

SINCLAIR QL

With the QL at last in the hands of eager buyers, Glyn Moody reports on his sessions with a production machine and on how well it lives up to its maker's enticing promises.

WHEN SIR CLIVE SINCLAIR launched his latest wonder micro in January this year he dubbed it the QL, or Quantum Leap. Since then, the only leap that those waiting for their QL have been aware of is the leap of faith that it will eventually arrive. The first machines went out in April — sometime after the "delivery within 28 days" initially promised. The backlog was still nowhere near being cleared in June.

Ironically, it was just around this time that Sinclair Research and Sir Clive personally gave written assurances under Part III of the Fair Trading Act 1973 that they would not advertise delivery times of goods which could not be kept. This followed complaints arising out of ads for the Spectrum, ZX-81 and even ZX-80 up to four years ago.

Allowing April as the month of first deliveries is being slightly generous. The machines that went out — the so-called PB version — had their sleek good looks rather spoiled by the presence of a vulnerable-looking plug-in to the ROM expansion port at the top of the machine. The kludge, as it came to be known, was part of the operating system that did not fit on to the EPROMs sitting inside the machine. This, along with the unfinished documentation, was the most obvious sign that the QLs were not final versions. The first of these, the AH model, started arriving at the end of May.

The QL is elegantly styled in matt black plastic, very slightly textured and with various "go faster" stripes etched into its

surface. For the first time on a Sinclair machine, a Reset button is provided, located on the right side of the machine. There is still no on/off switch. Also on the right are the two Microdrive units with their openings facing forwards. On the left of the machine are a small power-on light and the main peripheral add-on slot, as yet unused.



Benchmarks

The table shows the time in seconds taken to run eight standard routines. For a 68000-family machine running at 7.5MHz the QL seems very slow.

	BM1	BM2	BM3	BM4	BM5	BM6	BM7	BM8	Av.
QL/AH — 68008	1.9	5.4	9.3	9.1	11.8	24.0	42.4	20.7	15.6
HP Series 200									
Model 16 — 68000	0.2	0.6	1.4	1.6	1.7	2.8	4.3	15.0	3.5
BBC Model B — 6502	1.0	3.1	8.3	8.7	9.2	13.9	21.9	52.0	14.8
Spectrum — Z-80	4.8	8.7	21.1	20.4	24.0	55.3	80.7	253.0	58.5

At the back there are two local area network ports for use with QLAN, the power socket, and ports for a high-resolution colour monitor or colour TV. Four sockets, identical to those now used by BT for telephone jacks, provide two RS-232 connections and two joystick ports. The last slot, for plug-in ROMs, is the one used on FB-version machines for part of the operating system. The power socket connects to a rather heavy external power-supply unit, styled in a similar black plastic.

Spartan layout

Inside the QL the layout has a spare appearance. Apart from the ULAs that allow so much to be packed into relatively few chips, the main chip is the 68008 at the far left of the motherboard. The 68000 family of microprocessors has recently been completed by Motorola's launch of the top of the range 68020 model, sporting the full 32-bit structure throughout. The 68008 is not so much sawn-off as corseted; the processing is carried out with the full 32 bits, but all data transfers are limited to eight bits. Clearly some of the processing power is lost as conversions of data length take place.

An Intel 8049 handles the keyboard and

sound generation, and acts as an RS-232 receiver. One of the ULAs controls display and memory and the other deals with the Microdrives, the local area network, RS-232 transmission and the real-time clock. Unfortunately, there is no on-board battery backup to the clock, so it is real-time only when the machine is running.

The Microdrives use precisely the same technology as those of the Spectrum but are functionally incompatible with them. The cartridge itself contains about five metres of thin video tape, joined up into a continuous loop and specially lubricated to allow the tape to slip from the middle of the wound spool. The continuous form allows faster access to files, without the need for rewinding. But obviously the nature of the technology means that the risk of physical failure is higher than with discs.

Sinclair claims a minimum capacity of 85K. The exact figure varies from tape to tape, and depends partly on the extent to which the tape has been stretched and generally massaged by the formatting process. After formatting is complete, the number of usable sectors and the total number of sectors is displayed. 213/216 seems a popular ratio. Unfortunately, successful formatting is no guarantee

that the Microdrives will copy perfectly.

