Every Month £1.25 March 1986

SINCLAIR QL WORLD

INCORPORATING QL USER

TWO GREAT MAGAZINES IN ONE



SUPERCHARGED!

Breathe new life into your QL

Exploring the QL disk

Psion software applications

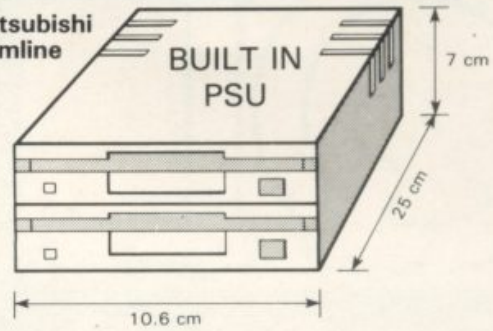
EIDERSOFT DISK SYSTEMS

AVAILABLE NOW EX-STOCK

CREDIT CARDS
TEL: 0708 851099

I.C.E. **ALL disk systems include ICE ROM software with CHOice see our other advert. IF YOU ALREADY HAVE ICE WE WILL REFUND THE DIFFERENCE!!**

QL BUSINESS PACKS
Special offers on disk business software for all Eidersoft disk customers eg.
QSPELL 3.5" disk £19.95
IMPACCT int. accounts £129.95
SAVE £50!
Many more special offers



Finish silk black/quad disks available (P.O.A.)/ single upgradable disk with any system deduct £50.

SYSTEM 1 TRL

£409! Inc VAT — 128K extra RAM/Disk interface. Parallel printer port. All accessories. Twin 720K 3.5 inch disk drives as shown.

SYSTEM 2 PCML

£449! Inc VAT — 256K extra RAM/Disk interface. Toolkit commands. All accessories. Twin 3.5 inch disk drives as shown.

Eidersoft Business Software

ARCHIVER £18.95 + £1 p&p
Adaptable business programs for PSION Archive version 2 plus:— Invoicing/Stock Control/Mailing/ Appointments.

QSPELL £19.95 + £1 p&p
The award winning spelling checker and word data base for Quill.

EIDERSOFT
SYSTEMS & SOFTWARE

Disk/Software Telephone Support Service P.O.A.
DISK DRIVES DELIVERY SECURICOR £9

INTEGRATED ACCOUNTING

IMPACCT SALES LEDGER

- ★ Add/change/enquiry
- ★ Customer file
- ★ Delivery address
- ★ Cash/cheque receipt and matching
- ★ Cash sales (shop) and refunds
- ★ Invoice/credit note production
- ★ Statements
- ★ Debtors report
- ★ Monthly transactions audit trial
- ★ Customer turnover rep.
- ★ VAT report
- ★ Analysis report by nominal codes

IMPACCT PURCHASE LEDGER

- ★ Add/change/enquire
- ★ Suppliers file
- ★ Cash/cheque receipt and matching
- ★ Record p.cash purchases and refunds
- ★ Invoice/credit note entry
- ★ Supplier outstanding invoices
- ★ Creditors report
- ★ Monthly transactions audit trial
- ★ Suppliers turnover report

IMPACCT NOMINAL LEDGER

- ★ List accounts
- ★ Journal entries and listing
- ★ Trial balance
- ★ Profit and loss report
- ★ Balance sheet
- ★ Budget entry
- ★ Comparative budgets
- ★ Interface and update from sales & purchase ledgers

IMPACCT STOCK CONTROL

- ★ Add/change/enquire
- ★ Record sales turnover rep.
- ★ Record purchases turnover rep.
- ★ Adjust stock level
- ★ Selling price list
- ★ Quantities on hand rep.
- ★ Stock valuation
- ★ Re-order level
- ★ FIFO turnover enq.

Each module £49.95 + £1 P&P Total package £179.95 + £1.50 P&P. Microdrive 3.5" disk versions add £4 per module.

Each module includes a full manual — Telephone support available
Training courses avalable

IMPACCT SOFTWARE

Eidersoft are pleased to announce exclusive distribution of the Xpert IMPACCT QL integrated accounts system.

At last a truly integrated QL accounts package that has all the features of packages costing 3 or 4 times the price! IMPACCT accounts includes invoicing/sales ledger — nominal ledger — purchase ledger and FIFO stock control. Each module is available separately or as a package.

★★Fully approved by chartered accountants★★
★★can be integrated to PSION packages★★

Dealers please phone us for more information.

NEW

Eidersoft, The Office, Hall Farm, North Ockendon, Upminster, Essex RM14 3QH.

Please supply the following items:—

☐	Disk System 1	£409.00 + £9.00 P&P
☐	Disk System 2	£449.00 + £9.00 P&P
☐	IMPACCT Sales Ledger	£49.95 + £1.50 P&P
☐	IMPACCT Purchase Ledger	£49.95 + £1.50 P&P
☐	IMPACCT Nominal Ledger	£49.95 + £1.50 P&P
☐	IMPACCT Stock Control	£49.95 + £1.50 P&P
☐	IMPACCT Complete System	£179.95 + £1.50 P&P
☐	Archiver	£18.95 + £1.00 P&P
☐	Qspell	£19.95 + £1.00 P&P

Name.....

Address .....

.....

..... Postcode .....

I enclose a cheque/PO for £.....

*EUROPOST £2.00 WORLD £3.00

Please deduct my Access/Visa/American Express

Card No. | | | | | | | | | | | | | | | | |

Exp. date

Please supply more information on.....

Eidersoft reserve the right to alter prices and specifications without prior notice.

SINCLAIR QL WORLD
INCORPORATING QL USER

Editor
Paul Coster BSc
Associate Editor
Geoff Wheelwright
Software Editor
Jason Ball
Art Editor
Mike Spiller
Technical Associate
Marcus Jeffery BSc

Advertising Manager
John Ross
Production Assistant
Nick Fry

Publisher
Richard Hease

CONTRIBUTORS
Paul Hickling
Phil Staniforth
Mary Sargent
Marcus Jeffery
Christopher Sherwood
Colin Opie
Nicky Trevett
Rob Sherratt
Andy Carmichael
James Lucy
Tony Dennis

Microdrive Exchange:
System Design

Sinclair QL World,
Wells House,
80-82 Upper Street,
London N1.

Telephone 01-359 3525

Published by Focus Investments, London

Distributed by Quadrant Publishing Services, Sutton.

Subscription information from: Quadrant Subscription Services, Oakfield House, Perrymount Road, Haywards Heath, West Sussex 0444 459188 (£15 UK, £30 Europe, £45 Rest of the world).

Typesetting and Make-up by Time Graphics (Northampton) Ltd.

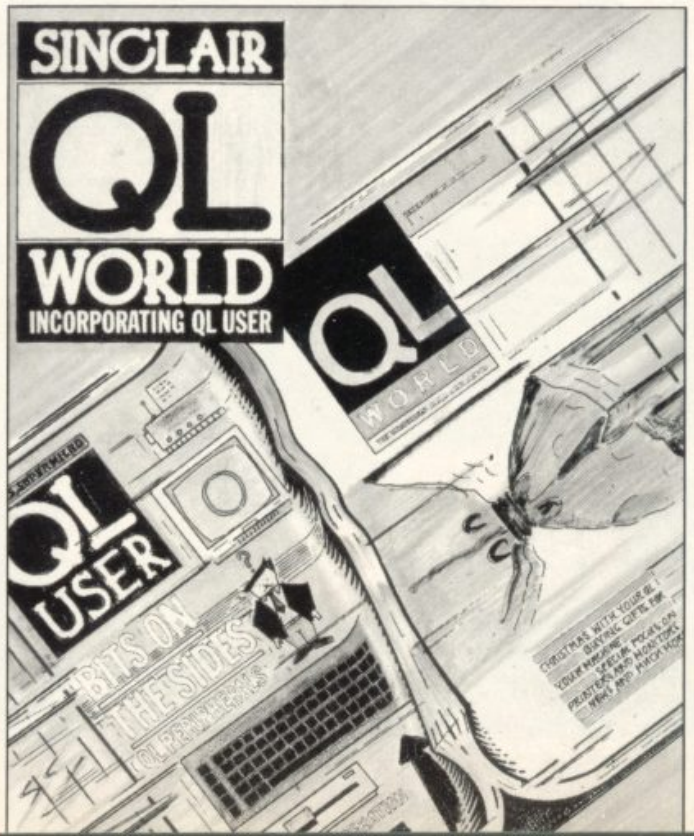
Printing by Cradley Print, England.

© COPYRIGHT SINCLAIR QL WORLD — 1986

CONTENTS

MARCH 1986

5	**QL SCENE** • News and product information for QL owners everywhere
10	**OPEN CHANNEL** • Letters to the Editor and other literary gems
12	**SUPERCHARGING SUPERBASIC** • The first QL compiler . . . it's a winner
17	**COMPETITION** • Continued from QL World, but open to QL User readers
19	**THE FORTH DIMENSION** • A remarkable language outlined
22	**BITS ON THE SIDES** • The second part of our roundup of peripherals
26	**SOFTWARE APPLICATIONS** • Assorted, creative uses for QL software within a business context
31	**QL COMMS** • New, regular feature devoted to QL communications
34	**OF DISKS AND DRIVES** • The second part of this enlightening exposé of storage media
38	**THE UNPREDICTABLE MICRO** • Part two takes the form of an astrology package review
42	**DIARY OF A QL USER** • Beginner's guide to the QL and associated literature
45	**BOOKMARKS** • Our resident critic analyses some QL books
46	**SOFTWARE FILE** • Reviews of the latest software from Sinclair et al
49	**THE PROGS** • More readers' programs from our extensive supply
59	**MICRODRIVE EXCHANGE** • Get your programs here!
60	**INSTANT ACCESS** • Vital addresses and contacts for QL users



I am pleased to see the merging of QL World and QL User in the magazine you see before you. We will now be able to bring you the best of all 'QL World' — combining the excellence of QL User's programming, games and project features with the business reviews and applications stories which have always been at the forefront of QL World.

The result of this merger is more than just the sum of two parts — it is the birth of a new magazine which will provide a comprehensive all-round look at every major aspect of using Sinclair's super-micro. I am delighted to be working with Paul Coster, whose magazine I have long envied and admired

— Geoff Wheelwright

I would like to thank Geoff for his kind words. I also feel that between the two of us Sinclair QL World is set to provide QL owners — now and in the future — with the best possible support and information on a micro which is excellent value for money. I hope the new magazine formula will exceed the already high standards set by QL User and QL World independently

— Paul Coster

U.K. No.1 QL DEALER

4 Systems

4 Systems FREEPOST Feltham TW13 4BR

CASH TRADER **£64** DECISION MAKER **£36** PROJECT PLANNER **£36** ENTREPRENEUR **£36** QL HOME FINANCE (BUZZ) **£24** TYPING TUTOR **£20** EIDERSOFT ARCHIVER **£17** INTEGRATED ACCOUNTS **£80** **LANGUAGES** METACOMCO ASSEMBLER **£36** METACOMCO BCPL **£54** METACOMCO LISP **£54** METACOMPO PASCAL **£79** MONITOR DISSEMBLER **£18** QL TOOLKIT **£22** FORTH **£36** DIGITAL BASIC COMPILER **£57** METACOMPCO 'C' **£95** CARTRIDGE DOCTOR **£15** Cartridges are available at a new low price of £1.50 inc VAT THE PAWN **£19** FLIGHT **£19** CRAZY PAINTER **£10** ICE **£30** METEOR STORY **£11** BOTTY **£9.90** EXEC ADVENTURE **£12** L.B.O. **£19** BJ CAVERN 2 **£10** SPOOK **£10** PSION ODRAW **£15** QL CAVERN **£13** MICRODEAL HOPPER **£13** MICRODEAL CUTHBERT IN SPACE **£13** PSION MATCH POINT **£15** HYPODRIVE **£15** MICRODEAL LANDS OF HAVOC **£16** PSION CHESS **£17** TALENT WEST **£15** TALENT ZKUL **£15** TALENT GRAPHIQL **£32** QL SPRITE GENERATOR **£22** QL SUPER BACKGAMMON **£14** EIDERSOFT ZAPPER **£11** EIDERSOFT QLART **£10** COSMOS **£15** AREA RADAR CONTROLLER **£12** SUPER ASTROLOGER **£24** SUPER ARCADIA **£15** SUPER FORTH + REVERSI **£29** MASTER BLASTER **£9** KNIGHT FLIGHT **£13** QSPELL **£19** QL REVERSI **£12** SQUADRON **£15** BLAST BUGGY **£12** QL CLASSIC ADVENTURES **£10** QL BOUNDER **£10** QL FICTIONARY **£13** QL SUPER TOOLKIT **£36** QL MONOPOLY **£15** QL SCRABBEL **£15** QL PAINT **£25** QL JABBER **£10**

No body gives YOUR QL more than 4 Systems

*SINCLAIR QL PRINTER £229
*VISION QL MONITOR £249
*CUMANA COMPLETE DUAL DISKS .£269
*512K RAM £115
*258K RAM £90
*TANDATA QCOM £129

01-844-1399

Access

VISA



QL SCENE

Microfair Duet

The winter ZX Microfair season is over, with two such events — the first in mid-February and the latest at the beginning of February — having passed through London's Horticultural Hall and many pence having changed hands. No new products of vast importance were shown at the affairs — unless you count the Commodore Amigas and Atari STs which seem to work their way on to Microfair stands these days — although many products which had been announced in recent months were given their first major showings.

There was the Digital Precision long-awaited SuperCharge compiler — and author Simon Goodwin on hand to answer questions about the ABC Elektronic Giga Soft Mouse — to be reviewed sooon in these pages — and many low-price 512K internal memory upgrades for the QL, some of them for less than £100 if you bought the chips at the fair.

Eidersoft was getting a crowd with its Mac-like ICE ROM cartridges and Micro Peripherals was shifting large numbers of its disc interfaces and printers.

The fairs were encouraging for the number of people they brought together and the support there seems to be for new QL software. Well done to Mike Johnston, as usual, for organising the events.

QL Scrabble

One of the most popular strategy games for the Spectrum was an adaption of the Scrabble board game. The game has now been developed for the QL by Leisure Genius and looks excellent — a full review will appear in the next issue.

It will sell for £14.95 and can be ordered from Leisure Genius at 3 Montagu Road, London W1H 1AB or enquiries by phone on 01-935 4662.

Dialogue On Dialog

In QL World Issue 4 we reviewed the Dialog Software Transact program for the QL. Unfortunately, the software support telephone number we quoted as 01-787 7871 has now been changed. The new number for help is 0371 831009.

Generation Gap

Families owning home computers are facing a computer generation gap, according to a Market Opinion Research International report published by Enterprise Computers. Fifty-three percent of computer-owning parents have never used their computers and fewer than one in 10 believe they know more about computers than their children.

Lack of parental control or awareness of the activities of the new 'computer kids' could spawn a generation of software pirates; one in four children use illegal copying as a means of obtaining computer programs.

The nation-wide MORI survey questioned 329 computer-owning children aged 13-17 and 201 parents with children of the same age group and a computer in the home.

Disturbing findings from the survey were the levels of ignorance among parents of what children do with computers at school. Fourteen percent had no idea whether or not they did programming and though 71 percent believed their children used computers at school, the figure is lower at 54 percent.

Though 'teacher knows most' about computers, only 42 percent of children who have computer lessons think they are fun.

The survey also suggests there may be a buying boom in the near future. The vast majority of those questioned owned computers recognised to be out-of-date. "If they had £250 to spend, 30 percent would buy a new model tomorrow, rather than adding to existing equipment. Sinclair owners are more likely to replace than Commodore, the best-selling machines.

Medic Snippet

We are informed that the police are now soliciting the public's help with regard to enquiries about Medic Datasystems. If you have ordered goods from Medic and not received the, please contact Sergeant Young in the Fraud Division of the Hampshire Constabulary on 0420 82244 x175 or by letter to: Sergeant Young, Hampshire Police Station, Orchard Lane, Alton, GU34 1LN.

Games Proliferation

A new collection of games software will kick off the new year for the QL, with releases from CP Software, Sinclair Research, Talent and Microdeal. The most prolific is Sinclair Research, which has announced the releases of *QL Jabber, QL Quboids, QL Classic Adventures, QL Pawn, QL Fictionary* and *QL Paint* (See our reviews in this issue).

One of the least expensive arcade game offerings is QL Jabber, which will sell for £9.95 and casts you as the hunter of nasty bugs inside your body.

Sinclair is also hoping to tap the advanture game market for the QL with QL Classic Adventure and QL Pawn. The first is a mild re-write and sequel to the old-time Crowther and Woods adventure, while the second is an all-new, high-level adventure with a flexible English-languague command interpreter.

QL Pawn also distinguishes itself by being one of the few adventure games which does not tell you its objective — you have to play to find out.

The Sinclair Paint program takes the now familiar MacPaint concept and marries it to the GraphiQL software produced by Talent. In fact, QL Paint is produced by Talent for Sinclair and includes joystick control, drop-down menus and selector bars in the software.

Talent has been busy promoting its new release, *Cosmos*, an interplanetary identification kit which specialises in showing you the position of Halley's comet.

Traditional games, however, will not be out of the running, as CP Software ships the first copies of its new version of *QL Bridge Player*. The company claims its £18.95 QL Bridge Player II is a stronger version of the classic card game than its previous offering. It was written by a Bridge expert entirely in machine code and includes powerful bidding facilities.

QL Poolswinner, may give you a chance to win back some of the money you spent at Christmas. The game is from a small Yorkshire software house, Yorkshire Mails (Software), and is complete with a database of 22,000 matches played in the last 10 years.

Psion Drawings

A sophisticated drawing package which can create original electronic works of art has been developed by Psion. *Q Draw* comprises the powerful graphics program used by Psion to create the images seen in *Chess* and *Match Point*. Drawings can be created from scratch in either high- or low-resolution, and personal touches saved from other programs can be added. Several popular black-and-white and colour printers are supported, allowing a permanent record of screen creations to be kept.

David Frodsham, Psion marketing manager, says: "Q Draw started as one of many powerful software tools written for Psion use and made possible the complex screens for QL Chess and Match Point. It was quickly recognised as an invaluable program for screen drawing and design work."

The many features of Q Draw permit the user to compose a drawing — be it simple or highly detailed — using coloured pens of various thicknesses. Lines can be plotted and shapes defined and subsequently coloured. Shapes can also be used as outlines of areas to be saved, moved or copied to another part of the screen. Costing £14.95, Q Draw is available from many leading multiples and software stockists.

Blatant Piracy

Digital Precision have informed us that a Belgian organisation is distributing pirated copies of *Supercharge*, under the guise of a 'French Version'. There is no 'French Version' of Supercharge!

Code produced by these pirated compilers will be corrupt — errors will be produced on division, file-handling, array redimensioning, null strings, procedure handling, array redimensioning, null strings, procedure handling, serial reports, powers, native code etc!

It is very easy to identify pirate copies of Supercharge. They are blister-packed and *do not* come with Lenslock, the optical protection device supplied with genuine copies of *Supercharge*.

Any readers on the continent who find they have been sold a pirated *Supercharge* should return the copy to the vendor and demand a refund.

It is easy for continental QL owners to obtain genuine copies of *Supercharge* mail order from Digital Precision, or Microconnection (Belgium), Logisoft (France), Pyramide (France), Philgerma (West Germany) and Dansoft (Denmark).

STRONG COMPUTER SYSTEMS

BRYN COTTAGE, PENIEL, CARMARTHEN, DYFED SA32 7DJ
TELEPHONE: 0267 231246

FULLY TESTED QL COMPUTER £199

WITH VERSION 2.3 SOFTWARE

PRINTER PRICES INCLUDE MIRACLE SYSTEM INTERFACE

SEIKOSHA SP1000A OR SINCLAIR BADGED SERIAL	£239
EPSON LX80	£269
EPSON LX80 WITH TRACTOR FEED	£286
TAXAN KP810	£269
TAXAN KP910	£419
QUEN DATA DAISYWHEEL	£228
Miracle Systems Parallel Interface	£29
Serial Cable	£10
2000 Sheets Fanfold Paper (Supplied with printer)	£16

ACCESSORIES

4 Microdrive Cartridges	£8	Transform Box	£5
10 Cartridges with Transform Box	£23		
10 DS/DD 5.25" Disks	£23		

RIBBONS

Brother M1009	£5.50	MT80 or Shinwa	£6.00
Quen Data	£6.00	SP1000A (SINCLAIR)	£7.50
Taxan	£8.00		

MONITORS (CABLES INCLUDED

Microvitec Cub 1451/DQ3 Colour	£254
Microvitec Cub 1451/DQT3 with Swivel Stand	£274
Swivel Stand for Microvitec	£25
Philips V7001 18MHz Green (RECOMMENDED FOR THE QL)	£92
Swivel Stand for Philips Monitor	£23

3250 WATT MAINS FILTER £36

- ★ Provides four protected mains sockets with plug
- ★ Avoid crashes and damage to the QL's components
- ★ 30db suppression 1MHz to 30MHz
- ★ 130 joules spike suppression

MICRACLE SYSTEMS MODAPTOR £39

- ★ Link your QL to any modem with an RS232C socket
- ★ Prestel and Bulletin Board software included

QUICK SHOT II JOYSTICK WITH ADAPTOR £14
QL JOYSTICK ADAPTOR £5

★ ★ BUDGET RAM & DISK UPGRADES ★ ★

Ram Upgrades 512K – Disk Drives 3.5" 720 Formatted
Interfaces are Cumana with Toolkit
Optional Cumana Eprom with RAMDISK added £6

STACKED DUAL DISK DRIVES + INTERFACE + EXPANDERAM £389
STACKED DUAL DISK DRIVES + INTERFACE + INTERNAL RAM £399

MIRACLE SYSTEMS 512K EXPANDERAM £119
FULL INTERNAL RAM EXPANSION FROM 128K TO 640K £129
Price including fast collection and return of QL
OR INTERNAL EXPANSION BOARD DO IT YOURSELF £109

SINGLE 3.5 DISK DRIVE + INTERFACE £199
STACKED 3.5 DUAL DRIVES + INTERFACE £279
10 QUALITY DS/DD 3.5 DISKS IN LIBRARY CASE £39
PCML 256K DISK INTERFACE WITH DUAL DRIVES £449

SOFTWARE

LANGUAGES

METACOMCO ASSEMBLER	£29	TR SYSTEMS PAYROLL	£63
METACOMCO BCPL	£49	DECISION MAKER	£35
METACOMCO LISP	£49	PROJECT PLANNER	£35
METACOMCO PASCAL	£69	ENTREPENEUR	£35
METACOMCO 'C'	£79	QL HOME FINANCE (BUZZ)	£22
DIGITAL BASIC COMPILER	£49	TYPING TUTOR	£20
DIGITAL FORTH + REVERSI	£24	EIDERSOFT ARCHIVER	£17
DIGITAL SUPER MONITOR	£18	EIDERSOFT QSPELL (CART)	£20
TALENT CARTRIDGE DOCTOR	£13	EIDERSOFT QSPELL (DISK)	£23

TONY TEBBY'S NEW SUPERTOOLKIT II ON EPROM	£34
EIDERSOFT ICE EPROM ON ITS OWN	£24
EIDERSOFT ICE EPROM WITH SOFTWARE COMPENDIUM	£59

LEISURE

TALENT ZKUL	£13	MICRODEAL HOPPER	£12
TALENT WEST	£13	MICRODEAL CUTHBERT/SPACE	£12
TALENT GRAPHIQL	£29	MICRODEAL CRAZY PAINTER	£11
ZAPPER WITH EAGLE	£9	MICRODEAL FLIGHT SIMULATOR	£16
QL SPRITE GENERATOR	£20	MICRODEAL LANDS OF HAVOC	£16
QL SUPERBACKGAMMON	£12	BJ RETURNS	£10
PSION CHESS	£17	MATCH POINT	£13
HYPODRIVE	£13	QDRAW	£15
DIGITAL REVERSI	£11	QL SUPER ARCADIA	£13
STEVE DAVIS SNOOKER	£13	SPOOK	£10
TALENT COSMOS	£13	DIGITAL ASTROLOGER	£23
QL CAVERNS	£12	MASTER BLASTER	£9
QL PAWN	£18	QL BOUNDER	£10
QL FICTIONARY	£13	QL METEOR STORM	£11
CITADELL	£9	BJ 3D	£10
KNIGHT FLIGHT	£13		

★ ALL PRICES INCLUDE VAT AND NEXT DAY DELIVERY BY SECURICOR ★

★ OR FIRST CLASS POST ★

CARE ELECTRONICS QJUMP

QL SuperTOOLKIT QL

FULL SCREEN EDITOR. SUPERCHARGE COMPATABLE. ALTKEY: USer can assign a string to any key no limit on size of string (except QL memory), it can be text or a basic program. LAST LINE RECALL. JOB CONTROL. RESIDENT PROGRAMS. FILE HANDLING. PRINT USING.
***EXTENDED NETWORK: Allows disc drives, printers etc to be shared between QL'S. New Broadcast protocol included. Ver2 of the Toolkit an extended (over 100 commands) and extensively improved version of the original QL Toolkit. Toolkit comes on 16K EPROM CARTRIDGE together with library rack and COMPREHENSIVE MANUAL designed to suit your QL ring binder.

