

No risk of infection

by Sid Martin and Timothy Green

Sid Martin and Timothy Green rejoice in the QL's viral immunity and probe the latest gadgets at Quanta's QL jamboree

THE SECOND Quanta workshop at Kingshorpe Community Centre brought together a host of QL enthusiasts. More than 200 people turned out over the weekend, and the organisers have reluctantly decided to try to find a bigger venue for the next meeting.

Much-hacked QLs jostled with STs, Z-88s and Psion Organisers in the machine room on the first floor. Presentations and the User Group AGM were held below, while in an adjoining room Tony Firshman Services spread electronics over the table-tennis table, upgrading Atari STs with QL emulation hardware.

Former Sinclair designer Tony Tebby took the first presentation, and hinted at the release of *QRAM 2*, without giving details or a release date.

Tony was still working on the software for the Miracle hard disk; this works fine, but rather slowly, because of a mysterious 20 millisecond pause after reading each sector. Miracle intends to ship the system as soon as it has ironed out this delay, which limits data-transfer to 25K a second.

The User Group has its own hard disk project, based on a transputer interface and an IBM-type ST506 drive. The circuit for the interface was printed in the March issue of the group's magazine.

The prototype at the show worked, but seemed slow and in need of software tweaks to improve speed and reliability. An assembled interface costs £250, or £25 for the software alone if you want to build your own.

A commercial competitor for Miracle's hard disk has materialised, care of new QL supplier Rebel Electronics. The firm had neat-looking circuit boards on show at the workshop, but could not give a demonstration as its controller software was unfinished. Suppliers seem to underestimate the difficulty of writing a good multi-tasking hard disk driver.

The Rebel interface is aimed at QL users with 640K of RAM or less. It plugs into the main connector at the end of the QL; besides the ST-506 standard interface, the board is expected to hold a hierarchical filing system, Dos, Toolkit and Speedscreen in ROM.

There are several other differ-



QL Designer Tony Tebby (*Q Jump*, ex Sinclair) with admirers

ences between the Rebel unit and Miracle's hard disk, previewed last month. Rebel uses an 8K 16 sector cache to buffer disk blocks, whereas Miracle uses a single-sector 512 byte buffer. Rebel says you can expand its cache to 32K, speeding up disk access still more.

The Miracle product is only available in a package of a single drive and interface, whereas Rebel's controller is a separate

unit which can handle one or two standard drives.

On its own, the Rebel controller costs £196. A complete package of 20 megabyte drive, interface and through-port for other expansion units costs £385; larger capacity disks will cost more.

Rebel lets you specify the mapping overhead and capacity of a drive when you format it, so you can trade off speed, capacity

and granularity to suit your own application. Capacity can be anything from 20 to 80 megabytes per drive.

Rebel's interface has two disadvantages compared with Miracle's product. It won't work with a Trump Card because it needs spare memory addresses for ROM and buffers. It plugs into the main edge connector, so anyone with a QL that has already expanded in that direction will need an expansion back-plane costing an extra £49 on top of the price of the interface. You can contact Rebel Electronics at 12 York Place, Leeds LS1 2DS, (0757) 86630.

Simon Goodwin of Creative CodeWorks gave the second presentation, discussing *Turbo Supercharge*, *Turbo Speedscreen* and his involvement with *QL World* magazine. CodeWorks promises the launch of the *Quickfax* database and a 'secret weapon' later this year, but won't be more specific.

Digital Precision's Freddy Vaccha gave the last presentation, and his new PC Emulator, *The Solution* was much in evidence at the workshop. It's out and it works, but not always, and rather slowly.

The Solution does multi-task - in fact it runs as two QL tasks, one to execute PC code and another to maintain the display. Once you've got MsDos up and running on a 640K QL, you end up with 468K free for PC programs. You need Miracle Systems' 768K Trump Card to breach the PC's 640K limit.

