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Partition ManagerTM 10 for Virtual Machines

User Manual

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Introduction

Partition Manager 10 for Virtual Machines is a special version of our Linux/DOS bootable environment (delivered as an ISO image) that contains fully functional Partition Manager 10 Professional. It's optimized to work with virtual machines of any virtualization software vendor – backup/restore virtualized systems, re-partition and clone virtual disks, fix boot problems, optimize performance of NTFS and FAT file systems, etc. If you do care about effective data organization and speed of your virtual machines – this very tool is exactly what you need.

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



Our company is constantly releasing new versions and updates to its software, that's why images shown in this manual may be different from what you see on your screen.

Features Overview

This chapter dwells upon key benefits and technical highlights of the product.

Key	Features
-----	----------

Features	Benefits
Support for GPT	Enjoy support of GPT (GUID Partition Table) disks, used now in Windows 7/Vista, Server 2008, Mac OS X and Linux
Merge partitions	Consolidate the disk space, which originally belongs to two adjacent partitions (NTFS, FAT16/FAT32), into a single, larger partition
<u>Redistribute free space</u>	Increase free space on one partition by up-taking the on- disk unallocated space and the unused space of other partitions
Backup/Restore	Back up separate partitions or entire virtual disks of any virtualization software vendor to get everything back on track in minutes when a disaster strikes
<u>Smart Defrag</u>	27 defragmentation strategies available to defragment FAT and NTFS file systems
<u>Boot Corrector</u>	Fix most of the system boot problems that can be a result of a human factor, program error, or a boot virus activity
<u>File Transfer Wizard</u>	Replace corrupted data from a previously created image in case of an operating system failure as well as transfer data between virtual and physical environments

Virtual operations	Preview changes before they are applied and chain multiple operations into one job
Change cluster size	Control the waste space factor and performance of the files input-output activity
View/Edit sectors	Directly access and modify sectors on virtual disks, save and restore sectors from specified files, navigate through the system metadata, etc.

Supported Technologies

Along with using innovative technologies from outside, Paragon has developed a number of its own original technologies that make its products unique and attractive for customers:

- **Paragon Power Shield™** technology to provide data consistency in case of a hardware malfunction, power outages or an operating system failure.
- **Paragon UFSD™** technology to browse partitions of any file system including hidden and unmounted, modify and copy files and folders, etc.
- **Paragon Restore with Shrink™** technology to restore a backup image to a free block of smaller size taking into account only the amount of actual data of the image.
- Paragon Smart Partition™ technology to securely perform hard disk partitioning operations of any complexity.
- **Microsoft Dynamic Disk** (simple, spanned, striped, mirrored, RAID-5) to offer more management flexibility without the partition limitation of basic disks. Dynamic storage can be particularly beneficial for large-scale businesses when dealing with many physical hard disks involving complex setup.
- **GUID Partition Table** (GPT). It is the next generation of a hard disk partitioning scheme developed to lift restrictions of the old MBR. GPT disks are now supported by Windows Vista/7, Server 2008, Mac OS X and Linux.

Supported Virtual Machines

You can use our Linux/DOS environment with virtual machines of any vendor that supports startup from a bootable ISO image.

Supported File Systems

- NTFS (v1.2, v3.0, v3.1)
- FAT16
- FAT32
- Linux Ext2FS
- Linux Ext3FS

- Linux Ext4FS
- Linux Swap
- Apple HFS+
- Other file systems (in the sector-by-sector mode)



Unfortunately, support of non-Roman characters for the HFS+ file system is unavailable at the moment. The company is about to implement it in the nearest future.

Supported Media

- Parallel ATA (IDE) HDD
- Serial ATA (SATA) HDD
- External SATA (eSATA) HDD
- SCSI HDD
- All levels of SCSI, IDE and SATA RAID controllers
- RAID support (hardware and software)
- CD-R/RW
- DVD-R/RW
- DVD+R/RW
- DVD+/-R (DL)
- BD-R
- BD-RE
- USB 1.x/2.0 and IEEE 1394 (FireWire) devices
- PC card storage devices

Getting Started

In this chapter you will find all the information necessary to get the product ready to use.