Quality software by Tony Tebby, Quality product by Care Electronics

SuperTOOLKIT **@ £34.50 Inc VAT p&p £2.** To order see below.

QL MONITORS AND TV/MONITORS

★★ PHILIPS COLOUR TV/MONITORS ★★ 85 CHARACTERS PER LINE

MEDIUM RESOLUTION
14" MODEL 14CT2006 **£253.00a** Inc. VAT
REMOTE CONTROL **SUPER VALUE**
16" MODEL 16CT2216 **£311.65a** Inc. VAT
We can supply up to 26" TV/Monitors—please ring for details.
ANTI-GLARE SCREEN
HIGH RESOLUTION
GREEN MODEL BM7502

★★FREE
LEADS SUPPLIED FOR USE WITH QL

£85.10b

DON'T BUY A COLOUR MONITOR!!

HAVE YOUR 14" & 16" PHILIPS & PYE COLOUR TV CONVERTED TO A TV/MONITOR



FACTORY CONVERTION £80.50a
RGB KIT £57.50d

- ★ Resolution better than 585 x 450 pixels.
- ★ Image clarity comparable to leading monitors.
- ★ Includes RGB lead for connecting with BBC/QL.
- ★ Conversions carried out at our workshops within 2/3 days.

Eprom Cartridge
One **£10.35c** Inc VAT
Five **£28.75c** Inc VAT
Ten **£52.90c** Inc VAT

HOW TO ORDER: By Post. Enclose your Cheque/P.O. made payable to **CARE Electronics.** Or use your ACCESS. Allow 7 days for delivery. Please add carriage.
OPEN: 9am–5pm MON–THUR
9am–4pm FRI/SAT
a) @ 10.00 c) @ 1.00
b) @ 8.00 d) @ 2.00

UNIT 14, PEERGLOW INDUSTRIAL ESTATE, OLD'S APPROACH, WATFORD, HERTS. TELEPHONE: 0923 777155

LOOK CLOSELY AT THESE SANDY SPECIALS ...



UPGRADES: Send your original cartridge — not the packaging — plus £5 (£6 if overseas, £10 if Supercharged) for an upgrade to the latest version of any D.P. program.

Super Astrologer de luxe

REVISED

You don't have to be C-C-C-Claudius to know the value of a good astrologer — and QL Super Astrologer is the definitive character reading and personality delineation package. You need absolutely no knowledge of Astrology to use this system — but it is not a toy as several professional astrologers have been stunned to discover.

This excellent package can cater for any birth-date or time, and any place on earth. Automatic personality comparisons can be performed — ideal for compatibility testing. Sample personality files are provided for lots of famous people, including Prince Charles, Princess Diana, Edison, Hitler, Roosevelt, Queen Victoria, and Freud...

Super Astrologer pushes the QL to its limit. It uses both microdrives and over 120K of data. The 58K machine-code program loads in under ten seconds and performs all calculations quickly and precisely. It gives an amazingly detailed personality readout, spread over 4 single-spaced A4 pages, or on the screen. Working astrologers can customise the text with the editor.

Super Astrologer was designed by a professional astronomer, working with an astrologer and a huge library of books on modern astrological technique. It handles the Natal chart, aspects, progressions, transits etc. Super Astrologer is very accurate and a powerful tool for astronomers as well as astrologers. It does all the Ephemeris calculations at colossal speed, with hosts of useful features including a scale display of planetary positions with variable magnification, interplanetary distance calculator, etc., etc.

"Highly ambitious... the dust hasn't had time to settle on my printer since my friends got wind of this program... it is accurate, comprehensive and easy to use... you certainly will not find as good an astrology program as this on any other home computer". QL WORLD.

We predicted that Super Astrologer would be a massive hit on the QL — and we were right! The new DE LUXE version allows full AND/OR selection in the delineation files, and print-outs of the Natal Chart and Solar System display, with full graphics. Super Astrologer de luxe costs £24.95, with full instructions.

Super Sprite Generator

Super Sprite Generator is a powerful graphic animation package. After over a year of enhancement and revision, Super Sprite Generator version 3.5 must be the Ultimate QL animation system. Super Sprite Generator allows you to create all the high speed, high tension, high drama special effects of arcade and adventure games.

A 'sprite' is an animated graphic symbol — a bird, a plane, Superman or anything else you choose. Multicoloured sprites can be designed with the machine-code sprite editor, and compiled into groups of up to 16 'frames' for automatic animation.

Up to 256 sprites can be held at any time, with 16 moving on screen simultaneously. Ultra-large sprites are allowed. At top speed the motion is faster than the eye can see!

As sprites move around they can be programmed to detect 'collisions' with one another, the border or the background, automatically. Sprites can pass over or under one another, with absolutely no 'flicker' at all. Speeds can be independently set, and sprites can be inverted or reversed at will.

Super Sprite Generator is exceptionally easy to use from SuperBASIC, fast SUPERCHARGED BASIC, or machine code. The new SuperBASIC commands are fully documented and error-trapped. You need no machine code knowledge at all — all the hard work is done for you. You don't even need to be able to draw — lots of demonstration sprites are provided!

"Takes all the hard work out of handling sprites..... results achieved are really excellent", QL USER.

Super Sprite Generator, version 3.5, costs just £24.95.

SUPER FORTH plus Reversi

Forth is a structured, intermediate-level programming language with a cult following. Forth is a remarkable language which combines the speed of machine-code with high-level control constructs and interactive testing facilities.

Gerry Jackson's SUPERFORTH is a complete, ultra-fast implementation of the Forth '83 standard. In addition to the standard commands SUPERFORTH includes a plethora of extra features to make the best of the QL:

- All the QL's features are supported, including sound windows, graphics, disk systems and other peripherals. Input and Output may be re-directed at will.
- Full 32 bit integer arithmetic, allowing lightning quick calculations to nine digits of precision. All floating-point arithmetic is also supported, including Logarithmic and Trigonometric functions.
- Incredible speed — much faster than any other QL Forth. A Sieve of Erastothenes (the Byte benchmark) runs in just 4 seconds in SUPERFORTH, compared with 3 minutes 30 seconds in QL SuperBASIC (or 3 minutes 10 seconds in IBM PC BASIC!).
- Multi-tasking (demo supplied) with full job control for SUPERFORTH and machine-code programs. SUPERFORTH itself runs as a task, so other programs may run at the same time.
- Built in screen-editor for Forth blocks or named files — alternatively you may use Quill to edit Forth source.

The SUPERFORTH package also includes an extremely powerful implementation of the classic boardgame REVERSI. This superb program demonstrates the speed, flexibility and expressive power of SUPERFORTH. REVERSI is written entirely in SUPERFORTH, and the well-written source-code is supplied for you to study or adapt.

REVERSI 1.4 offers nine levels of play, with near-instantaneous response on levels 1 and 2. Many options enable you to exchange sides, retract moves, set up positions, ask for hints or watch the computer 'think'. Moves can be entered by co-ordinate or simply by 'pointing' at the required position.

The latest version of REVERSI — version 1.4 — is better than ever! It is guaranteed to beat Sinclair Reversi every time, when the two are played on similar levels. It beat the Spectrum champion, MOI Othello, 10-0 in a supervised match — in fact we have yet to find any program, for any personal computer, capable of beating REVERSI on equal time — or any human capable of beating it at its top skill level. This is hardly surprising when you consider that REVERSI 1.4 uses state-of-the-art Artificial Intelligence techniques: alpha-beta tree searching with pruning and a 'killer' heuristic.

"Congratulations on an excellent program", E. Azzo Pardi, Malta.

"The best Forth program", H. Heuss, Berlin.

Digital Precision SUPERFORTH & REVERSI cost £29.95
REVERSI 1.4 is available separately, with full rules and an introduction to the strategies of the game, for £12.95.

SUPER ARCADIA

NEW!

Super Arcadia is a twin-pack of two superb machine-code arcade games.

BMX Burner is a subtle many-screen collect, detonate and dodge space arcade adventure, with sound-effects and multicolour animated sprites. The puzzles in this program have been carefully crafted to make an addictive and varied game which can be played time and time again.

Grid Racer is a grid-runner/painter game with great sound effects and scrolling windows. Grid Racer is a race against time, chasers and the dreaded Boot! One or two players; microdrive high score table.

BMX Burner and Grid Racer cost £15.95 together

DIGITAL PRECISION LTD

222 THE AVENUE, LONDON E4 9SE

Please note our new address

Please Rush me.....

All postage within the U.K. is free, but please add £1 (£2.50 for SUPERCHARGE) per program for orders from other countries, to cover airmail and packaging. Cheques from abroad should be drawn on a U.K. bank or be Eurocheques — if you are unable to do this, just add £5 to cover cheque clearing charges.

I enclose £ **SIGNATURE**

or debit my ACCESS/VISA Acc. No.

expiry date

"The quickest response I have experienced from the UK", T. Hansen, Norway.

Name .....

Address .....

.....

..... Postcode .....

BARCLAYCARD VISA **Credit Card orders: Tel: 01-527 5493**

SUPERCHARGE

Supercharge is a program that translates slow, interpreted SuperBASIC into fast, flexible 68008 machine code — totally automatically. You need no specialised knowledge at all.

Supercharge supports the entire syntax of SuperBASIC. Compiled programs run **incredibly fast**; some run over 100 times faster than in the original SuperBASIC. Microdrive loading times are accelerated by a factor of up to 30. Multitasking is fully supported, and easy to use.

★ ALL Supercharged programs multi-task — you can run any number of them on one QL, simultaneously (RAM permitting)

★ Supercharge supports full floating point arithmetic, to an accuracy of NINE digits (SuperBASIC only displays seven decimal places). Arithmetic is breathtakingly fast — integer handling is often 100 times faster than in interpreted BASIC.

★ Supercharge allows the entire syntax of QL SuperBASIC: file-handling, multi-dimensional arrays, local variables, procedures and functions (with parameters), turtle graphics, windows, both display modes, all devices (including disk drives, modems etc.), sound, graphics, colour, strings, etc., etc.

★ Supercharged programs are reliable on all versions of the QL. Most bugs and restrictions imposed by the SuperBASIC interpreter are corrected or lifted by the compiler. Say goodbye to the integer FOR bug, string and integer SELECT bugs, the CALL bug, the 'too many parameters' bug, the GOSUB in a loop bug, the RESPR bug, etc., etc.

★ Supercharge includes a sophisticated optimiser, which the user can direct to produce either especially compact or fast 68008 machine-code, on a line by line basis.

★ Supercharge is compatible with virtually all QL add-ons, including disk systems, expansion RAM, and **even** add-on commands which do not form a standard part of SuperBASIC! 'Toolkit' utilities work beautifully, so long as they don't try to modify interpreter data-structures (which obviously aren't there). Very few commands do this, and Supercharge generates clear warnings where incompatibilities might exist.

★ Supercharge issues explicit, plain-English reports and warnings, showing the exact position of mistakes. Many 'trivial' errors are automatically corrected!

★ Supercharge is fast, device-independent, concise and easy to use — it even compiled itself!

★ Supercharged programs may be interactively tested 'in slow motion' using the compatible SuperBASIC interpreter.

★ Supercharged programs are protected against unauthorised modification, as they cannot be LISTed. Compiled code loads **incredibly** fast — for instance, a 75K SuperBASIC program loads 25 times faster once compiled.

★ The 105 page Supercharge manual is comprehensive and readable, with tutorial and reference sections, examples, hints and tips, and a full index and glossary.

BASIC compiler

QL SUPERCHARGE is the most sophisticated BASIC compiler ever published. It is the result of 18 months work by a dedicated team of programmers led by Simon Goodwin, a top software designer and journalist.

The verdict from Supercharge users:

"Simple to use... an excellent product which coped completely with the vagaries of my own programming", E. Cogswell, Havant.

"Outstanding — the most important piece of QL software so far", Mike Walsh, Birmingham.

The manual is very informative and easily read... supercharge is great! Better than I ever expected", R. Schubel, New Jersey, USA.

"May I say how pleased I am with Supercharge", Richard Blake, London.

"I was impressed by the quality of the implementation and high degree of compatibility with SuperBASIC", T. Gruber, Aachen, W. Germany.

"Very high quality software... a very informative and useful manual", Michael Gottlieb, Edgware.

"Very good and fast in use. You seem to deliver what you promise, unlike other QL suppliers", R. Coughlan, Liverpool.

"Supercharge is a great improvement on SuperBASIC and has given me new faith in the QL", T. Hansen, Norway.

"I was very surprised by the professional quality — it is really excellent", F. Moya, France.

"Invaluable... I think Supercharge is an excellent product, and the documentation puts Sinclair to shame", Dr K. Williams, Putney.

"The manual is very good. It inspires confidence and has a sense of humour. Supercharge itself is great", H. Gupta, Northampton.

The manual is a model of clarity, readability and accuracy: congratulations! The car on the box should be a Rolls Royce", M. Johnson, London.

"Much more helpful than any previous manual I have ever read", Dr W. Fuggle, Birmingham.

"Easy to use — very well written", J. Hayes, Leeds.

"Very easy to use — very impressive", Dr G. Taylor, Harrow.

"Very impressed — should come as standard with the QL", A. Pritchard, Surrey.

"A credit to British enterprise", Dr Helmut Aigner, Austria.

"Excellent!" — Colin Opie, McGraw Hill; W.D. Software, Jersey; A Dedman, Ipswich; Dr Archer, Wakefield; C. Grogan, Huddersfield; G. Chew, Clwyd; K. Paul, Gerrards Cross; A.B. Steen, Eastleigh, Ingenieurburo Neitzel, Detmold, W. Germany... and many others.

The latest version of Supercharge — version 1.16 — is available as an upgrade, price £10, to users who wish to get the very most from their compiled programs.

Supercharge costs £59.95; this includes the compiler, code-generator, utility programs, add-on commands for task control and error-trapping, demonstration software and over 100 A4 pages of documentation. £5 off SUPERFORTH, £5 off SUPERSPRITE and £2 off Super Monitor + Disassembler when these programs are ordered at the same time as SUPERCHARGE.

SUPER OFFER !! SUPERCHARGE + ICE £79.95
****** SUPERCHARGE + ICE + CHOICE £89.95
******

All Digital Precision Software is available now. Software is compatible with ALL versions of the QL, memory expansion and disk interface systems.

Digital Precision software is available from TBD, Lightning, Creative Sparks, and other distributors of good software. Buyers in Central London can visit Micro-Anvika at 224 Tottenham Court Road.

Supercharge and Superforth are available on 5¼ inch 1440 sector disk at no extra charge.

DEALERS: our discounts are generous — phone us now on 01-527 5493.

PROGRAMMERS: We intend to dominate the QL software market, and we pay excellent royalties for good QL software. Send us a disk or cartridge now, for a prompt, confidential evaluation of work in progress.

Super Backgammon 3.0

Super Backgammon is an excellent machine-code program and a worthy opponent for beginners and experts alike. It has excellent graphics and obeys all the rules of Backgammon (supplied). Super Backgammon plays an aggressive, challenging and entertaining game at all of its six skill levels.

Other features include dual clocks, three playing modes, computerised dice thrower (with optional override if you're suspicious or you want to cheat!), 'Hint' option, evaluation display.

Version 3.0 is very much stronger than its predecessors, and the display has been enhanced to work on all colour or monochrome displays. The upgrade, for existing users, costs £5 upon return of the original cartridge.

"Be warned — the computer will almost certainly beat you!" QL USER.

"The attention to detail evident throughout results in a program that is very enjoyable to use", ELECTRONICS & COMPUTING

Super Backgammon costs £12.95, with full instructions and rules of Backgammon.

QL SUPER MONITOR & Disassembler is a multi-tasking program analysis tool. Test, edit or examine any machine code program with Super Monitor version 3.0 : £18.95

OPEN CHA

Sinclair QL World is pleased to receive readers' comments on any topic related to the QL. Send your letters to:
Open Channel,
Sinclair QL World,
Wells House,
80-82 Upper Street,
Islington,
LONDON N1.

Limited Resources

RE Ken Robinson's letter, *QL World*, October, 1985 — I concur with his pleas for more help for business users of the QL. We have three we are using for that purpose and while we get on well with Quill, Archive lands us in all kinds of bother.

With a copy of Century Communications QL Archive I began working through it with a view to putting media records on file — we are a public relations consultancy, — and while I can probably do what I require with several files linked, I had the idea of designing my own screen display. That was fine but I have the nasty feeling that I have too many fields — 32, in fact — and I cannot input any information.

I have tried 'sinput' followed by a list of variables but the cursor will not move after the first field information has been entered. When Enter is pressed, I get 'Error S-variable not found'.

Psion Software Support was contacted for assistance and asked particularly if 32 fields was too much. The reply was that it did not have the resources to provide much help in developing applications for customers. That is all very well but there needs to be a source of assistance so that our machines can be made to work for us.

While the CCL QL Archive is an excellent publication, I feel that the chapter on Screen Design needs expanding. Do any readers have experience in this area and if not, where do we go for help?

Keith Tearle,
Downham, Kent.

Another View

I READ with interest the letter from Ken Robinson. His narrow-minded attitude to computing is all too common. It is unlikely that most QLs are bought purely for business use. Available peripherals, software, languages and publications do not support that view. There is a place for the QL in any field, be it dedicated hacking, communication, science, education, games, business or anything else. Because of its nature it will be master in no field. Obviously, there are horses for courses.

I am a dedicated professional DP man during the working day and a dedicated hacker in my spare time. I have a plea to dedicated computer users like Robinson. Do not waste valuable mental energy criticising computer users with interests which differ from yours. Tell them what software and advice you require. Then they have a chance to provide it.

Certain parts of *QL World* are of more interest to me than others. I expect space to be freely given to any topic vaguely to do with the QL. The title implies any aspect of QL computing will be covered. So far, *QL World* is succeeding in this. Please keep it that way.

Alan Prior,
Shepperton, Middlesex.

Heated Exchange

I RECEIVED my QL in June, 1984 and immediately reported to Sinclair Research at Camberley that the power light never comes on but that I would retain the machine as otherwise it seemed usable. The computer has since been in service a little almost every day. One night I put a polythene sheet dust cover over the keyboard, as is my habit, but next morning discovered that I had forgotten to switch off the power the previous evening.

The Quill cartridge jumped out of its slot and would not stay in when driven. I had visions of having to return the machine for repair or renewal outside the 12-month guarantee period and arguing whose fault it was that the machine had over-heated.

After the machine had cooled for two hours Abacus and Archive cartridges were shown still to perform in it satisfactorily. A freshly-formatted Quill cartridge proved that apparently the only upset due to over-heating was to the warmed Wuill cartridge. It has now been re-formatted and works perfectly.

I have 34 cartridges in use and since the end of 1984 have had no trouble with any that I could not correct myself. Since then I have obtained 30 of the books published on the QL. Most of them deal with aspects covered adequately in the QL User Guide or elsewhere and are probably essential for anyone who wants to be able to use the computer for all purposes.

Should my machine ever need repair I would probably want to part-exchange it for a JM or later version. Can anyone advise me what the likely arrangements and cost would be?

P J Kemp,
Chorleywood, Herts.

Print Problems

Many thanks for an extra present which arrived on my birthday, in the shape of your October issue. David Storton's article on the Centronics GLP dot matrix printer provided the answer to an annoying problem.

I bought a QL in March from the store which provided Storton's printer and it recommended the GLP as a suitable and inexpensive accompaniment. A friend, with a great deal more experience of computers and printers told me to look at dip switch settings and print quality modes and I have since learned to adjust them so that I can call up near letter quality with a simple code mark at the start of a document.

My nagging problem was the wish to print from Easel. First attempts to produce faithful reproductions of the graphics, in near letter quality finish, but with a space between each line of printing which made it look as if the pictures had been put through an egg slicer.

