Norton Ghost™ Personal Edition
User's Guide

Norton Ghost™ Personal Edition User's Guide

Copyright Notice

Trademarks

Printed in the United States of America.

10 9 8 7 6 5 4 3 2 1

SYMANTEC LICENSE AND WARRANTY

NOTICE: SYMANTEC LICENSES THE ENCLOSED SOFTWARE TO YOU ONLY UPON THE CONDITION THAT YOU ACCEPT ALL OF THE TERMS CONTAINED IN THIS LICENSE AGREEMENT. PLEASE READ THESE TERMS CAREFULLY. IF YOU DO NOT AGREE TO THESE TERMS, THEN SYMANTEC IS UNWILLING TO LICENSE THE SOFTWARE TO YOU, IN WHICH EVENT YOU SHOULD RETURN THE FULL PRODUCT WITH PROOF OF PURCHASE TO THE DEALER FROM WHOM IT WAS ACQUIRED WITHIN SIXTY DAYS OF PURCHASE, AND YOUR MONEY WILL BE REFUNDED.

LICENSE AND WARRANTY:

The software which accompanies this license (the "Software") is the property of Symantec or its licensors and is protected by copyright law. While Symantec continues to own the Software, you will have certain rights to use the Software after your acceptance of this license. Except as may be modified by a license addendum which accompanies this license, your rights and obligations with respect to the use of this Software are as follows:

• You may:

(i) use the Software on one computer to clone, or apply an image of, a hard drive on that computer, or a portion thereof, to another hard drive on the same computer;

(ii) use the Software on that same computer to create an image file of a hard drive on that computer and store the image file on removable media for disaster recovery purposes;

(iii) use the Software to create a boot disk as described in the documentation for reapplying the hard drive image that was created for disaster recovery purposes to the hard drive on that same computer;

(iv) use the Software to clone a hard drive from that same computer to a replacement computer, in the manner described in the software documentation, and to use the Software on the replacement computer provided that the Software has been removed from the original computer;

(v) make one copy of the Software for archival purposes, or copy the Software onto the hard disk

of your computer and retain the original for archival purposes;

(vi) after written notice to Symantec, transfer the Software on a permanent basis to another person or entity, provided that you retain no copies of the Software and the transferee agrees to the terms of this agreement.

• You may not:

(i) use the Software commercially or non-commercially for the purpose of creating multiple computers or hard drives not connected to the original computer, with similar or identical configurations to that of the original computer or hard drive;

(ii) copy the documentation which accompanies the Software;

(iii) sublicense, rent or lease any portion of the Software;

(iv) reverse engineer, decompile, disassemble, modify, translate, make any attempt to discover the source code of the Software, or create derivative works from the Software; or

(v) use a previous version or copy of the Software after you have received a disk replacement set or an upgraded version as a replacement of the prior version, unless you donate a previous version of an upgraded version to a charity of your choice, and such charity agrees in writing that it will be the sole end user of the product, and that it will abide by the terms of this agreement. Unless you so donate a previous version of an upgraded version, upon upgrading the Software, all copies of the prior version must be destroyed.

• Sixty Day Money Back Guarantee:

If you are the original licensee of this copy of the Software and are dissatisfied with it for any reason,

you may return the complete product, together with your receipt, to Symantec or an authorized dealer, postage prepaid, for a full refund at any time during the sixty day period following the delivery to you of the Software.

• Limited Warranty:

Symantec warrants that the media on which the Software is distributed will be free from defects for a period of sixty (60) days from the date of delivery of the Software to you. Your sole remedy in the event of a breach of this warranty will be that Symantec will, at its option, replace any defective media returned to Symantec within the warranty period or refund the money you paid for the Software. Symantec does not warrant that the Software will meet your requirements or that operation of the Software will be uninterrupted or that the Software will be error-free.

THE ABOVE WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU MAY HAVE OTHER RIGHTS, WHICH VARY FROM STATE TO STATE.

• Disclaimer of Damages:

REGARDLESS OF WHETHER ANY REMEDY SET FORTH HEREIN FAILS OF ITS ESSENTIAL PURPOSE, IN NO EVENT WILL SYMANTEC BE LIABLE TO YOU FOR ANY SPECIAL, CONSEQUENTIAL, INDIRECT OR SIMILAR DAMAGES, INCLUDING ANY LOST PROFITS OR LOST DATA ARISING OUT OF THE USE OR INABILITY TO USE THE SOFTWARE EVEN IF SYMANTEC HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

SOME STATES DO NOT ALLOW THE LIMITATION OR EXCLUSION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

IN NO CASE SHALL SYMANTEC'S LIABILITY EXCEED THE PURCHASE PRICE FOR THE SOFTWARE. The disclaimers and limitations set forth above will apply regardless of whether you accept the Software.

• U.S. Government Restricted Rights:

RESTRICTED RIGHTS LEGEND. All Symantec products and documentation are commercial in nature. The software and software documentation are "Commercial Items", as that term is defined in 48 C.F.R. 2.101, consisting of "Commercial Computer Software" and "Commercial Computer Software Documentation", as such terms are defined in 48 C.F.R. 252.227-7014(a)(5) and 48 C.F.R. 252.227-7014(a)(1), and used in 48 C.F.R. 12.212 and 48 C.F.R. 227.7202, as applicable. Consistent with 48 C.F.R. 12.212, 48 C.F.R. 252.227-7015, 48 C.F.R. 227.7202 through 227.7202-4, 48 C.F.R. 52.227-14, and other relevant sections of the Code of Federal Regulations, as applicable, Symantec's computer software and computer software documentation are licensed to United States Government end users with only those rights as granted to all other end users, according to the terms and conditions contained in this license agreement. Manufacturer is Symantec Corporation, 10201 Torre Avenue, Cupertino, CA 95014.

• General:

This Agreement will be governed by the laws of the State of California. This Agreement may only be modified by a license addendum which accompanies this license or by a written document which has been signed by both you and Symantec. Should you have any questions concerning this Agreement, or if you desire to contact Symantec for any reason, please write: Symantec Customer Sales and Service, 10201 Torre Avenue, Cupertino, CA 95014.

C O N T E N T S

CHAPTER 1

About Norton Ghost Personal Edition

Norton Ghost is the fast and reliable software solution to satisfy all your PC disk cloning and copying needs: upgrading hard drives, backing up for disaster recovery, or migrating from your old PC to a new PC.

Caution: Norton Ghost Personal Edition is a powerful utility program that performs complex operations on your computer. It is recommended for experienced and highly skilled PC users only.

Norton Ghost clones either complete disks or specified partitions:

- An entire disk can be either cloned directly from one disk to another or saved into a Norton Ghost image file. The image file can be used as a template to create copies of the original disk.
- The contents of a partition can be copied to another partition. Selected partitions can be copied to an image file that is used as a template to create copies of the original partitions.

When cloning complete hard drives, procedures such as FDISK and FORMAT are a thing of the past. Norton Ghost dynamically partitions and formats a target disk on the fly. The source and target disks can be different sizes. Norton Ghost adjusts the position and size of the target partitions automatically, FAT12, FAT16, FAT32, and NTFS partitions are expanded or contracted to fit the target. The source and target disk can be on the same computer, or the target disk can be on a different computer, providing the two computers are connected through NetBIOS or the parallel ports.

Norton Ghost copies every required partition, regardless of type, from the source (disk or image file) to the target. If the source and target disks are identical in size and structure, Norton Ghost can perform a sector-by-sector copy. Because this is seldom the case and does not allow the resizing of

partitions, Norton Ghost positions each partition or logical drive on the target disk using the same rules as FDISK, copying the partitions on a file-by-file basis.

An image file can be stored on a CD, Superdisk, JAZ or ZIP drive, or other removable media. This file can be used for backup or for cloning copies of the original disk.

Norton Ghost runs in DOS with a simple graphical interface. Alternatively, to simplify repetitive tasks, command-line switches can automate operation.

The Norton Ghost installation CD contains these additional utilities that work with Norton Ghost:

- Ghost Explorer recovers and deletes individual directories and files from an image file.
- GDISK is a complete replacement for the FDISK and FORMAT utilities that allows on-the-fly formatting, better disk space utilization, batch mode operation, hiding and unhiding of partitions, and extensive partition reporting.

  Unlike FDISK, which uses interactive menus and prompts, GDISK is command line driven and offers quicker configuration of a disk's partitions.

How Norton Ghost works

Because the Norton Ghost executable is small with minimal conventional memory requirements, it can easily be run from a DOS boot disk or alternative storage location within DOS. Norton Ghost can make complete backups of disks or partitions. Norton Ghost even copies in-use system files that other backup utilities miss, making it a great tool for disaster recovery operations.

The following sections give examples of common ways to use Norton Ghost.

Clone internal hard disk drives and individual partitions

With Norton Ghost you can save all of the contents on one internal hard disk drive or partition to another by cloning local disk-to-disk, or partition-to-partition. The hardware must be installed correctly and have the hard disk drive jumpers and CMOS/BIOS correctly configured. As with all

Norton Ghost usage, both the source and destination must be free from file corruption and physical hard disk drive problems prior to cloning.

Note: When cloning an entire hard disk drive, the existing partition configuration is overwritten and need not be set in advance.

Internal transfer operations are one of the fastest methods of cloning, and offer a simple quick hard disk drive backup or migration tool. By using a second hard disk drive as a backup, it can be used to replace the original in the event of its failure or corruption, reducing the downtime of the machine.

Norton Ghost's ability to resize the partitions and file systems it understands while cloning disk-to-disk simplifies upgrading to a larger hard disk drive. Install the new hard disk drive hardware as required, then run Norton Ghost from a boot disk to migrate the contents of the old drive to the larger drive. This leaves the original disk untouched and available until the new system configuration is completed.

Caution: Make sure you correctly identify and select the source and destination disks as the operation cannot be undone.

Save and load image files to and from removable media

It is possible to burn image files onto a CD or to save an image file to a ZIP drive, JAZ drive, Superdisk, or other removable media.

For ZIP, JAZ, Superdisk, and removable media, Norton Ghost writes and reads directly to and from the device, providing that the device is working and has a DOS drive letter.

When creating the image of the model for storage on a CD, we recommend bringing the image down onto the PC that has the writing software, and then creating the CD. Norton Ghost can be included on the created CD.

To create a CD image file for later restoration:

1. Save the model hard disk to an image file using Norton Ghost and the split command-line option.
2. Run the CD writing software and save the image onto the CD.

For restoration purposes, once the device is working and has a drive letter, Norton Ghost can use that drive to perform the required task.

Clone hard disk drives and partitions peer-to-peer

Peer-to-peer connections are typically used when there are two computers that you wish to connect. Norton Ghost gives you the choice of connecting through the NetBIOS or through the LPT (printer) parallel port. In both cases, one computer becomes the master, the other the slave. See "Peer-to-peer connections" on page 18 for more information.

- To connect through the printer port you need a parallel data transfer cable plugged into the LPT port of both computers.
- To connect through NetBIOS you need a network card in each computer, a converted Ethernet cable, and the appropriate networking software. In general, connecting through the network gives two to five times the performance of an LPT connection.

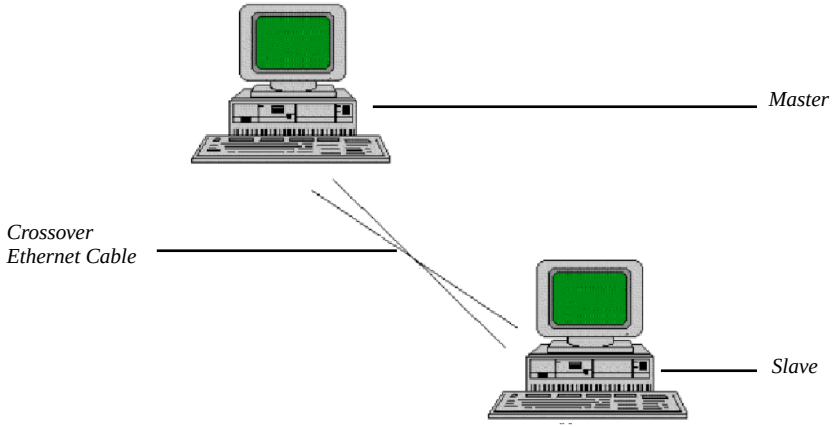
For NetBIOS and LPT connections, one machine must act as the master and the other the slave. All operator input will be on the master computer.

