



# PCWorld

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CLIP-AND-SAVE PULLOUT, PAGE 75



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### A Terabyte to Go?

Super storage:  
We lab-test 22  
pocket-size  
hard drives p.89



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players for less  
than \$300 p.46





## Good things come in small packages—

and when it comes to storage, the saying couldn't be more true. No matter what size your data set is, you can find a stylish, pocketable wonder of modern miniaturization to store it and transport it.

All portable storage units do basically the same thing, but these days they come in more flavors than you'll find at Baskin-Robbins.

PC World Labs tested 22 models, from Samsung's credit-card-size



## More Online

For reviews of all 22

portable hard drives we examined, go to [find.pcworld.com/64255](http://find.pcworld.com/64255).

# Top Portable Hard Drives Are Fast, Mobile

MODEL	Rating	Performance	Features and specifications	Bottom line
1  <b>Iomega eGo Mac Edition 500GB</b> \$100 <a href="http://find.pcworld.com/64244">find.pcworld.com/64244</a>	★★★★★ VERY GOOD	<ul style="list-style-type: none"> <li>Overall performance: Superior</li> <li>Copy files (3.7GB): 95 seconds</li> <li>Malware scan: 403 seconds</li> <li>Software: Very Good</li> </ul>	<ul style="list-style-type: none"> <li>• 500GB</li> <li>• 5400 rpm</li> <li>• FireWire 800/400, USB 2.0</li> <li>• Cost per gigabyte: 20 cents</li> </ul>	This speedy, colorful drive has FireWire 800 and 400 ports, and useful software (Retrospect Express and Iomega QuikProtect).
2  <b>Western Digital My Passport Essential 1TB</b> \$200 <a href="http://find.pcworld.com/64246">find.pcworld.com/64246</a>	★★★★★ VERY GOOD	<ul style="list-style-type: none"> <li>Overall performance: Very Good</li> <li>Copy files (3.7GB): 141 seconds</li> <li>Malware scan: 523 seconds</li> <li>Software: Very Good</li> </ul>	<ul style="list-style-type: none"> <li>• 1TB</li> <li>• 5400 rpm</li> <li>• USB 2.0</li> <li>• Cost per gigabyte: 20 cents</li> </ul>	This palm-size (though thicker than usual) 1TB USB drive performed well. The included WD SmartWare software is nicely designed, too.
3  <b>WiebeTech ToughTech XE Mini 500GB</b> \$255 <a href="http://find.pcworld.com/64245">find.pcworld.com/64245</a>	★★★★★ VERY GOOD	<ul style="list-style-type: none"> <li>Overall performance: Superior</li> <li>Copy files (3.7GB): 62 seconds</li> <li>Malware scan: 384 seconds</li> <li>Software: Good</li> </ul>	<ul style="list-style-type: none"> <li>• 500GB</li> <li>• 5400 rpm</li> <li>• eSATA, FireWire 800, USB 2.0</li> <li>• Cost per gigabyte: 51 cents</li> </ul>	The ToughTech XE Mini comes with dual FireWire 800 ports; its eSATA interface made it the fastest drive we saw, but it lacks USB bus power.
4  <b>Verbatim SureFire 500GB</b> \$140 <a href="http://find.pcworld.com/64247">find.pcworld.com/64247</a>	★★★★★ VERY GOOD	<ul style="list-style-type: none"> <li>Overall performance: Superior</li> <li>Copy files (3.7GB): 92 seconds</li> <li>Malware scan: 382 seconds</li> <li>Software: No bundled software</li> </ul>	<ul style="list-style-type: none"> <li>• 500GB</li> <li>• 5400 rpm</li> <li>• FireWire 800, USB 2.0</li> <li>• Cost per gigabyte: 28 cents</li> </ul>	The SureFire 500GB has neither bundled software nor a snazzy design, but it's a great performer when used with FireWire 800.