Altering the line feed and carriage return dip switches made no difference and I found that I was unable to make any changes in the Easel printer data. Although Version 2.00 offers the option to install a new printer driver, the program would not accept any new instructions, even when I attempted to install from Quill, in Microdrive 1, into Easel, in Microdrive 2.

The QL expert at Gultronics was helpful but was unable to offer a solution, although he was still trying when I last consulted him. So I called the Psion Support Service, which seems to be remarkably under-staffed – or over-worked.

When finally I made contact, I was told my problem had been solved and the solution would be sent by post. I received a letter explaining that if my printer was set up to give a line feed at the end of each line, and the end-of-line code in the printer driver was CR + LF, my printing would be double-spaced, a problem which I had solved very early on in setting up Quill.

I telephoned Psion again. On that occasion the staff were even busier and failed even to enquire which printer I was using. They convinced me, however, that I would be unable to install a new printer driver into Easel, despite the apparent option in the menu, and that my printer was unlikely to be able to print graphs if I had followed the previous instructions without any improvement.

I had just about capitulated when your article appeared. It made clear that I should be able to print reasonable graphs on a GLP with a little re-setting of the dip switches, so I took out the manual once again and went through each item in turn.

Eventually I found the extra piece of paper which went with the new EPROM and a switch which changed the line-spacing from 1/6in. to 1/8in. Not believing that difference could be sufficient to bridge the gap in my graphs, I changed the switch and immediately produced a very acceptable pie diagram with no difficulty.

I can now print graphs to my heart's content with the simple re-setting of a single switch and I fully agree with Storton that the GLP lives up to its name as a Great Little Printer.

Now for a query. Occasionally I have the opportunity to use a Macintosh and would be very interested in a WIMP system for the QL. A September news item promised a version of GEM from Digital Research which has not yet appeared but, in the meantime, Eidersoft has produced ICE and your latest issue contained an advertisement for a German system which includes a mouse. Is there any possibility of a review of any or all of these in the near future? Is it necessary to fit a memory expansion board to be able to use such a system effectively?

I much enjoy your magazine and learn a great deal from it. I trust the incorporation of QLUB will not interfere with the important independent nature of *QL World*.

Naomi Chowcat,
Finchley, London.

Editor's reply: We are pleased to hear how much our review was able to help and we should be able to provide you with a further guidance as to WIMP – Windows, Icon, Mouse and Pointer systems – environments for the QL. As you point out, the planned Digital Research/Sinclair deal

N N E L

to take GEM to the QL never materialised, despite the interest of both parties in developing such a system. The alternatives, including the ICE system from Eidersoft, will be considered in a comparative review.

To give you more immediate help, however, such systems generally require use either of a ROM in which the WIMP software can reside and used on the Apple Macintosh with its 64K internal ROM and on the ICE/Eidersoft system for QL with a 32K external ROM – or by setting aside part of the system RAM, as GEM and Microsoft Windows do on the IBM PC.

Even with the WIMP software in ROM, you may still find that you may need extra RAM to use it properly. The ICE system, for example, allows a level of multi-tasking – running several programs at once without having to re-load them from Microdrives each time – through the use of RAM-discs, which set aside areas of QL memory as imaginary drives.

The crux of the problem is that a WIMP system requires inputs from places other than the keyboard – i.e., the mouse – and has to generate high-resolution graphics instead of only text, and all that eats memory. The forthcoming comparative look at QL WIMP systems should settle the question for you fully but we hope this has given you food for thought.

Short And Sweet

I've written a semi-illiterate program to use the Oberon Omni-Reader (See 'The Progs') optical character reader with the QL. It works well — although I have many reservations about this little *Sunday Times* recommended baby, including the fact that it costs £450.

As far as I am concerned, the QL, Brother HR5 and Omni-Reader were made for each other.

John Thomson,
Penarth, Cardiff.

Competition Entry

The following was received in the QL World *recent 'Why do I need a disc drive' essay competition. We would like to share it with you:*

Me and my friend are working in the Institute of Computer Science of Polish Academy of Sciences. We have been using our QLs for word processing small reports and articles and exercising with Assembler, Forth and BCPL compiler.

We have more ambitious plans about our QLs. We begin to work on book of about 300 pages devoted to the Motorola 68000 family and its assembly language. It will be the first publication about this processor in Poland. All examples are written in Metacomco Assembler and run on a QL. We wonder if our Microdrive cartridges could cope with such amount of data — we cannot spare too many cartridges for back-ups.

The second serious application in which floppy disc drives we consider essential is connected with our professional activity. The domain of our interest is architecture of distributed systems in conjunction with fault-tolerance. As our Master Thesis we have written a simulator for evaluation of performance and reliability of distributed systems. Now we are working on implementation of this simulator on a QL. We estimate that simulator with experimental data will take 1.5-2MB memory space. As you can see the need for fast, reliable mass storage is enormous.

We consider a simulator as a heart of more complex system for investigation of novel computer architectures. In our opinion a QL with floppies and extended memory is very well-suited for such scientifical research. This work will be the part of our research towards a PhD degree.

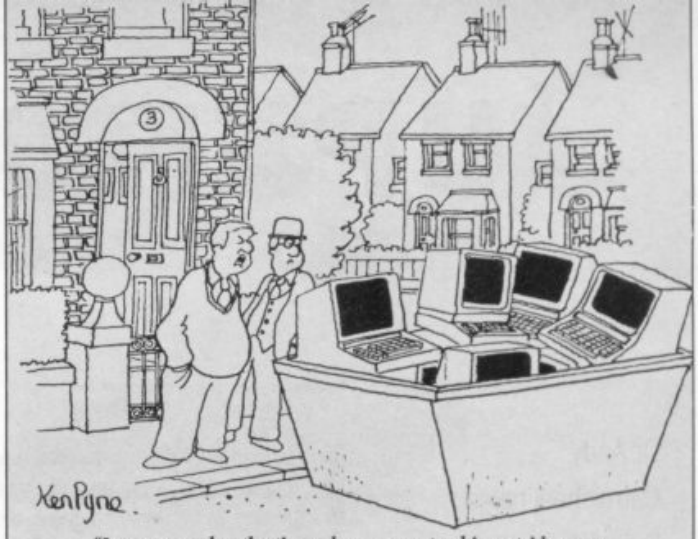
Rafel Gutowski,
Miroslaw Szturmowicz,
Powsinska,
Poland.

The Charitable QL

Hounslow Branch of the Multiple Sclerosis Society now has its members/helpers address list of some 500 people on QL Archive. This address list is used by the volunteer drivers, welfare visitors, newsletter secretary and fund raisers. Previously hand-typed and re-issued only occasionally, it soon became difficult to read as hand-written amendments were added quickly.

Each year, the branch sells Christmas cards. Last year's turnover was £1,500, providing a profit of around £600. QL Archive now handles this, producing invoices, recording orders, sales and donations and updating stock.

Fund raising not yet computerised is Flag Day — Quill, Abacus and Archive required — and the sponsored walks and swims. Once a cheap source of thin address labels is found the 500 monthly envelope-addressing problem would be solved.



"I can remember the time when you put a skip outside your house and it would get filled with old television sets!"

The main problem with the current system is the unreliable Microdrive and its slow access time. Continual use of the Archive search command frequently jams the cartridge and the subsequent recovery procedure is time-consuming. Loss of data is a very real threat to the work being done.

There is a need for the addition of disc drives to the system plus perhaps extra memory. Once installed and the system proved, a service could then be offered to neighbouring branches at materials cost only.

I would add that the Branch does not own the QL but 90 percent of computer time is used for society work.

C J Hill,
Twickenham.

MIDI Malaise

Can you inform me if there is a MIDI – Musical Instrument Digital Interface – software and hardware package available for the QL? Any manufacturers, names, addresses, performance details and prices would be appreciated.

I D Pucknell,
Addingham, W Yorks.

Editor's reply: So far as we know, there are no MIDI interfaces or software packages available for the QL. If any readers know of any, please write and inform us.

Accountant Wanted

SINCE DELIVERY of my computer in June, 1984, upgraded by Sinclair since then, I have added a dual drive floppy disc CST system and a memory upgrade to 512K by Silicon Express but cannot get this expanded system to work with QL Integrated Accounts.

I telephoned Sagesoft with my problem and it transpired that the memory required by my upgraded computer will not allow the programs to be loaded.

I telephoned Silicon Express and was told someone would talk to Sagesoft to see what the trouble was. They said that I could not talk to anyone at that time competent to discuss the problem. I have heard nothing since.

As I am using my QL extensively for business purposes, it is essential that I have a first-class accounting package which can be run confidently using the advantages of disc drives and the powerful memory.

Does anyone know of an accounting package which will run on my computer? I do not mind paying a sensible fee for assurance of reliability.

A Viney,
Yatton, Avon.

Whose Idea?

I have been a member of QLUB for some time and that is how I receive *QL World*.

In my opinion, it is the best independent magazine for the QL. First, I must congratulate you in having the idea of the Microdrive Exchange Plan. I cannot wait to order my copy of Rob Sherrat's FCOPY fast copy routine. Anyone with common sense will see from the listing that it is a very good program.

I have two questions. I have used the QL for a long time. When I was programming it I noticed that I had never used the ALTER key. In what is it used?

I write most of my programs in Basic and would like to convert them into machine code Is there a program to do it?

Rodgrigo de Andrade,
London NW1.

Editor's reply: The key denoted at 'ALT' is 'ALTERNATE', meaning that it can be used to generate alternate values for keypresses, in much the same way as the CONTROL and SHIFT keys. In programming, it is often used to generate commands – i.e., ALT in combination with the 'L' key might be used for loading a program from Microdrive.

As to converting Basic programs, there is no easy way to do it directly. It would be more worthwhile for you to buy a good monitor and assembler for the QL and learn that thoroughly, rather than go through the tortuous task of converting Basic software.

SUPERCHARGING

REVIEW

Dr Andy Carmichael takes Digital Precision's new compiler to task and realises its true potential.

It was in the October issue of *QL User* that we gave the news of the imminent launch of the Digital Precision SuperBasic compiler, with the preview article by the product designer Simon Goodwin. Now the program is available we have the opportunity to gauge whether it lives up to early expectations.

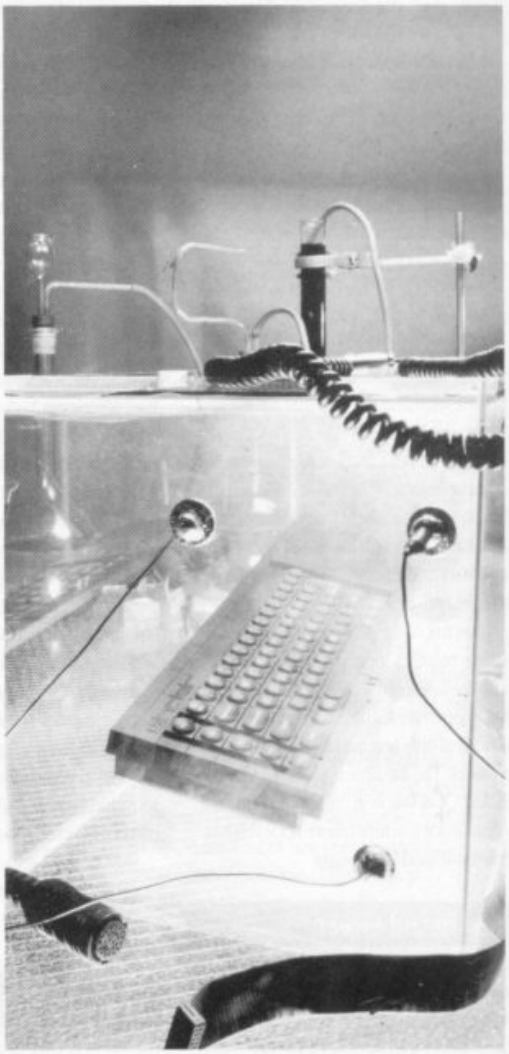
The claims are impressive — execution of programs speeded, in some cases by several hundred times; faster loading; multi-tasking achieved simply; compatibility with the entire syntax of SuperBasic, including add-on commands, for example from QL Toolkits, excluding listing commands such as EDIT, LIST, DLINE and the like; plus compatibility with all versions of the ROM and hardware add-ons. How is the final product in practice?

Before analysing the performance of Supercharge, let us deal briefly with what the purpose and advantages of a compiler can be. When you run an ordinary SuperBasic program on the QL, the computer must carry-out two functions. First, it has to understand the language in which the program is written and translate it into its native machine code; only then can it perform its second and useful function, carrying-out the instructions contained in the program.

What is more, the translation process is carried-out continually, even if it executes the same line again and again, since the interpreter — the software responsible for running the program — has no mechanism for 'remembering' the machine code it has just created. That is why Basic programs run so much slower than their machine code equivalents. Basic programs, however, have the great advantage that the programs are much easier for humans to write and understand and bugs are easier to iron out, since the program stops with a message — it is a useful one — and the program can be edited immediately.

So what about compilers? Like interpreters, they translate computer languages, which are easier for humans to understand, into machine code which the computer understands. Unlike interpreters, they do it before the program runs, so the computer has to look only at the coded instructions rather than having to translate the program at the same time. That gives them the best of both worlds — understandable programs, depending on who wrote them, and fast execution. Changing the program may take a little longer than with an interpreted program, however, as it has to be compiled again after every change.

The QL is particularly well-endowed with compilers for all kinds of computer languages. Pascal, Forth, BCPL, C and Fortran are among the most popular computer languages in use and all have at least one



compiler available for the QL. So the first question to ask is whether we need another for SuperBasic, especially as SuperBasic is available only on the QL, unlike C, Pascal and so on, so we could never carry compiled SuperBasic programs straight on to other micros. The answer is that many people will be interested in this SuperBasic compiler for at least three reasons:

- There is no need to learn another language if they are already familiar with Basic.
- Existing programs may be able to be compiled with only minimal changes. You probably will need to make some changes but we will deal with that later.
- Developing the programs is easier. The standard interpreter may be used initially to get the program correct, then the compiler may be used to make them fast.

To be useful, the compiler must cater for those requirements by achieving the maximum possible compatibility with SuperBasic as interpreted by the QL, while also giving us fast, efficient and compact machine code, good error messages when it is asked to compile a program which does not make sense, and good documentation which helps us to get down to compiling programs straightaway, and also helps with complex problems which may occur later. So we do not ask for much for our £60.

Let us now look at how Supercharge fares against those criteria. My first impressions of the compiler were favourable. It has an impressive, well-presented manual, it loaded without difficulty, gave a clear indication of the inputs required and I managed my first compilation with the minimum of fuss. Even though it was a compilation of the supplied demonstration program, I was very pleased.

The compiler is delivered on Microdrive cartridge or CST diskette and can be backed-up as many times as you like on to any media you have attached to your QL. The reason there is nothing apparently to prevent illegal copying of the software is that it has an unusual anti-piracy system, a Lenslok. It is a plastic optical device which is placed against the monitor or TV screen when the compiler has finished loading. It allows the apparently random set of black and white dots which appear on the screen to be unscrambled into two characters, which must be typed-in correctly before the compiler will run. If you get them wrong two different characters appear through the device for you to try again.

If you fail on the third attempt, the program assumes you do not have the optical key and clears the memory. That is annoying if you have a squint, find it difficult to distinguish between an upper or lower case "p", or forgot to save your Basic program. Once you are used to the device it adds only about 30 seconds to the loading time but it must be done for each and every compilation, so it can be slightly wearisome. Its advantage, of course is that you can make genuine back-ups of the software and the plastic lens is more robust than the master cartridge which other software packages require.

Once loaded, the program asks for a filename for the compiled code, whether you require a listing of the program and where it is to be sent — e.g., the screen, a file or the printer. The screen is the default for the listing and probably the fastest option, unless you have a disc system or choose to have no listing at all, but only six lines are used for that as the rest is used by the compiler, economising on memory by using the screen memory. As a consequence it is easy to miss an error message as they fly through the window rather quickly. If that worries you, you can always send the listing to a Microdrive file and look at it later at your leisure.

There are four phases to the compilation. The first pass through the program extracts Data statements and identifiers, the second pass passes the program in detail, reports any errors found and generates an intermediate code. The intermediate code is specific to the compiler rather than being assembly code or another recognised language. During the third and fourth passes, provided there have been no errors during the second phase, the machine code is generated and a relocatable executable task is created. In other words, the program can be run using the EXEC_W command, or if more than one is to run simultaneously, the EXEC command. The compiler makes multi-tasking a usable feature, rather than the specialised domain of a few dedicated hackers.

Within a very short time I had multiple copies of the compiled demonstration program running simultaneously, which was most encouraging. This program also showed the impressive increase in speed achieved by number-crunching programs.

Before venturing further with the compiler, a more

The increase in speed of compiled code was found to be less impressive than the advertised figure, due mainly to the external memory expansion fitted to the QL and used for the Digital Precision results. Our figures were obtained on an unexpanded QL with JM ROM.

Benchmark Test No.	SuperBasic timing	Supercharge timing	Speed-up factor*	Quoted Speed-Up factor**
1. (floating)	2.1	0.55	4	8
1. (integer)	6.5	0.52	13	32
2. (floating)	5.6	0.74	7	22
2. (integer)	6.3	0.52	12	51
3. (floating)	9.3	2.04	5	9
3. (integer)	11.4	1.04	11	33
4. (floating)	9.3	1.82	5	11
4. (integer)	10.5	0.98	11	36
5. (floating)	11.8	2.06	6	13
5. (integer)	13.1	1.21	11	39
6. (floating)	24.5	5.47	4	10
6. (integer)	47.5	3.17	15	39
7. (floating)	42.7	7.34	6	15
7. (integer)	64.7	4.27	15	58
8. (floating)	20.9	10.72	2	3
8. (integer)	N/A	N/A	N/A	N/A

*UNEXPANDED QL **QL WITH EXP

than cursory glance at the manual is needed. That can be the worst part of many software packages but the Supercharge manual manages somehow to be both lucid and concise — even occasionally amusing. It is of some 100 pages of typed A4, including a very useful index, a comprehensive glossary — there is even an entry for the C5, though not a definition of one — with a few pages occupied by publicity about the software house and its products.

In the main body of the manual there is a rapid introduction so that you can start compiling programs immediately, followed by more detailed information about what the compiler does and how to use it. There are explanations of error messages and warnings, details of how to make use of multi-tasking, definition of the extensions to SuperBasic which are supplied, and discussion of the compatibility of the compiler with the interpreter.

In addition, my copy was supplied with seven additional pages of miscellaneous and important information in a Quill file on the Microdrive cartridge. No doubt that eventually will be incorporated where it should be, in the printed manual. There is a fair amount of information to digest among all those pages and unfortunately most of it needs to be understood to make full use of the compiler. At least there is an excellent index, a sad omission from the QL User Guide.

The manual is supplied as loose leaves in a box rather than in a folder but it is ready-punched so if you have not already filled your QL User Guide with other information it fits neatly into the central section. I would have preferred a separate binding.

The demonstration program, of course, was scarcely a true test for how easy it is to use the compiler. The next problem was to make one of my programs compile. That is where the compatibility with the interpreter is really put to the test.

Any program Supercharge compiles correctly will almost certainly work with the interpreter. There are only a few exceptions, such as the bugs in the interpreter which have been corrected on the compiler. It is not true, however, that the compiler is equally at home with any program with which the interpreter copes. The compiler is much more fussy. No more "END DEFine" statements used instead of "RETurn", for example, unless it is the only one and at the end of the procedure, or mixing the nesting of loops or "SELect" statements. Further, errors in your program you have not discovered, as the interpreter has never reached the statement, may be thrown out by the compiler before you start.

The first of my programs I compiled was a *Towers of Hanoi* program, published in *QL User*, February, 1985. With a few minor adjustments — moving a DIM statement and then changing the code to initialise the arrays again — I was able to compile it. It still would not run, however, as it ran out of data space after a very short time, which is a common problem, since the default amount of memory allocated to tasks is just 2K. Fortunately a program is supplied with the compiler package which adjusts the data area of programs and so it is a simple task to correct it.

The compiled program then worked well, with no complaints about the recursion in the program, and noticeably faster than the SuperBasic equivalent. The increase in speed was only a modest 50 percent, however, probably because the majority of the time is spent drawing on the screen with the BLOCK command. That would occur at similar speeds in both the interpreted and compiled versions.

It is one thing adjusting your programs to go through the compiler but, as I discovered to my cost, another to change other people's code, particularly when it resembles knitted spagetti. Every program I compiled needed some adjustments and about half of them needed substantial changes, which in the end I decided to leave to another occasion. Those I did compile successfully work well and substantially faster.

The compiler must have some differences from the interpreter because of the different way they work and so it is unfortunately the case that programs written for the interpreter usually will need to be changed. None of the areas of incompatibility is unjustified and if you are writing a program from scratch which you know you want to compile, it is not too difficult to avoid the differences.

The main areas where the compiler differs in its understanding of SuperBasic from the interpreter are arithmetic range and accuracy; arrays and strings; nesting of structures; parameters passed by reference; bugs fixed.

The arithmetic range and accuracy of the compiler has been improved compared to the interpreter, which is good news for financial programmers who expect sums of more than £1 million to be handled exactly and is especially handy if you are working in lire or yen. It is a pity the interpreter does not do the same and that is a definite plus for the compiler.

Supercharge is a little more restrictive, however, in its handling of arrays. Array 'slicing' — e.g., ARR(4 to 7) — is supported only for the last dimension of character arrays (strings) and the only arrays allowed to be passed as parameters to procedures or functions are one-dimensional strings. The reason is that since multi-tasking jobs must occupy a static amount of memory, the compiler allocates memory in a different

SUPERCHARGING SUPERBASIC

manner from the interpreter.

The restriction on illegal nesting of structures — e.g., specifying the end of an outer loop before the end of a loop which is inside it — may be inconvenient if you write your programs in a very convoluted way. The compiler will insist that the loops occur in a logical fashion and that should improve the reliability and readability of programs, even if it means a few changes to the code.

Parameters are always passed 'by value' by the compiler, whereas the interpreter sometimes passes parameters 'by reference'. To make you aware of the problem, a warning is given by the compiler at procedure calls which might have been expecting a value to have been returned. In addition to those areas, a number of other minor differences are all well-documented in the manual, and a few bugs in the interpreter which the compiler writers decided to fix rather than implement for the sake of compatibility.

