Drive time

Floppy disks have been overtaken and lapped by today's removable storage drives. Roger Gann explains the new technologies and sorts the hatchbacks from the sportsters.

It's all to do with relativity, you know. Ten years ago, when your PC had a 20Mb hard disk, a 1.2Mb floppy was a capacious device capable of backing up the entire drive with a mere 17 disks. Today, the standard hard disk fitted to PCs has become the 1.2Gb drive: a 600-fold increase in capacity. And what of the humble floppy? In the same period, its capacity has increased by less than 20 percent. As a result, it's now at a disadvantage when used in conjunction with any modern large hard disks — for most users, the standard floppy disk just isn't big enough anymore.

In the past, this problem only affected a tiny proportion of users, and for those that did require high-capacity removable disks (typically DTP'ers running Macs), solutions were available: 44Mb 5.25in SyQuest removable hard disks. But these were expensive.

Times have changed, and today, everybody needs high-capacity removable storage. These days, applications don't come on single floppies. They come on CD-ROMs. Thanks to Windows and the impact of multimedia, file sizes have gone through the ceiling. Create a Word document with a few embedded graphics and before you know it, you've got a multi-megabyte data file, quite incapable of being shoehorned into a floppy disk.

Awkward as it is, there's no getting away from the fact that a PC just has to have some sort of removable, writable storage, with a capacity in tune with current storage requirements. We all need removable storage for several reasons: to transport files between PCs, to back up personal data, and to act as an overspill for your hard disk, to give you (in theory) unlimited storage. It's much easier to swap removable disks than fit another hard disk to obtain extra storage capacity.

In 1981, 5.25in floppies kicked off at 160Kb, quickly went to 180Kb and then to 360Kb with the advent of double-sided drives. In 1984, the 5.25in floppy maxed-out at 1.2Mb. That same year, Apricot and HP launched PCs with the revolutionary Sony 3.5in 720Kb disk drive. Three years down the road, this doubled in size to 1.44Mb and for the past decade or so, that's where it's stayed. Oh sure, there have been attempts to increase the capacity of the humble floppy, but none got very far.

First, there was IBM's bid (in 1991) to foist a 2.88Mb floppy standard on the PC world, using expensive barium-ferrite disks, but it never caught on. And both Iomega and 3M had another go in 1993 with the 21Mb "Floptical" disk. But it never took off: it was just too dear and too small.

For a long time, the range of removable storage options wasn't extensive. You could choose between low-capacity floppies, clumsy tape solutions, expensive optical drives, and removable cartridges. But today, the situation is radically different, and finally there is a real choice in removable storage. There is a wide range of capacities on offer, starting around100Mb and rising to 1Gb. The new removable drives have never been more affordable, and having been designed with the end-user in mind, are easy to install.

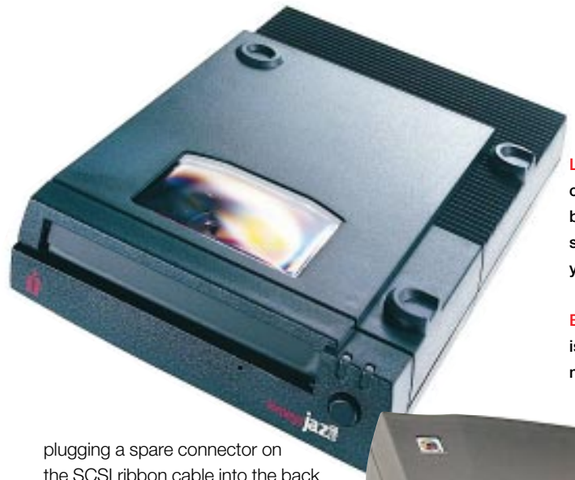
Installation options

Removable drives are available both in external and internal versions. The former will have either a parallel port or SCSI interface, while the latter will have a SCSI or IDE interface, although IDE is not all that common at the moment.

