

Recipe

How to Upgrade a Hard Disk Drive -- Without Crashing the System

Customers looking for added data capacity, faster data access, and quieter systems? These tips and tricks can help

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My first hard drive was just 40 MB. Back then, circa 1990, the only reason you'd upgrade a hard drive was to increase your [storage](#) space. Of course, the largest [hard drive](#) you could purchase then was all of 540 MB. These days I keep a [USB flash](#) drive in my pocket with more capacity than that!

That was 15 years ago. Today there are many good reasons for upgrading a hard drive. With the recent introduction of new hard-drive technologies such as SATA, Native Command Queuing (NCQ), larger buffers, fluid bearings, anti-shock mechanisms -- not to mention the constant increase of aerial density on the hard-drive platters themselves -- replacing a hard [disk](#) often results in a drive that is not only more capacious, but also markedly faster and quieter.

In this Recipe, I'll show you tips and tricks for upgrading your customers' disk drives, transferring their data to the new disk -- all without crashing their systems.

Getting Started

Whenever you add or upgrade a hard drive to a customer's system, the new drive should be installed and configured as the main C: drive. That's because the [operating system](#) will most likely reside on the C: drive.

Quite often, however, it's not done this way, due to confusion over how to successfully move an OS (along with applications and customer data) from one hard drive to another. Also, some technicians have discovered that they can save time by simply configuring the new drive as a "slave" to an older, smaller, and slower pre-existing drive. But with the right [software](#) and some know-how, you'll find it easy to transfer all the data -- including the [OS](#) -- from a customers' original hard drive to a new hard drive.

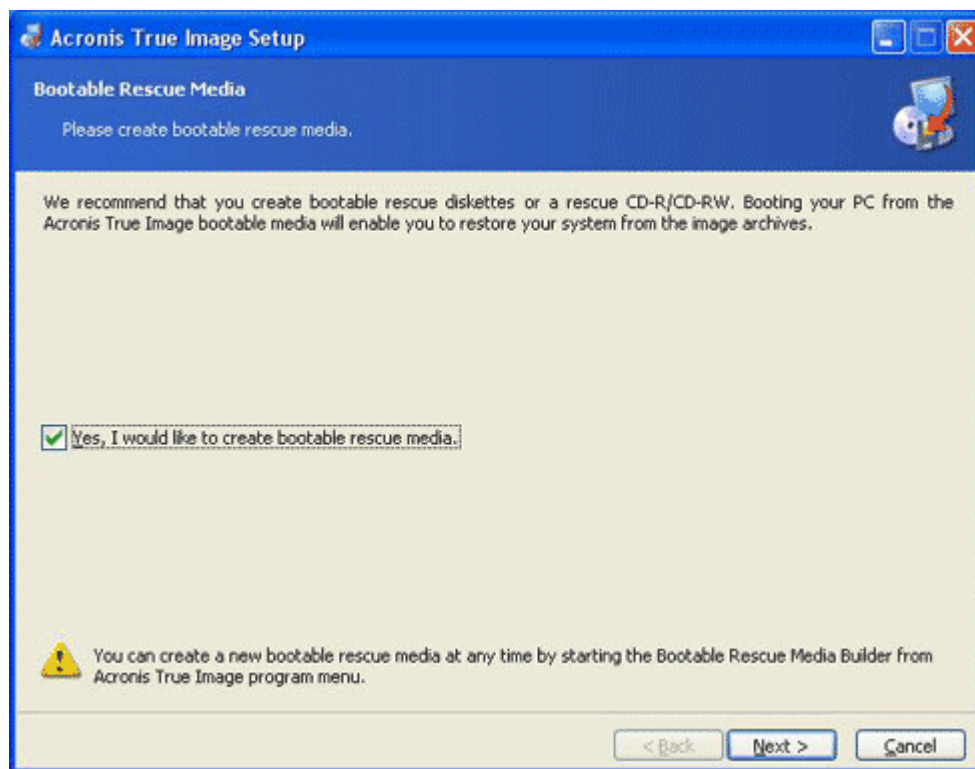
Currently, the two most popular programs for this purpose are Symantec (NSDQ:[SYMC](#))'s [Norton Ghost 9.0](#) and Acronis' [True Image 8.0](#).