The compiler reports errors which it detects during compilation and the code of the program reports errors which occur during execution. Since they are for the most part clear and meaningful, the debugging of programs is made much simpler. There is an explanation of each error message in the manual if it is not immediately clear from the context what went wrong. The less than helpful message "COMPILATION ABORTED" was obtained only once and after a little head-scratching I discovered that was because there was no room left on the Microdrive on which I was attempting to store the program. In fact, the current version of the compiler, version 1.16, does give an explicit message in this situation.

One of the major advantages of a compiler is the speed of loading the program, since it does not need to be analysed as it loads. Loading of the compiler, which is a large Supercharged program, took between 10 and 25 seconds from Microdrive, much faster than large SuperBasic programs which can often take several minutes to load. The compilation time obviously depends on length of program but for short programs of 30-40 lines I found that it took between 30 seconds and one minute, including writing to Microdrive. With the additional time required for using the Lenslok and typing-in file names, short programs could be compiled within three minutes.

The increase in execution speed achieved by compilation will vary a great deal, depending on the size, purpose and style of the program. Large number-crunchers using integer arithmetic have good speed-up factors, whereas I/O-bound programs may even run at the same speed. To give some basis for comparison, standard benchmarks are needed, even though they may not show the best cases of speed increase.

The standard *PCW* benchmarks have been used in the advertising and the same figures would have been quoted here but for the fact that I obtained different results when I tried to repeat them. Reading the small print in the manual revealed that the timings were obtained on QLs with early versions of the ROM (AH, JS, MG) in which the SuperBasic is somewhat slower than the JM ROM for example. More significantly, the computers used in the benchtests were fitted with a memory expansion card which, while not affecting the SuperBasic timings, speed up the compiled code considerably.

The figures quoted in the table were obtained on an unexpanded QL (build-number D05 with JM ROM) and used the QL's internal clock to time 100 iterations of the benchmark programs. Version 1.16 of the compiler was used, as was the feature for optimising the speed of the compiled code (so that the compiler produces in-line rather than threaded code).

Benchmarks are only of limited value in indicating how fast a real program will run and, whatever the speed-up factor on these very short programs for your particular hardware/ROM configuration, the indications are that you are likely to get even better results for larger programs. The great advantage of this compiler, however, is seen not in whether the code is 10, 50 or even 100 times faster but in that for this substantial increase in speed, the language used is the same as that used by the QL's own interpreter.

The arrival of the product is a significant event for the QL and should help many more people produce quality programs with a fraction of the effort machine code programming requires, and many times faster than interpreted Basic. I found the compiler easy to use and generally helpful with its error messages. The compiler is not completely compatible with the interpreter — no compiler could be — but it is close enough to make the development of programs much easier than with other languages which have no built-in interpreter.

If you are developing programs to run on other machines, a C or Pascal compiler would probably make more sense, but if you want a compiler only for the QL, I have no hesitation in recommending this one.

Supplier: Digital Precision
Cost: £59.95
Site licence: £250 — for software houses re-selling compiled code.

Exclusive Datalink QL Products

Datalink SPI – QL £19.95
Serial to Parallel Printer Interface
Plug-In-And-Go design, compatible with
any Centronics Parallel printers.

Datalink RS-232 QL Printer Lead £6.95
QL to 25 Way D Plug printer lead,
2 metre cable.

Datalink QL Joystick £9.95
Quickshot II Style Joystick, 3 fire buttons
Plug direct to CTL 1 or 2.

Datalink QL Joystick Adaptor £4.50
Convert any Atari/Commodore/Spectrum
joystick to use with QL.
Plug direct to CTL 1 or 2 via adaptor.

Prices include Postage, Packing & VAT
12 months warranty and 14 days money back option with all Datalink Products.

Dealer, Distributor & Export Enquiries welcome.

Datalink U K
99 Constitution Street
Leith
Edinburgh, EH6 7AE

Payment by cheque or
Visa Card Welcome
Telephone for immediate
dispatch 031-553 6161

All trademarks acknowledged

WDSoftware

FOR THE QL:-

JOSS **base £13**

Forget that tedious, time-consuming syntax! Just move the cursor and press SPACE for all your file commands. Cursor keys or your joystick allow you to access microdrives (up to 8) and floppy discs (as many as your interface allows) with up to 150 files on each! Scroll and print directories, COPY, DELETE or PRINT any file, select TV or Monitor mode before LOADing or RUNning any program. You only use the keyboard to set the DATE or label a device when FORMATting. Easy to use with Psion and other software. No silly icons to learn – JOSS will TELL you what it's going to do! Programmer's toolkit and mass copying/printing utilities also supplied. Specify microdrive-only, Microperipheral or CST-compatible disc versions.

RefQL7 **base £7**

1300 useful QL references with ARCHIVE 2 search/print program. Too long for just one cartridge, so if you have RefQL5 just pay £2 and extra media cost to update.

Mdv Extension Cable **£5.50**

Eight inches long, allows addition of extra microdrives to your QL. Twist it to put their slots facing you.

FOR THE QL/SPECTRUM/BBC/ELECTRON:-

WD Morse Tutor **base £4**

Written to teach amateurs, now used by professionals too! Absolute beginner, or stretching your speed to 18 wpm, you won't find anything with more helpful features. What else can offer 100 random sentences as well as all the basics! Disc version unsuitable for BBC B+.

FOR EXPORT:-

Hardware & Software from many sources. Ask for details.

ORDERING – ADD COST OF MEDIUM. POSTAGE £1 OUTSIDE EUROPE.

Mdv or 5.25" floppy = £2 3.5" floppy = £4

Pay base only for cassettes. Specify disc size, tracks, system.

PAYMENT – By ACCESS/Eurocard/MasterCard or STERLING (UK bank cheques, Eurocheques, drafts or International GIRO) To:-

WDSoftware(QU), Hilltop, St Mary, Jersey, C.I. Tel: (0534) 81392

PUT TALENT ON YOUR QL

CARTRIDGE DOCTOR

Your data is worth a lot to you. Source programs, text, scientific information, records, all represent hours of time and effort. The CARTRIDGE DOCTOR will, in most cases enable you to:

- Recover files from damaged or suspect cartridges, even files inaccessible to BASIC
- Recover newly-deleted files
- Recover files with lost or damaged blocks (in BASIC, QUILL etc.) using the FILE PATCH UTILITY.

The CARTRIDGE DOCTOR is easy to use. It incorporates a powerful rule-based expert system which can make sensible decisions and automate much of the labour needed to recover lost data. An extensive set of tools is also provided for the informed user. Full instructions are included.

Available from selected branches of W H Smiths and Boots or direct from TALENT.

£14.95 (Please add 50p postage and packing)

THE LOST KINGDOM OF ZKUL WEST (text adventures)

Explore the ancient dwelling place of Dwarves — or pit your wits and reflexes against a gang of robbers in a Western ghost town. These challenging text adventures are stimulating, addictive — and highly enjoyable.

"WEST will please not only adventure addicts but anyone who ever frowned into a puzzle of any sort" QL USER

The quality of the game is superb — this is the standard the others have to beat." MICRO ADVENTURER on ZKUL

Available from selected branches of W H Smiths or direct from TALENT

£14.95 each (Please add 50p postage and packing)

COSMOS by G F Cornwell

Identify over 500 stars and planets with this impressive astronomy program. COSMOS displays your choice of star maps for any date and time and for any part of the world.

View the solar system, the moons of Jupiter, the rings of Saturn — even Halley's Comet. Call up comprehensive information on any visible object in the sky. Menu-driven, easy to use — a fascinating addition to your QL software library.

Available direct from TALENT

(Please add 50p postage and packing)

£14.95

TALENT COMPUTER SYSTEMS

CURRAN BUILDING, 101 ST JAMES ROAD, GLASGOW G4 0NS

24 Hour Credit Card Hot-Line 041-552 2128

SOFTWARE FROM SCOTLAND

★COMPETITION★

Win a QL printer with Sinclair QL World

As you may have noticed, our competition scheduling was recently thrown into slight disarray by the merging of *QL World* and *QL User*, but we still want to give you the chance to win that QL printer we showed you in *QL World* Issue 5.

The printer is a re-designed Seikosha printer with special Sinclair software built-in so that it can handle the full Sinclair character set. It includes a serial interface and plugs straight into the QL using a standard cable. Tractor feed or friction feed can be used to pass paper through the printer.

Just to recap on how you can win the printer, we asked you to answer 10 skill-testing questions, the first three of which were presented in the December issue of *QL World*. As you have had to wait longer than expected, we repeat the first three questions we set in the December issue and give you the other seven. The winner will be drawn from the correct entries. Here are the 10 questions you must answer (postcards only please):



1. What is the name of the main character in the *QL Caverns* arcade game?
2. The Psion QL chess program won a major computer chess championship in 1985. Which young Russian player won the recent world chess tournament?
3. How many computers were launched by Sinclair Research prior to the QL?
4. How big is the screen on the Sinclair Research flat-screen pocket television set?
5. The storage capacity of the QL Microdrive storage system is about 100K. How much store is there on the Spectrum Microdrive cartridges?
   a. about the same. b. 50K c. 200K d. 1MB
6. What was the Timex/Sinclair version of the Sinclair Spectrum called in the U.S?
7. Who makes the official badged disc drives for the QL?
8. QL Fictionary is:
   a. A QL word game.
   b. An authoring system for writers.
   c. A new adventure game.
9. Name the two companies responsible for the CPUs in the QL and Spectrum respectively.
10. Prestel and Ceefax are not part of the same service. True or false?

QL & SQUIGGLE PART

100,000 Users of APL rave about it

They say *"It's the fastest way to develop applications"*

They say *"Because it's an interpreter it's flexible & quick to change"*

They say *"You never come up against limitations"*

They say *"It frees you from Basic Boredom"*

They say *"Anybody can use it – as easily as 1,2,3"*

They're Right!

And now YOU can use it too —
APL is now available with simple key words. QL/APL — the system with the 100,000 user heritage.

Order now by Credit Card and save your QL for only

£99.95

Ring 01-622 0395

MICRO APL

To: MicroAPL Ltd, Unit 1F, Nine Elms Industrial Estate, 87 Kirtling Street, London SW8 5BP.

- ☐ Please send me more details about the power of QL/APL.
- ☐ Please send me _____ copies of QL/APL at £99.95 plus £1.95 p&p
- ☐ I enclose cheque/P.O. made payable to MicroAPL Ltd.
- ☐ Please charge my Visa/Access card number _____
- Card expiry date _____

Name _____

Address _____

_____

_____

Tel No. _____ QL/3/86

QL and Sinclair are trademarks of Sinclair Research Ltd.

(Prices include VAT. Please allow 28 days for delivery. For credit card telephone orders, phone 01-622 0395)

THE FORTH DIMENSION

FEATURE

Forth is a computer language with the capacity for infinite extension — James Lucy looks at some of its lesser known features.

Once you have mastered SuperBasic, what next? Many people turn to Assembler but there are a number of other languages worthy of consideration, too. The QL is blessed with a wide range of them, some of which are full, standard implementations, in contrast to those found on many other home micros.

Why bother with another language? You may need more speed than an interpreted Basic can provide, or you may wish to develop portable applications which will run without too much modification on other machines. You might just enjoy the challenge of learning a new language.

So the next question is which language? The decision may already have been made for you by circumstances but if not there are some points to consider. There are no languages available on ROM for the QL so all must be loaded from disc or Microdrive into RAM. Most alternative languages are compiled, which usually means a much longer process to write and run the application than with SuperBasic. The compiled language generally is not interactive, which implies that errors of syntax are discovered inconveniently later rather than sooner and much Microdrive whirring is necessary to correct them.

What is needed is a language which combines the interactive characteristics of a typical interpreted language like Basic with the speed of a compiled language like C. Such a language is Forth.

Forth is fast, compact, structured, portable and may be written speedily. On the other hand, it is somewhat enigmatic, can be difficult to read, and requires its users to learn a good deal about it before reaching the 'getting started' level. The merits of Forth, however, are such that few programmers who achieve some competence with it ever abandon it and it is certainly true that Forth provides the medium for a good programmer to express his talent. Conversely, the poor programmer has plenty of rope with which to hang himself.

Forth is written in a rather unusual way. There is no program as such, but a series of definitions, many of which will use other user definitions in their construction. A simple definition — a Forth 'word' — will be described to do a job for which Forth is rather unsuited, causing delays.

Suppose you wished to produce a delay in a SuperBasic program but did not want to use PAUSE n, because that can be cut short by hitting a key. You might define a procedure:

```
1000  DEFine PROCedure delay
1010  LOCal a
1020  FOR a=1 to 10000
1030  END FOR a
1040  END DEFine
```

Whenever you require a delay you mention the procedure name 'delay' and the empty loop obliges with a hiatus of about 20 seconds. To achieve the same effect in Forth you might try a similar empty loop.

The following is the equivalent of the foregoing SuperBasic procedure:

```
: DELAY 10000 0 DO LOOP ;
```

That would also be called by typing 'DELAY' but, due to the speed of Forth, would execute 10,000 empty loops in rather less than half a second, or about 60 times faster than SuperBasic. If you insisted on a delay, you could put DELAY inside a loop:

```
: RATHER-LONGER 60 0 DO DELAY LOOP ;
```

By doing 60-odd iterations of 10,000 empty loops you would at last succeed in occupying about 20 seconds of Forth time.

In the Forth definition of DELAY the colon (:) and semi-colon (;) correspond to the SuperBasic DEFine PROCedure and END DEFine. The 10,000 is the limit of the loop and the 0, in Forth terminology, is the index. The Forth words 'DO' and 'LOOP' surround the action to be taken within the loop as in the SuperBasic FOR a=n TO m: action : END FOR a.

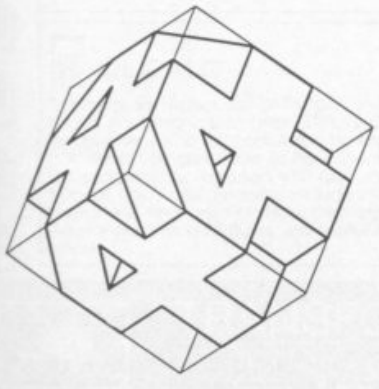
The definition of RATHER-LONGER shows how a Forth word which has already been defined — DELAY — can be used in another definition. That is analogous to the practice in SuperBasic of building a program from procedures until the program consists of just one command, the call to the first procedure.

A peculiarity of Forth, and one with which it is sometimes difficult to come to terms, is the use of the 'stack' and, to compound the confusion, Reverse Polish notation. The stack is an area of memory which Forth reserves for its working storage. When a number is put on the stack, Forth increments its pointer to the top of the stack, so that the next number goes above the last.

The pointer is decremented when a number is removed and many Forth words take the top one or two stack numbers as their operands. In fact, many Forths use an upside-down stack. To take an example, suppose we wish to add 2 and 3 and display the result. SuperBasic would use 'PRINT 2+3' but the equivalent Forth reads '2 3 + . '.

Forth puts 2 on the stack, piles 3 on top of it and then uses its + operator to add the top and second on the stack, leaving the result of the addition on the top. The Forth word '.' causes the top of the stack to be printed-out. The convention of placing the operator (+) after the operands (2 3) is Reverse Polish or 'postfix' notation and will be very familiar to those pioneers who bought Sinclair Scientific calculators.

Forth is at its best dealing with integer numbers, although floating-point packages exist. Because it can deal with numbers stored as long-words (32 bits), complete accuracy can be maintained with very large numbers, so the lack of floating point is rarely a problem. The onus is on the programmer not to exceed the numeric limits of Forth, by careful consideration of ▶



the size of numbers at intermediate stages in the calculation.

That thoughtfulness is typical of Forth as a whole. Whereas Basic allows the greatest possible freedom in arriving at a solution, sacrificing efficiency for ease of use, the Forth program should express the precise nature of the problem and offer a very direct route to the answer.

The efforts of the programmer should result in a fast, accurate and exceptionally compact application. The QL owner is particularly fortunate, as the 68008 microprocessor has the instruction set and multiplicity of registers to allow Forth to run to its full potential. The moral is simple — if you want to move on from SuperBasic, give Forth a chance.

Having looked at the advantages offered by Forth as a second, supplementary language for your QL, we look at the two leading contenders in the QL Forth market.

The Computer One Forth has been on the market for most of the time the QL has been available. It was written for C-One by Forth specialist Microprocessor Engineering and apparently is a re-write of a VAX minicomputer implementation. SuperForth from Digital Precision was written by Gerry Jackson, an Open University lecturer.

Included in the SuperForth package is a full-scale Reversi game written in Forth, also available separately from DP. Both programs offer the latest Forth standard, Forth-83, and have additional features for access to Qdos, graphics, floating point arithmetic and sundry other features.

Multi-tasking of Forth programs is possible on both systems and programs which stand alone without the visible part of the Forth system present can be generated. C-One allows such programs to be sold without royalty but reasonably requests inclusion of an acknowledgment and copyright notice.

Speed is one of the reasons to use Forth in the first place, so it is naturally relevant in comparing the two implementations. In practice there seemed little to choose between them. The standard Sieve of Eratosthenes benchmark was completed slightly faster by DP, whereas an empty DO . . . LOOP was faster on C-One. It is interesting to note that both programs were faster on the Sieve than the very expensive polyForth running on a similarly expensive IBM PC and the conclusion can be drawn that they are both fast Forths.

The link to the QL operating system and all its facilities must have caused the respective programmers considerable heartache. Both programs offer access to most of Qdos, although marginally I preferred the C-One syntax, and Computer One has the great advantage of an Assembler vocabulary which allows the user to implement any further links he may require, assuming he is familiar with the Qdos traps; in case you do not know, they are not just pitfalls for the unwary.

An area of great contrast is in packaging and documentation; the latter in particular can have a profound effect on the usefulness of a program and any inadequacies can make a good program seem poor. Digital Precision presents its program in an A4-sized hard box with the program on a single Microdrive and a manual consisting of about 50 loose leaf A4 sheets. The sheets are hole-punched and and are intended to occupy the spare space in the QL User Guide binder.

The manual sets out to be a self-contained guide to programming in SuperForth and succeeds very well, providing sufficient information for the beginner to go some way in to Forth. It is reasonably comprehensive, has a detailed contents list and an index, and is unusually free from typographical errors. It is a pity a dot matrix printer was used to produce it but no doubt a daisywheel would have had difficulty with some of the Forth symbols.

Computer One offers something of a contrast. The program is in the house style of a shrink-wrapped polystyrene ceiling tile with a hole cut in it containing a Microdrive cartridge. The 100-page A5 format type-set manual is well-written but suffers from too many msiprints and the lack of an index. It contains all the information you are likely to need and for the most part is very clearly laid out, but is a self-confessed reference guide and suggests you should buy a book on Forth if you are a beginner.

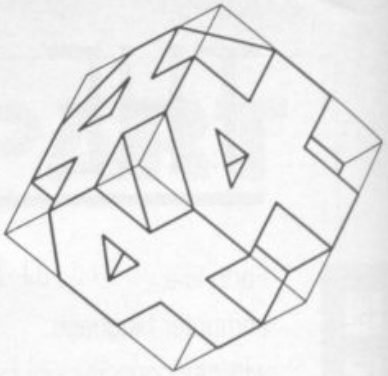
An inconvenience with both programs is the lack of an extra, spare Microdrive cartridge on which to make the necessary back-up but at least neither program is copy-protected, so will not boost the sales of the purveyors of pirated programs.

Forth source code is entered into an editor and written to Microdrive (or disc), whence it may be loaded and compiled. Both programs offer a full screen editor and allow the standard Forth screen of 1,024 characters to be generated. The Computer One editor scores for its neat layout and on-screen help, although the SuperForth editor may be more suitable for users with television sets rather than monitors. Computer One also provides a 'directory' facility which allows the first line — normally a description of contents — of each Forth screen to be viewed, whereas DP passes responsibility for remembering the contents of screens to the user.

In addition to all the standard features, each supplier offers additional attractions. The excellent *Reversi* game provided by DP. has already been mentioned and C-One includes an assembler, a de-compiler for establishing the definitions of already-compiled words, and a very feeble game intended only as a demonstration. A number of other interesting odds-and-ends are also offered in source code form.

If it is apparent that the Computer One Forth is preferred, there are two major factors to be taken into account. The first is the Reversi game supplied by DP, which for many people will be a sound reason for buying SuperForth, and the second is cost. SuperForth costs £30, less a 10 percent discount to QLUB members, whereas Computer One Forth is £40 and you will need a Forth book as well. The serious programmer should buy the Computer One Forth and the curious beginner should try Digital Precision SuperForth; but buy one or the other — Basic will never seem the same again.

- SuperForth + Reversi from Digital Precision, 224 The Avenue, London E4.
- Forth from Computer One Ltd, Science Park, Milton Road, Cambridge CB4 4BH.



TRANSFORM LTD. Computer Accessories

QL SOFTWARE

MAILING LIST £14.95
This program will allow you to quickly store and retrieve names and addresses from within ARCHIVE. Features include single key functions, prints address labels, exports files to Quill for mailing list; also compatible with our stock-control file.

STOCK CONTROL £14.95
Keeps a complete record of all your stock items including retail price, trade price, minimum order level, items on order and many other features.

QL APPOINTMENT/ DIARY £24.95
Records appointments dates and times, can be used as diary dentist, doctors, hairdressers, service engineers. Program allows 26 users with up to 40 appointments per day. Features include search for day, search for next spare time, search for client's appointment, print out all day appointments and many others.

QSPELL £19.95
Spelling checker for Quill supplied with 25000 words, checks on A4 page in 24 secs, users dictionary and auto learns words.

PAYROLL £63.25
Calculates weekly, monthly or 4 weekly payroll full tax calculations, coin analysis and payment rounding.

INTEGRATED ACCOUNTS £89.95
This new program from Sinclair will allow you to produce full profit and loss account.

ARCHIVE
Our team of programmers are able to write programs to your requirements, phone for further details.

QL KEY DEFINER £9.95
For those who use Quill or SUPERbasic this program is a must allowing you to define up to 2k on each key i.e. simply press ALT and "S" and the program will be saved onto the microdrive and overwritten, press "ALT" and "P" to print current file, press ALT and "G" to go to top of file, ALT and "B" to go to bottom of file, ALT and "D" will type in "Dear Sir" You can type a complete paragraph, phrase or letter by pressing one key.

In basic pressing F5 will bring back the last line typed; you can define keys for EDIT LIST etc.