Contacting Paragon Technology GmbH

If you have any questions about the company products, please do not hesitate to contact Paragon Technology GmbH.

Service	Contact
Visit Paragon GmbH web site	<u>www.paragon-</u> software.com
Registration & updates web- service	<u>kb.paragon-</u> <u>software.com</u>
Knowledge Base & Technical Support	<u>kb.paragon-</u> software.com
Pre-sale information	<u>sales@paragon-</u> <u>software.com</u>

Minimal System Requirements

- IBM AT compatible computer with i486 or higher CPU
- 256 MB of RAM
- SVGA-compatible monitor
- Mouse (recommended)

Booting from the Linux/DOS Environment

With our Linux/DOS bootable environment (delivered as an ISO image) you can boot a virtual machine into Linux or PTS DOS to get access to its hard disk(s) for maintenance or recovery purposes. It also has the PTS DOS safe mode, which may help in a number of non-standard situations such as interfering hardware settings or serious problems on the hardware level. In this case, only basic files and drivers (such as hard disk drivers, a monitor driver, and a keyboard driver) will be loaded.

In general the operation involves two actions:

- <u>Connecting our environment to a virtual machine;</u>
- <u>Booting from our environment</u>.

Connecting our environment to a virtual machine

There are many different virtualization software vendors presented on the market today. The most popular are VMware, Microsoft, Citrix, and Sun. Each of them enables to connect a bootable ISO image to a virtual machine to start it up from it. Although the operation scenario is quite similar for different vendors, there are some peculiarities.

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For VMware Workstation

1. Open a virtual machine.

🕙 USB Controller

Sound Adapter

🖳 Display

Processors

Present

1

Auto detect

Auto detect

2. Click on **Edit virtual machines settings**, then select **CD-ROM...**, or just double click on **CD-ROM...**



3. Select **Use ISO image**, and then click **Browse** to browse for our bootable environment. Click **Open** when ready.

Device status Connected Connect at p	ower on				
Connection					
🔘 Use physical	drive:				
Auto detect	~				
Connect	exclusively to this virt	ual machine			
Legacy e	mulation				
	26::	Browse			
		Advanced			
Look in:	PM10_for_VM	Solution (1998)	Þ	 +	
My Recent Documents	psg-128-see_lin	uxrcd_10.0.10.10402_000.iso			
Desktop					
My Documents					
My Computer					
S	File name:	psg-128-see linuxrcd 10.0.10.10402 000.iso	*		Qpen
My Network	Files of type:	CD-ROM images (*.iso)	~		Cancel

- 4. Click OK to finish.
- 5. Enter BIOS of the virtual machine by pressing **Esc** during the startup, and then select **CD-ROM Drive** as the first boot device. So you make sure the virtual machine will automatically start up from our environment.

Main	Advanced	Security	Power	Boot	
					1
CD-1	ROM Drive				
+Hare	d Drive				
+Rem	ovable Devices	5			Kei
Net	Jork hoot from	- Intel E1000			COL
100	JOIN DOOL IIO	" INCOI MIVVV			<f1< td=""></f1<>

6. Save changes and exit BIOS.

Main	Advanced	Security	Power	Boot	Exit
F. 34 0					Item Spe
Exit Sa Exit D	iscarding Changes	nges		F	
Load Se	etup Defaults				Exit Syste
Discard	1 Changes				save your
Save C	nanges				CMOS.