In addition to the Psion application programs supplied on four Microdrive cartridges, Sinclair supplies eight further blank cartridges — four for backing up the bundled software and four spares. Of our eight, four formatted without problems but threw up the message

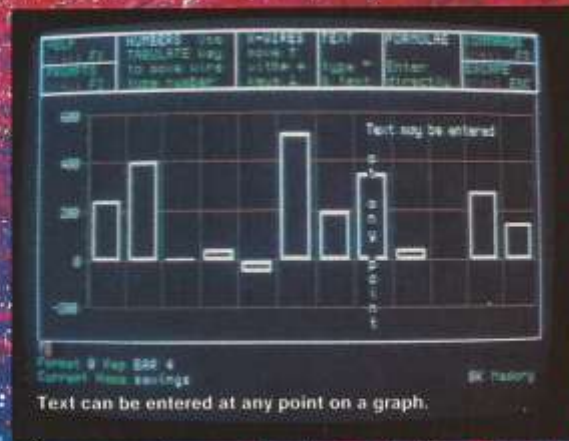
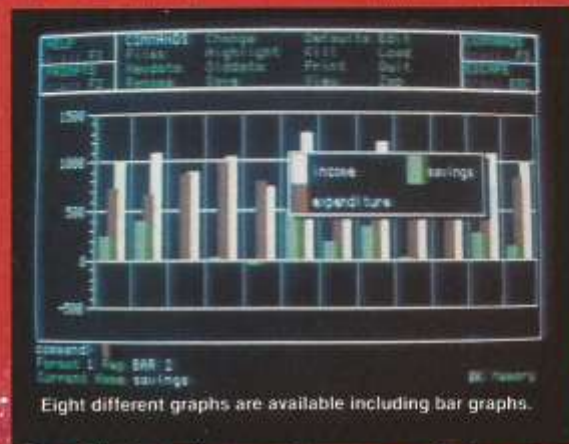
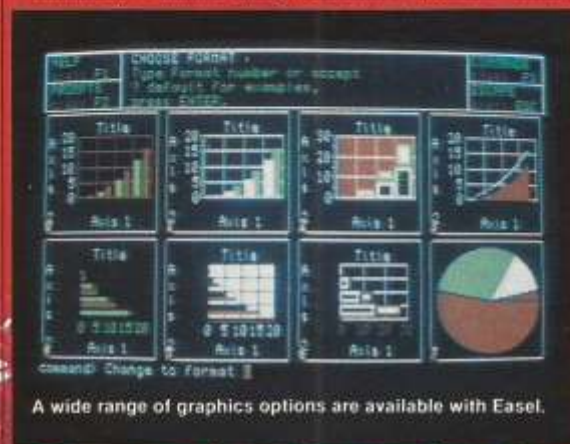
Bad or changed medium
when used for copying the Psion programs. A 50 percent failure rate does not augur well for the new medium.

Lack of RAM?

In use, the Microdrives seem to find the relevant sectors reasonably fast, though some of the operations can take minutes. It is hard to disentangle the extent to which this is caused by software problems, lack of RAM and so on. The worst example we found during this review was the 10 minutes it took to copy the Easel business graphics across from the master to a blank cartridge. Other Psion packages took several minutes.

It is hard to know quite what is causing the hold-ups until more details about QDOS and the tape format used are forthcoming. It may well prove possible to bypass whatever problems there are. But

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in their present form, such access times cast doubts over the Microdrives.

Equally worrying is the pricing structure being adopted by Sinclair. The quoted price for end-users is £4.95: way over the comparable figure for cassettes. The situation is just as bad for software houses, which may well be inhibited from plunging into Microdrive cartridge production of their programs.

The consequences of any resulting software starvation would be dire. The QL is already backing a lot of outsiders, and it cannot risk falling down with its software base. The QL is particularly vulnerable to this because Sinclair has chosen not to include a cassette port, presumably for fear of spoiling its professional image.

The keyboard is another aspect of the up-market approach adopted by Sinclair with its new machine, and the company claims to have spent £100,000 on designing it. Inevitably a membrane design is used, but the individually moulded rigid plastic key tops represent a huge improve-

ment over Sinclair's previous efforts. Opinions differ widely over its suitability for word-processing: I found it quite usable for touch typing, but a colleague likened it to plunging your hand in a bowl of cold porridge. As ever, the only way to decide is to try it yourself, which is rather problematical with a mail-order machine.

