

Hard Drive Duplicators

Buyer's Guide

Stop First! And Think

- *What features do I need in a duplicator?*
- *Do I really need a hardware duplicator?*
- *How do software cloning programs compare?*
- *Will my initial investment PAY-OFF in the long run?*

Hard Drive Cloning...

What to Choose???

Cloning Software:

Software duplication solutions are good for **private users** with simple applications. Don't expect fast copy speeds and extra functions.

Pro:

- + Low price
- + No space consumption

Con:

- Slow speed
- Subject to Operation System (OS) complications and constraints

USB Enclosure:

USB Enclosure duplication solutions tend to be a step-up in quality from software solutions. **Private users** can expect faster copy speeds and more functionality. The external USB connection is very convenient for some users.

Pro:

- + Low price
- + Small space consumption
- + Easy connection
- + Usually portable

Con:

- Slow speed
- Subject to Operation System (OS) complications and constraints

Duplicator :

Hardware duplication solutions tend to be higher in quality than software and USB methods. **IT Experts** and **Industrial Professionals** can expect faster copy speeds and more options such as Data-Only copy and Flexible copy functions. **Industrial Duplicator is for mass duplication device (1:5~) with quality build and cycle reduction in mind.**

Pro:

- + Fast copy speed
- + Fast set up and initiation
- + Free from Operation System (OS) complications or constraints

Con:

- More Expensive, especially industrial duplicators
- Space consuming

Hardware Duplicator Selection Criteria-1

HDD Interface Type and Speed

ATA, PATA, IDE, EIDE Interfaces	Support for these interface types is relatively common. There are many HDD sizes for these interfaces. Common interface is for 3.5" hard drive (40pin). Adapters are usually required for sizes other than 3.5" hard drives.
SATA I/II Support	Many SATA duplicators on the market support SATA I hard drives, but not SATA II (new technology with 300MB/S transfer rate). Failure to support SATA II hard drives may indicate a lack of current technology in a given duplicator. *Note: ATA-to-SATA conversion adapters are available for most ATA duplicators. However, modern duplicators normally support SATA interface with native connections.
SCSI Support	SCSI interface support tends to be expensive in comparison to ATA and SATA. This price jump is usually reflective of the higher cost of SCSI control components at the manufacturing level. Note that SCSI hard drives come in 3 different connector types: Wide (68 pins), Narrow (50 pins) and SCA (80 pins).
UDMA Mode Support	ATA interface supports UDMA data transfer speed modes 0~7. Maximum speed is 133MB/sec. (mode7). PIO mode is slow hard drive mode and your duplicator must support this PIO mode to handle old hard drive.
HDD Size Variations	Most HDD duplicators support standard 3.5" drives. Conversion Adapters are usually used to support smaller hard drive types or varying SCSI connector types. Check with the manufacturer of the duplicator or adapter to ensure compatibility.
Capacity Support	Some hard drive duplicators are limited as far as the capacity of hard drives that they can support. Make sure to check for such limitations and be wary of products with strict limitations, as this is an indicator of other performance and compatibility limitations.
Target Ports	When comparing two duplicators, make sure to break the retail price into price per-port. Note the quantities that you are looking to duplicate and calculate the most efficient time and money investment.
Speed	Copy speed varies drastically among HDD duplicators from approximately 5 MB per minute to 5 GB per minute. Note that the hard drive being copied plays a large role in this speed. The fastest HDD duplicators usually work at a 1~4% overhead on actual HDD data transfer speed (meaning copy speed is 1~4 % slower than HDD transfer speed).