For this recipe I chose the Acronis package. I find it easier to use, more robust, and less expensive than Symantec's. Acronis even offers a free trial of the software downloadable from its Web page, removing the risk of investing in a piece of software that may not suit your needs. I also found True Image 8.0 superior with regards to both the ease with which it creates a boot disk, and its ability to recognize SATA controllers. As they say, your mileage may vary.

Using True Image, the first step is to create a boot disk or diskettes with a portable version of the True Image software. Fortunately, Acronis makes this painless: The software automatically performs this task during installation.

In this Recipe I'll focus on cloning hard drives for the purpose of upgrading. So I recommend that you create a "safe" version of the bootable disk when asked -- it's less than half the size of the "full" version -- unless you are cloning to or from a USB or SCSI hard drive. Loading drivers you don't need slows the boot-disk creation process. It also requires more diskettes and takes more time to load. There's also the possibility of a compatibility issue, which could prevent the boot disk from working properly on a customer's system.

As shown below, True Image 8.0 will offer to create a bootable "rescue" CD or diskettes during installation. One blank CD or from three to seven blank diskettes are required, depending on whether you choose to create a "safe" or "full" version:



Cloning 101

You can clone any hard drive to any other hard drive, provided the target drive meets or exceeds the current capacity *in use* on the original drive. For example, if you have 20 GB of data on an 80 GB drive, you can clone that drive to any other drive with a capacity of at least 20 GB. This also means you can downgrade as well as upgrade so long as this condition is met. In other words, you could replace a 200-GB drive with a 20-GB drive, as long as the larger drive contained less than 20 GB worth of data.

Also, you can clone from one manufacturer's drive to another; from USB to IDE; from SATA to IDE; from SCSI to PC CARD or IEEE 1394 (Firewire); or any combination thereof. You can clone laptop hard drives to any of these devices, too.

The target drive need not be partitioned or formatted, as the cloning software will take care of this on the fly. But any data on the target drive before cloning will be erased permanently. After cloning, the target drive will be an exact mirror image of the original drive; only the available free space will differ. So before you clone, be sure to check the target drive for any useful data files. Then copy these files to another disk or CD; otherwise, they will be erased and lost forever.

Also, be careful when selecting the source drive. If you accidentally configure the software incorrectly -- for example, setting the target as the source, and the source as the target -- you'll wipe the target drive completely during this process. If that happens, you'll lose every [bit](#) and byte of your customers' data.

True Image will clone any hard drive with a FAT16/32, NTFS, Linux Ext2, Ext3, ReiserFS, or Linux SWAP file system. Release 8.0 also lets you copy individual partitions from a RAID array to a single drive, or from one RAID array to another. You can also build a recoverable image file, and do a sector-by-sector copy of damaged hard drives. While those features are beyond the scope of this recipe, it's good to know they're available.