In addition to the standard QWERTY keys and five function keys there is a proper space bar — the first to appear on a Sinclair machine — two Shift keys, Control, Alt, Tab, Escape and Enter. One problem with the layout is that the Shift

and Control are adjacent on one side, and Shift and Enter on the other. It is all too easy to mistake Enter for Shift, which can have dire consequences. The cursor keys are split rather awkwardly across the central space bar. On the plus side, back-space deletion, obtained by holding down Control and the Cursor Left key, is easily managed by one hand.

On power-up the opening screen presents you with a choice of monitor or screen, selected by F1 and F2 respectively. The monitor mode divides the screen into three areas. The bottom screen, labelled 0, is used for entering commands; the left-hand upper screen displays a listing of the program entered and the right-hand portion shows the output. For some reason best known to Sinclair, they are labelled 2 and 1 respectively.

The Television display mode combines the listing and output screens in one. The listing appears in bright blue and is overwritten in red by output. Two basic modes are available: eight colours with 256 by 256 pixels, allowing 37 characters across, and four colours and 512 by 256 pixels with 74 characters. In the Monitor display mode 83 characters are available, of which the first four are lost on a TV set.

Specification

CPU: Motorola 68008 running at 7.5MHz

RAM: 128K standard including 32K video RAM; promised expansion to 840K

ROM: 48K with 16K externally in FB version, containing QDOS and SuperBasic

Weight: 1.388kg, excluding power supply

Dimensions: 138mm, (5.4in.) by 46mm, (1.8in.); separate power supply

Keyboard: full-size 67-key QWERTY layout plus five function keys; membrane-pad switching operated by rigid plastic keys

Mass storage: two built-in Microdrives; typical cartridge capacity 85K

Interfaces: two RS-232s; two QLAN local area network sockets; monitor and TV ports; two joystick ports; ROM slot; main expansion slot

Software in price: system software in ROM; Psion application packages Quill, Abacus, Easel and Archive on Microdrive cartridges.

Price: £399 including VAT, plus £7.95 post and packing

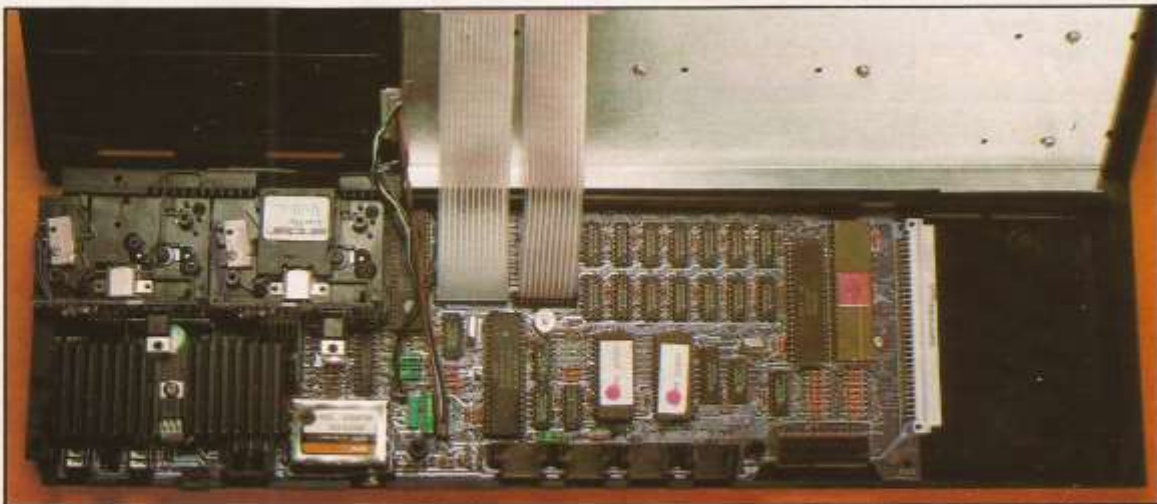
Manufacturer: Sinclair Research, Mail-order purchases from Freepost, Camberley, Surrey GU15 3BR; telephone: (0276) 686100; retail distribution due to begin in September



The tell-tale kludge is now extinct on final versions of the QL.