QL CALC £9.95
This program makes use of the QL's multi tasking facility enabling you to press CTRL and any other key to give you a full calculator; having used the calculator you can return to the current program. This program can be used with Quill, Archive, Abacus and Easel. Features include mouse type operations, keyboard overide, memory and all the standard type features very useful in a busy office.

MULTI TASKING £14.95
This program will allow users with extra memory to run QUILL, ARCHIVE, ABACUS and EASEL at the same time, or two ARCHIVE programs and QUILL. Pressing a key will allow you to suspend the current program and switch to the new program.

RAM DISC £14.95
Users with extra memory will with this software be able to set up a ram disc; programs can then be instantly saved and re-loaded. A printer spooler is also included to allow you to print whilst still using your computer.

TOOL KIT £9.95
This program will copy all or selected files, delete one or selected files, display file to screen, change file file name, format, and print multiple copies of Quill files.

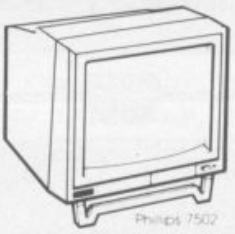
MEMORY EXTENSION

MEMORY EXTENSIONS

512k £125.00

MONITORS

QL VISION 215.00
PHILIPS 7502 75.00
Ex VAT



	ex vat	inc vat
QL Vision	215.00	247.25
Philips 7502 black and green	75.00	86.25
Connect your Spectrum to the QL; Vision Monitor	39.14	45.00

Please add £5.75 for delivery of monitors.

CARTRIDGES

10 CARTRIDGES 17.50
20 CARTRIDGES 35.00



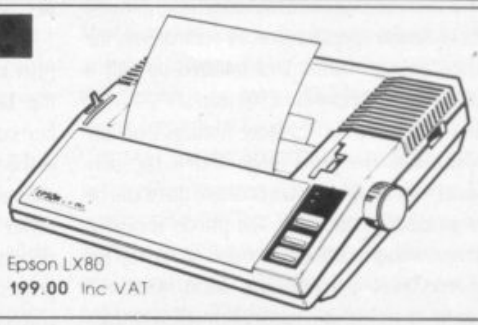
Microdrive Cartridges	£1.99
Microdrive storage box with 10 cartridges	22.45
Microdrive storage box with 20 cartridges	39.95

Add £1.00 post

PRINTERS

DOT MATRIX	Ex VAT	Inc VAT
Brother M1009	129.82	149.30
Seikosha SP1000	179.00	202.40
Epson LX80	199.00	228.85
Taxan Kaga	250.00	287.50
DAISY WHEEL		
Brother HR10	245.80	282.67
Brother HR15	349.44	401.86

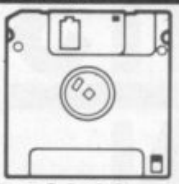
Please add £5.75 for delivery of printers.



Epson LX80
199.00 Inc VAT

3½" DISKS

DOUBLE SIDED DOUBLE DENSITY DISKS



10 FOR £30.00

LEADS

	Ex VAT	Inc VAT
QL to Spectrum	6.00	6.90
QL RS 232	10.00	11.50
Centronics interface	26.04	29.95

ACCESSORIES

Centronics interface	26.04	29.95
RS 232 lead	10.00	11.50
Monochrome monitor lead	5.00	5.75
M1009 tractor feed	13.20	15.18
LX tractor feed	18.00	20.70
2000 sheets of continuous paper	11.29	12.98
1000 labels	5.78	6.65
Microdrive cartridges	1.73	1.99
10 x 3 1 2" disc	26.08	30.00

We also stock a wide range of ribbons, daisy wheels etc.
Please add £3.00 for post and packing of paper. £1 for labels.

DISK DRIVES



Technology Research Delta	112.60	129.00
Technology Research Delta 64	152.17	175.00
Technology Research Delta 128	173.49	199.50
Cumana interface	72.13	82.95
720k single 3½" drive	97.14	112.02
1440k dual 3½" drives	185.41	213.23
Cumana interface + single drive	165.17	189.95
Cumana interface + dual drive	243.43	279.95

3½" DISK BOX

£13.25p

Holds 40 disks
Lockable
Tinted removable lid



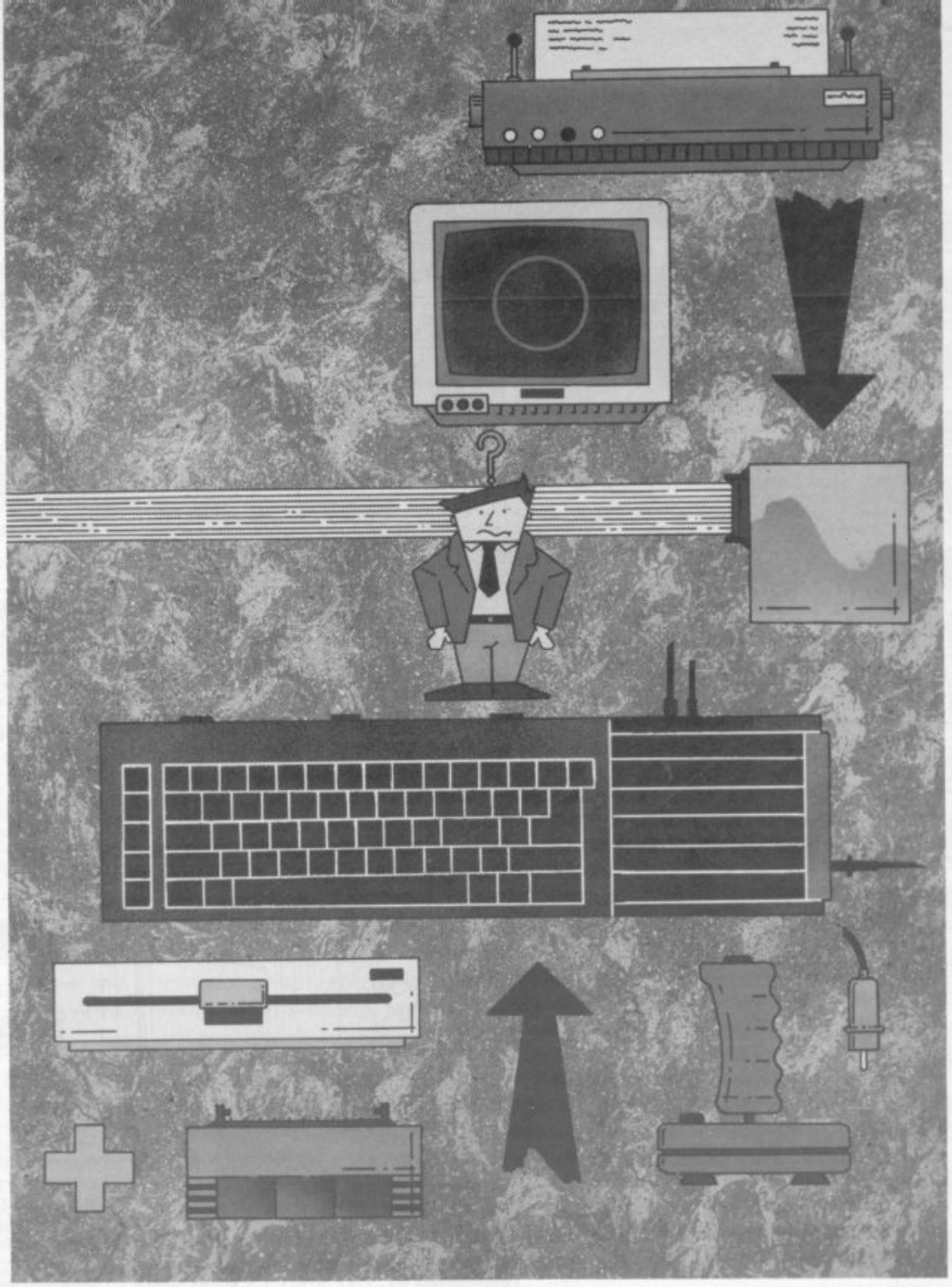
HOLDS 40 3½ DISKS
Add £1.00 post

Access
TRANSFORM LTD (Dept. QL) 01-658 6350
24, West Oak, Beckenham, Kent BR3 2EZ
VISA

PART TWO

BITS ON THE SIDES

Last month's index of interfaces, inside QL User, is followed by two printer reviews from QL World's software reviewer, Jason Ball.



IN QL WORLD's 'Choosing printers and monitors', we explained the advantages and disadvantages of daisywheel and dot matrix printers. In the next few issues, we will look more deeply at printers

The Brother low-price HR-15 daisywheel printer is at the lower end of the dot matrix printer market which has become inundated by competitive, low-cost printers of similar specifications. In comparison, the daisywheel printer market is dominated by only a handful of printers below the £500 mark.

At £445, the HR-15 offers more features than any other printer in the price range and is the only daisywheel with an optional keyboard so that it can be used as an electric typewriter. The printer is neat in appearance, with a touch-sensitive pad on the top for off-line selections, and measures 46cm. wide and 40cm. deep. At 16.5cm. it is particularly tall, so it does not have the streamlined look of some of the more modern daisywheels.

Capable of printing at 10, 12 and 15 pitch, with one, 1.5 or two-line feeds, the printer has the usual top-of-form and line-feed buttons and a facility for copying data stored in the memory buffer. Paper is fed into the machine via a friction feed system — like a normal typewriter — although an optional tractor feed system may be purchased for continuous fanfold paper.

The Brother printer is one of the only printers in the price range to incorporate a second ribbon, used with the keyboard for corrections or by printer and keyboard for printing in red. The important advantage of the second ribbon to the QL owner is that it can be software-controlled. Thus, with the correct printer driver installed, it is not necessary to change the ribbon to print text in red, as is necessary with other printers and, using a corrector ribbon, mistakes can be corrected when typing directly from the HR-15 add-on keyboard.

Changing the typefaces on a daisywheel printer is normally a complicated operation, necessitating a handkerchief to avoid covering your hands in the ink from the daisywheel. Brother has solved the messy operation by installing its daisywheels in permanent plastic cases; they protect their flimsy arms and slot quickly and easily into the print assembly without mess.

The range of typefaces is excellent — at least 15 are available, in 16 languages, and each costs about £15. The range of ribbons is equally good; the main ribbon can be multi-strike, correctable — in black, green, brown, blue and red — or nylon. Each ribbon prints up to 500,000 characters and sells for £3.60. The second ribbon type is a spooled tape which can be used for lift-off, cover-up or red print, costing less than £2 each.

A cut-sheet feeder is available as an optional extra, although it is expensive at £250, it performs well and saves an enormous amount of time.

The sheet-feeder is particularly useful when printing more than one page at a time; it loads each sheet automatically to the correct position and stores the printed sheets in order. Unfortunately, when you finish printing a sheet is left in the platen. That should be removed using the Line Feed function or the paper will be pressed into an annoying curve. Thus, if you are using the printer infrequently for single sheets, half the paper used will have to be re-loaded into the sheet feeder.

The HR-15 has an assortment of connections at the back. There is an interface option for either RS232 or Centronics, RS232 being most suitable for the QL, since Centronics may be used only with an interface.

There are two sets of dip switches; the first is for international character set according to your daisywheel and page length settings for correct top-of-form adjustment. The second dip switch deals with such trivialities as line feeds, auto-skip perforation and the RS-232 data length, parity and baud rate settings. Of the two other sockets, one is used to control the cut-sheet feeder and the other to connect the optional keyboard.

Perhaps the biggest problem with the HR-15 is print speed. Daisywheel printers are notoriously slow compared to dot matrix but at only 13 characters per second the Brother is 5cps slower than other machines which are only £20 more expensive. Thus, 15 minutes' printing on an 18cps printer would take 20 minutes on the Brother.

The printer has, however, a 3K buffer, expandable to 5K, which stores data before it is printed. Thus memory can be used to reprint the data without involvement of the computer. So copies of a letter can be printed while you work on something else with the QL.

Carriage width is also smaller than some machines — 12in. as opposed to 15in. — although a wide version of the HR-15 is available for the few people who need it. Despite many of the machines having better specifications than the Brother in those areas, none has as many facilities.

The manual is extremely comprehensive and covers everything from inserting paper into the platen to diagrams of the interfaces and internal circuits. All the features of the printer, such as bold print, underlining, super and subscripts are explained. Quill incorporates a printer driver specifically for the HR-15, so all those options,including ribbon control,can beused in Quill.

One important point to remember is that daisywheel printers interpret codes from the computer which are printed according to the characters on the daisywheel. It does not copy the screen like a dot matrix printer, so some characters such as £ and # may be incorrect if you do not install the driver software properly.

Unfortunately that makes the HR-15 unsuitable for accurate listings of programs. That is worsened by the difference in carriage return codes recognised by the HR-15 and dot matrix printers. As a result, a special routine has to be used to print lines from the screen if you are not using printer drivers from within Quill but programmers with long listings would be better with a dot matrix printer anyway.

The HR-15 has reflected its outstanding value in its dominance of the home market for daisywheel printers. There are few machines to rival its features, although its slow speed may make other faster machines more attractive. Support for the machine is considerable, so ribbons and daisywheels are easily purchased and it is well-suited to the QL, which can take advantage of all its features. The printer is available from any Brother dealer or you may contact Brother directly at Jones & Brother, Shepley Street, Audenshaw, Manchester M34 5JD.

In recent years Epson has become, in many people's view, an industry standard in the dot matrix market like IBM and the Personal Computer. It is appropriate, therefore, that this dot matrix printer review should be about the new Epson FX-105. It is one of a range of printers launched recently for 1986; the FX-80 and FX-100 were released in April, 1983. Identical in function to the new FX-85, the 105 is the biggest of the new range, with an extra wide platen for spreadsheets, ledger work and pre-printed forms, where accuracy is vital.

The 105 is almost identical in appearance to its predecessor, the FX-100, but incorporates several new features. When the FX-80 and FX-100 printers were introduced, they were considerably bigger than their predecessors. Ironically, the latest Epson FX range is slightly smaller than the last; the width of the FX-105 is 594mm., which is 21mm. less than the FX-100 and weighs 0.1 kilos less.

The design has changed very little, except for the printer hood. That has been re-shaped slightly to maximise the advantage of a new, quieter print head, which reduces the sound of the printer by three decibels. Tractor feed and friction feed are both supplied as standard.

The most important feature of the new FX range is the addition of near letter quality text printing, an alternative to daisywheel print for letters and other prestigious documents. That is possibly due to a new print head, which has been increased from the standard 9x9 matrix to an impressive 18x18 matrix for NLQ printing.

The printer is fashioned in cream-coloured plastic, with extensive use of clear brown perspex for the cover and sheet feeder. Three buttons on the front panel are used to select on- and off-line, draft or NLQ print, form feed and line feed, as well as a host of other facilities, which are also software controllable.

Dot matrix printers are difficult to load with paper at the best of times, particularly when inserting single sheets into tractor feed systems. Epson started originally on the wrong foot with its often-frustrating pinfeed system, but the FX range now benefits from a tractor feed — adjustable pinfeed, for various paper widths — which pulls the perforated paper through the platen without it going astray.

Friction feed is used for single sheets of paper but that required the removal of the tractor system to prevent the sheets fouling. It is a slow, inaccurate method of printing single pages, so Epson has developed an optional cut sheet feeder for the FX-105 (and 85), which loads the paper to the correct position automatically.

Having unpacked the printer, my first step was to set it up for the QL. That necessitates flicking a few dip-switches which are located conveniently beneath a cover on top of the machine and are used to select character set, type-style, line feeds and cut sheet feeder mode. The dip-switches also control such issues as slashed-zero characters and skip-over perforations. Many of those cold-start functions are also software controllable.

The FX-105 can print at 160cps in draught mode but slows to 32cps in correspondence (NLQ) mode — each character is printed twice. Proportional spacing is readily available and can be re-defined to suit your needs — if your eyesight is good enough to warrant it.

The on-board RAM buffer has been increased from 3K to a massive 8K, part of which may be used to define 240 dots per inch. The graphics may also be com-your own letter-heads and logos for your business and personal use. It will also store information from the QL as fast as it is sent, thereby releasing the QL for you to program while printing continues.

The graphics capabilities of the machine are excellent; eight graphics modes allow densities from 60 to 240 dots per inch. These graphics may also be combined with text to produce some spectacular results.

The printer gives an enormous selection of fonts — pica, elite and roman, as well as enlarged, emphasised, condensed, double-strike underline and sub/superscript modes, selected directly from the front panel or by the host computer. Italics and user-defined character sets, as well as the grphics modes, are also software controlled.

The FX-108 is designed to cope with paper up to 406mm. wide — twice the width of an A4 sheet — so it can cope with spreadsheets or large graphics pictures. The printer can also cope with paper as small as an address label — only 4in. wide.

Perhaps the most important-part of such a complicated printer is the manual and Epson has put a good deal of work into producing one of the best manuals on the market. It contains a comprehensive tutorial on setting-up and using the printer and provides a complex technical reference section for those experts using the printer to the full.

There is also a book by Collins, *Getting more from the Epson printer,* in which Susan Curran demonstrates many of the printer's features using a QL. That alone demonstrates the suitability of Epson printers for the QL. The FX printer is available with a parallel or serial interface — the latter is best-suited to the QL — and all its features can be fully exploited.

An important consideration is the printer drivers you will be using to get the QL screen on to paper. Most programs designed to reproduce text or graphics on paper include a printer driver — e.g., Quill by Psion and GraphiQL by Talent. Those printer drivers will almost certainly be for the Epson printer.

At £654, the cost of the FX-105 is warranted only by its excellent features, combined with a remarkable quality and reliability. At last Epson has produced a machine to rival the new dot matrix printers on the market and the FX-105 has the power and versatility to compete with all of them. Also, if ever you buy a more expensive computer, the Epson is now fully IBM-compatible at the flick of a dip-switch.

FOR THOSE 'GREAT' MICRODEAL GAMES

QL JOYSTICKS & INTERFACES



INTERFACES Only £4·75
Allows any ATARI or COMMODORE Joystick to plug into the QL

QUICKSHOT II Joystick £9·95 For above interface

SPECIAL OFFER both the above £12·95

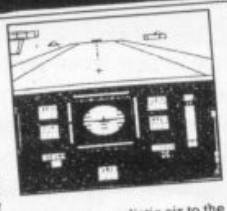
microdeal

DON'T TAKE OUR WORD FOR IT!

THIS IS WHAT POPULAR COMPUTING WEEKLY HAD TO SAY ABOUT OUR QL FLIGHT SIMULATOR

Take off

Program *QL Flight Simulator* **Micro** QL **Price** £19.95 **Supplier** Microdeal, 41 Truro Road, St Austell, Cornwall.



Up up and away with your QL is the promise from Microdeal. One of the essential programs on a home micro is the flight simulator and there have been the good and the appalling.

Microdeal's falls somewhere in between – the manual spends much of its time apologising for the graphics (it doesn't need to, they're fine) and asking the reader what he/she expects from a mere £200 computer. But the program doesn't warrant such excuses, it can stand on its own three wheels.

The wire graphics I mentioned are good enough to lend quite a realistic air to the view from the cockpit window of your single-engined machine – I particularly liked the floating compass points through which you can fly! On the dashboard your instruments are adequate: there are no navigational aids apart from a heading indicator, but you also have an altimeter, rev counter, gear up/down indicator and artificial horizon, together with rudder/aileron/el-evator indicators.

Your flight takes place over eight "worlds", each of which has its own runway and potential hazards in the shape of mountains, radar dishes, bridges and so on: and the weather in each world may be changed to the user's preference. Flying about the air space is as realistic as the taxiing sequence, during which you can refuel at the dump alongside each runway.

Sound is used well, with a lovely start-up burble, but fun isn't really what the program is about. Although there is a bridge and power-line to fly under, this simulator is really for the serious student of flying. While the manual and program are a touch stuffy, there is enough for the merely interested home user – and at a reasonable price – to make this *the* flight simulator for the QL.

Tony Bridge

Review reproduced with permission of Popular Computing Weekly

AVAILABLE NOW! FROM OUR 24 HOUR MICROPOST SYSTEM

QL Flight Simulator on Microdrive £19.95
Optional Quickshot II Joystick & Interface £12.95
Please add 75p post & packing

"THE FLIGHT SIMULATOR FOR THE QL"

5 STAR REVIEW! (THE BEST)

Name _____ Address _____

Please send me

☐ **QL Flight Simulator £19.95**

☐ **Joystick & Interface £12.95**

Post & packing 75p

Post your order to **microdeal** 41 Truro Rd St Austell Cornwall PL25 5JE

Credit Card Orders by phone 0726 68020

Your key to communications!

FREE Electronic Mail . . . International Telex . . . 10 National Chatlines (Interactive Bulletin Boards) . . . 70,000 users across the UK . . . Teleshopping . . . Multi-User Interactive Strategy Games



Instant computer news . . . Hardware and software reviews . . . Technical features . . . Hints and tips . . . On-line business advice and features



FREE and discounted quality software to download direct to your micro – **24 hours a day**

300,000 pages of information on the huge Prestel database

PRESTEL

PRESTEL is a trademark of British Telecommunications

for just 20p a day

Micronet 800 – The ultimate peripheral

Micronet 800
8 Herbal Hill, London EC1R 5EJ
Telephone: 01-278 3143

To: Micronet 800, 8 Herbal Hill, London EC1
Please send me a brochure on Micronet 800

Name_____

Address_____

_____

_____ Telephone No_____

Age_____ Micro_____

QLW Mar '86

SOFTWARE APPLICATIONS

Specialised business applications are one of the QL's strong points. Here are a collection of different uses for the QL and its bundled Psion software.

If you are considering doing financial forecasts — i.e., profit and loss, cashflow and balance sheet — on the QL but do not have the accountancy knowledge required, you may find it a confusing job. Version 2 of Abacus leaves 23K of memory available to the user and, though still not sufficient, is much more useful than earlier versions for the task. The attached sample uses the full 23K, 2K to 3K being used for underlining, so if you need more space omit the underlining.

After loading QL Abacus, first go to the 'DESIGN' command and set the 'Auto-Calculate on input' to 'off', 'Blank if zero' to 'yes' and 'Calculation Order' by 'Col'. Using the sample as a guide, enter headings across the top and down the side of the spreadsheet; use your own headings where appropriate.

The relevant columns for a year ahead are B for the Opening balance sheet, C to N for January to December, and O for cross-totals. Use the 'GRID' command to increase the 'WIDTH' of column A to 22 characters for the headings and to decrease columns B to N to seven characters each. That will show more columns on the screen. You can also press 'F2' to increase the number of rows displayed.