For Microsoft Virtual PC

1. Select a virtual machine, and then click Start.



2. Select Capture ISO Image... in the CD menu.

🍑 XP Virtual Machine - Microsoft Virtual PC 2007				
<u>A</u> ction <u>E</u> dit	CD Eloppy Help			
AMIBIOS(C BIOS Date	Use Physical Drive D: Use Physical Drive F: atrends, Inc. Capture <u>I</u> SO Image J Ver: 08.00.02			
Press DEL Checking	Release CD Eject CD			
512MB OK Auto-Dete Auto-Dete Auto-Dete Auto-Dete	cting Pri Channel (0)IDE Hard Disk cting Pri Channel (1)Not Detected cting Sec Channel (0)CDROM cting Sec Channel (1)			

3. Browse for our bootable environment. Click **Open** when ready.

Look in: TitualPC I I I I I I I I I I I I I I I I I I I	
Image: CDtools My Recent Documents Image: CDtools Image: CDtools </td <td></td>	
Desktop My Documents My Computer	
My Network Places File name: PM10 for VM.iso Files of type: CD Images (*.iso)	n zel

4. Enter BIOS of the virtual machine by pressing **Delete** during the startup, and then select **CD**-**ROM** as the first boot device. So you make sure the virtual machine will automatically start up from our environment.



5. Press F10 to save changes and exit BIOS.

For Sun VirtualBox

1. Right click of the mouse on a virtual machine, and then select Settings...



2. Go to the **Storage** section, and then click on the CD/DVD icon.

🌞 w2	k3x86 - Setting	js	? ×
	General System	Storage	
D	Display	Storage Tree Attributes	
9	Storage	Line Controller 🚱 😪 Name: IDE Controller	
₽	Audio	win2k3ICH.vdi Iype: PIIX4	•
₽	Network	Empty Empty	
	Serial Ports	Ploppy Co	
Ø	USB	Empty You can also change this while	
	Shared Folders	the machine is running.	
		On the Display page, you have assigned less than 14 MB of video memory which is the minimum amount required to switch the virtual machine to fullscreen or seamless mode.	1
	4	Non-optimal settings detected <u>OK</u> Cancel <u>H</u> elp	

3. Browse for our bootable environment. Click **Select** when ready.

Storage Tree	Attributes	
DE Controller	Slot:	IDE Secondary Master
win2k3ICH.vdi	<u>C</u> D/DVD Device:	Empty 📃 🗔
Empty		Empty Host Drive 'D:'
😜 Floppy Controller	Information ———	Host Drive 'F:'
Empty	Size:	
	Location:	
	Attached To:	
@ 😂 🏈 🏳		

<u>A</u> ctions					
8			8	\bigotimes	
New	Add	Remove	Release	Refresh	
🕑 на	ard <u>D</u> isks		/DVD Image	s 🗄 Eloppy Im	ages
Name	e				
	-				

Select a CD/DVD	-ROM disk image	file			? ×
Look jn:	C VirtualPC		•	🗢 🗈 💣 🏢	•
My Recent Documents Desktop My Documents My Computer	CDtools				
My Network Places	File <u>n</u> ame:	PM10 for VM.iso		•	- Rpen
	Files of type:	CD/DVD-ROM images (*.isc)	-	Cancel

Name		
PM10 for	/M.iso	
Location: Attached to:	E:\VirtualPC\PM10 for VM.iso	
Accorda co.	NOT ALLOUDED	
		<u>Select</u> Cancel

4. Go to the **System** section to select **CD/DVD-ROM** as the first boot device. So you make sure the virtual machine will automatically start up from our environment.

📃 General	System
🔝 System	
📃 Display	Motherboard Processor Acceleration
🧐 Storage	Base Memory: 512 MB
🖗 Audio	4 MB 1500 MB
🗗 Network	Boot Order:
🔉 Serial Ports	✓ Fibppy ✓ Hard Disk ✓ Move Up (Ctrl-Up)
🖉 USB	
Shared Folders	Extended Features: 🔽 Enable IO APIC
	Enable EFI (special OSes only)

5. Click **OK** when ready.

Booting from our environment

- 1. Connect our environment to a virtual machine.
- 2. Start up the virtual machine from our environment. The operation procedure differs for virtual machines of different vendors, though it's quite obvious.
- 3. <u>Select the required boot mode</u> (Normal, Safe, Low-Graphics Safe). By default the Normal Mode will be automatically initiated after a 10 second idle period.
- 4. <u>Click on an operation to start</u>. Hints on the selected at the moment item will help you make the right choice.