Hardware Duplicator Selection Criteria-2

Basic Copy Functions

<p>Data-Only Copy (2 types)</p>	<p><u>File System Analysis:</u> File System Analysis is the most common data-only copy method. Using the File System Allocation table, the duplicator scans the hard drive to locate the used data. It then selectively copies the used HDD disk space and ignores unused space in order to save time.</p> <p>Pro: + Faster than full HDD scan + No need to prepare a special master drive</p> <p>Con: - Limited support for OS and file allocation systems - May NOT copy hyphenated files nor NON OS recognized files</p> <hr/> <p><u>Full HDD Scan Mapping:</u> Using this method, a duplicator scans the entire surface of the master hard drive. It then memorizes where the used data space is located on the HDD platter and selectively copies the used disk space in order to save time.</p> <p>Pro: + Works for any OS and file allocation system + Make Exact Copy of Master Drive within and without OS systems</p> <p>Con: - More time consuming than File System Analysis - Must perform low level format on the master HDD before scan and copy</p>
<p>Sector-to-Sector Copy (mirror copy)</p>	<p>In a sector-to-sector (or mirror) copy, the duplicator copies every sector on the master drive to the exact corresponding LBA location on a target drive. This function can take much longer than a data-only copy functions because it does not skip any of the non-used data area. Common applications for this function are forensic investigation and data recovery applications where certain non-used data areas may need investigation.</p>
<p>Cross-Interface Copy</p>	<p>Cross interface copy functions allow the user to copy one type of hard drive to another. For example; copying a SATA hard drive to an IDE drive, or a SCSI drive to a SATA drive.</p>
<p>Bad Sector Skip</p>	<p>Bad sector skip functions are invaluable for copying unstable hard drives. These functions vary widely across HDD duplicator brands and types. If you feel that your application requires this function we suggest that you contact the manufacturers of each duplicator in order to properly understand the method and ability of their products to skip bad sectors.</p>
<p>Compare Process</p>	<p>It is important to understand that most duplication functions include a "CRC" compare function. This is incorporated after the copy function takes place in order to assure that the data has been copied successfully. While CRC compare functions are usually optional they are recommended by most duplicator manufacturers.</p>
<p>Quality Control On-The-Fly</p>	<p>What type of quality assurance methods does the HDD duplicator employ? Some duplicators have extra features that test the HDD in addition to duplication functions or ensure that the duplicated data is identical to the original master data. Make sure to ask about the measures that a duplicator takes to ensure that your end product is in good working condition.</p>

Hardware Duplicator Selection Criteria-3

Test and Repair

Hidden Partition Area (HPA)	A Hidden Partition Area (HPA) is an area of the hard drive that is not viewable by PC BIOS. Most modern duplicators include HPA ON/OFF functions in order to give the user more control over the hard drive. By removing an HPA, a user can duplicate all hidden areas of a hard drive and/or increase the capacity of a hard drive.
Non-Destructive Test	Sometimes your master hard drive (the HDD containing the original data) will show signs of being faulty or damaged. In these cases it is important to be able to test the master HDD without altering the data that it contains. Modern duplicators usually include at least such testing function, which examines the integrity of the HDD without altering the data.

Hardware Duplicator Selection Criteria-4

Forensic Investigation and Data Recovery

Algorithmic Verification	<p>Forensic computer investigators commonly use algorithmic verification methods to ensure that a copied hard drive is 100% identical to the original. Basically, hexadecimal values that comprise the data stored in a hard drive are run through an algorithm to produce a final value. If the value of the copied HDD is identical to the value of the master, then the hard drives are identical and the copy can be presented as legal evidence.</p> <p>Common types include; MD5, SHA-1 SHA-224, SHA-256, SHA-384, and SHA-512</p>
DD Image	A DD Image (also known as a forensic image) is the most common HDD data duplication method used in forensic investigation. It is basically a file that represents an identical snapshot of a hard drive at the time that it was imaged. It is appealing to the forensic community because it preserves the original hard drive's data bit-for-bit. DD is shorthand for "data definition."
HDD Mounting	Many duplicators have a "mount" function where the duplicator acts a medium for the user to view a given hard drive externally by PC. This allows the user to view the contents of the hard drive before or after any duplication takes place. It is important that the duplicator has an optional "write protect" function that ensures the integrity of the hard drive data.
Data Extraction	Data Extraction functions are invaluable to data recovery professionals or any other users who need to extract data from damaged or unstable hard drives. Data Extraction functions vary widely across HDD duplicator brands and types. If you need this function for your application, we suggest that you contact the duplicators' manufacturers in order to properly understand the method and ability of a specific duplicator.