Completing the Profit and Loss Account is fairly straightforward and is a matter of entering data which you have already prepared, together with the formulae to calculate sub-totals. If your sales are fairly equal each month, move the cursor to the first 'Sales' row — cold C — and enter:

'Row=10000' from C to 'N'

If sales are affected by seasonal factors, enter the monthly values individually. If you have more than one type of sale, enter each row in the same way. For the 'Sub-Total' row go to col C and enter:

'Row=sum(C5:C6)' or

'Row=C5+ from C to 'N'

Assuming Cost of Sales is a fixed percentage of sales, the formula for Purchases will be:

'Row=C5*.55' from C to 'N'

Use 'Units' command 'Cells', 'I' (Integer) if you wish to retain whole numbers; do that at the end if you want to avoid doing it every time you have a percentage calculation.

Wages may also be a percentage of sales, in which case use the same procedure. If wages are not a fixed percentage, enter the values as 'Row=' or individually for each column as appropriate.

Employers' National Insurance contributions are 10.45 percent of gross wages — altered in the Budget for lower-paid employees — and are entered:

'Row=C14*.1045' from C to 'N'

Sub-total for cost of sales if:

'Row=sum(C12:C15)' from C to 'N'

Gross profit is sales minus cost of sales:

'Row=C8-C17' from C to 'N'

Gross profit % is gross profit divided by sales multiplied by 100:

'Row=C20/C8*100' from C to 'O'

Use the 'UNITS' command 'Cells' 'decimal' to select the number of decimal places for your percentage rows.

Overheads can then be entered, sub-totalled in the same way, and deducted from the gross profit to arrive at 'Nett profit':

Row=C20-C38' from C to 'N'

Depreciation is calculated on buildings at four percent and vehicles at 20 percent annually — one-twelfth per month:

'Row=(C94*.04+C95*.2)/12 from C to 'N'

Bank interest is calculated at row 85 and is a negative value; multiply by '–1' to convert it to positive:

'Row=C85*–1 from C to 'N'

Nett profit percentage is nett profit divided by sales, multiplied by 100:

'Row=C+1/C8*100' from C to 'O'

For the total column 'GOTO' column O of your first sales line and enter:

'Col=sum(C5:N5)' from 5 to '41'

That will also change your gross profit percentage total column, so change it back to the formula in row 21. For cumulative nett profit, copy C41 to C44 and from February:

'Row=D4+C44' from D to 'N'

An unfortunate fact in business is that making profit does not necessarily mean a healthy cash position. During a growth period, an increase in sales may cause cash problems if customers do not pay promptly. The effect which slow payers will have on your liquidity will show up in the cashflow forecast. Advance warning of cash shortfalls will enable you to negotiate with your bank manager for an increased overdraft facility. Opening balance sheet amounts will affect the cash position; opening debtors will be received in January and opening creditors will be paid in January.

For income, I have assumed that 55 percent of sales are for cash and the balance is received in the month following the sale. Complete your cashflow according to your situation. Cash sales are entered as 55 percent of row 8:

'Row=C8*.55' from C to 'N'

January credit sales income is from the previous December debtors, shown in the opening balance sheet:

'B103'

February credit sales income is the balance of January sales:

'Row=C8–C52' from D to 'N'

Total income is:

'Row=C52+C53' from C to 'N'

Expenditure for January will include payment of creditors outstanding from December. January purchases expenditure is:

'B110'

February is based on January purchases, March based on February and the like:

'Row=C12+C13' from D to 'N'

Under the PAYE system, a varying amount of total wages is paid to employees in the current month and the balance, plus employers' National Insurance contributions, is due to be paid by the 21st day of the following month. I have assumed that 70 percent is paid to employees in the current month:

'Row=(C14+C24)*.7' from C to 'N'

January PAYE and NIC is the amount owing from December:

'B111'

February pays January wages and salaries plus employers' NIC, less paid to employees in January:

'Row=C14+C15+C24+C25–C60' from D to 'N'

Since retiring I have set up as a self-employed engineering consultant working from home. Provided that work does not interfere with pleasure, it is a most satisfactory arrangement. My requirements are production of 30-page technical reports and specifications, correspondence, invoices and annual statement of practice accounts.

The reports and specifications frequently contain many common details, although each is tailored to the needs of a service; that means a workload of peaks and troughs and on-the-spot promises of deadlines.

I cannot afford to depend on the very expensive services of a typing agency, let alone be bothered with hand-written editions and re-editions of reports and specifications and then typing the letters.

The practice accounts require the tedious collation of numerous invoices and other items of income and expenditure which have accumulated during the year, all of which have to be sorted into date sequence within sub-ledger.

My daughter, who lives nearby, is hon. sec. of a local organisation which requires her to maintain records of 300 members and distribute regular newsletters. Surely father can help.

The case for a QL is thus self-evident. How else could all the requirements be met at the price? — *Hugh Eccles, London.*

Since entering the QL world in January, 1985 I have written several application programs for use in business — more precisely in large catering establishments. I have used Archive language for all the applications.

Initially I used it because of its simple and logical way of using procedures, making it easy to write meaningful programs from the start. Using Archive as a common programming tool also gave me the possibility of effortless transfer of data between interrelated files.

That compatibility means that a single entry can be used to update data in several files. So can the recording of a delivery automatically update the stock-control system, ordering procedures, suppliers' account, purchase ledger, through to the up-to-date balance sheet.

A recorded sale will perform the equivalent chain of updating, including supplying information to the payroll bonus system. Another advantage gained through using Archive in this way is that the system can be kept up and running throughout a working day, thus enabling direct and easy access to other databases, like my personal telephone directory, diary/appointment system and mailing facility. — *Olle Andersson, Poole, Dorset.*

Overheads generally will be paid monthly in arrears. There are exceptions, e.g., rent, rates, electricity, telephone. Assuming that rent is payable quarterly in advance, rates half-yearly in advance but taking one month credit, electricity and telephone quarterly in arrears:

Rent is 12,000–300 in January, April, July and October; rates are 7,200–3,600 in May and November.

Electricity varies throughout the year; total the quarterly amounts:

March='Sum(C28:E28)'
June='Sum(F28:H28)'
September='Sum(I28:K28)'
December='Sum(L28:N28)'

Telephone is 2,400 — enter 600 in March, June, September and December.

Other overheads, excluding depreciation and bank interest, are paid monthly in arrears from February:

'Row=Sum(C30:C34)' from D to 'N'

January pays opening overheads creditor due from December:

'C112'

Sub-total revenue expenditure is:

'Row=Sum(C59:C66) from C to 'N'

Revenue surplus/deficit is income minus expenditure:

'Row=C55–C68' from C to 'N'

Items arising from the profit and loss account are already shown — now I will deal with amounts for capital expenditure, stock movements and bank interest. Note that a cash shortfall at row 71 is indicated by a negative value. Capital expenditure on buildings in January is entered as –30,000 and vehicles in May and September — 7,000 each.

Stock movement is the difference between stock levels from one month to the next and reflect any seasonal nature of the business. Calculate it from the 'Stocks' line of the balance sheet below:

'Row=B102–C102' from C to 'N'

Total surplus/deficit:

'Row=Sum(C71:C78)' from C to 'N'

Enter the opening bank overdraft in col. B of the cumulative surplus/deficit row; it is negative in the cashflow, so:

'B108*–1'

From February the amount will be col. B plus the cash balance for January:

'Row=B83+C80' from C to 'N'

Calculate the bank interest at, say, 15 percent per annum, 15 percent for one month:

'Row=C83*.15/12' from C to 'N'

Interest normally is charged to the bank statement half-yearly, so rows 83 and 87 will be the same from January to May and from July to November.

Cumulative surplus/deficit/interest for January to May is:

'Row=C83' from C to 'G'

For June add the six months' interest which now be shown on the bank statement:

'H83+Sumn(C85:H85)'

Cumulative surplus/deficit for July now includes the interest paid:

'H87+I80'

For August to December:

'Row=I83+J80' from J to 'N'

Cumulative surplus/deficit/interest for July to November will be:

'Row=I83' from I to 'M'

For December we again add the interest now charged to the bank statement:

'N83+Sum(I85:N85)'

That ends the cashflow.

From the foregoing it is possible to complete the balance sheet. First enter the opening balance sheet amounts in column B. Buildings will be opening balance plus capital expenditure; it was a minus in the cashflow so multiply to '–1':

'Row=B94+(C75*–1)' from C to 'N'

Likewise with vehicles:

'Row=B95+(C76*–1)' from C to 'N'

Total fixed assets:

'Row=B94+B95' from B to 'N'

Depreciation is shown in row 35; now accumulate it:

'Row=B97+35' from C to 'N'

Nett fixed assets are total fixed assets minus depreciation:

'Row=B96–B97' from B to 'N'

Current assets are stocks of goods and materials and amounts owed to you. Enter the amount of stock which you think you will require each month to cover sales, taking seasonal factors into consideration. The formula has already been entered in the cashflow to take account of the movements and will be calculated (on 'EXECUTE') after you have entered the stock values.

Debtors are opening debtors plus sales, less receipts from January onwards:

'Row=B103+C8–C55' from C to 'N'

Sub-total is stocks plus debtors:

'Row=B102+B103' from B to 'N'

Current liabilities are amounts still owed by you to the bank, to suppliers, to PAYE and NIC, to overheads and to bank interest. Cumulative surplus/deficit/interest at row 87 now becomes 'bank overdraft' — do not forget it is a negative value in the cashflow:

'Row=C87*–1' from C to 'N'

Purchases creditor is opening creditor plus purchases, less payment:

'Row=B110+C12+C13–C59' from C to 'N'

PAYE and NIC creditor is opening creditor plus salaries, wages and NIC, less payments to employees and Inland Revenue:

'Row=B111+C14+C15+C24+C25–C60–C61' from C to 'N'

Overhead creditor is the opening creditor plus the sum of rows 26 to 34, less rows 62 to 66:

The application which I am trying to develop is to combine the National Grid map reference system with the wealth of scattered information on tourist attractions throughout the country. The speedy calculation of direction and distance, to and between locations for the tourist, must be a welcome aid to arranging holidays and tours.

A primary facility will be the ability to call and display all the places of interest which lay in a specified radius of any map reference. Details of the places, such as open times, cost, time required to view, and more, all held in files.

After making a selection, the user can obtain the computed direction and distance between the places of interest in any order, displayed in tables, lines or plotted points. The possible saving in time and petrol can only be imagined. The tourist attractions may also benefit with more visitors.

Users will also be able to enter their map references for calculating direction and direct distance. Comparison with any published road distance can indicate how devious the route may be. A further development might include many road distances. — *A J Harris, London.*

'Row=B112+Sum(C26:C34)–Sum(C62:C66)' from C to 'N'

Bank interest creditor is the increasing amount due for January to June paid in June and and for July to December paid in December. January and July stand alone and the other months are cumulated:

January is 'C85*–1'
February is 'Row=C113+(D85*–1')' from D to 'G'
June is nil as the interest has been paid
July is 'I85*–1'
August is 'Row=I113+(J85*–1)' from J to 'M'
December is nil as the interest has been paid.

Sub-total of current liabilities is sum of rows 108 to 113:

'Row=Sum(B108:B113)' from B to 'N'

Nett assets are the sum of new fixed assets plus cur- ▶

rent assets, minus current liabilities:

'Row=B99+B105-B115' from B to 'N'

Nett assets are financed by shareholders' funds — share capital plus accumulated profit and loss. Share capital is:

'Row=40000' from B to 'N'

Profit and loss B/F is:

'Row=16585 from B to 'N'

Profit and loss this year to date is:

'Row=C44' from C to 'N'

Shareholders' funds are the sum of rows 123 to 125:

'Row=Sum(B123:B125) from B to 'N'

Use the 'EXECUTE' command two or three times — F3 followed by 'X' — to complete the calculations. The two sides of the balance sheet should have the same totals and the bank balance should equal the cumulative surplus/deficit/interest. If they do not agree, 'EXECUTE' a few more times. If they still do not agree, 'EXECUTE' a few more times. If they still do not agree, check your entries.

When you have agreed and balanced all the figures, save everything to Microdrive or floppy disc. You can now do any what-if? permutations by changing amounts in the profit and loss account, e.g., sales. The advantage of using percentages for cost of sales will now become apparent as the relevant amounts will be re-calculated on 'Execute' automatically.

Be careful when making changes or adding extra lines to take account of existing formulae, sub-totals, to ensure that the spreadsheet remains self-balancing — *William Loaghman.*

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1															
2	PROFIT & LOSS ACCOUNT		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
3	----------		---	---	---	---	---	---	---	---	---	---	---	---	-----
4	SALES														
5	ELECTRICAL		25000	25000	35000	25000	25000	25000	30000	30000	25000	30000	50000	30000	355000
6	HOUSEHOLD		20000	20000	25000	20000	20000	20000	30000	30000	20000	30000	50000	30000	315000
7			-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------
8	TOTAL SALES		45000	45000	60000	45000	45000	45000	60000	60000	45000	60000	100000	60000	670000
9			-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------
10	LESS COST OF SALES														
11	PURCHASES														
12	- ELECTRICAL		13750	13750	19250	13750	13750	13750	16500	16500	13750	16500	27500	16500	195250
13	- HOUSEHOLD		11000	11000	13750	11000	11000	11000	16500	16500	11000	16500	27500	16500	173250
14	WAGES		9000	9000	12000	9000	9000	9000	12000	12000	9000	12000	20000	12000	134000
15	EMPLOYERS NATIONAL INS		941	941	1254	941	941	941	1254	1254	941	1254	2090	1254	14003
16			-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------
17	SUB-TOTAL		34691	34691	46254	34691	34691	34691	46254	46254	34691	46254	77090	46254	516503
18			-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------
19															
20	GROSS PROFIT		10310	10310	13746	10310	10310	10310	13746	13746	10310	13746	22910	13746	153497
21	GROSS PROFIT %		22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9
22															
23	LESS OVERHEADS														
24	SALARIES		4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	48000
25	EMPLOYERS NATIONAL INS		418	418	418	418	418	418	418	418	418	418	418	418	5016
26	RENT		1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	12000
27	RATES		600	600	600	600	600	600	600	600	600	600	600	600	7200
28	ELECTRICITY		500	500	500	350	300	300	300	300	350	400	550	600	4950
29	TELEPHONE		200	200	200	200	200	200	200	200	200	200	200	200	2400
30	TRAVEL & ACCOM		200	200	1000	200	200	200	1000	200	200	200	1000	200	4800
31	MOTOR EXPENSES		500	500	500	500	500	500	500	500	500	500	500	500	6000
32	REPAIRS & MAINT		200	200	200	200	200	200	200	200	200	200	200	200	2400
33	ADVERTISING		300	300	300	1000	300	300	1000	300	300	300	1000	300	5700
34	PENSION CONTRIBUTION		400	400	400	400	400	400	400	400	400	400	400	400	4800
35	DEPRECIATION		467	467	467	467	583	583	583	583	700	700	700	700	7000
36	BANK INTEREST		447	518	289	317	467	495	496	491	693	788	344	71	5406
37			----	----	----	----	----	----	----	----	----	----	----	----	------
38	TOTAL OVERHEADS		9232	9303	9874	9652	9168	9197	10698	9192	9561	9706	10912	9189	115672
39			----	----	----	----	----	----	----	----	----	----	----	----	------
40															
41	NET PROFIT		1078	1006	3872	658	1141	1113	3048	4564	748	4040	11998	4557	37825
42	NET PROFIT %		2.4	2.2	6.5	1.5	2.5	2.5	5.1	7.6	1.7	6.7	12.0	7.6	5.6
43															
44	CUMULATIVE NET PROFIT		1078	2084	5956	6614	7755	8868	11917	16480	17228	21269	33267	37825	
45			====	====	====	====	====	====	=====	=====	=====	=====	=====	=====	
46															
47															
48	CASH FLOW		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
49	---------		---	---	---	---	---	---	---	---	---	---	---	---	-----
50	INCOME														
51	SALES REVENUE														
52	- CASH SALES		24750	24750	33000	24750	24750	24750	33000	33000	24750	33000	55000	33000	368500
53	- CREDIT CARDS ETC		14000	20250	20250	27000	20250	20250	20250	27000	27000	20250	27000	45000	288500
54			-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------
55	TOTAL INCOME		38750	45000	53250	51750	45000	45000	53250	60000	51750	53250	82000	78000	657000
56			-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------
57															
58	EXPENDITURE														
59	PURCHASES		20000	24750	24750	33000	24750	24750	24750	33000	33000	24750	33000	55000	355500

60 WAGES & SALARIES	9100	9100	11200	9100	9100	9100	11200	11200	9100	11200	16800	11200	127400
61 PAYE & NIC	4000	5259	5259	6472	5259	5259	5259	6472	6472	5259	6472	9708	71147
62 RENT	3000			3000			3000			3000			12000
63 RATES					3600						3600		7200
64 ELECTRICITY			1500			950			950			1550	4950
65 TELEPHONE			600			600			600			600	2400
66 OTHER OVERHEADS	600	1600	1600	2400	2300	1600	1600	3100	1600	1600	1600	3100	22900
67	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------
68 REVENUE EXPENDITURE	36900	40709	44909	53972	45009	42259	45909	53772	51722	45809	61472	81158	603497
69	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------
70													
71 REV SURPLUS/DEFICIT	1850	4292	8342	-2222	-9	2742	7442	6228	28	7442	20528	-3156	53503
72													
73 BALANCE SHEET ITEMS													
74 CAPITAL EXPENDITURE													
75 - BUILDINGS	-30000												-30000
76 - VEHICLES					-7000				-7000				-14000
77													
78 STOCK MOVEMENT		-10000	10000		-5000	-5000	-5000	-5000	-10000	-15000	15000	25000	-5000
79	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------
80 TOTAL SURP/DEF	-28150	-5709	18342	-2222	-12009	-2259	2442	1228	-16972	-7559	35528	21842	4503
81													
82													
83 CUM SURP/DEF	-7615	-35765	-41474	-23132	-25354	-37363	-39621	-39713	-38485	-55457	-63016	-27488	-5646
84													
85 INTEREST	-447	-518	-289	-317	-467	-495	-496	-481	-693	-788	-344	-71	-5406
86	------	------	------	------	------	------	------	------	------	------	------	------	------
87 CUM SURP/DEF/INT	-35765	-41474	-23132	-25354	-37363	-42155	-39713	-38485	-55457	-63016	-27488	-8518	
88	======	======	======	======	======	======	======	======	======	======	======	======	
89													
90													
91 BALANCE SHEET	OPENING	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
92 ----------	-------	---	---	---	---	---	---	---	---	---	---	---	---
93 FIXED ASSETS													
94 - BUILDINGS	50000	80000	80000	80000	80000	80000	80000	80000	80000	80000	80000	80000	80000
95 - VEHICLES	12000	12000	12000	12000	12000	19000	19000	19000	19000	26000	26000	26000	26000
96 TOTAL FIXED ASSETS	62000	92000	92000	92000	92000	99000	99000	99000	99000	106000	106000	106000	106000
97 LESS DEPRECIATION	12000	12467	12933	13400	13867	14450	15033	15617	16200	16900	17600	18300	19000
98	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
99 NET FIXED ASSETS	50000	79533	79067	78600	78133	84550	83967	83383	82800	89100	88400	87700	87000
100	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
101 CURRENT ASSETS													
102 -STOCKS	25000	25000	35000	25000	25000	30000	35000	40000	45000	55000	70000	55000	30000
103 -DEBTORS	14000	20250	20250	27000	20250	20250	20250	27000	27000	20250	27000	45000	27000
104	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
105 SUB-TOTAL	39000	45250	55250	52000	45250	50250	55250	67000	72000	75250	97000	100000	57000
106	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
107 CURRENT LIABILITIES													
108 -BANK BALANCE	7615	35765	41474	23132	25354	37363	42155	39713	38485	55457	63016	27488	8518
109 -CREDITORS													
110 - PURCHASES	20000	24750	24750	33000	24750	24750	24750	33000	33000	24750	33000	55000	33000
111 - PAYE & NI.	4000	5259	5259	6472	5259	5259	5259	6472	6472	5259	6472	9708	6472
112 - OVERHEADS	800	900	3200	4200	3250	1050	1600	2200	2800	3400	2600	2850	1600
113 - INTEREST		447	965	1255	1572	2039		496	977	1671	2458	2802	
114	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
115 SUB-TOTAL	32415	67121	75647	68059	60184	70460	73763	81882	81735	90537	107546	97848	49590
116	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
117													
118 NET ASSETS	56585	57663	58669	62541	63199	64340	65453	68502	73065	73813	77854	89852	94410
119	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
120													
121 FINANCED BY													
122 ----------													
123 SHARE CAPITAL	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000
124 PROFIT & LOSS B/F	16585	16585	16585	16585	16585	16585	16585	16585	16585	16585	16585	16585	16585
125 P&L THIS YEAR TO DATE		1078	2084	5956	6614	7755	8868	11917	16480	17228	21269	33267	37825
126	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
127													
128 SHAREHOLDERS FUNDS	56585	57663	58669	62541	63199	64340	65453	68502	73065	73813	77854	89852	94410
129	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====

EQUATE: THE EQUATION PROCESSOR

MICRODRIVE, 40 or 80K disk; Please Specify.

EQUATE is for anyone who wants to solve a problem which can be expressed mathematically. Even if you cannot state your problem as an equation, in most cases EQUATE can do this for you.

Examples provided get you started quickly, and enable you to apply EQUATE to your own problems.

PROFESSIONAL USERS will save time, and have more confidence in their answers.

Hi-res graphs ensure that wild initial guesses are not required, even for the most complicated of equations.

Features of EQUATE: Equation solving — polynomial and linear simultaneous. Differentiation, Integration, Curve fitting of experimental data. Graphing, Graph magnification, Windowing, Import & Export using Archive, Abacus and Easel. Hi-Res screen dump to printer. Equation editing.



ONLY £39.95 inc. VAT

FLITE SOFTWARE

To order, send a cheque, postal order or your Access or Visa card number to:

Flite Software Ltd., P.O. Box 302, Glasgow G12 9HQ

Telephone Order 24 hour HOT LINE on 010 353 74 21255

A leaflet giving further detailed information about EQUATE is available from Flite Software at the above address. Please send a stamped, addressed envelope.

FAST DELIVERY OF QL DISC DRIVES

Cumana 3.5" 1 Mbyte floppy disc drives, internal power supply, complete with disc interface, utilities, manual, and optional RAM on the interface card.