Boot Menu

 Normal Mode Safe Mode Low-Graphics Safe Mode Floppy disk Hard disk Ø MBR (Paragon) Find OSes on your hard disks 	Main recovery environment
--	------------------------------

The Boot Menu contains the following commands:

- Normal Mode. Boot into the Linux normal mode. This mode uses the full set of drivers (recommended);
- **Safe Mode**. Boot into the PTS DOS mode. This mode can be used as an alternative of the Linux normal mode if it fails to work properly;
- Low-Graphics Safe Mode. Boot into the PTS DOS safe mode. In this case, only the minimal set of drivers will be included, like hard disk, monitor, and keyboard drivers. This mode has simple graphics and a simple menu;
- Floppy Disk. Reboot the virtual machine from a system floppy disk;
- Hard Disk 0. Boot from the primary hard disk;
- Find OS(s) on your hard disks. The program will scan hard disks of the virtual machine to find any bootable operating system.

To move within the menu, please use the arrow keys of the computer keyboard.



While working with our bootable environment you might experience some inconvenience caused by possible video artifacts. It is just a result of changing video modes and in no way will affect the program functionality. If this is the case, please wait a bit and everything will be OK.

Normal Mode

When the Normal mode is selected, the Linux launch menu appears:



- Paragon Partition Manager (enables to copy and back up separate partitions or entire hard disks, carry out partitioning operations, etc.);
- Restore Wizard (allows restoring hard disks and partitions);
- File Transfer Wizard (allows coping files/folders to another disk or a partition as well as recording them to CD/DVD);
- Boot Corrector (helps to correct the Windows System Registry without Windows being loaded);
- Network Configurator (enables to establish a network connection under Linux);



If you are going to use network resources, first launch the Network Configuration Wizard to establish a network connection.

- Log Saver (helps to collect and send the necessary log files to the Technical Support);
- View the mounted partitions (the list of all mounted partitions will be displayed);



Our Linux/DOS environment assigns drive letters to partitions the way it is done in DOS, i.e. one after another, primary partitions at first. Thus mounted partitions may have different drive letters from Windows.

- Start the command line (allows experienced users to execute any operation);
- Reboot the computer;
- Power off the computer.

Safe Mode

When the Safe mode is selected, the PTS DOS launch menu appears. It has nearly the same functionality as for the Normal mode except the **Network Configurator** and **Log Saver** commands. Besides due to certain limitations of the PTS DOS environment, there is no possibility to burn CD/DVD discs.

Low Graphics Safe Mode

When the Low Graphics mode is selected, the PTS DOS launch menu appears. It has the same functionality and looks similar to the Safe mode but graphically simpler.

🥐 Partition Manager 10.0	You can create, delete and
🧇 Simple Restore Wizard	format hard disk partitions
<u>fi</u> File Transfer Wizard	using this program, which
🔚 Boot Corrector	will start now.
	Upon the start, please
🛌 Start the command line	select the drive and one of
🧶 Reboot the computer	its partitions or its free
	space. Then activate the
	'Partition' pull-down menu
	and select one of the
	partitioning operations.

Typical Scenarios

This chapter lists a number of the most frequently used scenarios that may be accomplished with the program. You can find here useful recommendations and descriptions of operations.

Fixing MBR after a Boot Virus Attack

As a result of a boot virus attack the MBR (Master Boot Record) of your virtual system has been corrupted, thus it fails to boot. Our Boot Corrector will help you fix it up in a couple of minutes.