Using the NETBIOS interface

With Ethernet, or Token Ring, it is possible to clone between two machines, using their network interface cards through the NetBIOS protocol interface. By purchasing, or making, a custom connectivity Ethernet crossover cable or using coaxial or a mini-HUB and cables, a PC can connect to another PC. This is a two-node peer-to-peer network. To set up NetBIOS requires five basic Novell networking software components:

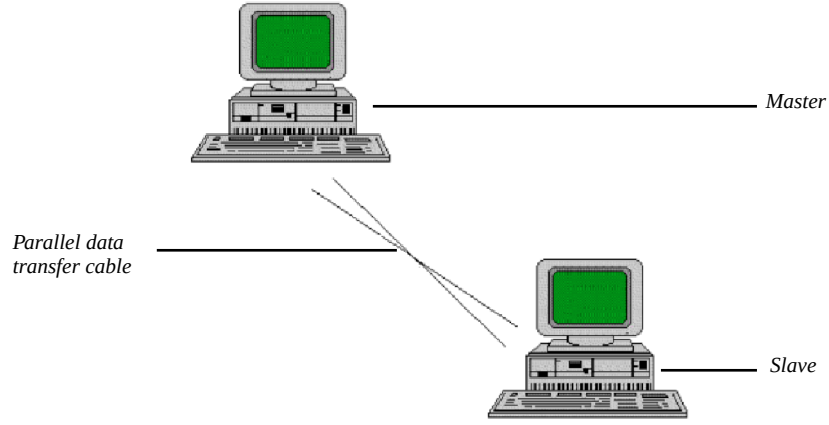
- LSL
- MLID (the Network Interface Card ODI driver)
- IPXODI
- NetBIOS interface
- NET.CFG (configuration)

These components can be loaded from a boot disk to allow Norton Ghost to use NetBIOS to communicate and clone between master and slave.



Using the parallel (LPT) port

With two computers and a parallel data transfer cable (not provided with Norton Ghost) you can clone two computers, master to slave.



CHAPTER 2

Setting up Norton Ghost

Minimum system requirements

The system requirements to run Norton Ghost are:

- 386SX processor (486 or above recommended)
- 4 MB RAM (8 MB RAM for NTFS), 16 MB recommended
- DOS 5.0 or above
- VGA monitor

Hardware requirements for Norton Ghost transfer modes

Peer-to-peer LPT/parallel port connection	Parallel connection cable and a bidirectional parallel port with EPP or ECP compatibility on each machine.
Peer-to-peer NetBIOS connection	Ethernet or Token Ring network interface card. Established network connection which includes one of the following: ■ Crossover Ethernet cable (pins 1236 > 3612) ■ Coaxial cable ■ Standard cables with hub or MAU NetBIOS network software
SCSI tape driver	DOS ASPI driver SCSI tape drive Tape media
Removable media	Removable media drive and media Media drivers required to use in DOS
CD-ROM usage	CD-ROM writer CD-ROM writer disk creation software

Installing Norton Ghost Personal Edition

Norton Ghost installation requires you to run the setup program or copy the Norton Ghost executable to the location from which it will be run, depending on whether you install in Windows or DOS.

Installing Norton Ghost in Windows

To install Norton Ghost in Windows:

1 Insert the Norton Ghost Personal Edition CD in your CD-ROM drive. After a moment, the Norton Ghost setup program starts automatically.

If the setup program does not start automatically, Autorun might be disabled on your computer.

To manually start the installation, double-click the My Computer icon on your desktop. Then locate and double-click SETUP.EXE on the installation CD.

Note: If you do not have a CD-ROM drive, see the Disk Replacement form in this guide for information about getting floppy disks.

2 Follow the instructions that appear on the screen.

The setup program places a Norton Ghost Personal Edition program group in your Start menu and installs the files necessary to run Norton Ghost Personal Edition.

Installing Norton Ghost in DOS

To install Norton Ghost in DOS:

1 Create a directory on the destination drive.

For example, C:\GHOSTPE.

2 Locate the DOSINST folder on the installation CD and copy the directory tree under DOSINST to the folder you created in step 1.

For example, if E:\ is your CD-ROM drive, type the following at the DOS prompt:

cd E:\DOSINST

copy *.* C:\GHOSTPE

Note: If a Windows drag-and-drop or copy and paste operation is used instead of a DOS command, the files being copied from the CD retain their read-only attributes when copied to a floppy disk or hard drive. You must manually change the attribute on the Norton Ghost executable (GHOSTPE.EXE) and all other files that will be updated or edited.

To remove read-only property on Norton Ghost files in Windows:

1 Select the GHOSTPE.EXE file.

2 Right-click the file and select Properties.

3 Uncheck the Read-only attribute.

4 Click OK.

Uninstalling Norton Ghost

Uninstalling Norton Ghost in Windows

To uninstall Norton Ghost in Windows:

1. Click the Start button, then select Settings > Control Panel.
2. Double-click Add/Remove programs.
3. In the list of installed programs, select Norton Ghost Personal Edition. Click Add/Remove.
4. Follow the instructions on the screen.

Uninstalling Norton Ghost in DOS

To uninstall Norton Ghost under DOS:

- Delete the single GHOSTPE.EXE executable file and associated files in the Ghost directory on your hard drive.

Setting up a DOS boot disk

Norton Ghost is a DOS-based application that should be run in DOS mode outside of Windows. On some systems, such as Windows NT, Windows 2000, and other non-DOS operating systems, a DOS boot disk must be used to start the system to allow Norton Ghost to operate. Additional DOS drivers may be required to allow Norton Ghost to access local hardware. The configuration files on a DOS boot disk can be altered to load these drivers as detailed in "Setting up transfer methods" on page 17.

To create a DOS boot disk for Norton Ghost:

1. Insert a blank floppy disk into the A: drive of a Windows 9x or DOS machine.
2. Copy the system files onto the disk. Do one of the following:

- Within Windows 95/98:
  - a. Double-click the My Computer icon.
  - b. Right-click the floppy drive, and select Format.
  - c. Choose Copy System Files.
- Within a DOS prompt box:

Use the following DOS command to copy the system files to the formatted disk:

```
C:\> sys c: a:
```

Use the following DOS command to format and copy the system files to the unformatted disk:

```
C:\> format a: /s
```

3 Copy GHOSTPE.EXE onto the boot disk. For example:

```
C:\> copy c:\GHOSTPE\GHOSTPE.EXE a:\
```

4 Set up any drivers required for the transfer method. For more information see "Setting up transfer methods" on page 17.

Setting up transfer methods

The following sections summarize the information you need to prepare devices and drives for Norton Ghost operation.

Internal drives

To work with internal drives, ensure that each of the drives is properly configured. This means that if fixed IDE drives are in use, the jumpers on the drives are set up correctly, and the BIOS of the machine is configured for the disks and setup arrangement. Both the source and the destination drives must be free from file corruption and physical hard drive defects.

Local devices

To use Norton Ghost with SCSI tape devices, the tape device needs to have an Advanced SCSI Programming Interface (ASPI) driver for DOS installed. The driver is installed in the config.sys file as shown in the example below:

```
device=C:\scsitape\aspi4dos.sys
```

Refer to the documentation included with the SCSI tape device for further details.

Peer-to-peer connections

Peer-to-peer connections enable Norton Ghost to run on two machines and transfer drives and partitions, and to use image files between them.

Action	Master	Slave
Disk-to-disk copy	Machine containing source disk	Machine containing destination disk
Disk-to-image file copy	Machine containing source disk	Machine receiving destination image file
Image file-to-disk copy	Machine containing destination disk	Machine containing source image file
Partition-to-partition copy	Machine containing source partition	Machine containing destination partition
Partition-to-image file copy	Machine containing source partition	Machine receiving destination image file
Image file-to-partition copy	Machine containing destination partition	Machine containing source image file

Peer-to-peer parallel port connections

Connect both computers through the LPT port with a parallel data transfer cable. Norton Ghost must be running under DOS on both computers. The parallel port must be set to bidirectional, or EPP, or ECP, but not unidirectional. You may need to experiment with the mode for best performance.

Select which computer is the master (the machine from which you control the connection), and which is the slave (the other machine participating in the connection). All operator input will be on the master computer. Use the previous table to choose which machine will be the master and which will be slave.

Peer-to-peer NetBIOS network connections

NetBIOS is only available for peer-to-peer connections. Sample third-party files are available on the Symantec FTP site at:

```
ftp://ftp.symantec.com/public/english_us_canada/products/
 ghost/
```

Sourcing NetBIOS

The following steps explain the NetBIOS setup procedure.

1. Install network interface cards.
2. Once the network interface cards are installed, the two peer machines need to be connected using cabling. The type and setup of the connection will depend on your individual network requirements. These can include converted twisted pair cables, coaxial, hub, and MAU-based setups.
3. Run the Network Interface Card setup program and configure the card.
4. Set up NetBIOS.

   Here is an example of loading NetBIOS in your startnet.bat or autoexec.bat:

   ```
   LSL.COM
   REM (Comment: replace NE2000.COM with your NIC driver)
   NE2000.COM
   IPXODI.COM
   NETBIOS.EXE
   ```

   An example of the net.cfg for an NE2000 NIC:

   ```
   #set up the NIC
   link driver NE2000
   _int 10
   _port 300
   ```

   Select which computer is the master (the machine from which you control the connection), and which is the slave (the other machine participating in the connection). All operator input will be on the master computer. See "Peer-to-peer connections" on page 18 to choose which will be the master and which machine will be slave.

C H A P T E R 3

Using Norton Ghost

This chapter describes how to perform operations. The procedures assume that all hardware is configured properly and communication methods are established. See "Setting up transfer methods" on page 17 for more information.

Information on the following tasks is provided:

- Starting Norton Ghost
- Navigating in Norton Ghost without a mouse
- Cloning disks
- Cloning partitions
- Managing image files

What you need to do

The following section gives a quick overview of the ways you can use Norton Ghost to perform everyday tasks.

1. Identify what you want Norton Ghost to do and how many machines are involved.
   - Disk duplication
   - Disk image file creation
   - Disk creation from image file
   - Partition duplication
   - Partition image file creation
   - Partition creation from image file
2. Select the hardware setup method you will use to perform the operation.

   Internal disk drives and:

- No other devices.
- Other peripheral devices not needing additional setup (for example, Jaz or Zip drive).
- SCSI tape drive requiring DOS ASPI driver setup.
- Third-party device requiring DOS driver setup.
- Peer-to-peer connection using LPT printer port.
- Peer-to-peer connection using NetBIOS and network interface cards connection.

3 Set up the hardware and system for the method chosen.

- Ensure all hard drives are installed correctly and the BIOS of the system is configured and correctly displays the valid parameters of the drives.
- Set up additional drivers required for other devices:

  SCSI tape drive requiring DOS driver setup

  Install the SCSI ASPI DOS driver in the config.sys file as outlined in SCSI Tape Drive documentation.

  Third-party device requiring DOS driver setup

  Install the DOS driver as outlined in device documentation.

  Peer-to-peer connection: LPT

  Using a parallel data transfer connection cable, connect up the two machines. Decide which machine is the master and which is the slave.

  Peer-to-peer connection: NetBIOS

  - Install network interface card (NIC).
  - Connect cabling.
  - Set up NIC using manufacturer's installation program.
  - Run NIC test program to check NIC and cabling.
  - Install NetBIOS networking software.
  - Select which machine is the master and which is the slave.
- Test Hardware and DOS driver setup.

4 Start Norton Ghost. Optionally, add command-line switches. For information on the Norton Ghost command-line switches, see "Command-line switches" on page 47.

5 Select the transfer method and Norton Ghost operation from menu.

6 Select source hard disk drive, partitions, or image file.

7 Select destination hard disk drive, partition, or image file.

Warning: Choose carefully. Make sure you select the correct destination to overwrite. In most cases, you will not be able to recover from an incorrectly selected destination drive.

8 Follow on-screen prompts and proceed with clone.

9 Reboot the machine.

Starting Norton Ghost

Norton Ghost is a DOS-based application and should run in DOS mode outside of Windows, if possible. If you run Norton Ghost within Windows 95/98, note the following:

- Files may be in an open or changing state. If these files are cloned, the resulting destination files will be left in an inconsistent state.
- The operating system's volume must not be overwritten.
- If you overwrite a drive or partition, the system must be restarted.
- LPT connection operation is not available.
- Norton Ghost will not automatically reboot the system.
- Hard disk drive sizes may be displayed smaller than their actual size. Norton Ghost will only be able to access the displayed destination size. The remaining space will not be used.