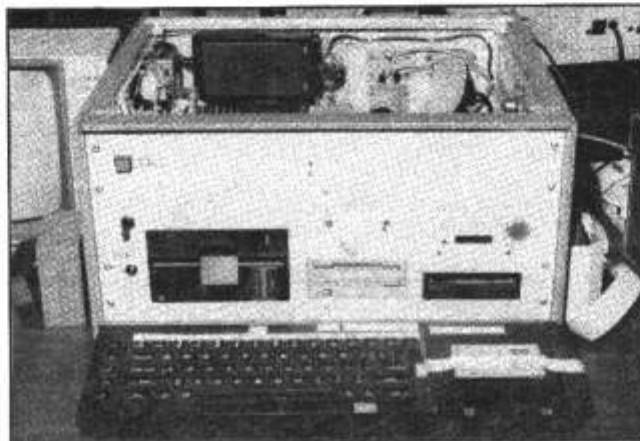
The display is updated intermittently by a low-priority task. The cursor keeps up with what you type, but the characters themselves lag behind unless you type very, very slowly or pause to give the emulator time to catch up.

It took 58 seconds for a directory of 25 files to scroll up the screen when we entered a DIR command. There's a noticeable pause after a disk command is entered, before the drive starts to run.

Once the emulator is using a drive you can't access it from QDos tasks. This is tough for single-disk users who want to multi-task; they must resort to microdrives unless they can spare memory for a RAM disk.

Several Quanta members reported compatibility problems,

Continued on page 159



The extraordinary customised Homebrew QL

but the main problem with *The Solution* appeared to be its speed. DP claims "as a conservative guide you must expect that it will be about 0.1 times the speed of an XT."

Even budget PCs out-power the XT's 4.77 MHz 8088, so we compared *The Solution* with the original Amstrad PC1512 - hardly state-of-the-art in the PC world.

We tested the emulator in the machine room at the Quanta workshop, using a 640K internally-expanded QL, running the latest version of *The Solution*, supplied that day.

To make it easy for readers to compare and check our results, we ran some of the Kiobaud benchmarks under GW-BASIC. BASIC benchmarks are not usually meaningful because they compare programs which may work in different ways.

In this case we used the same test programs with the same BASIC interpreter and the same version of Dos, so the only difference was the hardware running the code. The PC interpreter is 68416 bytes long and loaded from an IBM disk into the QL in 42 seconds, leaving 62115 bytes free for BASIC programs.

Benchmark 1 is an empty FOR loop. In our test *The Solution* looped a thousand times in 38.1 seconds, versus 0.55 seconds on the Amstrad PC - a ratio of 69.3 times in favour of Amstrad.

One thousand iterations of benchmark 2, a two-statement IF loop, took 142.2 seconds to run on the emulator, against 2.04 seconds on the PC1512 - making the QL 69.7 times slower than the PC on that test.

We are interested in comparing these timings with tests by *Shopper* readers: the exact speed of emulation depends on the detailed hardware set-up on both QL and PC. The similarity of the ratios is a good sign that the tests are fair and do not reveal a 'blind spot' in the emulator's repertoire.

At this speed, impressive though the feat is, we must ask if PC emulation on the QL is really worth the hassle. As *Solution* purchaser John De Rivaz puts it, "the overall speed made me wish I'd put the £130 towards a PC."

Many QL programs can process IBM files if you convert your data with a utility like PDQL's *DiscOver*, or Digital Precision's vintage *Media Manager*.

There's a lot of excellent QL software about, and most of it multi-tasks quickly, letting you do things that would be tricky on most IBMs. As Quanta member Richard Lee commented, "it's really the wrong way round - what you need is a QL emulator for the PC!"

Emulator and later

The original QL PC Emulator, from Ant Computing, seems to have vanished from the market. An improved 'version 2' has been advertised, and we've been promised a copy, but nothing has arrived yet - several weeks after the proposed delivery date.

Ant programmer Guy Turley is still at work, and says the new version already runs *Perfect Writer*, *Xtree* and Psion's *PC Xchange*. He was trying to get *GEM* running when we called him, and seemed determined to press on, despite damaging claims from competitors.