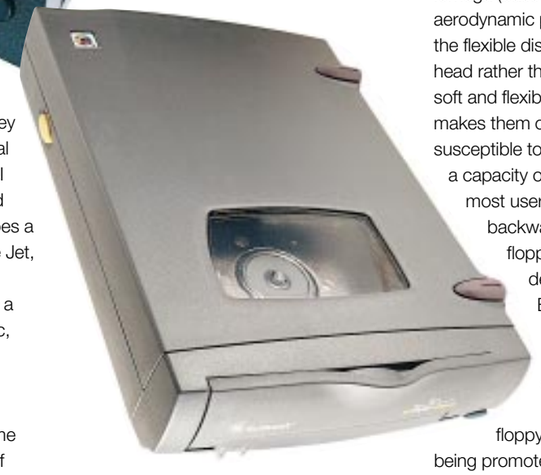
Unlike fitting a second hard disk, which can be a daunting task, the great news is that most of the new breed of removable storage devices have been designed with ease-of-installation in mind. The easiest to install are the external drives with a parallel port interface. Not only do you not have to take the lid off your PC, but it also lets you share/move the drive between different PCs. You can use it with a notebook, too. And because it uses your printer/parallel port, installation is no more complicated than plugging in a cable.

The only problem with this otherwise perfect arrangement is that the parallel port, which was never designed to handle these devices, isn't very "fast", and older parallel ports can act as a bottleneck, slowing down the drive's data transfer rate. Luckily, however, most recent PCs are equipped with an enhanced parallel port (EPP or ECP) and these are capable of good data transfer rates. I recently used a parallel port tape streamer hooked up to an EPP port and it was capable of backing up at just under 8Mb/min — a pretty respectable rate. In any event, such bottlenecks would only really impinge on fast devices, such as removable hard disks. Slower devices, such as the Zip drive, don't have a stellar data transfer rate to start with and so are unlikely to suffer at the hands of the parallel port interface.

If the ultimate data transfer rate is what you're after, you ought to consider SCSI versions of these devices. Most internal drives (Jaz, SyQuest, MaxIT and Zip) tend to use a SCSI interface, which is fine if you already have a SCSI card fitted as installation is no more complicated than plugging a spare connector on the SCSI ribbon cable into the back of the drive. The same applies to external SCSI drives, too. Very often they can be "daisy-chained" to other external SCSI devices. If you haven't got a SCSI card, they can be expensive to buy and fiddly to configure, although Iomega does a cut-down SCSI host adaptor called the Jet, which sells for around £80. Given the choice, I'd spend another £20 and buy a better host adaptor, from, say, Adaptec, Bus Logic or AvanSys.



Left **Iomega's Jaz drive can take cartridges as big as 1Gb — enough space for you to back up your entire hard disk**



Below **SyQuest's EZflyer is cheaper but holds a maximum of 230Mb**

Spoilt for choice

Although all these devices offer the same basic facilities and differ only in terms of capacity and speed, they do employ different technologies. They can be split into categories based on their respective technologies. At the last count there were three removable storage technologies: super-floppy, hard disk, and magneto-optical. Even though CD-R discs are dropping in price and the Panasonic innovative PD hybrid drive offers some interesting advantages, neither technology currently has much market presence.

Super-floppies

The current crop of super-floppies may resemble conventional floppy disks in physical size and operation, but they don't use the same magnetic recording technology employed on the standard 1.44Mb floppy. Without doubt, the most popular super-floppy is the Zip drive, of which Iomega claims to have sold ten million. The secret of the Zip's good performance (apart from its high 3,000 rpm spin rate) is a technology pioneered by Iomega (based on the Bernoulli aerodynamic principle) which actually sucks the flexible disk up towards the read/write head rather than vice-versa. The disks are soft and flexible like floppy disks, which makes them cheap to make and less susceptible to shock. They're fast, and have a capacity of 94Mb — big enough for most users. Sadly, Zip drives are not backward compatible with 3.5in floppies and can't be used as boot devices, although there are BIOSs in the pipeline which will permit that. Imagine, you could install Win95 from a single floppy!