Norton Ghost should never be run within Windows NT, Windows 2000, OS/2 or other non-DOS operating systems. To run Norton Ghost on a machine running a non-DOS operating system, use a DOS boot diskette.

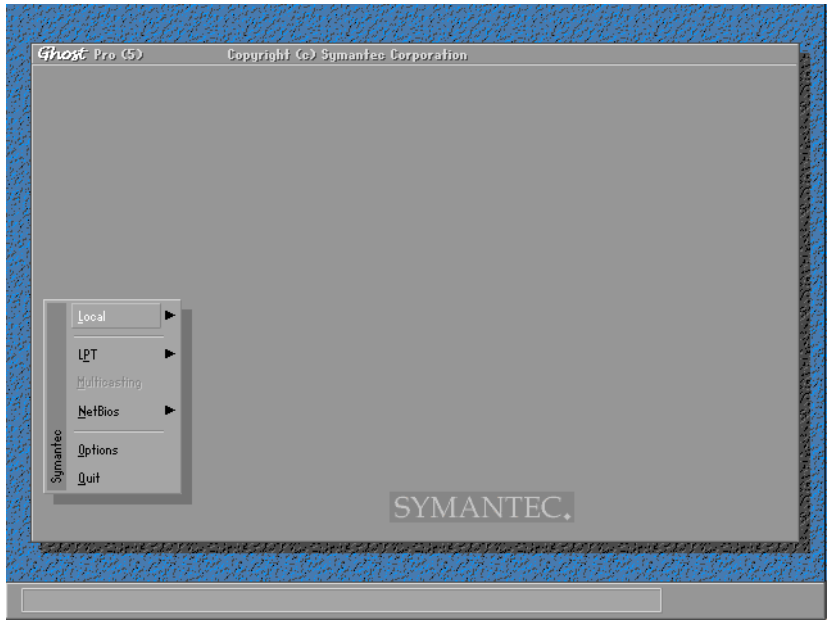
To start Norton Ghost:

- From the DOS prompt, type:

```
C:\> ghostpe.exe
```

Alternatively, boot the machine using a DOS boot disk. A DOS boot disk can be created on a machine running Windows or DOS. See "Setting up a DOS boot disk" on page 16 for more information. Running Norton Ghost in DOS may require additional DOS drivers to be started to allow Norton

Ghost to access and use some hardware. See "Setting up transfer methods" on page 17 for more information.



Navigating without a mouse

Depending upon how Norton Ghost is started, mouse support may not be available.

To use Norton Ghost without a mouse:

- Use arrow keys to navigate the menu.
- Press Tab to move from button to button.
- Press Enter to activate the selected button.
- Press Enter to select an item in a list.

Cloning disks

Disk cloning procedures are accessed from the main menu. To specify the transfer method, select one of the following:

- Local

- LPT > Master
- NetBIOS > Master

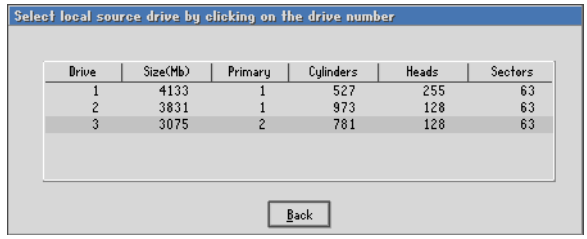
Cloning from disk to disk

To clone disk to disk:

1. From the main menu, select Disk > To Disk.

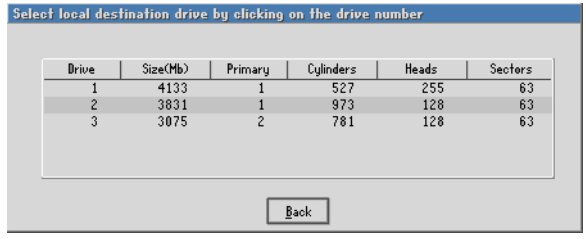
   The Source Drive dialog box displays.

2. Select the source drive.



   The Source Drive dialog box displays the details of every disk Norton Ghost can find on the local machine. On selection of the source drive, the Destination Drive dialog box displays.

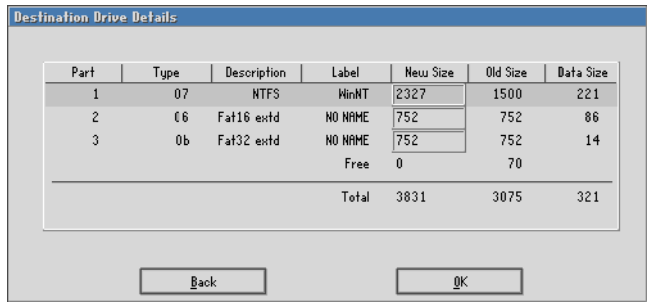
3. Select the destination drive.



   The Destination Drive dialog box displays the details of every disk Norton Ghost can find on the destination machine. If a peer-to-peer connection is established this will be the slave machine's disks. (If this is a local disk-to-disk copy, then the source disk will be unavailable for selection.). On selection of the destination drive, the Destination Drive Details dialog box displays.

Warning: Choose carefully as this is the disk that is going to get overwritten.

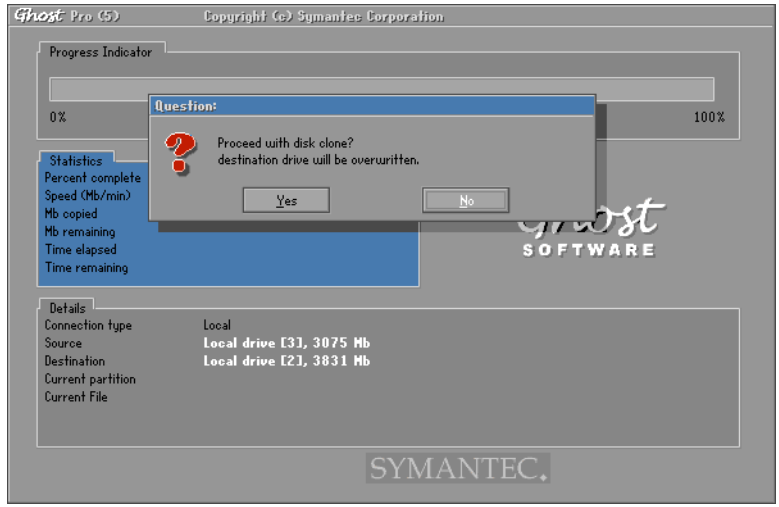
4 Confirm or change the destination drive partition layout.



The Destination Drive Details dialog box displays a suggested partition layout for the destination drive. By default Norton Ghost allocates any extra space that the new disk has to the first FAT or NTFS partition that it discovers.

You can change the size of any destination FAT or NTFS partition at this stage simply by entering the new size in megabytes.

You cannot enter a value that exceeds the available space, is beyond the file systems limitations, or that is not large enough to contain the data held in the source partition. On selecting OK, Norton Ghost displays the final “Proceed with disk clone?” question. This is the last chance to back out.



5 Check the details displayed and ensure the correct options have been selected. Do one of the following:

- Select Yes to proceed with the disk cloning.

  The system performs a quick integrity check of the file structure on the source disk and then copies the source disk to the destination. If you need to abort the process use Ctrl-C, but be aware that this leaves the destination disk in an unknown state.

Warning: Only select Yes if you are really sure you want to proceed. The destination drive will be completely overwritten with no chance of recovering any data.

- Select No to return to the menu.

6 When the disk clone is complete, reboot the machine. Norton Disk Doctor, ScanDisk, or a similar utility can then be run to verify the integrity of the destination disk.

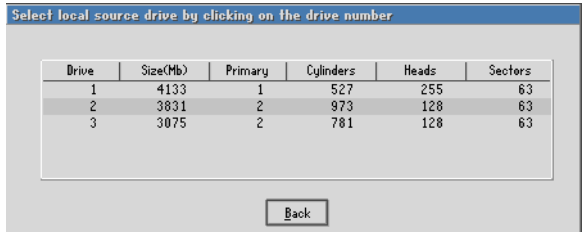
Cloning a disk to image file

To clone a disk to an image file:

1 From the main menu, select Disk > To Image.

The Source Drive dialog box displays.

2 Select the source drive.

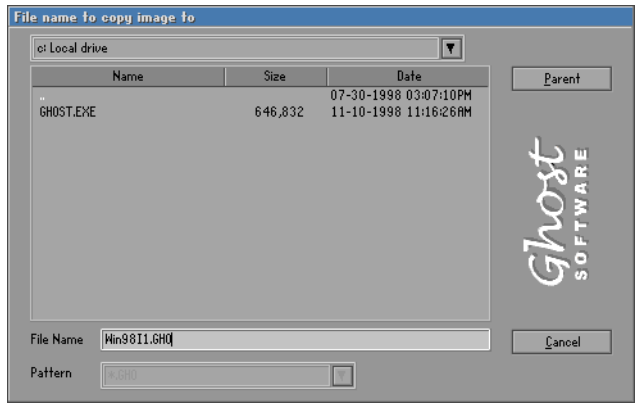


The Source Drive dialog box displays the details of every disk Norton Ghost can find on the local machine. On selection of the source drive, the File Locator dialog box displays.

3 Select the image file. Do one of the following:

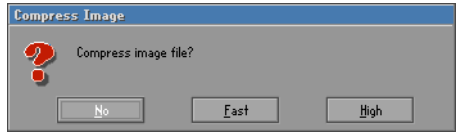
- Type the path and filename for the disk image file.
- Browse to locate the image file.

Specify the drive or device, and specify the full pathname.



The image file may reside on a local drive (but not the one that is being copied from). When using peer-to-peer connections, the image file will be created on the slave machine. On pressing Enter, the compress image question displays.

4 Select the compression type.

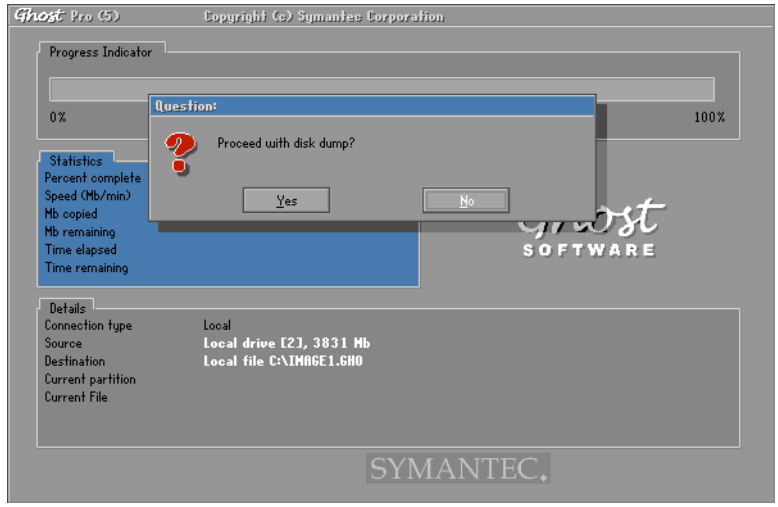


- Select No for no compression (high speed).
- Select Fast for low compression (medium speed).
- Select High for high compression (slower speed).

Compression may affect the speed of operations. On selection of a compression type, Norton Ghost estimates the amount of space available for the destination image file. If there is insufficient space, Norton Ghost prompts you to enable spanning of image files.

Note: If spanning is enabled, Norton Ghost prompts for the additional disks and volumes. See "Image files and volume spanning" on page 40 for more information.

Norton Ghost displays the final “Proceed with disk dump?” question. This is the last chance to back out.



5 Check the details displayed and ensure the correct options have been selected. Do one of the following:

- Select Yes to proceed with the image file creation.

  The system performs a quick integrity check of the file structure on the source disk and then copies the source disk to the destination image file. If you need to abort the process use Ctrl-C, but be aware that this leaves the destination image file in an unknown state.

- Select No to return to the menu.

6 After the image file creation is complete, Norton Ghost can verify the integrity of the image file. From the main menu, select Check > Image File.

Cloning a disk from an image file

To clone a disk from an image file:

1 From the main menu, select Disk > From Image.

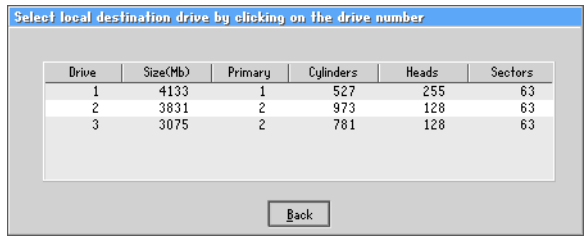
Norton Ghost displays the File Locator dialog box.

