you format it and assign it a drive letter. An MBR disk can have up to four primary partitions, or three primary partitions, one extended partition, and multiple logical drives.

File system metadata. The servicing structures of a file system, which contain information about allocating files and directories, security information etc, are named file system metadata. File system metadata are invisible for users and ordinary applications because accidental modifications of the metadata usually make a partition unusable.

Hard disk geometry. Traditionally, the usable space of a hard disk is logically divided into *Cylinders*, Cylinders are divided into *Tracks* (or *Heads*), and Tracks are divided into *Sectors*.

The triad of values {[Sectors-per-Track], [Tracks-per-Cylinder], [Amount-of-Cylinders]} is usually named *Hard Disk Geometry* or *C/H/S geometry*.
Tracks and Cylinders are enumerated from "0", while Sectors are enumerated beginning with "1".
These disk parameters play an essential role in the *DOS Partitioning scheme*. The alignment of partitions takes the parameters of the hard disk geometry into consideration.

Modern hardware uses an advanced scheme for the *linear addressing* of Sectors, which assumes that all on-disk sectors are continuously enumerated from “0”. To allow backward compatibility with older standards, modern hard disks can additionally emulate C/H/S geometry.

Hidden partitions. The concept of hidden partitions was introduced in the IBM OS/2 Boot Manager. Operating systems do not mount "hidden" partitions, which prevents access to their contents.

A method of hiding partitions consists in changing the Partition ID value that is saved in an appropriate entry of the Partition Table. This is achieved by XOR-ing the Partition ID with the 0x10 hexadecimal value.

This method only works when the set of usable Partition ID values is very limited, since large sets of usable Partition IDs can lead to confusing file system types; for example, Ext2 partitions are marked with the 0x83 Partition ID value. A hidden Ext2 partition would be marked with the 0x93 Partition ID value, which is identical with the Amoeba File system Partition ID.

Magnetic Force Microscopy (MFM) is an effective tool to magnetic investigations on submicron scale. Image obtained by MFM is the space distribution of some parameter characterizing magnetic probe-sample interaction, i.e. interaction force, amplitude of vibrating magnetic probe, etc. The MFM technology can be successfully used to resurrect deleted information.

Master File Table (MFT) is a relational database that consists of rows of file records and columns of file attributes. It contains at least one entry for every file on an NTFS volume, including the MFT itself. MFT is similar to a FAT table in a FAT file system.

MBR & 1st track of the hard disk is the 0th sector of the disk. MBR (Master Boot Record) contains important information about the disk layout:
- The partitioning scheme.
- The starting records of the Partition Table.
- The standard bootstrap code (or the initial code of boot managers, disk overlay software or boot viruses).

Generally, the 0th sector is used for similar purposes in all existing partitioning schemes.
The capacity of the MBR is not sufficient to place sophisticated boot programs. This means that the on-boot software uses the entire 0th track of the hard disk in addition to the 0th sector because it is not included in any partition. For example, boot managing utilities such as LILO, GRUB and Paragon Boot Manager are located in the 0th track.

Partition ID (or File system ID) is the identifier of a file system that is placed in the partition. The partition ID is used to quickly detect partitions of supported types. Some of the operating systems rely completely on the Partition ID when distinguishing supported partitions, while others again do not.
The partition ID is saved in appropriate entries of the *Partition Table*. It takes up only 1 byte of space.

Partition Label (sometimes also referred to as Volume Label) is a small textual field (up to 11 characters) that is located in the partition's boot sector. This value is used for notification purposes only. It is detectable by any partitioning tool including DOS' FDISK utility.

Modern operating systems use other methods to save the Volume Label within the file system, e.g. as a special hidden file. The Volume Label is able to contain a relatively large amount of text in multiple languages. In general, the Volume Label and the Partition Label are rather different.

Partitioning scheme is a set of rules, constraints and the format of on-disk structures that keep information of the partitions that are located on the hard disk. There are several partitioning schemes, which can be used. The most popular partitioning scheme is the so-called *DOS partitioning scheme*. It was introduced by IBM and Microsoft to use multiple partitions in the disk subsystems on IBM PC compatible computers.

Another popular partitioning scheme is the so-called *LDM* (Logical Disks Model) that originates from UNIX mainframe systems. The Veritas Executive accommodates the simplified version of LDM to the Windows 2000 operating system.

Windows 2000 and XP support two quite different partitioning schemes: the old DOS partitioning scheme and the new Dynamic Disk Management (DDM). The problem is that older versions of Windows do not support DDM. In addition, most hard disk utilities do not support it as well.

Recovery Media is a CD or DVD (or even a floppy disk) from which the user can boot and recover the system.

Root Directory is the top-level directory of a formatted logical drive. The Root Directory includes other files and directories.
In modern file systems (e.g. Ext2/Ext3, FNTFS and even FAT32), the Root Directory does not differ from other directories in properties. This is not the case for old FAT12 and FAT16 file systems.

Serial Number. In the DOS partitioning scheme, every hard disk and every partition has a Serial Number, which consists of 32 bits and is represented by an 8-figure hexadecimal value.

The hard disk's Serial Number is stored in the MBR. Its value is assigned when the MBR sector is initialized by standard disk managing tools from Microsoft, such as Windows Disk Administrator and FDISK utility.

In fact, the hard disk's Serial Number is not important for most operating systems and software. It is known that Windows NT, 2000 and XP store hard disks’ Serial Number values in the database of assigned drive letters.

A partition's Serial Number is stored in its Boot Sector (in FAT16, FAT32 and NFTS file systems). Its value is assigned when the partition is formatted. In fact, the partition's Serial Number does not play an important role for most operating systems and software.