- 1. Connect our environment to a virtual machine.
- 2. Start up the virtual machine from our environment.
- 3. In the boot menu select **Normal Mode** to use the Linux environment (more preferable) or **Safe Mode** to use the PTS DOS environment (in case you've got problems with Linux).





By default the Normal Mode will be automatically initiated after a 10 second idle period.

4. In the Linux launch menu select **Boot Corrector**. You can find it in PTS DOS as well.



5. On the wizard's welcome page, select Correct the Master Boot Record (MBR).



6. On the next page choose the required hard disk from the pull-down list (if several) and then select the **Update the MBR executable code** option.



7. Confirm the operation.

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8. After the operation is completed click the **Report** button to see a well informative summary page. The program also enables to store the resulted report. To do that, just press **Save** and choose the exact location in the opened dialog.

Reporting				
You have successfully completed boot correction. To view the report on the operations performed, click Report.				
Report				
Report 🛛 🛛				
Paragon Boot Corrector's Report				
Operations performed:				
Operation #1: Correct the Master Boot Record Hard disk targeted: Basic Hard Disk 0 Status: Successful				
Date and Time: 2010 Jan 20 Wed 15:42:37				
<u>Save</u> <u>C</u> lose				

- 9. Click **Finish** to close Boot Corrector.
- 10. Reboot the virtual machine from the hard disk.

Copying Data from the Corrupted Virtual System to Network

Your virtual system is severely damaged and doesn't boot. With our solution you can easily retrieve valuable information and copy it to a network drive.

- 1. Connect our environment to a virtual machine.
- 2. Start up the virtual machine from our environment.
- 3. In the boot menu select **Normal Mode** to use the Linux environment, since it's the only mode that enables to work network.



By default the Normal Mode will be automatically initiated after a 10 second idle period.

4. In the Linux launch menu select Network Configurator.



- 5. On the wizard's welcome page, click Next.
- 6. On the Load Config File page, click Next. By default, the wizard saves all network settings in the netconf.ini file located on the Linux RAM drive, thus it will only be available until restart of the virtual machine. However, you can just once configure your network device and then save this file to some other destination, for instance a local drive, and this way avoid constant re-configuration, just by providing a path to it.

Please select the file with network configuration settings.	
_ Select config file	

7. The wizard automatically attempts to detect all available network devices and then displays them (if any) in form of a list. On every found device there's information about its interface and used driver as well as a brief description. You can manually add a network device in case it hasn't been found automatically by clicking **Add a device** and selecting a device you need from the list. Do not forget to check it by clicking **Probe**.

Interface	Driver	Device description
eth0	pcnet32	Advanced Micro Devices [AMD] 79c970 [PCnet32 LANCE] (rev 10)
		Change device Add a device
		Change device Add a device < Back

8. You need to properly set up the selected network device. If your local network has a DHCP, you can just leave everything as is, otherwise manually type in an IP address, a network mask, default gateway, etc.

General			
Obtain an IP address automatically			
O Use the following IP address			
IP address: 1 .0 .0 .0			
Network mask: 255 . 0 . 0			
Default gateway: 1 ,0 ,0 ,0			
DNS servers:			
Parrova			
Wins server: 1 • 0 • 0 • 0			
Network will be restarted on this check select			
< Configure another Restart network > Cancel			

9. On the next page, click **Add** and provide all the necessary information to map a network share in the opened dialog. Click **Unmount** to delete an existing network connection if necessary.

	Mount settings	
Network path: Mount point: Username: Password:	//172.30.30.3/pool /mnt/storage gue st	
Rescan netwo	rk <u>O</u> k <u>C</u> ancel	Add
List of network resou	rces:	
//172.30.30.3/pool	/mnt/storage	
	Unmount Add	

10. Save the netconf.ini file if necessary and click **Finish** to complete the wizard. Copyright© 1994-2010 Paragon Software Group. All rights reserved.