2 Do one of the following:

- Type the path and filename of the image file.
- Browse to locate the image file.

Specify the drive or device and select the full pathname. Note that the image file may reside on a local drive (but not the one that is being copied to). When using peer-to-peer connections, the file will be located on the slave machine. On pressing enter, the Destination Drive dialog box displays.

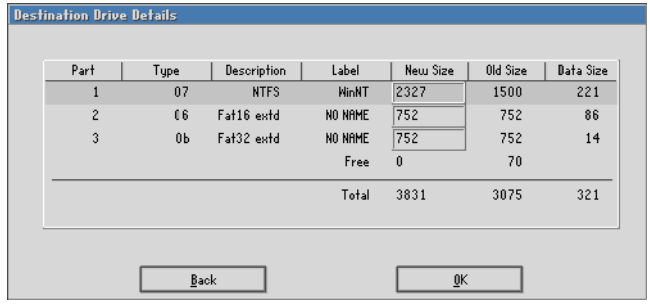
3 Select the destination drive.



The Destination Drive dialog box displays the details of every drive Norton Ghost can find on the local machine. The disk containing the source image file is not available for selection. On selection of the destination drive, the Destination Drive Details dialog box displays.

Warning: Choose carefully as this is the disk that is going to get overwritten.

4 Confirm or change the destination drive partition layout.



The Destination Drive Details dialog box displays a suggested partition layout for the destination drive. By default Norton Ghost allocates any extra space that the new disk has to the first FAT or NTFS partition that it discovers.

You can change the size of any target FAT or NTFS partition at this stage simply by entering the new size in megabytes.

You cannot enter a value that exceeds the available space, is beyond the file systems limitations, or is not large enough to contain the data

held in the source partition. On selecting OK, Norton Ghost displays the final “Proceed with disk load?” question. This is the last chance to back out.

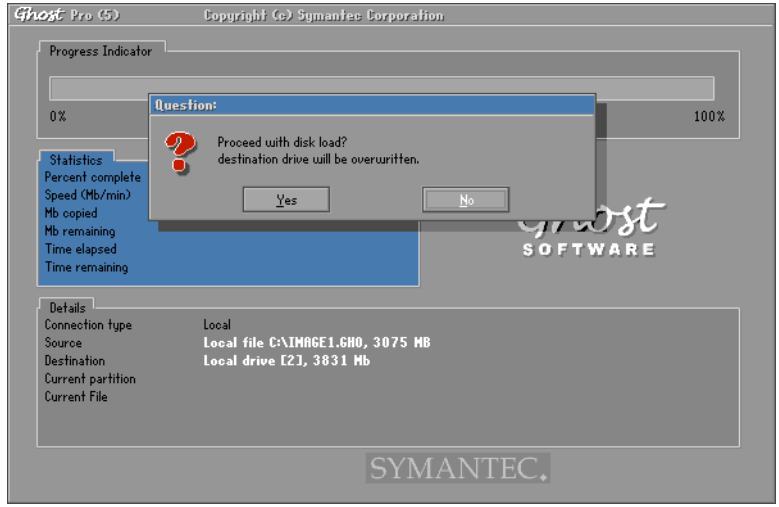
5 Check the details displayed and ensure the correct options have been selected. Do one of the following:

- Select Yes to proceed with the disk cloning.

  Norton Ghost creates the destination drive using the source image file drive details. If you need to abort the process use Ctrl-C, but be aware that this leaves the destination drive in an unknown state.

Warning: Only select Yes if you are really sure you want to proceed. The destination drive will be completely overwritten with no chance of recovering any data.

- Select No to return to the menu.



Note: Spanned and split image files are handled as outlined in the image file management section. See “Managing image files” on page 39.

6 When the disk image load is complete, reboot the machine. Norton Disk Doctor, ScanDisk, or a similar utility can then be run to verify the integrity of the destination drive.

Cloning partitions

Partition cloning procedures are accessed from the main menu. To specify a transfer method, select one of the following:

- Local
- LPT > Master
- NetBIOS > Master

The source and destination partitions must be correctly configured before cloning partitions.

Cloning from partition to partition

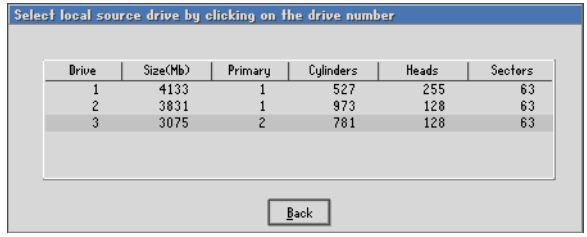
A destination partition must be correctly configured before Norton Ghost can clone another partition into it.

To clone from partition to partition:

1. From the main menu, select Partition > To Partition.

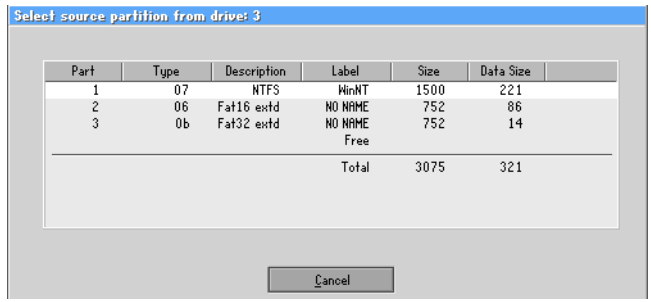
   The Source Drive dialog box displays.

2. Select the source drive.



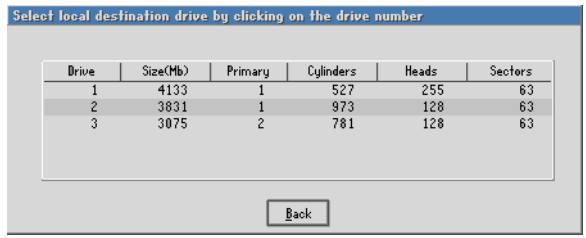
   The Source Drive dialog box displays the details of every drive Norton Ghost can find on the local machine. On selection of the source drive, the Source Partition dialog box displays.

3 Select the source partition.



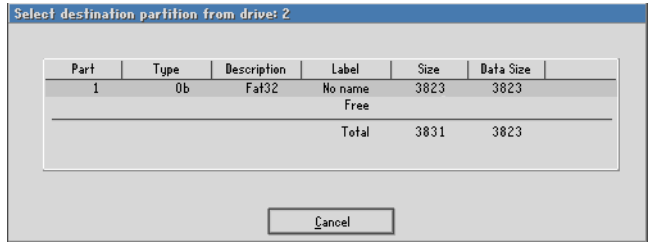
The Source Partition dialog box displays the details of all the partitions on the selected source drive. On selection of the source partition, the Destination Drive dialog box displays.

4 Select the destination drive.



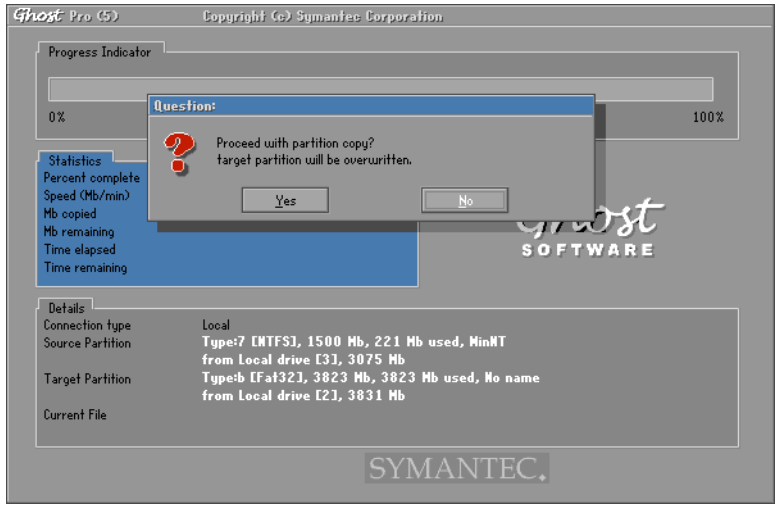
The Destination Drive dialog box displays the details of every disk Norton Ghost can find on the destination machine. For peer-to-peer connections, the slave machine is the destination. On selection of the destination drive, the Destination Partition dialog box displays.

5 Select the destination partition.



The Destination Partition dialog box displays the details of all the partitions on the selected destination drive. On selection of the destination partition, Norton Ghost displays the final “Proceed with partition copy?” question. This is the last chance to back out.

Warning: Choose carefully as this is the partition that is going to be overwritten.



6 Check the details displayed and ensure the correct options have been selected. Do one of the following:

- Select Yes to proceed with the partition copy.

  If you need to abort the process use Ctrl-C, but be aware that this leaves the destination drive in an unknown state.

  Warning: Only select Yes if you are really sure you want to proceed. The destination partition will be completely overwritten with no chance of recovering any data.

- Select No to return to the menu.

7 When the partition copy is complete, reboot the destination machine. Norton Disk Doctor, ScanDisk, or a similar utility can then be run to verify the integrity of the destination partition.

Cloning from partition to image file

To clone a partition to an image file:

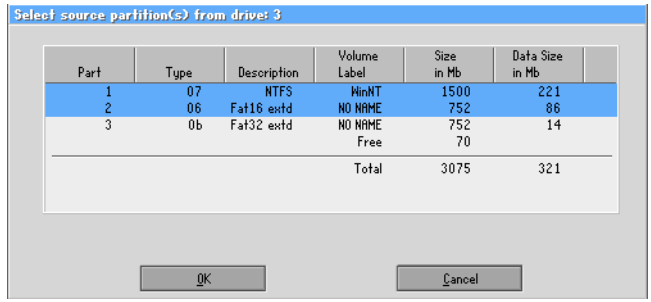
1 From the main menu, select Partition > To Image.

The Source Drive dialog box displays.

2 Select the source drive.

The Source Drive dialog box displays the details of every disk Norton Ghost can find on the local machine. On selection of the source drive, the Source Partition dialog box displays.

3 Select the source partitions to be included in the destination image file.



The Source Partition dialog box displays the details of all the partitions on the selected source drive. Multiple partitions may be selected. On selecting OK, the File Locator dialog box displays.

4 Select the image file. Do one of the following:

- Type the path and filename for the disk image file.
- Browse to locate the image file.

The image file may reside on a local drive (but not the one that is being copied from). When using peer-to-peer connections, the image file will be created on the slave machine. On pressing Enter, the compress image question displays.

5 Select the compression type.

- Select No for no compression (high speed).
- Select Fast for low compression (medium speed).
- Select High for high compression (slower speed).

Compression may affect the speed of operations. On selection of a compression level, Norton Ghost estimates the amount of space available for the destination image file. If there is insufficient space, Norton Ghost prompts you to enable spanning of image files.

Note: If spanning is enabled, Norton Ghost prompts for the additional disks and volumes. See "Image files and volume spanning" on page 40 for more information.

Norton Ghost displays the final "Proceed with partition dump?" question. This is the last chance to back out.

6 Check the details displayed and ensure the correct options have been selected. Do one of the following:

- Select Yes to proceed with the image file creation.

  The system performs a quick integrity check of the file structure on the source partitions and then copies the source partitions to the destination image file. If you need to abort the process use Ctrl-C, but be aware that this leaves the destination image file in an unknown state.

- Select No to return to the menu.

7 After the image file creation is complete, Norton Ghost can verify the integrity of the image file. From the main menu, select Check > Image File.

Cloning a partition from an image file

A destination partition must be correctly configured before Norton Ghost can clone another partition into it.

To clone a partition from an image file:

1 From the main menu, select Partition > From Image.

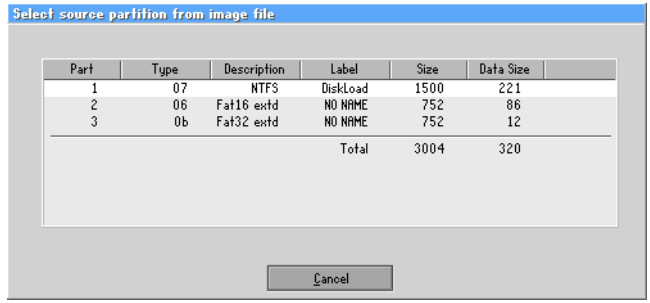
The File Locator dialog box displays.