5  <b>Seagate FreeAgent Go 1TB</b> \$230 <a href="http://find.pcworld.com/64248">find.pcworld.com/64248</a>	★★★★★ VERY GOOD	<ul style="list-style-type: none"> <li>Overall performance: Good</li> <li>Copy files (3.7GB): 173 seconds</li> <li>Malware scan: 499 seconds</li> <li>Software: Very Good</li> </ul>	<ul style="list-style-type: none"> <li>• 1TB</li> <li>• 5400 rpm</li> <li>• eSATA, FireWire 800, USB 2.0</li> <li>• Cost per gigabyte: 23 cents</li> </ul>	This 1TB drive fits in an optional Go docking station (\$20); it lagged a bit behind WD's 1TB drive in our file-reading and installation tests.
6  <b>Western Digital My Passport Elite 500GB</b> \$130 <a href="http://find.pcworld.com/64251">find.pcworld.com/64251</a>	★★★★★ VERY GOOD	<ul style="list-style-type: none"> <li>Overall performance: Very Good</li> <li>Copy files (3.7GB): 140 seconds</li> <li>Malware scan: 518 seconds</li> <li>Software: Very Good</li> </ul>	<ul style="list-style-type: none"> <li>• 500GB</li> <li>• 5400 rpm</li> <li>• USB 2.0 (includes drive dock)</li> <li>• Cost per gigabyte: 26 cents</li> </ul>	The best USB performer we tested, this My Passport model comes with versatile WD SmartWare software and a docking station.
7  <b>Rocstor Airhawk A9 320GB</b> \$135 <a href="http://find.pcworld.com/64249">find.pcworld.com/64249</a>	★★★★★ VERY GOOD	<ul style="list-style-type: none"> <li>Overall performance: Superior</li> <li>Copy files (3.7GB): 84 seconds</li> <li>Malware scan: 357 seconds</li> <li>Software: No bundled software</li> </ul>	<ul style="list-style-type: none"> <li>• 320GB</li> <li>• 7200 rpm</li> <li>• FireWire 800/400, USB 2.0</li> <li>• Cost per gigabyte: 42 cents</li> </ul>	The sleekly designed Airhawk A9 320GB is speedy, with test results similar to those of other drives tested via FireWire 800 or e-SATA.
8  <b>Rocstor Rocport ID9 320GB</b> \$140 <a href="http://find.pcworld.com/64250">find.pcworld.com/64250</a>	★★★★★ VERY GOOD	<ul style="list-style-type: none"> <li>Overall performance: Superior</li> <li>Copy files (3.7GB): 91 seconds</li> <li>Malware scan: 394 seconds</li> <li>Software: No bundled software</li> </ul>	<ul style="list-style-type: none"> <li>• 320GB</li> <li>• 7200 rpm</li> <li>• FireWire 800/400, USB 2.0</li> <li>• Cost per gigabyte: 43 cents</li> </ul>	Distinguished by a boxier, more colorful design than its Airhawk sibling, the Rocport ID9 320GB performed almost as well.
9  <b>Seagate FreeAgent Go Special Edition 500GB</b> \$145 <a href="http://find.pcworld.com/64252">find.pcworld.com/64252</a>	★★★★★ VERY GOOD	<ul style="list-style-type: none"> <li>Overall performance: Good</li> <li>Copy files (3.7GB): 149 seconds</li> <li>Malware scan: 521 seconds</li> <li>Software bundle: Very Good</li> </ul>	<ul style="list-style-type: none"> <li>• 500GB</li> <li>• 5400 rpm</li> <li>• USB 2.0 (includes drive dock)</li> <li>• Cost per gigabyte: 29 cents</li> </ul>	Stylish design, large capacity, and a docking station that can handle even the 1TB Go keep this drive in play as your storage needs grow.
10  <b>CMS V2ABS 500GB</b> \$195 <a href="http://find.pcworld.com/64253">find.pcworld.com/64253</a>	★★★★ GOOD	<ul style="list-style-type: none"> <li>Overall performance: Very Good</li> <li>Copy files (3.7GB): 160 seconds</li> <li>Malware scan: 493 seconds</li> <li>Software bundle: Very Good</li> </ul>	<ul style="list-style-type: none"> <li>• 500GB</li> <li>• 5400 rpm</li> <li>• USB 2.0</li> <li>• Cost per gigabyte: 39 cents</li> </ul>	The V2ABS 500GB includes CMS's BounceBack Professional software, which uniquely lets you boot from the drive if your main drive fails.