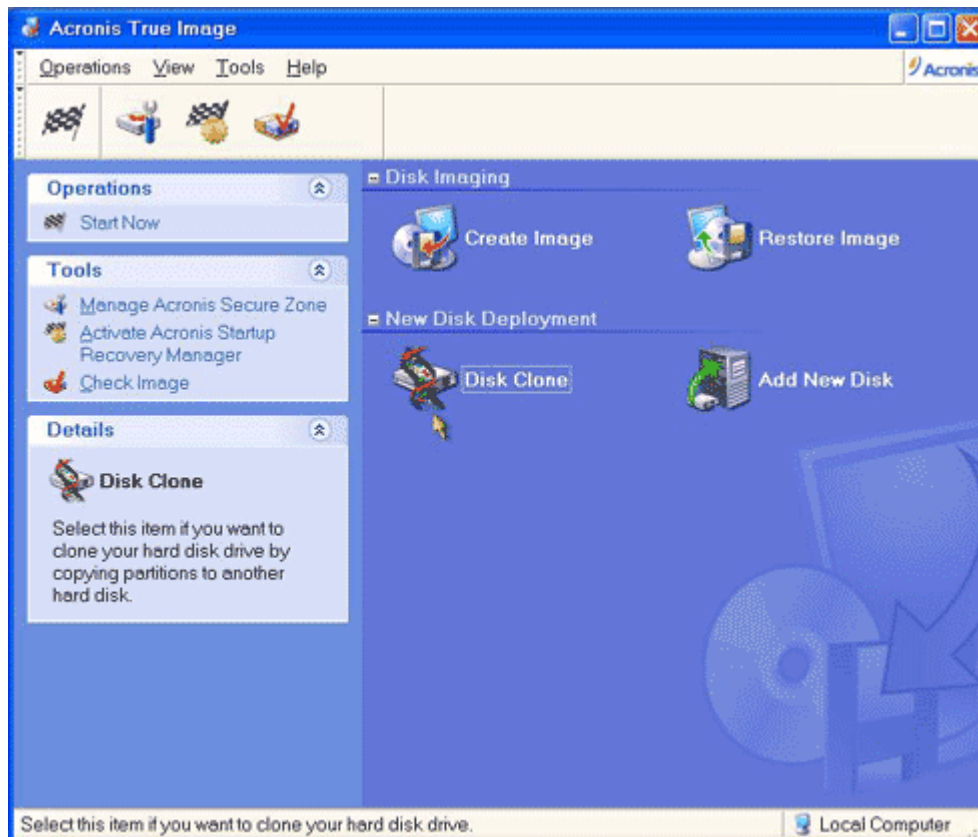
Getting to Work

The new hard drive needn't be physically screwed into the computer case prior to this procedure. For example, if I were replacing an old hard drive with a new one, I would simply lay the new drive upside-down (that is, with its circuit board visible) on the desk next to the PC. With the PC's cover removed, I would then temporarily cable the drive to the PC motherboard, making it a slave to the current drive it will replace. Or I would disconnect any drives on the secondary controller and use its data and power cables temporarily on the new drive.

The position of the drive is irrelevant, too, as the drive will function on its back, side, or belly with equal efficiency. The purpose behind laying the drive flat and upside-down is to prevent any metal from coming in contact with the circuit board on the drive. If these metals touch, you could have a short-circuit that permanently damages the new drive. Be especially careful about hard-to-see metal screws you may have left on the desk or on the sides of the PC case.

IDE to IDE

The simplest scenario involves replacing or adding a new IDE drive to a system that already has an older IDE drive. To do this, simply boot from your True Image rescue disk, select Disk Clone and, using the wizard, select the drive you want to clone. Here's how it looks when you boot from the True Image boot disk; the following screen will appear offering the "Disk Clone" option:



Next, select the target drive. Within minutes -- or hours, depending on how much data you're cloning -- you'll have an exact mirror-image copy of the older hard drive.

IDE to SATA

Cloning an IDE drive to an SATA drive, or vice versa, is almost as straightforward as IDE-to-IDE cloning. There's just one key difference: Currently, only a handful of SATA controllers are available, the majority of which are made by Silicon Image, VIA, and Promise. The Promise controller is, strictly speaking, a RAID controller; as such, it will not be detected automatically by the True Image software. However, when I've tested the VIA and Silicon Image SATA controllers, both were automatically detected by the True Image software.

Because Windows XP does not natively include SATA drivers, when you attempt to boot from the new, cloned SATA hard drive, you'll discover that Windows XP will not load. To prevent this, be sure to enable the SATA controller in the [BIOS](#) and load the drivers into Windows before cloning. Should you forget to do this, a repair installation of Windows will be required to make the machine bootable again without losing your customer's data. You'll need your customer's XP installation CD and a diskette containing the SATA drivers. (These are generally available from the motherboard manufacturers' Web sites.) Boot to your customer's XP installation CD. Almost immediately as the XP installation CD loads, you'll be invited to press F6 to "install a third party SCSI or RAID driver." Do it.