2 Do one of the following:

- Type the path and filename of the image file.
- Browse to locate the image file.

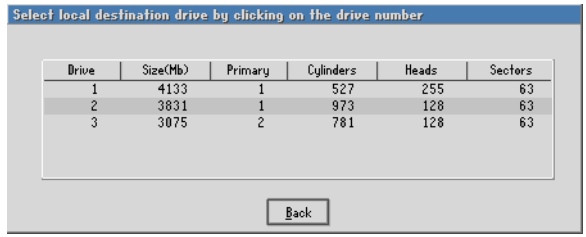
Specify the drive or device and select the full pathname. Note that the image file may reside on a local drive (but not the one that is being copied to). When using peer-to-peer connections, the image file will be located on the slave machine. On pressing Enter, the Source Partition dialog box displays.

3 Select the source partition from the image file.



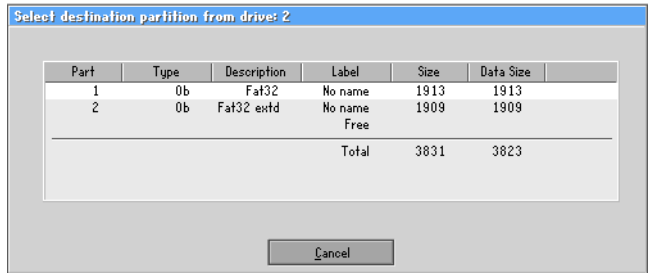
The Source Partition dialog box displays the details of all the partitions in the image file. On selection of the source partition, the Destination Drive dialog box displays.

4 Select the destination drive.



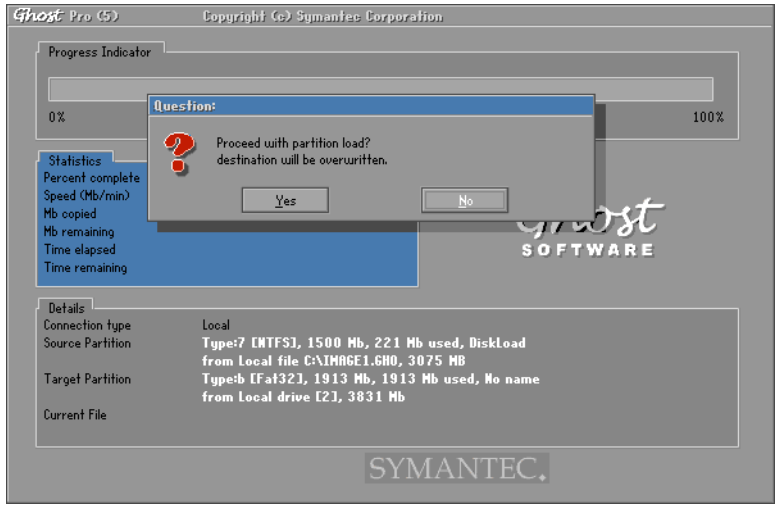
The Destination Drive dialog box displays the details of every disk Norton Ghost can find on the local machine. On selection of the destination drive, the Destination Partition dialog box displays.

5 Select the destination partition.



The Destination Partition dialog box displays the details of all the partitions on the selected destination drive. On selection of the destination partition, Norton Ghost displays the final “Proceed with partition load?” question. This is the last chance to back out.

Warning: Choose carefully as this is the partition that is going to be overwritten.



6 Check the details displayed and ensure the correct options have been selected. Do one of the following:

- Select Yes to proceed with the partition cloning.

  Norton Ghost overwrites the destination partition using the partition details contained in the image file. If you need to abort the process use Ctrl-C, but be aware that this leaves the destination partition in an unknown state.

  Warning: Only select Yes if you are really sure you want to proceed. The destination partition will be completely overwritten with no chance of recovering any data.

- Select No to return to the menu.

  Note: Spanned and split image files are handled as outlined in the Image File Management section. See "Managing image files" on page 39.

7 When the partition copy is complete, reboot the destination machine. Norton Disk Doctor, ScanDisk, or a similar utility can then be run to verify the integrity of the destination partition.

Managing image files

Norton Ghost can create an image file that contains all the information required to recreate a complete disk or partition. Image files are a useful way to store and reliably compress images of model system configurations, or to create backup copies of complete drives or partitions.

The image files created with Norton Ghost have a .gho extension by default. They can contain the entire disk or partitions in the disk. Image files support:

- Various levels of compression
- CRC32 data integrity checking
- Splitting of media files
- Spanning across volumes

If you also use the Ghost Explorer application, an image file companion utility, individual files from these image files can be recovered selectively without having to restore the complete partition or disk.

Image files and compression

Image files created in Norton Ghost support several levels of data compression. When using Norton Ghost in interactive mode, three compression options are provided: none, fast, and high. The Norton Ghost command-line switches provide access to nine levels of compression. The compression switch -Z is detailed in Appendix A.

As a general rule, the more compression you use, the slower Norton Ghost will operate. However, compression can improve speed when there is a data transfer bottleneck. There is a big difference in speed between high compression and no compression when creating an image file on a local disk. Over a NetBIOS connection, fast compression is often as fast as, or faster than, no compression. Over a parallel cable, high compression is often faster than no compression because fewer bytes need to be sent over the cable. Decompression of high-compressed images is much faster than the original compression. The level of compression you should select depends on your own individual requirements.

Image files and CRC32

Cyclic Redundancy Checking (CRC) is a data error checking technique. CRC ensures that the original data that was written to the image file is the same as the data that is being used from the image file. The 32 value in CRC32 indicates the CRC technique uses a 32-bit value to store error checking information. The use of CRC32 increases detection of errors in the image file.

When image files are created, CRC32 details are embedded into the file to ensure image file corruption can be detected when it is being restored to disk. CRC32 is currently included on a file-by-file basis with FAT partitions and on a MFT table basis for NTFS partitions.

In addition to image file error detection, the CRC values can be used to verify that image files and partitions or disks are identical. This can offer an additional detection method against bad sector writes and other drive anomalies that may be missed during normal imaging checks.

A text file containing CRC values and associated file attributes can be generated using the -CRC32 command-line switch. These switches and functions are detailed in Appendix A.

Image files and volume spanning

Standard image files

Standard image files consist of a single file that contains the contents of the complete disk or required partitions. This type of image file is used for storing system configurations on hard disk drives and tape drives where the volume is large enough and capable of holding the complete image file in one piece.

Size-limited, multi-segment image files

There are situations where it may not be practical to have a standard image file. Norton Ghost can split up an image file into segments (known as spans) that are limited to a user-specified size. This option is most commonly used to limit span sizes to 550 MB for later transfer onto CD.

Spanned image files

Spanned image files are similar to size-limited multi-segment image files. The difference is that each segment file (or span) of the image file is limited by the actual volume size of the media the image is being saved to. This allows you to specify a drive and filename and let Norton Ghost sort out when to request another volume or location for the remaining data. For example, this is very useful when using ZIP, JAZ, LS120 Superdisk, and other disk drive types.

Norton Ghost also allows size limiting of spans when spanning volumes, ensuring no span exceeds the maximum size.

With all image files, the only constraint on the selection of the destination volume is that it must not be part of the source selection; for example, it cannot be on a source disk or partition if that disk or partition is being included in the image.

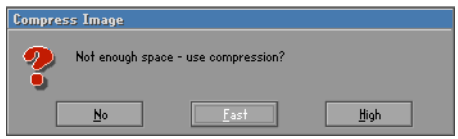
Creating an image file

An image file can be created using the disk-to-image file and partitions-to-image file options in Norton Ghost. For more information, see "Cloning a disk to image file" on page 27 and "Cloning from partition to image file" on page 34.

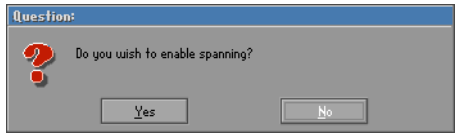
How to span an image across multiple volumes and limit span sizes

When creating an image file from a disk or partition, the destination drive may not have sufficient space to store the image file. If Norton Ghost estimates this is the case, you are informed that there is not enough space on the destination volume and asked whether to enable spanning the image file. Norton Ghost assumes compression will reduce the size of the image by one-third when determining whether the image will fit. Alternatively, the -span and -split command-line switches can be used to configure Norton Ghost on start up to use image file splitting. See "Norton Ghost command-line switches" on page 47 for more information.

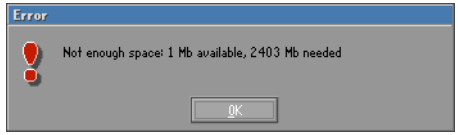
The following message displays:



If you select compression and there is still a possibility of insufficient space, the following message displays:



If spanning is not enabled, an error message displays:



Before starting to save the disk contents to the image file, Norton Ghost displays the source and destination details and gives you a chance to back out. The default is to back out.

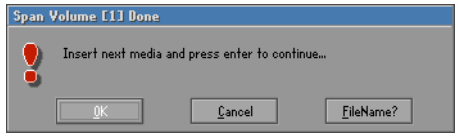
Once the process starts, the image file creation continues until the destination volume is filled up. You are prompted to either select Enter to continue or specify where the next span of the image file is to be located. Select OK to continue on the same form of media or enter a filename to span to a different location.

For example, if you started spanning onto a JAZ drive and wish to span a 3.0 GB drive onto just JAZ disks, select Enter to continue on JAZ disks. If you wish to span across different forms of media, selecting FileName gives you the option to span onto a different location.

Caution: Record where you save your segments of the span. Also record the filename of each span segment. Norton Ghost will not record the location and filename you have selected.

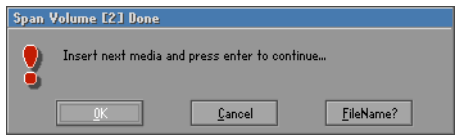
If you have a single partition on a drive, or if you are imaging a single partition, Norton Ghost will end on the last-spanned volume with no user intervention. However, if you are imaging a hard drive with multiple partitions, Norton Ghost needs to record boundary information onto the first span of the image file. This boundary information is recorded to the location of the partition amongst the spanned set. You are prompted to confirm that the first span is ready to be updated.

The screen below shows how Norton Ghost will prompt you for span set disk one and for subsequent volumes.



How to load from a spanned image

When loading a disk or partition from an image file, the process is the same as loading from an unspanned image file. The loading procedure is the reverse of the saving procedure. You are prompted to provide details of each portion of the spanned image, as shown in the screen below.



Do one of the following:

- Select OK to continue on the same form of media. For example, if you originally spanned onto a JAZ drive and wish to restore a 3.0 GB drive from just JAZ disks, replace the disk and press Enter to continue from JAZ disks.
- If you wish to restore from different forms of media, selecting FileName gives you the option to restore from a different location.

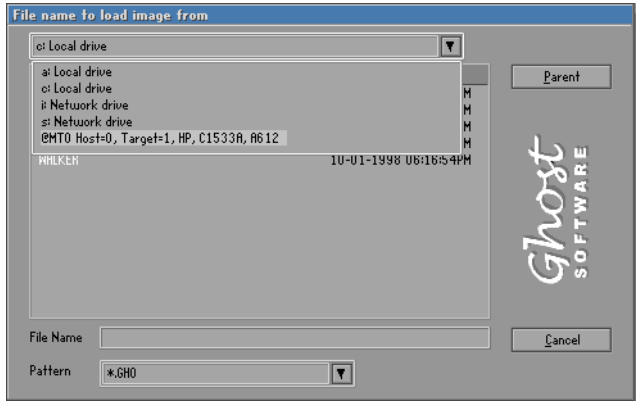
Caution: You need to know where you saved your segments of the span. You must also know each filename and path for each span segment.

When the disk image load is complete, reboot the target machine.

Image files and tape drives

Norton Ghost's support of SCSI tape drives allows storage of a single image file onto a tape. When written onto the tape, there is no associated file system used and this means that you are unable to access the tape from a drive letter as if it were another storage drive. SCSI tapes only support standard image files.

When using tape drives with Norton Ghost, the tape drive can be selected as the source or destination device in the File Locator window. Each SCSI tape device is shown as MTx, where x is a number starting at 0 and increases incrementally for each drive present. For example, the following screen shows a tape drive MT0 available for use.