CHART NOTE: Ratings are as of 12/14/2009.



## Dock It From Your PC

120GB S1 Mini to the latest capacious yet svelte 1TB Seagate FreeAgent Go and Western Digital My Passport Essential SE 1TB drives. We tested dockable models, ruggedized units, and multiple-interface units that can connect to almost any PC. Many of them came with surprisingly capable customized software packages that pop up the minute you attach the drive.

There's something for everyone; and some of the test results we obtained will surprise—if not delight—PC fans.

## Multiple Interfaces

Our lineup of drives includes models from Adata, Buffalo Technology, CMS, Hitachi, HP, Iomega, LaCie, Rocstor, Samsung, Seagate, Toshiba, Verbatim, Western Digital, and WiebeTech. Of the 22 drives we tested, 17 exclusively use the USB 2.0 interface. Most of those 17 have a mini-USB port, but the Western Digital models use micro-USB connectors (most often found on cell phones).

Five drives have FireWire 800 or 800/400 interfaces as well as USB 2.0, and the WiebeTech ToughTech XE Mini has an eSATA port, too. Though it offers tremendous speed, eSATA remains rare on portable drives. The Airhawk, Rocport, and SureFire models are termed *triple-interface drives* while the WiebeTech is called a *quad-interface drive*.

Models with extra interfaces tend to cost a bit more, but dual-interface USB/FireWire 400, triple-interface USB/FireWire 400/FireWire 800, and quad-interface USB/FireWire 400/FireWire 800/eSATA drives behave better under many circumstances and deliver superior performance when connected via something other than USB.

Depending on the test, the eSATA-based WiebeTech ToughTech XE Mini and the FireWire 800-linked Rocstor Rocbit FX KT, Rocstor Airhawk A9, Roc-



stor Rocport ID9, and Iomega eGo ran approximately two to three times as fast as the USB 2.0 drives.

Though eSATA is the fastest interface, two drawbacks inhibit its practical value in portable drives. First, the eSATA connector was not designed to carry power, so you must use an AC adapter to power a drive using the eSATA interface. Second, eSATA drives aren't reliably hot-pluggable; in order for it to show up under Windows Explorer as a drive letter, you must plug the drive in before you boot or you must reboot after attaching it.

FireWire 400 and 800 behave the same way USB 2.0 does, except that they're better. Seconds after you plug a unit in, the drive letter appears; and unlike with USB 2.0, underpowered ports are rare.

Unfortunately, FireWire 800 ports are hard to find except on Macs. Adding one to a Windows PC costs \$30 or so for an add-in card and even more for a notebook adapter card. FireWire 800 is backward-compatible with FireWire 400 (with an adapter cable); and thanks to cameras and DVRs, those ports are relatively common. The FireWire drives we tested included a FireWire 400 port or an 800-to-400 adapter cable, so you can probably patch together a FireWire 400 setup without an additional cash outlay.

Power is an important issue with portable drives: eSATA requires a separate AC adapter, and many USB ports on netbooks, laptops, and even PCs are underpowered. No one wants to carry an AC adapter around with them. Of the 22 models we reviewed, 21 relied for power on a single USB 2.0 port on a desktop PC. The sole exception was >>

### 1TB to Go:

Western Digital's My Passport Elite (left) and Seagate's FreeAgent Go.