The bulky external power-supply unit mars the QL's sleek appearance.



The ULAs account for the QL's bare appearance inside, also space has been left for expansion peripherals to be slotted in.

The display is one of the least successful aspects of the QL. In the TV mode there is a lot of pulsing of the background and general lack of stability, lending a sub-aqua effect to the image. The characters are very difficult to read in the four-colour mode, and more so in black and white where problems of definition seem greater.

Since SuperBasic is resident in ROM, the command line responds automatically to this language. QDOS, the proprietary operating system, remains essentially invisible to the end-user. Until Sinclair releases documentation it is hard to make any useful comments on the system.

One disappointment is that it turns out that the much-vaunted multi-tasking will be available only from machine-code programs. Windows are offered, but there seems little you can do with them without the multi-tasking capability.

Slow SuperBasic

As the Benchmarks show, SuperBasic is slow for a 68000-based machine. Since the 68008 is inherently a fast processor, even with its eight-bit data bus, it has been suggested that the problem lies in the interpreter. It is certainly quite instructive to note the changes in the SuperBasic manual that have occurred since January as commands have come and gone or have been renamed, providing some indication of difficulties or second thoughts.

Sinclair's new Basic is incompatible with the Spectrum's ZX Basic. It lays claim to its "Super" on the grounds of being structured. Programs have the ordered form characteristic of Pascal and other structured languages, with neatly matched For and End commands, and Procedures and Functions tucked away at the end of the listing. Other goodies on offer include a Select, which allows a range of command options dependent on particular conditions, like Case in Pascal; an If that has now acquired an Else in addition to the Then; and an automatic line-numbering command, Auto.

Graphics

A wide range of graphics commands are included. Paper and Ink select the colours for each of the two modes available. Pixels, lines, arcs, circles and ellipses can all be drawn using single commands, and there is a Fill command to colour-in closed shapes in a swift and efficient way. Scroll and Pan allow the screen to be scrolled a specified number of pixels up, down, left or right. This command can also be applied to any windows that have been created.

The Window command permits a portion of the screen to be defined as an independent area, which may be scrolled and also display data directed towards it. Much of the power of the facility depends on a full implementation of the multi-



The QDOS command lists the files available on the Microdrive cartridge. The amount of free storage space left on tape is displayed in proportion to that used.

tasking, and as such will only be available to machine-code programmers.

Other modish graphics commands include some for a pseudo-turtle — that is, one that exists purely in terms of movements on the screen, rather than as a physical robot. Standard commands include Pendown, Move, Turn and Turnto. A Beep command can be invoked with two, five, six, seven or eight parameters allowing various levels of envelope specification. As with the BBC's Envelope command, much experimentation will be needed to work out the consequences of small parameter changes. Only one sound channel is provided.

Windows, like all input/output commands, are handled using the concept of a stream. Any device, such as the keyboard, Microdrives, Windows and Printer, can be hooked up to a stream to accept data flow and, where appropriate, provide input. It is therefore theoretically possible to redirect printer output to a Microdrive. Streams will also be important in accessing peripherals when they eventually appear, and for sending out information over the QLAN network.

All the standard maths functions are included, as well as an impressive floating-point range of -10^{615} to 10^{615} with eight significant figures. Even though structured programming is supposed to avoid them, old favourites like Goto and GOSUB are still available.

In fact, there is a contradiction between the whole logical structured approach and some of SuperBasic's facilities. For example, it is very tolerant of mixed data types. You can enter something as horrendous as

```
LET X% = 1.4 + "4"
```

and SuperBasic will do its best to make

sense of it. First it translates the string "4"

into the number 4.0, adds it to 1.4, then ignores the decimal fraction so that it can be assigned to an integer variable X%.

So the QL saves you from having to worry about all those little details that make programming so tiresome. Unfortunately, it also encourages you to be sloppy and even incomprehensible in your programming habits, which is precisely the thing that structured languages were designed to avoid.

A definitive assessment of SuperBasic will have to wait for a definitive version; at the moment it has a number of worrying bugs and bumps. Still, it is clear that Sinclair is aiming high, and the eventual possibilities could be very exciting.

The Psion software bundled with QL has settled down to a slightly more stable state. It was discussed in some detail in the May issue of *Practical Computing*, though at that time the programs were only running from ROM boards.