11. In the Linux launch menu select File Transfer Wizard.



- 12. On the wizard's welcome page, click Next.
- 13. Select a disk where the files you need are stored from the pull-down list in the right pane of the page.



14. Select files you want to copy and place them to Clipboard by pressing the left arrow-button.

Clipboard	_	Source	
imnt/disk/sda1/Documents and Setting		Default User	~
		🔁	^
		🚞 Application Data	
		Cookies	
		🛅 Desktop	
		🛅 Favorites	Ξ
		🛅 Local Settings	
		🛅 My Documents	
		🛅 NetHood	
		Contraction PrintHood	
		🛅 Recent	
<		🛅 SendTo	~
Total data size: n/a Calc]	Rename (F6) Delete (F8)	

Click the Calc button to estimate the resulted data size.

15. Choose the way the data will be stored. Select **Save data to any local drive or a network share**.



16. Select the previously mapped network share to copy the data to by pressing the standard browse button [...].

25

	Select path	
Look in: / (Root d /MyCom /mt(Me /mt/dis /mt/dis /media (C:\ (NT C:\ (NT) pool (Ne	My computer Iir) uputer (My computer) punted resources) k (Local disks) Removable disks) FS, 0 on Disk 0) (Local disk) FS, 1 on Disk 0) (Local disk) etwork share)	ta from
File name: File type:	All files (*.*)	£
Select path - /mnt/storage Space avail. Total data si	e/storage able on destination: n/a ize: 10.0 Hr	

17. Check all parameters of the operation. Click **Next** to accomplish the operation.

Total data size:	10.0 Hr
Data save destination:	Save the data locally
Settings	
Destination nath:	/mnt/storage/storage
bestination pain.	Innestorage/storage
To start transfer process click Next	

18. In the Progress window you can see in real-time a detailed report on all actions carried out by the program.

Operations list:		Sub	operation progress	
1: Transfer user data				
		Op	peration progress	
	Time elapsed:	00:00:00	Time to finish:	00:00:00
	Copied so far:	0.01 MB		
		c)verall progress	
Transfering "/mnt/disk/sda1/Docu All operations have been finished	ments and Setting	s/Default Use	er/My Documents" to "/m	nnt/storage/storage/l
	C	lose 💦		

19. After the operation is completed, close the wizard by pressing the appropriate buttons.

20. Turn off the virtual machine.

Resizing a Virtual Disk

You've got several partitions on a virtual disk. After installing a number of resource-consuming applications and system updates the system partition has started to suffer from the lack of free space. But an adjacent partition has a plenty of redundant space. With our solution you can easily redistribute free space between partitions of your virtual disk with one operation only.

- 1. Connect our environment to a virtual machine.
- 2. Start up the virtual machine from our environment.
- 3. In the boot menu select **Normal Mode** to use the Linux environment (more preferable) or **Safe Mode** to use the PTS DOS environment (in case you've got problems with Linux).



By default the Normal Mode will be automatically initiated after a 10 second idle period.

4. In the Linux launch menu select Paragon Partition Manager. You can find it in PTS DOS as well.



5. In the main menu of the program select: Wizards > Express Resize Wizard.

Disk	Par	tition	Ch <u>a</u> nges	Wizards	H <u>e</u> lp		
 СD с	Ba	asic Han	d Disk 0 (VM : Free	Copy H Backup Restore	ard Disk Wizard Wizard		
 Size	Ba	sic Hard	Disk 0	Undelet Express	e Partitions s Resize Wizard	rtual, Size	98.1 GB
	B	Volum asic Ha	e Type rd Disk 0 (S	File Tra	unsfer Wizard	Used	Free
ition. em	0	C:	Primar	Boot Co	orrector	1.6 GB	387 ME
	1 2	D: *:	Primar Primar	Network	Configurator	2.5 GB	2.4 GB