INTERFACE	SINGLE	DUAL
Cumana	£211	£288
Delta plus parallel printer interface	£251	£328
Delta plus 128K RAM + printer interface	£321	£398
PCML plus 256K RAM	£361	£438
Cumana plus 256K Expandaram	£306	£383
Cumana plus 512K Expandaram	£336	£413

TWO MICRODRIVE TOOLKITS

Read and write microdive sectors from basic and assembly language programs.

QL MDV EXTENSIONS TOOLKIT £9.99

Adds six functions to Basic allowing read/write/verify of microdrive sectors, reading of medium names and "fingerprint" from sector headers, and includes a repeat format routine. An eight page manual explains the functions, details the microdrive format and uses example programs supplied on microdrive.

QL MDV ASSEMBLY LANGUAGE TOOLKIT (Source Code) £29.99

Over 1000 lines of fully commented assembly language source code to a set of routines equivalent to the above, but with some additions. An eight page manual explains microdrive format and how to implement a copy protection scheme as well as QDOS-like routine definitions.

BOTH THE ABOVE TOOLKITS ON ONE MICRODRIVE £34.99

COMPARE Also sell a wide range of QL peripherals (monitors/printers/modems/EPROM programmers) and software. Please send SAE for full price list.

PRICES INCLUDE VAT AND DELIVERY

OVERSEAS CUSTOMERS – WRITE FOR EXPORT TERMS

COMPWARE

57 REPTON DRIVE, HASLINGTON, CREWE CW1 1SA

Telephone: CREWE (0270) 532301

TANDATA COMMUNICATIONS FOR THE SINCLAIR QL NEW LOW PRICE!

Q-CONNECT, Q-MOD AND Q-CALL ONLY £129.95

Q-CONNECT AND Q-MOD ONLY £109.95

PRICES INCLUDE VAT



The only communications package for the QL. The modules are available separately but, by using all three as a complete matched system, full advantage can be taken of the integrated features.

Q-CONNECT

Complete RS232 output for general communications from 75-9600 baud with full two way buffering and flow control. Software on a micro drive to support all 3 modules includes Prestel Viewdata/Videotex and VT100 emulation, and many other features.

Q-MOD

Manual dial V23 modem operating at 1200/75 bps and 1200/1200 half duplex.

Q-CALL

Provides traditional pulse/loop disconnect auto-dial and auto answer.

Tandata

Tandata Marketing Limited

Albert Road North, Malvern, Worcs. WR14 2TL
Telephone: 06845 68421. Telex: 337617 Tandat G.
Prestel *799# Telecom Gold 81: TAN001
A subsidiary of Tandata Holdings plc.
Prestel is a registered trade mark of British Telecommunications plc.

I'd like to know more about Tandata communications for the QL.

Name _____

_____

Address _____

_____

_____

_____

Tel No _____

Send to:
Tandata Marketing Ltd.,
Albert Road North, Malvern,
Worcs. WR14 2TL.

QL COMMS

A new regular feature, taken from QL World's communications expert — Tony Dennis

AT PRESENT there appears to be only two good communications packages on the market for the QL, *Terminal Emulator* from Qcode and *Q-CON* from Tandata. It therefore seems appropriate to discuss exactly what an ideal QL communications package might contain, in the hope that the ideas might be developed by a keen reader or software house. As far as possible, details of where to obtain the relevant technical information are given.

The first problem to overcome is the manner in which Sinclair has configured the two serial ports on the QL. They will not support a split baud rate. That makes life difficult, since Prestel, the major U.K. on-line service, requires a modem to receive at 1,200 baud and transmit at 75 baud. Tandata and Qcode overcome the problem by using an interface but there is an alternative.

Any intelligent modem, the Dacom DSL 2123 GT, for example, contains a data buffer. It can therefore handle speed conversions internally, obviating the need for an external interface. Thus the micro-to-modem link can operate at a constant bi-directional 1,200 baud rate and the modem converts that to 300, 1,200/75 or 1,200/1,200 baud operation as required. That is possible with the existing Qcode package using a standard QL serial cable.

Having solved the speed problem, a terminal emulation program to output standard ASCII via the serial port is easy to produce. All that is needed is for the scrolling software to over-write the top line once the screen has filled. Add to the package the ability to change the number of stop bits and parity and it will be suitable for bulletin boards, electronic mail and most on-line databases.

A good deal of tasks are common to most on-line services. Examples are deleting a character and back-spacing or giving the command to log-off a system. Therefore it should be possible to program the function keys to carry-out those common tasks and produce a template so that they can be employed swiftly on-line. The software should be intelligent so that it knows with which service it is dealing. Thus pressing F1 for 'sign off' would produce *90# for Prestel and OFF for Telecom Gold.

File Transfer

The next requirement of an ideal comms package is an ability to support Prestel graphics. A summary of Prestel transmission characteristics and the character code set has been produced by its technical department. They can be sent to genuine enquirers. Telephone Prestel on 01-583 9811.

On the required features list would definitely be a file transfer capability. The on-line community appears to have adopted Xmodem as the standard error-checking file transfer protocol. It was written originally to work on CP/M systems but has gained universal acceptance. Possessing Xmodem will permit the QL to swap files with virtually any other micro.

Xmodem operates by splitting data into blocks to which a checksum is appended. If any corruption occurs the receiving party detects an incorrect value and asks for that particular block to be sent again. The workings of Xmodem have been outlined in a leaflet issued by AFPAS, which is run by Fred Brown at 421 Endike Lane, Hull HU6 8AG. Alternatively, those who have access to a 300-baud modem can read messages about installing Xmodem on John Nolan's TBBS London, Tel: 01 348 9400.

Obviously that package should be up-to-date and therefore would support two other file transfer protocols which are gaining ground rapidly. One is XPC, pioneered in the U.S. by Tymnet and in the public domain. Tymnet U.K. is on 01-900 0955. The other is EPAD, which is being promoted by BT for use on its MultiStream service. Details are available on Freephone MultiStream or 01-920 0661.

Among the advantages with XPC are that it transfers files faster than Xmodem, as well as being able to support several simultaneous on-line sessions over a single line. In theory, a QL user could flick between Telecom Gold and World Reporter — the Datasolve on-line news service — at the touch of a key. In fact, since the QL has two serial ports, the ideal comms package should be able to support two simultaneous sessions via two modems. A QL user could compare information available on Prestel against that available on a rival service such as Pergamon Infoline.

Why support EPAD as well? Mainly because it provides the error-checking for MultiStream, the friendlier BT version of Packet SwitchStream. It is the entry point to a national and international data network to which all the major services are connected. MultiStream is also the favoured data network for Cellnet, the national cellular telephone network.

Macro Potential

Looking into the future, any communications software worth its salt will support Hayes AT modem commands. Hayes Microcomputer Products is the major manufacturer of modems for micro-computers in the U.S. Its command set has been widely adopted, since it provides convenient software shorthand for instructing an intelligent modem. There are commands to suppress echoing of characters and for auto-answering calls. Naturally it will be extremely useful for the QL to be able to operate Hayes and compatible modems. Hayes is on 01-847 4471.

The icing on the cake for the hypothetical communications package would be the ability to create macros. They are self-contained strings of commands which would enable the QL to carry-out an entire communications session automatically. The QL could dial a number at a pre-set time and initiate the modem when the connection was made. That would be followed by an automatic uploading of the correct passwords.

Live Sessions

In the case of an electronic mail service, having logged-in successfully, the macro could then cause the QL to send the appropriate command to read waiting mail. The resulting file is then saved back to tape or disc. Naturally the macro is able to detect when the mail file has ended so that it can sign off. The session completed, a message would await the QL owner's return, indicating that electronic mail had been collected.

Some existing comms packages which support macros require the user to learn a fairly complicated programming language specific to that piece of software. Nowadays macros can be created by recording a live on-line session. It can then be called-up, edited to remove mistakes and then saved ready for use. A single keystroke would be sufficient to initiate a highly-complicated macro.

The majority of these features would be transparent to the QL user. When the software had loaded, it would present a menu listing the major on-line services. Selections could be made with a single key. Q-Con and Terminal Emulator possess a fair amount of what is described. One can only hope the next issues of their software are even more comprehensive.

silicon express

A RANGE UNEQ'L



MICROVITEC MONITOR

* Specifically designed for the QL
* Offers excellent 85 column text performance and outstanding graphics capabilities
* Incorporates high contrast medium resolution cathode ray tube
* Includes tilt and swivel mechanism

INSIDER D
INTERFACE

* Fits snugly into the ca connecting to the mai
* Incorporates complete Toolkit utility and inclu software utility disk
* Full microdrive emulati
* Fast access times e.g. in under 10 seconds
* Full two year guarante

For immediate despatch of goods you can order now by phoning us on Leicester (0533) 374917 quoting your Access card number.

Or fill in and post the coupon - no stamp required - and we will despatch your goods within 14 days

ORDER FORM

POST TO: Silicon Express Ltd., FREEPOST, Rothley, Leicester LE7 7QZ

Please allow 14 days for delivery of postal orders - telephone orders immediate despatch

____ Insider Disk Interface Board @ £113.85
____ Single 80 track double sided 3 1/2" drive system including Insider Board @ £199.00
____ Dual 80 track double sided 3 1/2" drive system including Insider Board @ £270.00
____ Single 80 track double sided 5 1/4" drive system including Insider Board @ £199.00
____ Dual 80 track double sided 5 1/4" drive system including Insider Board @ £270.00
____ Microvitec 1451 DQ3T colour monitor @ £299.00
____ Centronics printer interface @ £29.95
____ New 512K QL with one year warranty @ £325.00
____ 512K internal memory upgrade @ £150.00*

I enclose cheque/postal order for £_____made payable to silicon Express Limited

Name _____

Address _____

_____

_____

PRICES INCLUDE VAT, POST AND PACKING

***For internal memory upgrade, please send your QL RECORDED DELIVERY together with your remittance or Access details for £150.00 to Silicon Express Limited, Silicon House, Fowke Street, Rothley, Leicester. LE7 7PJ**

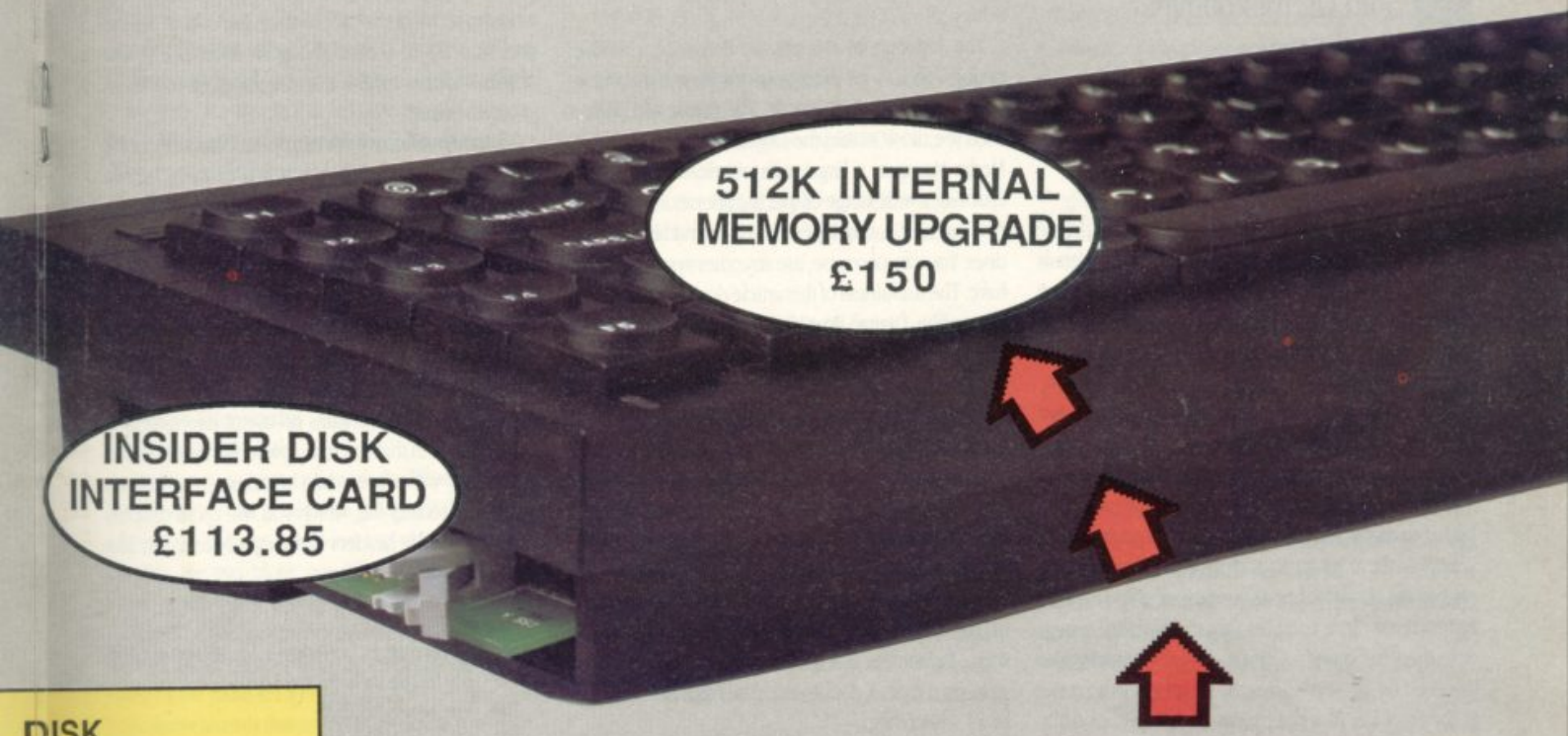


ED

CENTRONICS PRINTER INTERFACE

* Connects QL to any centronics compatible printer
* Plugs into SER1 or SER2 port and directly into printer
* Fully self-contained with 3 metre cable

CENTRONICS PRINTER INTERFACE £29.95



512K INTERNAL MEMORY UPGRADE £150

INSIDER DISK INTERFACE CARD £113.85

DISK E CARD

case of the QL,
nain expansion port
ete ROM - based
ncludes new

ulation facility
e.g. boots 'Quill'
s
ntee

512K INTERNAL MEMORY UPGRADE

* Expands the QL's memory from 128K to 512K
* Leaves the expansion slot free for other boards
* Internally upgraded at our service centre - see address below (NOT FREEPOST)
* 7 Day return service
* Contact our Sales Desk for further details

NEW LOWER PRICES

Complete Disk Systems now include menu driven advanced utility software

DISK DRIVES

* 3 1/2" single or dual 80 track double sided
* 5 1/4" single or dual 80 track double sided

DEALER ENQUIRIES WELCOME

OF DISKS AND DRIVES

The final part of Colin Opie's fascinating insight into QL microdrives and disks.

Last month, in the first part of this two-part article, we looked closely at the formatting and directory details of a Microdrive cartridge. We saw how our files are allocated storage space on a cartridge and how we might begin to recover one or more files which, for some reason, have gone astray.

No-one can deny that disc accesses are relatively fast compared to the cartridge. The speed, although in part caused by an inherently faster device, is partly due to the way in which sectors are allocated to user files. Added to that is that discs are not simply a stream of sectors — there are tracks and possibly sides also to be concerned about. All of those factors give rise to a system much more complex than the cartridge system described last month. Certain design elements, like the need for protection against illegal copying, make recovery of lost files not exactly trivial. It is not really possible to create simplistic utilities to perform automatic file recovery, such as we did for the cartridges. The approach adopted here is therefore different from that of last month.

The format and directory details of discs are covered first. The description is for disc filing systems which conform to the standards laid down by Sinclair Research Ltd. Next we look at a special file which permits us to have direct access to disc sectors. The first two items give us a good basis for any delving we need to do. As noted, however, the QL disc system is non-trivial and a good sector editor, together with various utilities, will be needed if any degree of success is to be achieved.

The last part of this article, therefore, discusses options open to us to recover our files, assuming we have access to a good editor. The editor and utilities used are those within the Digital Precision QL Super Media Manager, a large suite of editors and utilities enabling a wide range of specific operations to be carried-out on QL cartridges and discs and also non-QL discs. You can, of course, use any other system you may have. The usefulness of this article does not depend on having the Digital Precision package. Disk Formata disc is split into concentric tracks of sectors as shown in figure one. A disc may be single- or double-sided. A QL disc consists normally either of 80 or 40 tracks, numbered 0-79 or 0-39, each track having nine sectors.

Sectors are numbered physically at format time from 1 to 9 but the data structures we will meet later and which are used to access those sectors use the values 0 to 8. Each sector can hold 512 bytes of data. So the sectors can store the same amount of data as those on the cartridges; it is simply that there are more of them. Remember that a maximum of 256 sectors can exist on a tape. A double-sided 80-track disc can contain 1,440 of them.

No splicing exists on a disc and that, combined with factors of reliability and homogenity, means that normally all sectors will be good. It would be most rare if a formatted disc did not return with a full complement of sectors — i.e., 1,440/1,440, 720/720 or 360/360. There are three main ways in which the data in a sector is organised, depending on whether the sector in question is a mapping sector, a sector containing directory data, or a simple data sector.

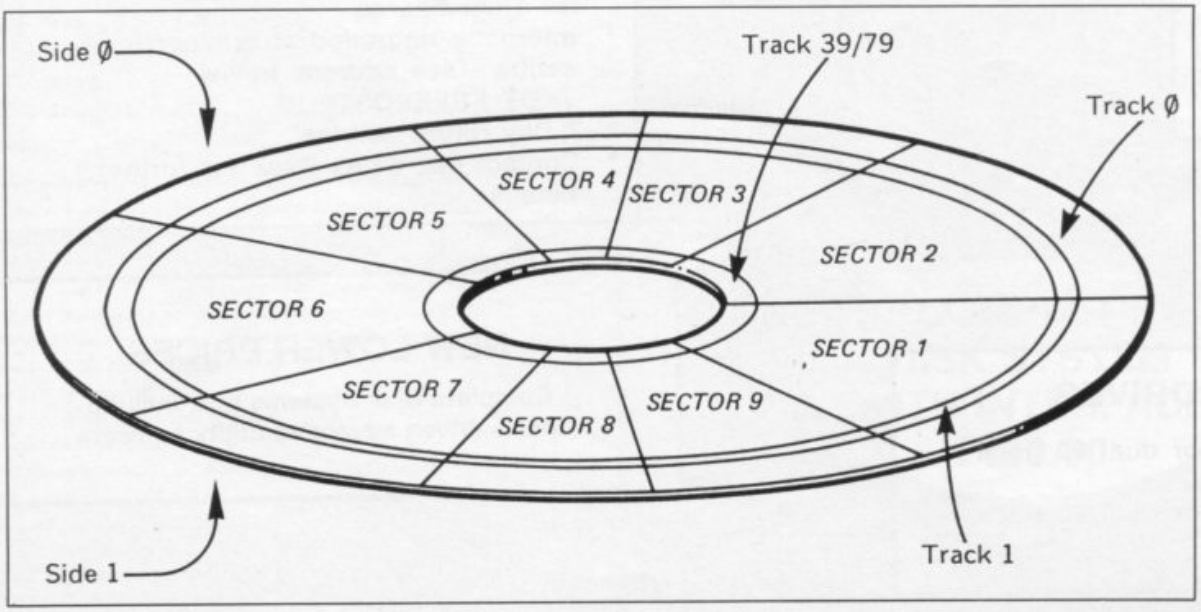
Any file which is to be stored on a disc must be stored in physical sectors. In that respect there is little difference between the tape system and the discs. The system still splits the file into 512-byte blocks and writes each block, or part block in the case of the last one, into a free sector. The main difference is that physical sectors on the disc are allocated to files in groups of three.

Therefore when we talk of a disc allocation block for a file we are talking about a group of three sectors. Each file is given a number which is used as an index into the directory. Initially at least, saved files are allocated numbers from unity upwards — i.e., 1,2,3, . . . The directory of a disc is handled by Qdos in the same way as a user file. The only difference is that, normally, only Qdos has access to that file. Again that is true for tapes or discs. The main difference is that with discs the 64-byte header contains no useful information. It was designed in that way to aid protection methods but it obviously will prove to be a hindrance to us. Instead, only the directory file, which you will recall contains copies of the file headers in the tape system, contains the real file header data:

Byte offset:

- $00 32-bit integer holding file length (bytes). The file length includes the header.
- $04 File access key byte.
- $05 File type byte.
- $06 File information (8 bytes).
- $0E 16-bit integer holding file name length.
- $10 File name (ASCII). Max 36 bytes.
- $34 Date stamp (4 bytes)
- $38– Spare.

The file access byte normally is set to zero. The file or unity for executable programs. In the latter case the



Representation of QL disk formatting. We have selected the side on top, but it could equally be inverted.

first four bytes of the file information field contain the default size of the data space for that program. Note that every file has a 64-byte header; it is just that with discs the file copy of the header is almost meaningless. It still means that only 448 bytes of the file can be stored in the first sector, 'sector a' of block 0. Any subsequent sectors of blocks can contain a full 512 bytes.

We found last month that tape systems use only one sector for the mapping sector but we already know that in disc systems three sectors are always allocated per block. The first allocation block — block 0 — is given over to the file allocation map. That gives us 1,536 bytes to play with. The first 96 bytes of the allocation map are devoted to information about the disc. That leaves 1,440 bytes — an interesting number. Remember that on a double-sided 80-track disc we have 1,440 sectors and that any one allocation block consists of three sectors. That means we can have a maximum of 480 blocks.

It will be no surprise when we find that the rest of the allocation map is split into groups of three bytes, each group of bytes being used to store the corresponding file and block number for each allocation block — see figure two. The high-order 12 bits are used to store the file number and the low-order 12 bits store the block number. Initially, empty blocks are signified by the value $FDFFF.

We know already that user files are saved with numbers ranging from unity upwards and, from last month, that the directory file is file number zero. If, by way of example, file six needs five sectors to store it, two blocks will have been allocated to the file and the mapping sectors will contain the entries $006000 and $006001. Note that this allocation mechanism also explains the two messages the QL produces on formatting a disc and then immediately doing a directory operation on it.