The March issue of *QL World* carried an advertisement for the Ant emulator, apparently available from Schoen, an established QL hardware firm. But Schoen boss Chris Smith has since dropped the option to distribute Ant's product.

This sudden volte face follows news from Germany, where the QL industry is still in full swing and programmers have come up with a hardware PC emulator that is claimed to run much faster than *Solution*. The third emulator will be called *Transformer* and should sell at a price 'highly



Digital Precision main man Freddy Vaccha

competitive with *Solution*'.

Once again, news of this package has arrived ahead of the real thing, but the details sound interesting. *Transformer* uses a small expansion board which generates an IBM-type CGA display directly, with no need for a background task to update the screen. The board is said to have a duplicate expansion plug, so it can be plugged in at the same time as RAM or disk controllers.

The CGA hardware means that display updates should be as fast as a genuine IBM. PC code will still have to be interpreted by 68008 routines, but *Transformer* puts key software into a ROM cartridge, making it run faster than code in most types of RAM. MDA text displays will be simulated in software, like the other emulators.

Compatibility with Trump Card and the Miracle hard disk is promised. The programmer

claims the emulation is so good that a genuine PC hard disk driver will run, loading data at up to 140K a second. We'll believe it when we see it.

Contact

Schoen Personal Computer Products, Nothcote Crescent, West Horsley, Surrey KT24 6LX (04865) 3836.

Natural immunity

In recent months we've heard much moaning from owners of PCs, Amigas, and other machines with half-finished operating systems. They're frightened that their machines might be 'infected' with a 'virus' - a simple self-replicating program that runs in the 'background' while you use the computer, and copies itself quietly from disk to disk until it has made lots of copies (which copy themselves further).

After a while, a virus makes itself obvious by scrambling the screen display, humming 'Air on a G string' or - in pathological cases - scrapping your hard disk directory.

The unconventional design of the QL makes it virtually immune from viruses. QLs do not load operating system code from disk in any consistent way, so there's no chance for a virus to grab control of the system by patching that code.

Nowadays each QL has its own ROM drive control routines, from a variety of authors - there's no need to read code from a 'boot' sector. As a side-effect this usually makes device access faster, because ROM can work without 'wait states', unlike most RAM.

Only the ancient Quest disk system was different, and could theoretically be infected - it loaded its code from cartridge! Even so, it's unlikely that a program could surreptitiously sneak data onto a cartridge without you noticing.

Even if a microphobic genetic



Leon Heller, Quanta founder and *Shopper* contributor

engineer did find some way to infiltrate code secretly onto QL disks or cartridges, and propagate it via RAM, they'd have trouble getting the virus to work with all device drivers. If they use the standard 'hooks' to link into the system it's easy for users to spot and disconnect the virus code.

There's not much chance of linking direct to the hardware or low-level code, because relevant addresses vary wildly between machines - the QL's device independent design means that different interfaces work identically.

In practice most QL disk device drivers are based on code by Tony Tebby, who wrote much of the standard QL ROM while he worked for Sinclair. This device driver was first used by CST - which now uses a modified version - and later adopted by Medic, Miracle, PCML and Sandy.

Sinclair's own interface, made by Micro Peripherals, uses different code, and Micro Control Systems developed its own device driver for the MCS Memodisk.

The QL's 'device independent' design means that different interfaces work identically - the hardware and code may vary, but you don't need special versions of commercial software for each.

Tebby ROM revisions

The QL is often chastised for its quirky microdrive system, but gets little credit for its ingenious disk handling. QL disk devices could teach Microsoft and most others a few tricks, especially when it comes to speed and compatibility with other systems.

We can use one or two sided 3.5", 3" or 5.25" drives on our machines, in single or double density with any number of tracks. Eight inch drives should work as well, but we can't find one to try!

The QL automatically works out the format of each disk when you put it in the drive. Similarly it works out the top speed of each drive, with no need for configuration.

What's more, several tasks can access a disk at one time - including programs running on other QLs connected via the network. You can open any file on another machine's drive just as if it was your own, except that you must put the network station number in front of the device and file name. Tasks can share access to files, but only one task at a time can write to a particular file or attempt to format a disk.