Data exchange

The four packages offer word-processing, spreadsheet, graphics and database applications. Each comes on a separate Microdrive cartridge and their size is such that only one at a time can be resident in memory on the standard machine. Consequently the exchange of data between programs is not entirely straightforward, and certainly not instantaneous.

The Quill word-processing package offers all the standard features, and is fully WYSIWYG. As a result, the response time is often very slow as the machine struggles to reformat the text's

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on-screen appearance: perhaps the worst offenders are the Replace mode and back-space deletion. One problem with deletion is that you run too far ahead of the plodding cursor and so blot out some of the previous word too.

As part of the general policy of command integration, editing throughout the packages is carried out using the keystrokes used by the SuperBasic line editor, which is limited but serviceable. Help screens, called up by pressing F1, have to be pulled in off a Microdrive cartridge and, as with all Microdrive operations, longish waits are involved. Even straightforward text entry can cause frenzied accessing, and this only serves to slow down the system's response time even further. Loading new documents is similarly frustrating: load times of minutes are not uncommon even for small documents.

Two major omissions are a mail-merge facility and any capability for print spooling — a shame when you remember that the QL is billed as a multi-tasking machine. Generally, Quill is best regarded

as a slow but usable word processor, offering most of the facilities looked for in a package but not ideally suited to extensive use by good typists. For the two-finger beginner or for occasional use in the home it should suffice.

The spreadsheet program can be recommended with fewer reservations. It is quite fast, again offers all the standard facilities, and adds a few of its own. Particularly useful is the ability to manipulate whole rows and columns using only the first entry as a label. Thus, formulae like

$$\text{costs} = \text{sales} * 0.43 + 169$$

are legal. One slightly annoying feature for those of us brought up on VisiCalc and its clones is the necessity of entering a number before using the cursor keys, where the latter will serve on their own in the older packages. There should be no problems in putting this package to serious uses, and it measures up well against other stand-alone programs.

The Easel graphics package is the largest in terms of program size. Though superficially the most impressive it is ultimately probably the least useful. Graphs can be created at the keyboard by directly inputting data, or data can be imported for other applications.

Although there are some eight different kinds of graph available, and colours can be changed for particular parts of them, the overall variation is really quite small. Otherwise Easel is easy to use, well implemented and fast, considering the graphic manipulations. A nice touch is the ability to add text at any point on a graph.

Perhaps the most interesting of the Psion packages is Archive, the program-mable database. Databases have traditionally been heavy business applications rather than for the home user, but Archive could well change all that.

A default record format is available on which each field can be set up as required. New records can be added by using the Insert command, which allows the fields to be filled in one by one, or Append, where Let commands are used to assign values to particular fields. The command line generally interprets input as a command; where input is required, a second cursor appears in the upper part of the screen representing the record.

Once a file has been set up, its contents can be scanned using First, Next, Before and Last to pass from record to record. Records with a particular field can be found using the Select command. A file

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	January	February	March	April	May
income	1000	1100	900	1050	75
expenditure	750	650	850	1000	58
savings	250	450	50	50	-5

Abacus has a standard spreadsheet format.

Information

The important feature of the QL packages is their ability to exchange data. Perhaps the most useful example of this would be the inclusion of a spreadsheet calculation in a letter:

	January	February	March	April	May	June
income	1000	1100	900	1050	75	75
expenditure	750	650	850	1000	58	58
savings	250	450	50	50	-5	-5

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July August September October November December

WORDS: 2200 LINES: 1 PAGE: 1

DOCUMENT: "data_base.doc"

Portions of a spreadsheet can be incorporated into a document.

Import

Import "test.doc" as "test"

Display

The Import function is used to exchange data.

February

1100	650
450	

Display

Print

Quit

Data can be displayed in a user-defined format.

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can also be sorted on any of its fields in ascending or descending alphabetical or numerical order; it is possible to sort on two fields. The Locate command can then be used to search on part of a string, for example Sm, to find all names beginning with these letters. This allows a kind of wild-card facility.

As well as using the default display — invoked, reasonably enough, by the command Display — it is possible to design alternative screen formats using the screen editor Sedit. Formats can be saved and loaded from Microdrives.