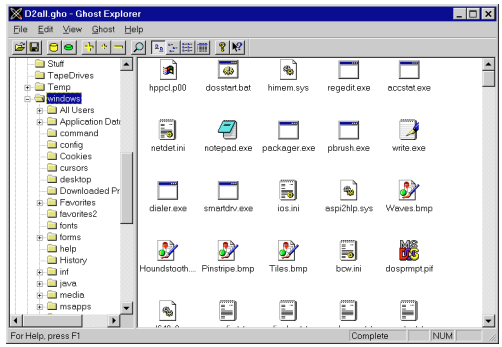
For Norton Ghost to access SCSI tape drives, a DOS ASPI driver must be installed prior to use. See "Setting up transfer methods" on page 17 for more information.

Norton Ghost in its default mode performs well with most SCSI tape devices. In some situations with older style SCSI tape devices and possibly with unreliable tapes, Norton Ghost may need to be configured to slow down or alter the way it uses the tape device. These options are listed in Appendix A.

Viewing image file content and selective file restoration

Ghost Explorer is a Norton Ghost companion Windows 95 program that looks similar to Windows Explorer. It can open an image file and restore individual files or entire directory structures from it. It can also launch Norton Ghost in batch mode to create an image file, using Windows dialog

boxes to prompt for the disk and partition to save. A sample screen is shown below:



Norton Ghost creates an index in the image file as it works that allows Ghost Explorer to create a display of files very quickly.

For more information on Ghost Explorer, see the Ghost Explorer online help.

APPENDIX A

Norton Ghost command-line switches

Norton Ghost can be run:

- Interactively with no command-line switches
- Interactively with selected switches

The Norton Ghost command-line switches are used to alter Norton Ghost's behavior and automate procedures. To list Norton Ghost's command-line switches, type:

```
ghostpe.exe -h.
```

A hyphen (-) or a slash (/) must proceed all switches apart from @. Switches are not case sensitive. They can be entered in upper, lower, or mixed case.

Command-line switches

@filename

Specifies a file containing additional command-line switches that should be read. *filename* indicates the path and filename of the command-line switch file. The command-line switch file can include any Norton Ghost command-line switches, except for -afile and -dfile. The Norton Ghost command-line switch file must be a text file with each switch on a new line. This feature allows you to exceed the DOS command-line limit of 150 characters.

Example:

```
ghostpe.exe @ghswitch.txt
```

Example command-line switch file contents:

```
-clone,mode=pdump,src=1:2,dst=g:\part2.gho
-fcr
```

-afile=*filename*

Overrides the default abort error log file (ghost.err) to the directory and file given in filename.

-autoname

Automatically names spanned image files during creation. Avoids the user prompt asking for confirmation of the next destination location for the remainder of the image file.

-bfc=*x*

Handles bad FAT clusters when writing to disk. If this switch is set, and the target partition is FAT, Norton Ghost will try to work around bad sectors. The "x" value indicates the maximum number of bad sectors allowed to be handled by Norton Ghost. The default value is 500. Norton Ghost will abort when a bad sector is encountered in a non-FAT partition; after the maximum number of bad clusters is exceeded; or if the switch is not selected.

-chkimg,filename

Checks the integrity of the image file indicated by filename.

-clone

The full syntax for this switch is:

```
-
clone,MODE={copy|load|dump|pcopy|pload|pdump},SRC={dri
ve|file|drive:partition|@MTx},DST={drive|file|drive:partit
ion|@MTx},SZE{E|F|L|  n={nnnnM|nnP|F|V}
```

Clone operation switch. Note that no spaces are allowed in the command line. This switch allows automation of Norton Ghost operations and has a series of arguments that define the operation parameters:

MODE={copy | load | dump | pcopy | pload | pdump}

MODE defines the type of clone command:

copy	- disk-to-disk copy
load	- file-to-disk load
dump	- disk-to-file dump
pcopy	- partition-to-partition copy
pload	- file-to-partition load
pdump	- partition-to-file dump

SRC={drive | file | drive:partition | @MTx}

SRC defines the source for the operation selected by the clone mode option:

Mode	Description of SRC option
copy/dump	Source disk number. For example, disk one is represented by `SRC=1.`
load	The image file source location drive, path and filename or device. If using a tape drive device set to `@MTx` (x=0...)
pcopy/pdump	Source partition number. 1:2 indicates the second partition on drive one.
pload	Partition image filename or device and partition number. g:\images\disk1.img:2 indicates the second partition in the image file.

DST={drive | file | drive:partition | @MTx}

DST defines the destination location for the operation:

Mode	Meaning
copy/load	Destination drive. For example, disk two is represented by `DST=2.`

dump	Disk image filename, for example g:\images\system2.img. If using a tape drive set to @MTx(x=0...).
pcopy/pload	Destination partition, For example, 2:2 indicates the LOAD second partition on drive two.
pdump	Partition image filename e.g, g:\images\part1.img:2.

SZE{E | F | L | n={nnnnM | nnP| F | V}}

SZE is used to set the size of the destination partitions for either a disk load or disk copy operation.

Available Options:

E	The size of all partitions except the last partition will remain fixed. The last partition will be resized to the maximum allowed size.
F	Resizes the first partition to maximum size allowed based on file type. If additional space remains, other partition sizes will be increased.
L	Resizes the last partition to maximum size allowed based on file type. If additional space remains, other partition sizes will be increased.
n=xxxxM	Indicates that the nth destination partition is to have a size of xxxx MB (e.g, SZE2=800M indicates partition two is to have 800 MB).
n=mmP	Indicates that the nth destination partition is to have a size of mm percent of the target disk. Due to partition size rounding and alignment issues, 100% physical use of disk space may not be possible.
n=F	Indicates that the nth destination partition is to remain fixed in size.
n=V	Indicates that the partition will be resized according to the following rules:

Rule 1: If the destination disk is larger than the original source disk, then the partition(s) will be expanded to have the maximum amount of space subject to the free space available and the partition type (for example, FAT16 partitions will have a maximum size of 2047 MB).

Rule 2: If the destination disk is smaller than the original source disk (but still large enough to accommodate the data from the source disk), the free space left over after the data space has been satisfied will be distributed between the destination partitions in proportion to the data usage in the source partitions.

Examples of switch usage

To copy local drive one to local drive two:

```
ghostpe.exe -clone,mode=copy,src=1,dst=2
```

To connect using NetBIOS to another machine running Norton Ghost in slave mode, and save a disk image of local drive two to the remote file c:\drive2.gho:

```
ghostpe.exe -clone,mode=dump,src=2,dst=c:\drive2.gho -nbm
```

The slave machine can be started with `ghostpe.exe -nbs`

To copy the second partition of the local drive one the first partition of local drive:

```
ghostpe.exe -clone,mode=pcopy,src=1:2,dst=2:1
```

To load drive two from an image file and resize the destination partitions into a 60:40 allocation

```
ghostpe.exe -clone,mode=load,src=g:\2prtdisk.gho,dst=2
,sze1=60P,sze2=40P
```

To clone a three partition disk and keep the first partition on the destination drive the same size as on the source disk, but divide up the remaining space between the other partitions, leaving no unallocated space

```
ghostpe.exe -
 clone,mode=copy,src=1,dst=2,sze1=F,sze2=V,sze3=V
```

To load drive one from an image file and resize the first partition to 450 MB, the second to 1599 MB and the third to 2047 MB.

```
ghostpe.exe -clone,mode=load,src=g:\3prtdisk.gho,dst=1
,sze1=450M,sze2=1599M,sze3=2047M
```

To load a disk from an image file and resize the last partition to its capacity. The first partition utilizes the remaining space.

```
ghostpe.exe -clone,mode=load,src=g:\2prtdisk.gho,
```

```
dst=1,szeL
```

-CRC32

The -CRC32 switch allows making a list of the files on a disk or partition, or in an image file with CRC values for each, and to verify that list against the original or a clone. The purpose is to allow both quick listing of the contents of an image file and verification that a disk created by Norton Ghost contains the same files as the original. CRC checking works file by file with FAT partitions. NTFS partitions are CRC-checked within an image file by each MFT table. It is not possible at present to obtain a list of files failing a CRC check with an NTFS file system. When a CRC file is created for an NTFS partition, only a single CRC value is generated. You can also create a CRC file from an image file, and verify against a disk.

The full syntax for this switch is:

-CRC32,action={create|verify|pcreate|pverify|dcreate|dverify},src={{Disk Spec}|{Part Spec}|{File}},{crcfile={File}|vlist={File}|vexcept={File}}

Note that no spaces are allowed in the command line.

crcfile={File}::ASCII CRC32 file - default=ghost.crc

vlist={File}::Verification list file - default=ghost.ls

vexcept={File}::Verification exception file - no default

The possible actions (with descriptions) are:

create

Create an ASCII CRC32 file from a disk.

verify

Verify a disk from a CRC32 file.

pcreate

Create an ASCII CRC32 file from a partition.

pverify

Verify a partition from an ASCII CRC32 file.

dcreate

Create an ASCII CRC32 file from an image file.

dverify

Verify an image file from an ASCII CRC32 file.

Examples of -CRC32 usage

To create a CRC32 file (called ghost.crc) while making an image file:

```
ghostpe.exe -fcr
```

To create a list of files and CRC32 values for a disk:

```
ghostpe.exe -CRC32,action=create,src=1,crcfile=ghost.crc
```

To verify the list against an image file:

```
ghostpe.exe -crc32,action=dverify,src=x:dumpfile.gho,
crcfile=ghost.crc
```

To create an ASCII CRC32 file from the primary hard drive:

```
ghostpe.exe -crc32,action=create
```

Note that the default disk is the primary drive, the default ASCII CRC32 file is ghost.crc.

To create an ASCII CRC32 file:

```
ghostpe.exe -CRC32,action=create,src=2,crcfile=myfile.txt
```

Same as previous except you specify the disk and ASCII CRC32 file. This example uses disk 2 as the source drive and the outfile myfile.txt.

To verify the contents of the primary drive against a CRC32 file:

```
ghostpe.exe -CRC32,action=verify
```

Once again, the default disk is the primary drive and the default ASCII CRC32 file is ghost.crc (in the current directory). In addition, the default verification list file is ghost.ls.

To verify the contents of the primary drive against a CRC32 file:

```
ghostpe.exe -CRC32,action=verify,src=1,crcfile=myfile.txt,
vlist=myfile.out
```

Same as previous but specify the disk, CRC file, and list file. This example uses disk 1 as the source drive, myfile.txt as the ASCII CRC32 file, and myfile.out as the verification list file.

To verify the contents of the primary drive against a CRC32 file:

```
ghostpe.exe -CRC32,action=verify,src=1,
crcfile=myfile.txt,vlist=myfile.out,vexcept=myfile.exc
```

Same as above with the inclusion of the EXCEPTION argument that excludes compared files based upon its entries.

VEXCEPT

The VEXCEPT argument specifies files that are not checked with CRC. This is normally used to exclude files that are always changed on boot. A sample exception file follows:

```
[ghost exclusion list]
\PERSONAL\PHONE
[partition:1]
\WINDOWS\COOKIES\*.*
\WINDOWS\HISTORY\*
\WINDOWS\RECENT\*
\WINDOWS\USER.DAT
\WINDOWS\TEMPOR~1\CACHE1\*
\WINDOWS\TEMPOR~1\CACHE2\*
\WINDOWS\TEMPOR~1\CACHE3\*
\WINDOWS\TEMPOR~1\CACHE4\*
[partition:2]
*\*.1
[end of list]
```

The exclusion list is case-sensitive; all files should be specified in upper case. The *wildcard follows Unix rule, it is more powerful than the MS-DOS *. In particular it matches the . as well as any other character, but other characters can follow the *. Thus a wildcard of *br* will match any files containing the letters “br”, for example, brxyz.txt, abr.txt, abc.dbr.

The specification of \WINDOWS\COOKIES*.* in the example above means match all files in the subdirectory \WINDOWS\COOKIES that have an extension. To match all files with or without an extension, WINDOWS\COOKIES* should be used.

Short filenames should be used in exclusion files.

Files specified before the first [Partition:x] heading will be used to match files in any partition.

A directory of * matches any subdirectory, regardless of nesting. The above exclusion file will match any file with an extension of .1 in any subdirectory on the second partition. Apart from this, wildcards should be used for files, not for directories.

-crcignore

Ignores CRC errors. CRC errors indicate data corruption. This switch overrides the CRC error detection to allow a corrupted image file to be used. Note that using this switch will leave the corrupted files in an unknown state.