- 6. On the wizard's welcome page, click **Next**.
- Increase size of the system partition with the slider or manually by entering the required value.
 Please note, when you change size of one partition the size of the other will be changed as well, thus redistributing unused space between the partitions.

	ion:		
Basic Hard Disk 0 (VMwar	re Virtual) - 98.1 GB		
D: *: Free			
Set new sizes of selected r	artitions		
bet new sizes of selected p	annons		
NTFS (2.3 GB)		NTFS (4.6 GB)	
NTFS (2.3 GB)		 NTFS (4.6 GB)	мв
NTFS (2.3 GB)		 N	ITFS (4.6 GB)



If you've got more than two partitions on your hard disk and a partition you need to increase is surrounded by other partitions, you've got the choice to choose which partition will act as a space donor. Just click on the left partition of the pair, as the right one will be selected automatically.

- 8. Click **Finish** to complete the wizard.
- 9. Click **Apply** to execute the operation.

	Applying changes 🛛 🛛
	1 pending operations Apply changes ?
<	Yes No Details
Undo last	
Undo all	
Apply	You have pending operation

10. In the Progress window you can see in real-time a detailed report on all actions carried out by the program.

Operations list:		Su	boperation progres	55
1: Redistribute partitions				
		C	peration progress	
	Time elapsed:	00:00:04	Time to finish	n: 00:00:27
	Copied so far:	0.03 MB	Read so far:	17.8 MB (4.9 MB/s)
			Write so far:	0.0 MB (0.0 MB/s)
			Overall progress	
(Restart enabled)				
Modifying drive /dev/sda2 on hard	disk 0			
Checking parameters				
Checking files and directories				
Z	C	ancel		

Optimizing a Virtual Disk

You've noticed that performance of your virtual system has been significantly decreased due to heavy fragmentation of files on its disks formatted to NTFS. With our solution you can effectively fight against this problem with no fear of data loss even in case of a power outage or an OS failure.

- 1. Connect our environment to a virtual machine.
- 2. <u>Start up the virtual machine from our environment</u>.
- 3. In the boot menu select **Normal Mode** to use the Linux environment (more preferable) or **Safe Mode** to use the PTS DOS environment (in case you've got problems with Linux).

🔊 Normal Mode	Main recovery
🏽 Safe Mode	environment
🍙 Low-Graphics Safe Mode	
📼 Floppy disk	
📾 Hard disk Ø MBR 🛛 (Paragon)	
📾 Find OSes on your hard disks	



By default the Normal Mode will be automatically initiated after a 10 second idle period.

4. In the Linux launch menu select Paragon Partition Manager. You can find it in PTS DOS as well.



5. In the main window of the program right click of the mouse on an NTFS partition, and then select: **Modify > Defragmentation**...

Ν	Volume	Туре	File System	Size	2	Used	Free
В	asic Hard	Disk 0 (Size 98	.1 GB)				
0	C:	Primarv	NTFS	2.3	GВ	1.6 GB	696 MB
1	D:	Back Up Partiti	on	Alt-B	ŝВ	2.5 GB	2.1 GB
2	*:	Burn Partition	on CD or DVD		GB		
		Restore Partitio	on	Alt-R			
		Copy Partition		Alt-C			
		Format Partitio	n	Alt-F			
		Delete Partition	1	Hide			
		Move/Resize P	artition	Set in	active		
		Convert File S	ystem	Chan	ge Clus	ter Size	
		Unmount		Chan	ge Volu	me Label	
	-	N. 117		Chan	ge Seri	al Number	
		Modify		Chan	ge Parti	ition ID	
	-	Test Surface	· · · ·	Downg	grade N	ITFS versio	n
		Check File Sv	tem Integrity	Comp	act \$MI	FI	
		Check The By		Chang	ge SID.		
		Edit/View Secto	rs	Make	logical		
		Properties		Defrag	menta	tion	
				\$MFT	Defrag	mentation	
		You ha	we pending o				

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6. In the opened dialog define settings of the operation. To improve the performance we recommend you to mark the **Do not save content of the Pagefile.sys or (and) Hiberfile.sys** checkbox as these files are only needed for the current Windows session.