The new kid on the super-floppy block is the rival standard being promoted by 3M and Compaq. An LS-120 disk looks very similar to a common-or-garden 1.44Mb 3.5in disk, but uses a refinement of the old 21Mb floptical technology to deliver much greater capacity and speed. In fact, this technology had originally been developed by Iomega, but

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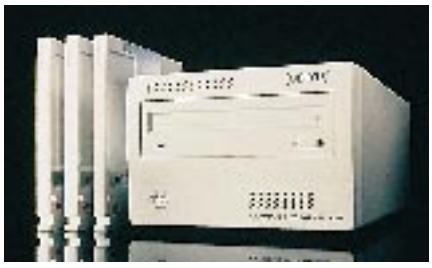
was abandoned and sold on to 3M. Named after the "laser servo" technology it employs, an LS-120 disk has optical reference tracks on its surface that are both written and read by a laser system. These "servo" tracks are much narrower and can be laid closer together on the disk: an LS-120 disk has a track density of 2,490tpi (tracks per inch) compared with 135tpi on a standard 1.44Mb floppy. As a result, the LS-120 can hold 120Mb of data.

As well as being a bit bigger, its other advantage over the Zip drive is that it can also read/write ordinary 3.5in floppies and so can be used as a boot device. While its data transfer rate is faster than that of a standard 3.5in floppy drive, it's not as fast as a Zip drive due to its considerably slower spin speed. And at present, the LS-120 isn't available to buy as an add-on — it's currently only available ready-installed on Compaq's new range of Deskpro PCs.

Hard disks

Above about 100Mb, the most commonly used removable drive technology is derived from that found in conventional hard disks, which not only gives you high capacities but also provides fast performance, pretty close to that of conventional fixed hard disks. These drives behave just like small, fast hard disks.

This approach isn't particularly new: SyQuest cartridges have been using the technology for many years. However, SyQuest drives have tended to be small



The PowerMO 230 is one of the latest generation of magneto-optical drives from Olympus

(44Mb and 88Mb). Recently, SyQuest embraced the 3.5in form factor and launched a 135Mb drive (the EZ-135) but this has been rapidly superseded by the 230Mb EZflyer. It's fast, like a hard disk, and reasonably priced (about £200).

Xyratex, the IBM spin-off, has got in on the act with its 540Mb MaxIT drive. This is a little pricier (about £300) but has twice the capacity and can read older SyQuest cartridges. It's nippy, too.

The drive with the largest capacity is Iomega's Jaz which can take cartridges as large as 1Gb. This, too, is affordably priced (about £375) and offers excellent capacity with great performance. Its huge capacity makes it possible to back up your original hard disk in one go, in just a matter of minutes. It's a good choice for audio-visual work, capable of holding an entire MPEG movie in one swallow. You could even make it your primary drive!

Magneto-optical

As you might expect from the name, these drives use a hybrid of magnetic and optical technologies. The disks have a special alloy layer that can be modified under the influence of a magnetic field. Changes can then be read by reflecting a laser beam off the alloy layer. The magnetic field in the magneto-optical (MO) disk actually twists the laser's beam of light, and this twist can be detected and used to read the data.

However, this is a "two-pass" process, and as a result, MO operations are relatively slow. This drawback is compounded by the fact that MO heads tend to be heavy, which also makes for slow average access times. Nevertheless, MO disks are cheap at around a tenner and they have top archival properties, often being rated with an average life of 30 years — far longer than any magnetic media.

MO came close to being killed off by the Zip, but a new generation of faster, cheaper drives, spearheaded by Fujitsu, have breathed new life into the format. MO disks are much the same size as 3.5in floppies but about twice as thick. Olympus has been the first to market the latest generation of MO kit with the slick-looking PowerMO 230. And Fujitsu has recently announced a 640Mb MO drive, the £299 DynaMO, which is backwards-compatible with older 128Mb and 230Mb MO disks.

•PCW Contacts

Roger Gann can be contacted by post c/o *PCW* at the usual address, or via email at **rgann@mcgilivray.win-uk.net**