-dd

Dumps disk metrics information to the dump log file ghststat.dmp. The file location can be altered using the -dfile=filename switch.

-dfile=*filename*

Changes the path and filename of the dump log file created using the -dd switch. This switch can not be included in the @ ghost switch text file.

-di

Displays diagnostics. This is useful for Technical Support purposes. For each disk present on the machine, the physical attributes such as drive, cylinders, heads, sectors per track, and total sectors are displayed. For each partition present on each disk, the number, type, physical/logical flag, starting sector and number of sectors are displayed. The diagnostics may be redirected to a file and given to Technical Support to assist with problem solving.

Example:

```
ghostpe.exe –di > diag.ls
```

will output disk diagnostics to the file diag.ls.

-dl=*number*

Specifies the highest BIOS fixed disk slot to attempt to detect. Solves problems where some Phoenix BIOS based systems may hang when Norton Ghost attempts to detect disks or when all disks do not appear in

Norton Ghost. This switch may also assist when tape drives are incorrectly reported as drives. Valid values for number are 128 to 255.

-f32

Allows Norton Ghost to convert all FAT16 volumes to FAT32 volumes when the destination partition is larger than 2047 MB in size. Caution: ensure that the installed operating systems requiring access to the volumes that will be converted support FAT32.

-f64

Allows Norton Ghost to resize FAT16 partitions to be greater than 2047 MB using 64K clusters. This is only supported by Windows NT. Do not use on systems including other operating systems.

-fatlimit

Limits the size of NT FAT16 partitions to 2047 MB. Useful when Windows NT OS FAT16 partitions are present on the disk, and 64K clusters are not wanted.

-fcr

Creates a CRC32 file (called ghost.crc) while creating an image file.

-ffi

Forces the use of direct IDE access for IDE hard disk operations. By default, direct IDE access is only used for disks greater than 1024 cylinders when Extended Int13 is not supported. This switch does not have any effect when running Norton Ghost in Windows 95/98.

-ffs

Prefer the use of direct ASPI/SCSI disk access for SCSI hard disk operations.

-ffx

Prefer the use of Extended Interrupt 13h disk access for hard disk operations.

-finger

Displays the fingerprint details written on a hard disk drive created by Norton Ghost. The fingerprint displays the process used to create the drive or partition and the time, date, and disk the operation was performed on.

-fnf

Disables the creation of a fingerprint when cloning hard disk drives or partitions. Similar to the functionality environment switch FPRNT=N.

-fni

Disables direct IDE Access support for IDE hard disk operations.

-fns

Disables direct ASPI/SCSI access support for SCSI hard disk operations.

-fnw

Disables writing to FAT disks or partitions. Similar to the functionality environment switch WRITE=N. This switch does not work with NTFS volumes.

-fnx

Disables Extended INT13 support during cloning and disk geometry detection.

-fro

Forces Norton Ghost to continue cloning even if source contains bad clusters.

-fx

Flag Exit. Causes Norton Ghost to exit to DOS after operation completion. By default, Norton Ghost prompts the user to reboot or exit when the operation has finished.

-h

Displays the Norton Ghost command-line switch help page.

-ia

Image All. The Image All switch forces Norton Ghost to do a sector-by-sector copy of all partitions. When copying a partition from a disk to an

image file or to another disk, Norton Ghost examines the source partition and decides whether to copy just the files and directory structure, or to do a sector-by-sector copy. If it understands the internal format of the partition, it defaults to copying the files and directory structure. Generally this is the best option, but occasionally, if a disk has been set up with special hidden security files that are in specific positions on the partition, the only way to reproduce them accurately on the target partition is through a sector-by-sector copy.

-ib

Image Boot. Copies the entire boot track, including the boot sector, when creating a disk image file or copying disk to disk. Use this switch when installed applications such as boot-time utilities use the boot track to store information. By default, Norton Ghost copies only the boot sector, and does not copy the remainder boot track. You cannot perform partition-to-partition or partition-to-image functions with the -ib switch.

-id

Image Disk. Similar to -ia (Image All), but also copies the boot track, as in -ib (ImageBoot); extended partition tables; and unpartitioned space on the disk. When looking at an image made with -id, you will see the unpartitioned space and extended partitions in the list of partitions. The -id switch is primarily for the use of law enforcement agencies who require forensic images.

When Norton Ghost restores from a -id image, it relocates partitions to cylinder boundaries and adjusts partition tables accordingly. Head, sector, and cylinder information in partition tables is adjusted to match the geometry of the destination disk. Partitions are not resizeable, and you will need an identical or larger disk than the original to restore to.

Norton Ghost does not wipe the destination disk when restoring from a -id image. Geometry differences between disks may leave some tracks on the destination disk with their previous contents.

Use the -ia (Image All) switch instead of the -id switch when copying partition to partition or partition to image. An individual partition can be restored from an image created with -id.

-lpm

LPT master mode. This switch causes Norton Ghost to automatically go into LPT master mode, and is the equivalent of selecting LPT Master in the

main menu. See “Peer-to-peer connections” on page 18, for more information.

-lps

LPT slave mode. This switch causes Norton Ghost to automatically go into LPT slave mode, and is the equivalent of selecting LPT Slave in the main menu. See “Peer-to-peer connections” on page 18, for more information.

-memcheck

Activates internal memory usage checking for technical support.

-nbm

NetBIOS master mode. This switch causes Norton Ghost to automatically go into NetBIOS master mode, and is the equivalent of selecting the NetBIOS Master option from the main menu. See “Peer-to-peer NetBIOS network connections” on page 18, for more information.

-nbs

NetBIOS slave mode. This switch causes Norton Ghost to automatically go into NetBIOS slave mode, and is the equivalent of selecting NetBIOS slave in the main menu. See “Peer-to-peer connections” on page 18, for more information.

-nd

Disables NetBIOS.

-nofile

Disables the Image File Selection dialogue box. Useful when opening directories with large numbers of files and overly slow links.

-ntc-

Disables NTFS contiguous run allocation.

-ntd

Enables NTFS internal diagnostic checking.

-ntic

Ignores the NTFS volume CHKDSK bit. Norton Ghost checks the CHKDSK bit on a NTFS volume before performing operations. When Norton Ghost indicates the CHDSK bit is set, we recommend running CHKDSK on the volume to ensure the drive is in a sound state before cloning.

-ntiid

By default, Norton Ghost copies partitions participating in an NT volume set, stripe set, or mirror set using Image All sector-by-sector copying. This switch forces Norton Ghost to ignore the Windows NT volume set partition status and clone the partition as if it were an NTFS partition to allow it to be intelligently cloned on a file-by-file basis. Care should be taken when using this switch. Use of the -ntiid switch with volume sets and stripe sets is not recommended. When cloning mirrored partitions, also known as NT software RAID partitions, use the following procedure:

1. With Windows NT disk administrator, break the mirror set.
2. Using the -ntiid switch, clone just one of the mirror partitions, and resize as desired. Note: Partitions can only be resized by Norton Ghost during a DISK operation. When performing a partition operation, the target partition size must already be established.
3. After cloning, recreate a mirror set using the Windows NT disk administrator. The disk administrator will create the partitions in the mirror set.

-ntil

Ignores non-empty NTFS log file check (inconsistent volume).

-ntn

Inhibits the CHKDSK on first NTFS volume boot. Norton Ghost automatically sets the CHKDSK bit on an NTFS volume to force NT to check the volume structure when it boots for the first time after cloning. This is done to demonstrate Norton Ghost has left the volume in an integral state and to detect if an error exists in the created volume structure. We recommend that this switch is not used.

-ntx:*y*

Specifies Norton Ghost's NTFS volume memory cache to be yK in size.

-or

Override. Allows the override of internal space and integrity checks. Use of this switch should be avoided.

-pwd and -pwd=*x*

Specifies password protection to be used when creating an image file.

x indicates the password for the image file. If no password is given in the switch Norton Ghost will prompt for one.

-rb

Reboots after finishing a load or copy. After completing a load or copy operation, the target machine must be rebooted so that the operating system can load the new disk/partition information. Normally, Norton Ghost prompts the user to reboot or exit. -rb tells Norton Ghost to automatically reboot after completing the clone. See also -fx switch.

-skip=*x*

Skip file. Causes Norton Ghost to exclude the indicated files during an operation. A skip entry can specify a single file, directory, or multiple files using the *wildcard. Filenames must be given in short filename format and all pathnames are absolute. Only FAT system files are able to be skipped. It is not possible to skip files on NTFS or other file systems. The skip switch may only be included in the command line once. To specify multiple skip entries, they must be included in a text file indicated using -skip=@skipfile. The format of the skip text file 'skipfile' matches the format used with the CRC32 vexcept option.

Examples:

```
-skip=\windows\user.dll
```

Skips the file user.dll in the windows directory.

```
-skip=*\readme.txt
```

Skips any file called readme.txt in any directory.

```
-skip=\ghostpe\*.dll
```

Skips any file ending with .dll in the ghost directory.

```
-skip=\progra~1\
```

Skips the whole program files directory (note the short filename).

```
-skip=@skipfile.txt
```

Skips files as outlined in the skipfile.txt file. For example, the skipfile.txt contains:

```
*\*.tmt
[partition:1]
\windows\
*\*.exe
[Partition:2]
*\*me.txt
```

This would skip all *.tmt files on any partition, the windows directory and any *.exe files on the first partition, and any file that ended with the me.txt on the second partition.

-sleep=*x*

Slows Norton Ghost operation. The greater the x value, the slower Norton Ghost will operate.

-span

Enables spanning of image files across volumes.

-split=x

Splits image file into “x” MB spans. Use this to create a forced size volume set. For example, if you would like to force smaller image files from a 1024 MB drive, you could specify 200 MB segments. For example,

```
ghostpe.exe -split=200
```

will divide the image into 200 MB segments.

-tapebuffered

Default tape mode. Sets the ASPI driver to report a read/write as successful as soon as the data has been transferred to it. Useful when using older or unreliable tape devices or sequential media.

-tapeeject

Forces Norton Ghost to eject the tape following a tape operation. Earlier versions ejected the tape by default. By default, Norton Ghost does not eject the tape and rewinds the tape before exiting to DOS.

-tapesafe

Sets the ASPI driver to report a read/write as successful only when the data has been transferred to the physical medium. Useful when using older or unreliable tape devices or sequential media.

-tapespeed=x

Allows control of tape speed. Where x equals 0 to F. 0 is default, 1-F increases tape speed. Only use this when the tape does not work correctly at the speed used by Norton Ghost.

-tapeunbuffered

Sets the ASPI driver to report a read/write as successful only when the data has been transferred to the tape drive. (It is possible that this occurs before the data is actually physically written to the medium.)

-vdw

If this switch is set, Norton Ghost will use the disk's verify command to check every sector on the disk before it is written. The action Norton Ghost takes if a sector fails the verify depends on the -bfc switch.

-ver

Displays the version number of Norton Ghost.

-ver=value

Tests the version number of Norton Ghost. If the version number value given is less than the version number of Norton Ghost, Norton Ghost will operate normally. If the version number value given is greater than the version number of Norton Ghost, Norton Ghost will abort and exit before carrying out the command.

-wd-

Disables disk caching on destination disk.

-ws-

Disables disk caching on source disk.

-z

Compress when saving a disk or partition to an image file.

- -z or -z1 low compression (fast)
- -z2 high compression (medium)
- -z3 thru -z9 higher compression (slower)

APPENDIX B

Frequently asked questions

When I compare the contents of the original source disk to the disk Norton Ghost created there is a difference in the number of files. Why?

In addition to files skipped using the -skip switch, some temporary files are not included when cloning a FAT volume. These include SWAPPER.DAT, WIN386.SWP, SPART.PAR, PAGEFILE.SYS, HYBERN8, 386SPART.PAR, GHOST.DTA, and DOS DATA SF.

Can I run Norton Ghost inside Windows 95/98/NT, or OS/2?

It is best to run Norton Ghost in DOS mode only. Norton Ghost should not be run in Windows NT or OS/2. Norton Ghost will run in a DOS box of Windows 95/98, but caution should be observed. When the operating system is running there may be files open or in a changing state, which, if cloned, will result in the destination being in an unknown state. In addition, if you overwrite partitions, the system must be restarted before using them.

If I shouldn't run Norton Ghost inside the operating system, how should I launch Norton Ghost?

It is best to execute Norton Ghost at the true DOS level, not a DOS window inside the operating system. Hitting F8 while Starting Windows 95/98 works well, or you can create a floppy boot disk and then launch Norton Ghost.