You are about to defra system is NTFS.	agment volume C:, [No label], file
- Select order in which files/direc	tories should be placed
Put directories:	First 🗸
Sort by size:	Do not sort 💙
Sort by modification time:	Do not sort 💌
Defragmentation mode:	Safe (recommended)
☑ Do not save content of page	file.sys and hiberfil.sys
	Ok Cancel



The Defragment Partition dialog offers a number of additional parameters that can also be of help. However here we pay attention to the most relevant to fulfill our task.

- 7. Click **OK** to complete the dialog.
- 8. Click Apply to execute the operation.

	Applying changes 🛛 🔀
	1 pending operations Apply changes ?
	Yes No Details
Undo last	
Undo all	
Apply	You have pending operation

9. At first the program will analyze the selected partition for data fragmentation and report on the results. Click **Defragment** to confirm the operation.

/olume (C))		1
Volume si	ze:	= 2.3 GB	
Cluster siz	ze:	= 2.048 Bytes	
Used size	:	= 1.6 GB (70%)	
Free size:		= 693 MB (30%)	
Free spac	e fragments:	= 1007	
Free spac	e fragmentat	ion: = 56%	
lles fragme	entation		>
-iles fragme	entation:		
Fragments	File Size	File Name	
Fragments	File Size	File Name /pagefile.sys	^
Fragments	File Size 1.0 GB 258 Hr	File Name /pagefile.sys /WINNT/Installer/8ea7.msi	
Fragments 3075 5 3	File Size 1.0 GB 258 Hr 104 Hr	File Name /pagefile.sys /WINNT/Installer/8ea7.msi /WINNT/system32/NtmsData/NTMSDATA.BAK	
Fragments 3075 5 3	File Size 1.0 GB 258 Hr 104 Hr 80.0 Hr	File Name /pagefile.sys /WINNT/Installer/8ea7.msi /WINNT/system32/NtmsData/NTMSDATA.BAK /WINNT/system32/NtmsData/NTMSIDX	
Fragments 3075 5 3 4	File Size 1.0 GB 258 Hr 104 Hr 80.0 Hr	File Name /pagefile.sys /WINNT/Installer/8ea7.msi /WINNT/system32/NtmsData/NTMSDATA.BAK /WINNT/system32/NtmsData/NTMSIDX	~
Fragments 3075 5 3 4	File Size 1.0 GB 258 Hr 104 Hr 80.0 Hr	File Name /pagefile.sys /WINNT/Installer/8ea7.msi /WINNT/system32/NtmsData/NTMSDATA.BAK /WINNT/system32/NtmsData/NTMSIDX	×
Fragments 3075 5 3 4	File Size 1.0 GB 258 Hr 104 Hr 80.0 Hr	File Name /pagefile.sys /WINNT/Installer/8ea7.msi /WINNT/system32/NtmsData/NTMSDATA.BAK /WINNT/system32/NtmsData/NTMSIDX	×
Fragments 3075 5 3 4	File Size 1.0 GB 258 Hr 104 Hr 80.0 Hr	File Name /p agefile.sys /WINNT/Installer/8ea7.msi /WINNT/system32/NtmsData/NTMSDATA.BAK /WINNT/system32/NtmsData/NTMSIDX Defragment	

10. In the Progress window you can see in real-time a detailed report on all actions carried out by the program.

Operations list:	Suboperation progress		
1: Partition defragmentation			
	Operation progress		
	Time elapsed: 00:00:01	Time to finish:	00:00:03
		Overall progress	
			1
Getting clusters bitmap			
Defragging Volume			
Analyzing NTFS			
Sorting elements			
Defragging NTFS			
	Cancel	X	



The operation needs time to complete, so please be patient and do not turn off the machine until it completes.