### Interfaces:

Iomega's eGo (left) and Rocstor's Rocport ID9 (right) use USB, FireWire 400, and FireWire 800. WiebeTech has eSATA, USB, and FireWire 800.





the WiebeTech ToughTech XE Mini, with its unpowered combination USB 2.0/eSATA port. But even the Wiebe-Tech didn't need an AC adapter when attached via FireWire 400 or 800.

One way to deal with underpowered USB ports is to use a two-to-one USB cable that draws power from two separate USB ports. Iomega's eGo drive, all three Rocstor units, and Seagate's Free-Agent Go docking station shipped with these hedge-your-bet accessories.

so portable. Today, you can easily slip a 1TB unit into your pocket. Two of the drives in this roundup—Seagate's Free-Agent Go 1TB and Western Digital's My Passport Essential SE 1TB—fit a terabyte of capacity into a 2.5-inch mechanism, thanks largely to adding a third platter. The extra platter makes the units (especially the Seagate) slightly thicker and heavier than a typical 2.5-inch portable drive, but they remain highly portable just the same.

Samsung's supersmall S1

and with multiple drives in play, the gauge offers a nice way to determine which one has the most space available for your next operation or project.

## Performance

Drives equipped with an eSATA or FireWire 800 bus were much faster than their USB 2.0 cousins, and eSATA was about 10 percent faster than FireWire 800. We also noticed differences in performance within each bracket. The Rocstor Airhawk A9 was the fastest of the drives we tested via FireWire 800, by 7 percent. The other three FireWire 800 drives finished within a couple of percentage points of each other.

Among USB 2.0 drives, the two Western Digital My Passport models earned top marks for performance. Most of the other drives had minor differences in test scores. Generally, 1.8-inch drives are slower than 2-inch mechanisms; so the Samsung S1 Mini's second-to-last-place finish is less surprising than its beating the Toshiba Portable Hard Drive 640GB (whose performance improves if you manually launch the included software and reformat the drive).

The type of interface you use has more influence on your portable hard drive's performance than any other factor; and vendors can replace the mechanism inside any model whenever they please.

## Rugged Design

Hard-drive manufacturers' efforts to improve the shock resistance of their bare hard drives have yielded innovations such as incorporating sensors for g-force (acceleration due to gravity) to detect when a drive is falling through space. Even so, hard drives remain too fragile to withstand even normal use without additional protective measures.

To reduce shock and vibration in hard drives, manufacturers place rubber washers at points where the drive is screwed to the enclosure and use rubberized external coatings and bumpers as high-tech slings inside the box.



### Ruggedness:

Buffalo's MiniStation Metro Portable (left), Hitachi's SimpleTough 320GB, and Adata's Sport SH83 tolerate careless treatment.

A raceway on the Hitachi stores the drive's cable.



Yet another USB drawback that you might run into: USB 2.0 drives attached to PCs sometimes prevent them from clearing POST (power-on self-test) and booting. I've never been able to trace the cause of this phenomenon, but I've experienced it on a number of different PCs.

## Capacity

Not so long ago, 1-terabyte hard drives cost hundreds of dollars each. And they didn't exist in the 2.5-inch form that permits the drives in this roundup to be

Mini—the only 1.8-inch hard drive that we tested here—had the smallest capacity in the roundup (120GB). Of the other units we tested, four offered 250GB of storage, six had 320GB, eight had 500GB, and one had 640GB, though most of them are available in different capacities.

The amount of storage you need depends on how you use the drive. If it's strictly for business documents, even the 120GB S1 Mini probably offers plenty of space. On the other hand, if you want to rip and watch your DVD collection from a hard drive, even 1TB may eventually be too little.

Western Digital's My Passport Elite includes an LED gauge on the front of the unit that tracks available capacity. Depending on how you use your storage device, this feature could be extremely handy. The drive comes with a dock,



## Dock It From Your Pocket

VENDORS SUCH AS Seagate and Western Digital provide docking stations that obviate the need to fiddle around with a cable each time you connect the drive to your PC. A docking station may save you only a few seconds each time you attach the drive, but those seconds add up in the long run. Docking stations are also incredibly handy when you use multiple drives for rotating backups or archiving (storing individual projects on their own drives, as audio recording and photography studios often do).