I know I should launch Norton Ghost outside the operating system, but then I don't have access to a JAZ, ZIP or CD-ROM drive for saving and loading disk images. How do I work around this?

Create a bootable disk with the DOS-based drivers required to access these devices.

Can Norton Ghost compress an image file?

Yes. Norton Ghost includes several levels of compression that offer a range of performance and storage gains.

After cloning and restarting Windows 95, Windows 95 keeps finding a new NIC card. The NIC card is the same as on my model machine. Why?

Plug and play at times will see and find devices twice or more. To avoid this, remove the device and all the protocols from the model BEFORE saving the image or cloning. After cloning, restart. Windows 95 will detect the card for the first time and request the drivers. These drivers can be saved in the image file for easy access after cloning.

Does Norton Ghost support Macintosh?

No.

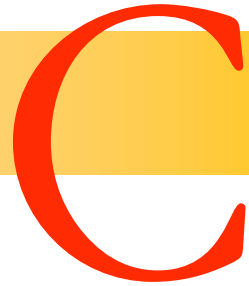
If I accidentally specify the wrong destination drive, is there any way to restore the original contents?

No. Norton Ghost completely overwrites the target hard disk or partition. Be careful when selecting the destination and ensure the operation you have selected is correct when Norton Ghost asks if you are sure you want to proceed.

Does Norton Ghost support spanning multiple JAZ or ZIP drives?

Yes.

A P P E N D I X



Troubleshooting

Browse through the “Frequently asked questions” on page 65 for answers to commonly asked questions. If an error code is reported, find its meaning and possible resolution in the following table.

Norton Ghost error codes

A Norton Ghost error message consists of an error number, a description, and possibly a suggestion of what can be done to remedy the problem.

Below is a list of the more common errors that Norton Ghost may report. Refer to “Diagnostics” on page 69 for information on the ghost.err file generated when an abort error occurs.

Further information is available on Symantec’s Norton Ghost technical support website. See “Symantec Service and Support Solutions.”

8005, 8012

Norton Ghost is being run in a non-DOS environment. Either boot the system to DOS or create a DOS boot disk with required device drivers to start the system and run Norton Ghost.

10098, 12412

The partition number must be included in the command-line switches. See “Norton Ghost command-line switches” on page 47 for further information.

11010, 10013, 10014, 10016, 10017, 10019, 10032, 10041, 10042, 11000

Incorrect path/file syntax. Ensure path and filename are correct and complete. Also make sure you have the proper user rights to read or create the image file on the network.

14030

An unregistered version of Norton Ghost has encountered a file with a date beyond its expiration date. Scan your system for files beyond this date and temporarily remove them from the system to allow Norton Ghost to continue. You can locate the offender by looking at the drive:\path\filename at the bottom of the Norton Ghost window when this error occurs. Visit the Symantec website at www.symantec.com for details on how to purchase Norton Ghost.

15150

Probable corrupt image file. Check the integrity of the image file by selecting Local > Check > Image File in the main menu.

15170

Due to an unformatted or invalid partition on the source hard drive. Make certain the source drive is completely allocated as Norton Ghost looks for 100% viable media.

CDR101: Not ready reading drive X, Abort, Retry, Fail

A system error message. This error is not caused by Norton Ghost. It is caused by malfunctioning hardware or software configurations.The image file on the CD is not readable. To verify this, try going into DOS and copying the image file off the CD using copy verification.

APPENDIX D

Diagnostics

This appendix contains information that may be helpful for diagnostic purposes.

Hard drive detection and diagnostic information

Norton Ghost has the ability to generate several different diagnostic reports outlining the hard drive devices detected, other system-related information, and error conditions when they are detected.

Norton Ghost abort error file (ghost.err)

An error message consists of an error number, a description, and possibly a suggestion of what can be done to remedy the problem.

The Norton Ghost abort error file includes these details along with additional drive diagnostics and details required to assist technical support in diagnosing the cause of the problem.

The Norton Ghost abort error file is generated when a erroneous condition is detected by the software which Norton Ghost is unable to recover from or work around. The ghost.err file is generated in the directory where the Norton Ghost executable resides. If this location is read-only, the ghost.err file output location should be redirected. The location and file name of the abort file generated by Norton Ghost during an abort can be altered using the -afile=drive:\path\filename command line switch.

For more information, see "Troubleshooting" on page 67.

Hard disk geometry diagnostics

A list of all detected hard drives on the system and their associated geometry values can be reported to screen using the command line switch -di. To generate a file containing the details, the DOS redirect output can be used as shown in the following example:

```
c:\ > ghostpe -di > drives.txt
```

Full diagnostic statistics dump summary

A full diagnostic statistics dump summary file contains the detected hard disk geometry details along with other Norton Ghost statistics. The full Norton Ghost diagnostic statistics dump can be created using the command line switch -dd. The location and file name of file generated by Norton Ghost can be altered by adding the -dfile=drive:\path\filename command line switch.

Symantec Service and Support Solutions

Symantec is committed to excellent service worldwide. Our goal is to provide you with professional assistance in the use of our software and services, wherever you are located.

Technical Support and Customer Service solutions vary by country. If you have questions about the services described below, please refer to the section "Worldwide Service and Support" at the end of this chapter.

Registering your Symantec product

To register your Symantec product, please complete the registration card included with your package and drop the card in the mail. You can also register via modem during the installation process (if your software offers this feature) or via fax to (800) 800-1438 or (541) 984-8020.

Technical support

Symantec offers an array of technical support options designed for your individual needs to help you get the most out of your software investment.

World Wide Web

The Symantec World Wide Web site (http://service.symantec.com) is the doorway to a set of online technical support solutions where you will find the following services:

Interactive problem solver

Symantec's online interactive problem solver (known as the Support Genie) helps you solve problems and answer questions about many Symantec products.

Product knowledgebases

Product knowledgebases enable you to search thousands of documents used by Symantec Support Technicians to answer customer questions.

FAQs

Frequently Asked Questions documents, also known as FAQs, list commonly asked questions and clear answers for specific products.

Ask a tech

Ask a tech discussion groups provide a forum where you can ask questions and receive answers from Symantec online support technicians.

File downloads

Point your web browser to http://service.symantec.com to search for and download technical notes and software updates. You can also click the LiveUpdate button in programs enabled with this feature to automatically download and install software updates and virus definitions.

Other technical support options

Other Symantec support options include the following:

America Online	Type Keyword: SYMANTEC to access the Symantec forum.
CompuServe	Type GO SYMANTEC to access the Symantec forum.
Symantec BBS	Set your modem to 8 data bits, 1 stop bit, no parity and dial (541) 484-6669.
Automated fax retrieval system	To receive general product information, fact sheets and product upgrade order forms directly to your fax machine, please call our Customer Service fax retrieval system at (800) 554-4403 or (541) 984-2490. For technical application notes, please call our Technical Support fax retrieval system at (541) 984-2490 and select option 2.
StandardCare Support	If you can't access the Internet, take advantage of your 90 days of free telephone technical support (from the date of your first call) at no charge to all registered users of Symantec software. Please see the back of this manual for the support telephone number for your product.

PriorityCare and PlatinumCare Support

Expanded telephone support services are available to all registered customers. For complete information, please call our automated fax retrieval service, located in the United States, at (800) 554-4403 or (541) 984-2490, and request document 070, or visit www.symantec.com/techsupp/phone/index.html

Support for old and discontinued versions

When a new version of this software is released, registered users will receive upgrade information in the mail. Telephone support will be provided for the previous version for six months after the release of the new version. Technical information may still be available through online support.

When Symantec announces that a product will no longer be marketed or sold, telephone support will be discontinued 60 days later. Support will only be available for discontinued products through online services. See the section "Technical support" for online service options.

Customer Service

Symantec's Customer Service department can assist you with non-technical questions. Call Customer Service to:

- Order an upgrade.
- Subscribe to the Symantec Support Solution of your choice.
- Fulfill your request for product literature or demonstration disks.
- Find out about dealers and consultants in your area.
- Replace missing or defective CDs, disks, manuals, etc.
- Update your product registration with address or name changes.

You can also visit Customer Service online at www.symantec.com/custserv for the latest Customer Service FAQs, to find out the status of your order or return, or to post a query to a Customer Service discussion group.

Worldwide Service and Support

Symantec provides Technical Support and Customer Service worldwide. Services vary by country and include International Partners who represent Symantec in regions without a Symantec office. For general information, please contact the Symantec Service and Support Office for your region.

Service and Support offices

NORTH AMERICA

Symantec Corporation 175 W. Broadway Eugene, OR 97401	(800) 441-7234 (USA & Canada) (541) 334-6054 (all other locations) Fax: (541) 984-8020
Automated Fax Retrieval	(800) 554-4403 (541) 984-2490

BRAZIL

Symantec Brazil Av. Juruce, 302 - cj 11 São Paulo - SP 04080 011 Brazil	+55 (11) 5561 0284 Fax: +55 (11) 5530 8869

EUROPE

Symantec Ltd. Schipholweg 103 2316 XC Leiden The Netherlands	+31 (71) 408 3111 Fax: +31 (71) 408 3150
Automated Fax Retrieval	+31 (71) 408 3782

ASIA/PACIFIC RIM

Symantec Australia Pty. Ltd. 408 Victoria Road Gladesville, NSW 2111 Australia	+61 (2) 9850 1000 Fax: +61 (2) 9850 1001
Automated Fax Retrieval	+61 (2) 9817 4550

Most International Partners provide Customer Service and Technical Support for Symantec products in your local language. For more information on other Symantec and International Partner locations, please call our Technical Support automated fax retrieval service, in the United States at +1 (541) 984-2490, choose Option 2, and request document 1400.

Every effort has been made to ensure the accuracy of this information. However, the information contained herein is subject to change without notice. Symantec Corporation reserves the right for such change without prior notice.

8/98

Norton Ghost™ Personal Edition
Disk Replacement Form

DISK REPLACEMENT: After your 60-Day Limited Warranty, if your disk or CD becomes unusable, fill out and return 1) this form, 2) your damaged disk or CD, and 3) your payment (see pricing below, add sales tax if applicable), to the address below to receive replacement disks. *DURING THE 60-DAY LIMITED WARRANTY PERIOD, THIS SERVICE IS FREE.* You must be a registered customer in order to receive disk replacements.

FOR DISK REPLACEMENT

Please send me: ___ 3.5" high-density disks (replacement) ___ CD Replacement

Name_____

Company Name _____

Street Address (No P.O. Boxes, Please) _____

City _____State _____ Zip/Postal Code _____

Country* _____ Daytime Phone _____

Software Purchase Date_____

*This offer limited to U.S., Canada, and Mexico. Outside North America, contact your local Symantec office or distributer.

Briefly describe the problem:_____

_____

Disk Replacement Price	$ 10.00
Sales Tax (See Table)	_____
Shipping & Handling	$ 9.95
TOTAL DUE	_____

SALES TAX TABLE: AZ (5%), **CA** (7.25%), **CO** (3%), **CT** (6%), **DC** (5.75%), **FL** (6%), **GA** (4%), **IA** (5%), **IL** (6.25%), **IN** (5%), **KS** (4.9%), **LA** (4%), **MA** (5%), **MD** (5%), **ME** (6%), **MI** (6%), **MN** (6.5%), **MO** (4.225%), **NC** (6%), **NJ** (6%), **NY** (4%), **OH** (5%), **OK** (4.5%), **PA** (6%), **SC** (5%), **TN** (6%), **TX** (6.25%), **VA** (4.5%), **WA** (6.5%), **WI** (5%). Please add local sales tax (as well as state sales tax) in AZ, CA, FL, GA, MO, NY, OH, OK, SC, TN, TX, WA, WI.

FORM OF PAYMENT ** (Check One):

___ Check (Payable to Symantec) Amount Enclosed $ _____ __ Visa __ Mastercard __ American Express

Credit Card Number _____ Expires _____

Name on Card (please print) _____Signature _____

****U.S. Dollars. Payment must be made in U.S. dollars drawn on a U.S. bank.**

MAIL YOUR DISK REPLACEMENT ORDER TO:

Symantec Corporation
Attention: Order Processing
175 West Broadway
Eugene, OR 97401-3003 (800) 441-7234

Please allow 2-3 weeks for delivery within the U.S.

SYMANTEC.™

I N D E X

J

L

M

N

O

P

R

S

T

U

W

Z