Perhaps the most powerful feature of Archive is its ability to run procedures. These structured programs look very similar to a SuperBasic listing, but without the line numbers. Using them you can run routines to search through files, print out mailing lists, merge, reorder and delete — in short, everything you would expect from a fully programmable database.

Most of the SuperBasic commands like Getkey() and While are available, and the program handles procedure layout as in SuperBasic. Procedures may call other procedures and can use local parameters. Multiple files may be accessed by assigning them distinct logical names. They are defined when a file is Opened — which allows alterations — or Looked at, which is limited to read only. It is important to Close files at the end of a session.

Initial impressions are that Archive is a powerful program. Its sorts and searches on small files were fast, but how it would cope with larger files that exceed RAM space might well be another matter. The procedural language is very powerful, if slightly daunting for the beginner.

Integration

One of the key features of the Psion suite is its claim to integration. Command integration, or the appearance of the screens and the use of the function keys in a consistent fashion, is superficially quite complete. However, Archive is substantially different in approach. All input is treated initially as command, which must be entered in full, whereas in the other three packages first letters suffice.

In Archive, all the command menus are called up by successive presses of F3; in Quill, there is a command Other which takes you down to a further nested list of commands. Matters are complicated by the fact that there are two commands beginning with F, namely Footer on the main list and Files on the subsidiary one.

More crucial is the level of data integration. Again, matters vary from package to package. The Export function allows data to be passed from Abacus to the other three packages relatively easily. A file with the extension name of _EXP is



When the Microdrive cartridge slots in the tape is pressed against the read/write head.

created, and can then be called up using the Import command from the other applications. On the other hand, passage of data from Archive to Quill is not so straightforward. Given that it is not possible to hold all packages in memory simultaneously, this awkwardness is not so critical; the main transfers are possible and relatively easy. Perhaps things ought to be kept in context since the Psion programs are being bundled with a machine for a total of £400 and it would be unreasonable to expect perfection.

The manuals are quite comprehensive, with plenty of screen dumps and examples. The Introduction and SuperBasic sections have been touched up slightly between the FB and AH versions, but unfortunately some errors have been corrected only to be replaced by others. In particular, the line numbers of the example programs have been changed, but not consistently. The Keywords section explaining SuperBasic is useful but could be fuller.

With the present so dubious, it may seem a little premature to consider the future, but there can be little doubt that after a few more months' tidying up the QL will be a serviceable machine. Additions promised from Sinclair are the 512K RAM — guaranteed non-wobble — a Winchester, modem and terminal emulator, Centronics port and a non-thermal printer. There is also the possibility that an upgraded Microdrive with a capacity of 1Mbyte will be released; unfortunately this will yet again be incompatible with everything else.

The Psion packages are being slimmed down further so that they can be crammed on to a 128K ROM. This will improve performance and free far more RAM. At the moment the 32K video RAM, together with the large programs, leaves precious little user space. Psion has recently started marketing the QL packages for other machines like the IBM PC and Sirius under the name Xchange. As well as concurrency, they have additional features like mail-merge and print spooling — some of which may filter back to the QL one day.

Despite all the delays and problems, Sinclair is confident that the QL is going to be a winner on the scale of its previous machines. Sales targets are 250,000 this year and 750,000 next year. New manufacturers are due to be announced soon, and the American launch is planned for the autumn.

Conclusions

- This one will run and run. When the bumps have been ironed out the QL will represent unbeatable value.
- The Microdrives are overpriced underperformers. It will not be long before third-party suppliers offer disc drives that really will be a leap for the machine.
- The Psion programs are eminently usable for most home applications. Only Quill lets the side down with its rather sedate response.
- SuperBasic seems to be a little wobbly at present. The potential is there, especially with the structuring and wide range of commands. It is also slow, which could be a problem for Basic games. The lack of multi-tasking at this level is also disappointing.
- Initially there will be a shortage of software, but the indications are that software writers are heaving away to cater for what will be a huge market.
- It is only too easy to knock aspects of the QL, but the fact remains that for about £400 you are getting a micro with potential, and four usable application programs here and now. Despite claims to the contrary, it is no low-end business machine but an up-market home micro. □

QLangers

Practical Computing is monitoring the state of the QL. If you find any bugs or bumps in the software, please send details to QLangers, Practical Computing, Room L307, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