There have been a few 'upgrades' of Tony Tebby's QL disk software, but recent changes have been very minor. Versions between 1.07 and 1.10 added and fixed the 'FLP1_*D' code which lets QL programs read MsP

Continued on page 160

Continued from page 159

and CP/M disks, along with almost all single and double density disk formats.

Version 1.11 was just a code re-organisation, while 1.12 improves the code which automatically works out the top safe stepping speed for any drive.

Version 1.13 fixed problems with non-standard Mitsubishi drives, while 1.14 improved the speed of formatting to one second per track for double-sided disks, or 600 milliseconds per track, single-sided. (There are 1,000 milliseconds, or mS, in one second.)

Versions from 1.14 onwards detect disk changes more reliably and let you configure drive access with the three-parameter FLP_OPT command.

Some systems implement FLP_OPT as three distinct commands: FLP_SEC, FLP_START and FLP_TRACK. These upgrades are not mentioned in most manuals, so we'll summarise their effects here.

FLP_SEC sets a 'security level', a value between 0 and 2. This determines the tolerance of the system to sudden disk changes. The default is level 2, which should always detect disk changes - as long as you resist the temptation to pull the disks

out while the drive is turning.

Tebby insists that - contrary to Sinclair's advice - the *best* time to pull a microdrive cartridge from a drive is while it's trying to read data! He told Quanta that starting and stopping is a traumatic experience for the cartridge, while the rotation of the roller in the drive should disengage smoothly if you pull the cartridge out while it is busy. Take this advice with a pinch of salt, and *don't* try it while data is being written, or you may lose the entire contents.

Disk security level 1 is similar to the default, but goes a bit faster because it only checks for disk changes when writing to the disk, and doesn't bother to update the directory till the end of a sequence of operations separated by less than half a second.

At this level you may pick up gibberish if you change disks with files open and try to read data, but programs stop and your data stays intact if you try to write to the wrong disk. Level 0 is fastest, but gets in a mess if you change disks while files are open.

FLP_START sets the amount of time the system waits for disks to get up to speed before writing. The default is 600 mS, but you

can set it in 20 mS steps, with FLP_START. Modern, fast 3.5" drives can cope with a speed of 260 milliseconds - a parameter value of 13. You may need anything up to 80 to accommodate old and tired drives.

The QL automatically works out the density and number of sides and tracks when you give it a disk to chew on, so FLP_TRACK lets you speed up formatting by reducing the number of tracks initialised. Many QL software houses send out software on low-capacity disks, which saves them time when formatting. Disks are as reliable as normal, and you can re-format them if you want to get at the remaining space.

For example, FLP_OPT 2,13,12 gives 216 sectors, with the default security level and start-up time: 210 sectors are free after the disk map and directory are set up. Floppy disk allocation is in 3 sector lumps, so a 210 sector disk won't hold as many small files as a 210 sector cartridge. If in doubt, bump the format up to 13 or 14 tracks.

If you've got a double-sided drive you can still format single-sided disks for other people by adding '**' as the 16th character of the FORMAT parameter, after

the drive and 10-character medium name.

Recent disk ROM changes have been very minor - the latest version number is 1.19, which features improved recovery from disk positioning errors. The change only affects drives which misbehave occasionally, so it's probably not worth upgrading unless you're having problems. Versions up to 1.21 have been produced for various manufacturers, but they're effectively the same as 1.19.

Many disk systems include SuperToolkit 2 in their ROM. This is now at version 2.13, but a new release is soon expected to fix an obscure problem in the integrated programming editor ED.

We haven't enough space this month to discuss 'FLP1_*D' in detail, but we shall return to the subject of alien disk reading in future.

Sid Martin and Timothy Green are Spectrum and QL enthusiasts, curiously determined to get Infocom's Hitchhiker's Guide to the Galaxy running on SAM, Spectrum Plus Three, the QL, CP/Mulator and Success on the Thor. Nobody knows why