Both Western Digital's My Passport Elite and Seagate's FreeAgent Go Special Edition ship with a dock. The Seagate dock's design seemed a bit better balanced than the WD dock's, but if you do a lot of swapping, a bit of double-sided tape wouldn't be out of place with either unit. Another point in favor of the FreeAgent Go docking system is that the much thicker FreeAgent Go 1TB will still fit in the standard Go series dock, thanks to a cleverly placed notch in its case. Now if only someone would make a FireWire 800 dock.

Western Digital's slim My Passport Elite drive comes with a USB dock.



The goal is to reduce the effective g-force to a level that the drive can withstand in both its nonoperational state (with its read/write heads parked safely off the disk platters) and its operational state (with the read/write heads engaged). Vendors claim that their bare drives possess a shock resistance to g-force of up to 400g when operational, and up to 1000g when nonoperational, but you should treat portable hard drives as delicate mechanisms. A drive that might survive a 3-foot fall while not plugged in would probably sustain damage if it suffered the same fall while in use.

One way to minimize your portable drive's risk of damage is to use a short cable. This helps keep the drive out of the way of flying hands and elbows, and increases the likelihood that the cable will unplug and the drive will park its read/write heads before the unit hits the floor. Drive manufacturers call this automatic action *emergency retract*; according to Seagate, it takes from 40 to 80 milliseconds, depending on where the heads are when power is cut off. The drive taps residual electromotive force from the spinning plat-

ters to perform the emergency operation.

Every drive in our roundup withstood the mild bumps that we subjected them to, and a couple of designs stood out for their ruggedness: Adata's bright yellow Sport SH93 and Hitachi's SimpleTough 320GB. The SH93's USB port is capped with soft rubber, and the company claims that the resulting seal can withstand immersion in 1 meter of water for 30 minutes without leaking. An integrated raceway around the SH93's rubberized waist lets you store the included cable.

The SimpleTough comes with a conveniently integrated, nonremovable cable, as does the Buffalo MiniStation Metro Portable, the CMS V2ABS, and the LaCie Little Disk 250GB. Only the SimpleTough's cable is ruggedized with a corrugated, high-grip surface, however. Hitachi claims that it's waterproof, too.



### Tiny Size:

Car keys (left) aren't out of scale with Samsung's 120GB S1 Mini and WD's 500GB Elite drive.

## XPRESS Software

Many vendors try to make their portable drives stand out from the pack with bundled encryption software, backup software or both. Since the focus is on ease of use, most of the programs offer fewer options than some of the better-known stand-alone applications do.

Adata, Rocstor, and Verbatim shipped their drives to us without any bundled software. But you can choose from an array of free backup software at [find.pcworld.com/69239](http://find.pcworld.com/69239). Except for the Adata, all of these drives are FireWire models.

For many PC users, software is a key factor in the buying decision, and having software especially tailored to your drive is convenient. Many of the drives' software bundles come preloaded and launch automatically when you connect the drive to your PC's USB port.

The Buffalo Technology, Samsung, Seagate, and Western Digital drives came with both backup software and data-encryption software. The Hitachi, Iomega, LaCie, Toshiba, and WiebeTech drives provided backup software only.

The Hitachi drives bundled Arcsoft TotalMedia Backup. This program is easy to use, but the only way you can define additional file types to back up is by using a filter. The company does supplement its bundle with Hitachi Ultimate Online Backup (which >>



includes 2GB of free storage).

Similarly, Iomega's eGo offers Mozy Home; its Retrospect Express Backup and QuikProtect programs let you add individual files to a backup set. You get 2GB of free online storage at Mozy Home with the eGo.