You're only offered this option for about 20 seconds, so act quickly. After you've pressed F6, it may seem like nothing has happened. Be patient. Eventually, you'll be greeted with a screen inviting you to press "S" to load third-party disk controller drivers. Press "S," insert the SATA driver diskette into the floppy drive, and follow the on-screen instructions.

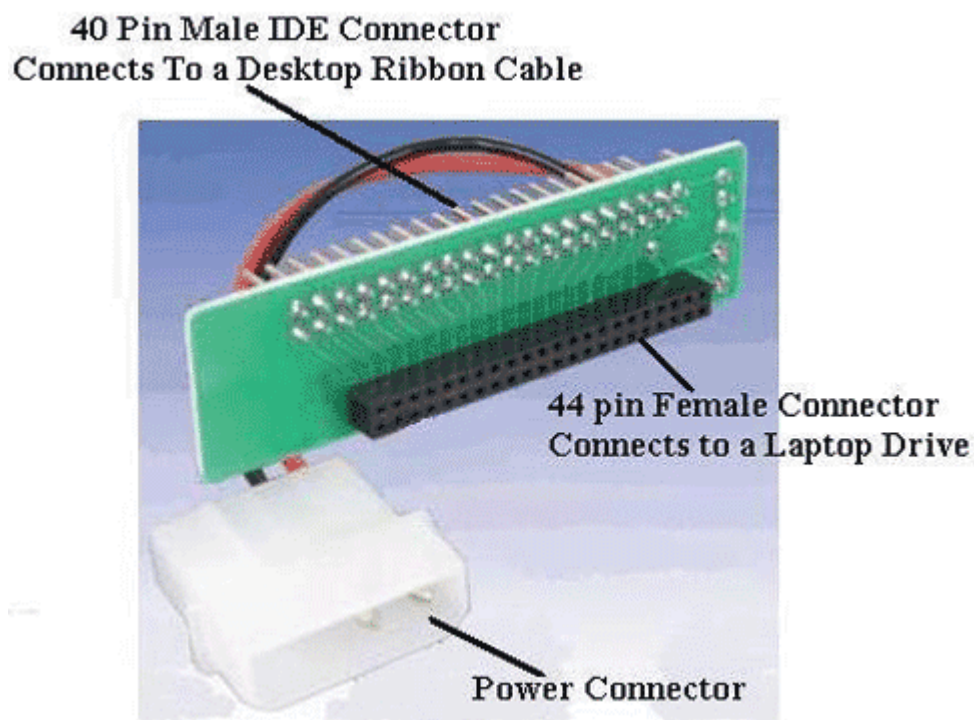
Once the Windows XP setup loads the remainder of the drivers from the CD, you'll see a screen asking if you want to set up or repair Windows XP. It's important that you do *not* choose "repair" at this point. The Windows XP installation process actually offers a second repair option, and that's the one we want!

Next, press ENTER to "set up Windows XP now." Then press F8 to agree to the software license when you're asked. The next screen will offer a second repair option. Select this. Windows will then install on top of itself, leaving all of your customer's data and applications unharmed.

Note: When you do this, you will lose all previously installed Windows updates. But once the repair install is complete, Windows XP should boot back to the customer's familiar desktop. I highly recommend that you immediately visit Microsoft (NSDQ:MSFT)'s [Windows Update site](#) to download and install all the patches your customer's system is missing.

Cloning Laptop Hard Drives

To upgrade a laptop's hard drive, you'll also need a traditional desktop system on hand. Most laptops allow for the installation of only one hard drive. But by using an inexpensive laptop hard-drive adapter, such as the one pictured below, you can cable both the original and new laptop hard drives to a desktop PC.



Using two adapters and two laptop hard drives, cable both drives temporarily to the desktop PC. Then boot to your True Image CD or diskettes. Clone the drives. Then install the newly cloned drive back into the laptop. It's really that simple!

Once you've verified that the newly cloned drive is bootable, you can safely mount the drive permanently, then close up the case. The result: a happy customer, and a hard-drive upgrade installation you can be proud of.