CMS's BounceBack Ultimate handles various backup chores, but it's unique in letting you mirror your system's main hard drive. If the main system subsequently fails, you can boot from the external drive and keep working.

Western Digital's SmartWare was one of the friendliest application packages we looked at, and it offers full-drive security (most competing packages support only file and folder encryption). On the other hand, we couldn't figure out how to modify or add to the default file selections (Pictures, Movies, Music, Documents, and Other). HP's SimpleSave automates main-drive backup effectively; like SmartWare, it auto-selects files, but it lets you modify those selections.

Seagate's Manager Software for its FreeAgent drives is as friendly as WD's, but it offers only folder encryption. On the other hand, it supports folder-level syncing, and you can modify file selections for your backups individually.

Samsung's S1 Mini ships with a nice (but nameless) software app with a very pretty interface. We wish it let users add files individually to a backup, though.

Toshiba's Portable Hard Drive 640MB was relatively slow, but we liked the automatic launching and configuring functions in its version of NTI Backup Now EZ—the only version that handled both file-based and image backups.

LaCie drives ship with the highly configurable (though harder) Genie Backup Assistant, and with a syncing program.

## Security

If your portable drive contains sensitive data, encrypting it to keep it away from prying eyes is a good idea. Vendors favor software-dependent encryption; and in



### Software:

**HP's SimpleSave automatically selects files to back up, but allows customization.**

the drives that we reviewed, they split just about evenly between full-drive encryption and file and folder-level encryption. The better

choice for you depends on whether you want quick and unfettered access to some files while vigorously defending the rest, or whether you want everything protected at full strength.

Western Digital's and Buffalo's drives adopt the full-drive approach. Both use a small partition (the OS sees it as a CD drive) to provide access to their utilities; but once you set a password, you can't access the main partition where your data resides. Samsung's SecretZone creates password-protected images that you can mount as virtual removable drives for seamless access; otherwise, however, it leaves your drive available.

Seagate uses an encrypted folder that you can add files to and delete files from via a stand-alone encryption tool.

If you use your drive exclusively on your own desktop PCs and laptops, a software approach to security is fine, though some people may dislike the idea of installing and possibly running an unrecognized piece of software on their system. Rocstor's Rocbit FX KT drive offers an far more elegant solution: It uses a mini-USB security dongle containing an encryption key to unlock the encrypted data on the drive. No dongle, no

data. The drive comes bundled with two dongles in case you misplace one.

**Tip:** Always remove security dongles when you aren't around—even if you're just making a dash for a cup of coffee. For some reason, devices with security dongles parked in them tend to attract more than their fair share of attention.

## What You Want

The portable hard drive you buy should have a USB 2.0 port for universal connectivity. Of course, that's a bit like saying that the car you buy should have four wheels: It's nearly impossible to find a portable drive that lacks USB. Still, both FireWire and eSATA are handy options to have, too—FireWire 800, in particular. And the more data you transfer, the handier they become.

Toshiba's slower-than-average Portable Hard Drive 640 would have been on our must-avoid list, if not for its well-designed backup software. The Samsung S1 Mini is slow, too, but extreme portability and adept security software intercede on its behalf. WiebeTech's quad-interface ToughTech XE Mini

sounds enticing—and if you're looking for eSATA speed, it has the goods. Because it can't run on USB bus power, however, you can't leave its AC adapter at home.

Seagate's FreeAgent Go portable drives win our nod for archiving or rotating backups; the dock and capacities are state-of-the-art even though the drive's USB performance is only middle-of-the-pack. WD's My Passport Elite is your best bet if you need a combination of small size and big USB performance.

Rocstor's Rocbit FX KT should appeal to anyone who needs to satisfy strict security requirements, and Adata's SH93 is a winner if you need a portable drive that can survive a hiking trip. ●

### Security:

**Rocstor's Rocbit FX KT includes a mini-USB dongle containing an encryption key.**