When a disc is formatted a message of the form 1440/1440 sectors appears. That means that 1,440 sectors could be created and all of them were verified as being good ones. If a directory is requested, the title of the medium is given followed, in this case, by '1434/1440 sectors'. That means that of the 1,440 good sectors which exist, 1,434 of them remain for our use — i.e., 717KB of storage. The reason we are six down before starting is that the directory file — file 0 — always exists and starts just one block — three sectors — long and, of course, the mapping sector — file $F8 — always exists and is always just one block — three sectors — long. The 96 bytes of disc information stored at the beginning of the mapping block are:

Byte offset:

$00 4 bytes format ID ('QL5A')
$04 10 bytes medium name (space filled)
$0E 2 bytes format random number.
$10 4 bytes count of updates.
$14 2 bytes free sectors.
$16 2 bytes good sectors.
$18 2 bytes total number of sectors.
$1A 2 bytes sectors per track (normally 9).
$1C 2 bytes sectors per cylinder (9 or 18).
$1E 2 bytes number of tracks (40 or 80).
$20 3 bytes sectors per block (normally 3).
$22 2 bytes block number of dir EOF.
$24 2 bytes byte number of dir EOF (0 to 511).
$26 2 bytes sector offset/track.
$28 18 bytes logical to physical sector table.
$3A 18 bytes physical to logical sector table.
$4C– (spare)

Note that near the end of this 96-byte block there are two 18-byte tables. It has been hinted at already that certain things go on in the background of a disc filing system to keep things fast. These two tables are precisely for that purpose.

To keep serial access to discs as fast as possible, adjacent logical sectors are stored, spaced apart, in physical sectors. The two tales in the 96-byte descriptor define the logical to physical relationship. If we take a double-sided disc as an example, there are 18 sectors per cylinder and they normally will be used in the following order:

Sectors	Side	Allocation block
0, 3, 6	0	0
0, 3, 6	1	1
1, 4, 7	0	2
1, 4, 7	1	3
2, 5, 8	0	4
2, 5, 8	1	5

That means that our mapping block — block 0 — resides in sectors 0, 3 and 6 of side 0, track 0. Moreover, the 96-byte disc definition table will be found at the start of sector 0, track 0, side 0. That latter fact will remain true no matter what type of disc it is — i.e., 40/80-track, 1/2 sided. That clearly is important so that the disc filing system can tell very quickly and reliably what type of disc it is trying to handle.

When moving across tracks a further timing factor is introduced, the sector offset per track value stored at offset $26 in the definition table. Each time a track is reversed a logical/physical sector table, such as is shown, will be modified. Each element in the table, in terms of sector numbers — not sides — is modified to be calculated as:

(original_entry + (track * offset))
MOD sectors_per_track

This offset per track is usually equal to five and therefore we can see that allocation blocks will reside in sectors 5, 8, and 2, in that order, of track 1, side 0.

It is important to keep track of these physical sector allocation tables to make sensible attempts at file retrieval.

Mention has been made of a special file which gives us direct read/write access to the disc sectors. The file name is a code which performs the disc operating system the physical attributes of the disc being accessed:

's' for FM type signal (single density).
'd' for MFM type signal (double density).
filename *dnc, '0' for 128 bytes/sector, '1' for 256, '2' for 512 '3' for 1,024.

We know that QL discs usually are double-density, having 512 bytes per sector. To access sectors on drive 'flp1_' we need to open up the file 'flp1_*d2d'. That gives us a channel but what about reading and writing? That is easy. The file requires a sector to be read or written at a determined absolute file position. The position is given by the formula pos = sector + (side * 256) + (track * 65536).

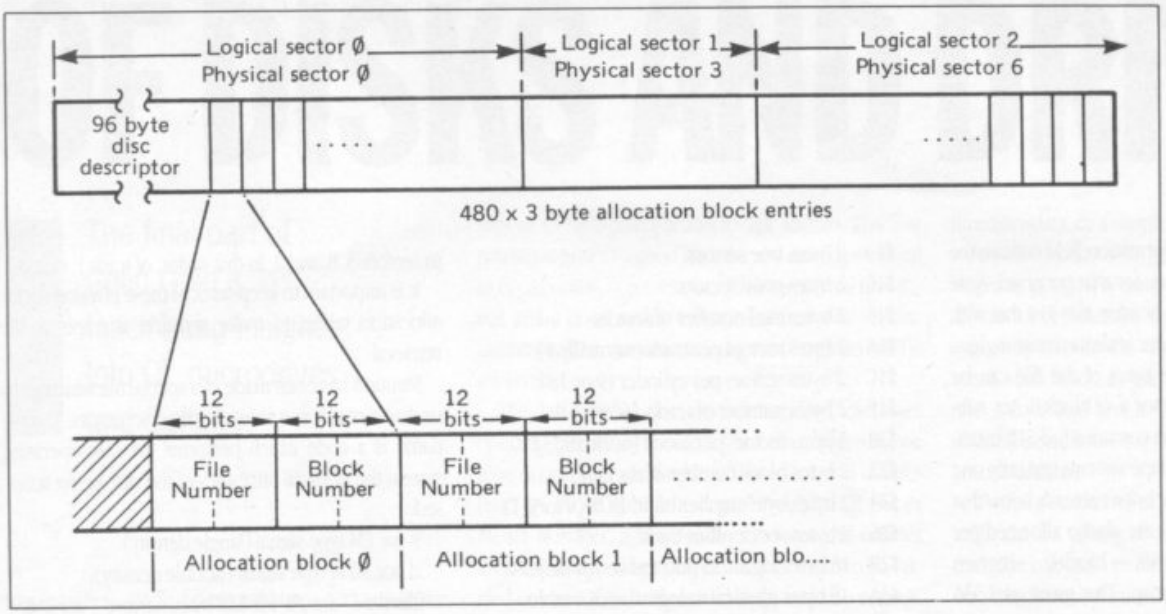
A sector is 512 bytes long and it must be read into a string variable using the extensions GET and PUT which exist within standard disc filing system ROMs. So we now have:

GET#n/p,sector$ — to read a sector.
PUT#n/p,sector$ — to write a sector.

When all is done we close the file channel as normal. Notice that it is much simpler than the extensions forced upon us in the case of cartridges. Note also that the special file and the GET and PUT extensions are part of the defined standard of Sinclair-compatible disc operating systems. If your disc operating system complains at their use it is not Sinclair Research-compatible. Although we have this direct sector access facility and the display extensions created last month, the amount of work involved in making sure we do not perform some grave error during a recovery operation is still mountainous.

If you are just experimenting, you have the basics of the tools to do it, but if you are about to embark on a real life-and-death recovery operation I suggest you turn to a good sector editor and utility package, such as that marketed by Digital Precision — QL Super Media Manager. You have been warned.

Fortunately, Qdos performs few changes to a disc when a file is deleted. Conversely, the disc system keeps only one reasonable copy of a file header — the copy in the directory — and the directory entry is wiped clean when a file is deleted. In any event, the main point to remember is that we can restore successfully more deleted files to the directory only if no file saving has been performed since the delete(s) took place. Clearly if a file has been saved since a delete, there is no reason to suppose that it would not use the directory entry of a deleted file and/or some sectors used to store the original file.



QL disk mapping. Note the means by which each sector has blocks allocated according to a rigid standard.

Let us think of what happens when a file is saved. A file number is allocated to it which, if multiplied by 64, will provide a pointer to the start of the directory entry in the directory file. Sufficient blocks of three sectors will have been allocated to store the file and the mapping sector will have been updated to show exactly which blocks had been used. Remember that this is performed by storing the file number and block number in the three-byte hole associated with any one allocation block — see figure two. When a file is deleted the 64-byte directory entry is wiped clean — compared to the cartridge system where only the first 16 bytes of the directory entry are filled with zeros. That has the important attribute that the file name no longer exists in the directory. The mapping block entries for the erased file are returned to the pool of free ones by having the most significant byte of the three-byte record set to $FD. So, for example, if we take our file number 6 mentioned earlier, the two mapping records will be altered thus:

$006000 —> $FD6000
$006001 —> $FD6001

They are the only two operations performed, though they create much greater difficulties for us compared to the cartridge system. We have no name in the directory, disc sectors do not have block headers which tell us to whom they belong, and the file copy of the file header is incomplete.

Another difficulty arises if there were more than 16 files on the disc. The mapping block entries at least preserve the least significant nibble of the file number and the whole of the block number, so be grateful for small mercies. If the disc contained more than 16 files it is possible that there will be more than one entry, such as $FD6000. For example, one could refer to deleted file 6 and another to deleted file 22. Without patient and careful scrutiny of map entries to physical sector contents there will be no way of knowing which is which.

The only small mercies we have are the slightly altered mapping entries, the fact that although the true file header is next to useless it contains the name of the file, and the fact that all sectors used to store the file remain intact.

I have retrieved a file successfully using the QL Super Media Manager disc sector editor this way — a similar approach should be possible in other systems if they are of real value. First, I obtained a hard copy of all three mapping sectors. That permitted me to peruse the contents easily. Second, the disc sector string search utility was used to find the name of the file. The utility gave a response at offset 16 of a particular sector — the normal file name offset within a header — and informed me the number of the allocation block which would have used this sector when being used itself. That was almost certainly the start of my file. Using the sector editor, I was able to confirm that suspicion.

Reverting to the hard copy of the mapping sectors and the sector editor itself, I made a list of all entries of the form — $FDx000, $FDx001, $FDx002. After that it was possible to scan the sectors associated with the last allocation block for such entries. That enabled me to find the end of my file.

At that point I fed the number of blocks, part blocks, and the offset within the last sector into the specific calculator utility of the editor, which returned the length of the file as a long word — 32 bits. The file lost was file number 5 and the editor was used to re-set the appropriate entries in the mapping block. The editor was then used to insert the appropriate data into the corresponding empty directory slot. Finally, the number of sectors reclaimed — equal to the number of blocks * 3 — was subtracted from the entry for the number of free sectors in the 96-byte disc descriptor.

There is no need to re-set the QL, as is the case with cartridges, and a subsequent look at the directory for the disc showed the file to be there and intact. Perhaps I was lucky and things might not have gone so smoothly. There was only one set of entries of the form $FD5000, $FD5001, and so on. Either way, I think you will agree that the operation is far from automatic and much more complex than its cartridge counterpart. Perhaps it is a case for the motto Who Dares Wins?

Recovering from 'bad sector medium' errors is a little more difficult if such a situation is possible. The main problem is trying to determine what has happened. Is it a totally corrupted mapping sector which is causing the error, or is it a bad sector somewhere causing the disc controller to abort? No matter what else we will try to do, the basis of our recovery attempts is the mapping and use of the individual sectors. If we think that the mapping sector may be satisfactory, we can use it to obtain a list of all physical sectors holding our file. Then it is a matter of reading each sector to see if the controller can do it. The Digital Precision sector editor has a way of telling you of a failure to read without aborting. Re-writing a — dummy at this point — sector may cure the problem and enable the file to be read, even though 512 bytes in the middle may not be highly suitable.

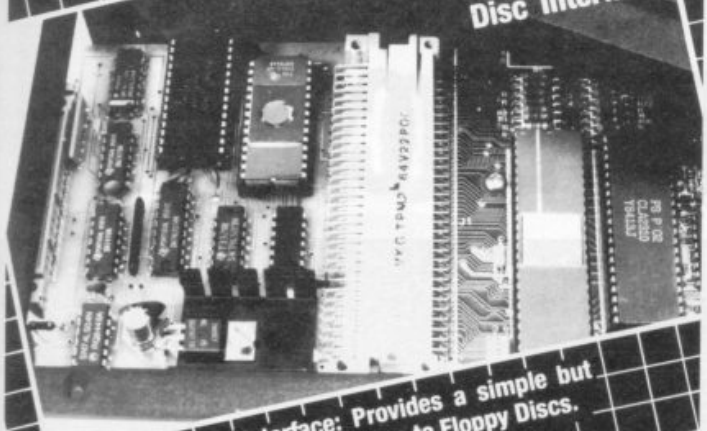
Another alternative is to take an empty block and copy all you can from the block containing the bad sector to the new block, and then update the mapping block accordingly. Note that you should mark the old block as bad and change the appropriate totals for good and used sectors in the disc descriptor block.

If the mapping block has gone east, our troubles really start. In essence, we will have to know — or find out — what is on our disc and determine file lengths, and re-write the mapping block manually. That undoubtedly will take many painful hours, depending on how many files were on the disc and how bad the mapping block is. The choice of doing it or not will depend solely on how desperate you are to retrieve that data. It may also be necessary to re-create the directory file, if that has been upset as well.

It is worth spending a little time scanning through the disc with the editor to determine exactly what the problem seems to be. The point about our recovery attempt under these circumstances is that we want to retrieve as much as we can. If it was the mapping sector which went east, we should still be able to recover all our original files, even if it takes a little time. It is true that, for example, a double-sided 80-track disc will hold about the same amount of data as six or seven cartridges, and the speed of access is undeniably greater, even to the extent of being pleasing.

Despite all that has been revealed here, if you do not keep to the ancient programmers' motto of back up or back out, you will have some taxing work ahead of you, even with the help of a good sector editor.

Kempston QL Disc Interface



Kempston QL Disc Interface: Provides a simple but powerful upgrade from Microdrives to Floppy Discs.

- Microdrive filing system operations are supported.
- QL Toolkit commands included in 8K operating system. Microdrive extentions OPEN, OVERWRITE, RENAME, TRUNCATE.
- File handling commands for direct access. Wild name definition of files. WSTAT, WDIR, WDEL, WDEL-F.
- Job control commands for multitasking under QDOS.
- Compatible with standard independent powered disc drives, 3", 3½" and 5¼".
- Single or multiple Disc Drives.
- Fits compactly inside the QL.
- Complete with a fully documented manual.

£115.00 inc VAT & PP

Kempston QL Centronics Interface



Kempston QL Centronics Interface: New design plugs directly into ROM port, offering several advantages over the serial drivers provided.

- Large buffers for print spooling.
- Automatic form creation.
- File holding.
- Driving software contained in an on-board ROM.
- Allows screen dump on nine different printer formats.
- Comes complete with a metre of cable, centronics connector and a concise manual.

£39.95 inc VAT & PP

Available directly from Kempston Micro Sales Ltd. Singer Way, Kempston, Bedford MK42 7AF. Tel. (0234) 856633 Please send me:

☐ **Kempston QL Disc Interface £115.00** ☐ **Kempston QL Centronics Interface £39.95**

Access/B.Card _____ Signature _____

I enclose a cheque/P.O. for £ _____

Name/Address _____

QLW

All prices include VAT and P&P. Overseas add £4.00 P&P

Save £20 on the MT80+ printer

QUALITY PRINTING FOR AROUND £199



From Europe's leading matrix printer manufacturer

- ☐ 80 column, 100 cps optimised bi-directional print
- ☐ Expanded, compressed and bold print plus italics
- ☐ Dot addressable and line graphics
- ☐ Friction and tractor feed
- ☐ Quick tear facility
- ☐ Easy change cassette ribbon

Now the MT80+ from Mannesmann Tally is even better value-for-money! Simply cut the voucher and hand to your nearest dealer upon purchase to claim your £20 discount (inc. VAT). Full information on the amazing MT80+, plus the name of your nearest stockist is available by ringing the number below.

(0734) 791533/791619

MANNESMANN TALLY

£20 THIS VOUCHER ENTITLES THE BEARER TO £20 OFF THE MT80+

Please complete all sections below in block capitals. One voucher per printer. Offer ends March 31st 1986.

Name _____ Address _____

Printer Serial No. _____ Signature _____

Date _____ Computer used _____

Dealer conditions Mannesmann Tally guarantee £20 (inc VAT) refund upon receipt of voucher and copy of proof of sale. Send to MT Direct, Mannesmann Tally Ltd, Molly Millars Lane, Wokingham, Berks RG11 2QT. Vouchers must be received at Mannesmann Tally by April 30th 1986. Don't forget your own name and address. Further information available from MT Direct on (0734) 791533/791619. VAT NO. 199-6679-73.

24 HOUR PERSONALLY ANSWERED FREEPHONE 0800 400 402.

REVIEW

THE UNPREDICTABLE

Phil Staniforth continues his guide to QL astrology with a review of Digital Precision's 'Super Astrologer',



= SUPER ASTR

BEING AN EXPERIENCED astrologer and keen QL user it has been a delight to find a program which lives up to the potential of the QL and to the art and complexity of astrology. *Super Astrologer* has been compiled into machine code by the other Digital Precision new release, *Supercharge*, and as such is superbly fast.

The program is in fact about 210K long and is on two cartridges which can be loaded in my version of QL SuperBasic (JM) in less than 30 seconds. Comparisons between the pre-release SuperBasic version (1.0) and the compiled version (1.4) now on release are given.

Super Astrologer is the first astrology program for the QL and as such is a highly-ambitious affair. It presents not only a means of calculating a birthchart and the various technical data associated with it but also gives a four-page character interpretation culled from more than 100K of text to browse through.

That part of the program can suit all tastes, for if you

E MICRO



Illustration by Paul Robinson

ROLOGER

do not know much about astrology, at least there is something to read. Whereas for the more knowledgeable the ability to alter and enlarge the text — with the screen editor which is part of the package — to suit personal ideas and taste will prove irresistible.

The theme of personalising the program has been carried further with the inclusion of a character editor for the astrological glyphs. The editor is very neat, as it maps out the symbols on a large grid, then you use the arrow keys to move round and then press the space bar to delete or add to the shape. I had great fun with it and quickly re-designed the astrological symbols to my preferences.

Another feature of the program is the Astro Test, by which you can compare your chart to that of someone else for compatibility. You will need to know something of astrology, as the information that part of the program provides is more technical. No text is provided; you could, of course, write your own.

The space bar is used throughout the program to move from one display screen to another. After an information screen on how to enter birth data, the start-up screen presents you with five options. The first is to change the graphic defaults of the background colours and also the colours of the planetary symbols to suit either a monitor or a TV.

The facility to save birth information and call it up again is an important and useful feature. Super Astrologer allows you to save up to at least 190 birth files on a micro cartridge and 1,300 fit on a DS/DD diskette. They are saved with the prefix BD_(filename) and then can be loaded back via Microdrive 1 and 2, whereupon the program automatically calculates the chart for the birthtime loaded.

I mention this now as the option screen has been very well thought-out and once you have begun to save a number of birth times you begin to realise how useful it is. Pressing options <1> or <2> switches you to each Microdrive respectively and displays the directory of a cartridge in each. At the same time it switches the other two options automatically to Load <l> and Display <d> files to the corresponding Microdrive.

That obviates any swapping round of cartridges to get them in the correct drive to carry-out operations. Most of the work has been done for you but the Display and Load options are not fully error-trapped. If you ask for a file which does not exist on the cartridge you are accessing the program will crash, so be warned — check that the file you want is there before making this fatal error.

You can, of course, take no notice of the options and press the space bar and move on to inputting the details of a new chart — name, time, and so on. That is fairly straightforward, though care should be taken to understand the differences between British Summer Time, Zone Times, and Greenwich Mean Time. Digital Precision thoughtfully has provided a table of British Summer Times for this century in the accompanying manual. If you make any errors you are able to backtrack easily and correct your mistakes.

After the initial entry of your birth details, the program presents you with a number of options, ranging from screen layouts of your chart in text form and in the traditional form of a horoscope wheel, to planetary aspect grids. You can also look at future positions of the planets in relation to your chart with the progressions option. If your knowledge of astrology is slight or non-existent, the aspect grids and progression options are best left alone until you have learned more of astrological techniques.

Except for the graphic horoscope screens, you have the choice to print-out each screen of birth data and information as you proceed.

The program has made a reasonable attempt to interest the astronomer, with the choice to display the solar system astronomically for the date of your birth. You can also magnify and zoom the display larger or smaller. It also lets you play with the projection of the display by changing your angle of view. Distances of planets from the earth on the day in question are also shown.

The jewel in the Super Astrologer crown, especially for the uninitiated, is the printout available on character analysis. It is four pages long and is good enough to interest, amuse, and will have your friends clamouring for more. I can bear witness to that as the dust has not settled on my printer from the amount of requests from friends since they learned of the program.

Overall, Super Astrologer succeeds very well. It is accurate and comprehensive for the experienced and discerning astrologer, easy to use for the beginner, with the added bonus of an end-product. The display screen could certainly have had more attention lavished on it, as fewer than 30 percent of QL owners have good resolution monitors; the graphics were designed specifically with the <F2> TV mode and monochrome monitors in mind.

It is an excellent program which does its best to cater for all tastes. At £21.95 it is extremely good value as you get not only the astrology program but various other utilities, such as the Editor which can be used on any SuperBasic program, within limits. You certainly will not find as good an astrology program as this on any other home computer.

Super Astrologer	Load time
Compiled	29 sec.
SuperBasic	4 min. 30 sec.
Chart Calculation (text) screen	**Display time**
Compiled	9 sec.
SuperBasic	40 sec.
Graphic Screens	**Display time**
Compiled	6 sec.
SuperBasic	15 sec.
Aspect Screens	**Display time**
Compiled	3 sec.
SuperBasic	18 sec.

MIRACLE SYSTEMS

— 14 day money back guarantee on all products —
— 12 month warranty on all products —

QL CENTRONICS PRINTER INTERFACE £29.95
- ★ Complete unit including 3 metre cable
- ★ Plugs into either SER1 or SER2

QL SERIAL CABLE £7.50
- ★ 3 metre cable

QL JOYSTICK ADAPTOR £4.99
- ★ Lets Atari/Commodore/Spectrum joysticks plug into CTL ports

QL SCREEN DUMP £4.99
- ★ Copies whole or part of screen to Epson compatible printer

QL DOUBLE EXPANDER £39.00
- ★ Connects both RAM and DISK to QL (Not necessary for MIRACLE EXPANDERAM)

QL MODAPTOR £39.00
- ★ Links QL to 300/300, 1200/75, 1200/1200 modem

QL MOUSE ..... (Please call)

QL EXPANDERAM 256 ..... £95.00
- ★ 256K RAM with through connector for DISK I/F

QL EXPANDERAM 512 ..... £125.00
- ★ 512K RAM with through connector for DISK I/F

QL RAMDISC SOFTWARE £14.95
- ★ Configures RAM as disk lookalike
- ★ Ideally suited to **MS EXPANDERAM**
- ★ Enables Microdrive software to run much faster with less wear on microdrives
- ★ Fully compatible with Psion packages, SuperBasic etc.

MIRACLE SYSTEMS LTD
AVONDALE WORKSHOPS
WOODLAND WAY
KINGSWOOD
BRISTOL
BS15 1QL

Please send CWO.
Access order welcomed.
Send SAE for catalogue.

SINCLAIR and QL are trade marks of Sinclair Research Ltd
Tel: (0272) 603871 Ext 210

Micro Anvika

COMPUTERS & PERIPHERALS
224 Tottenham Court Road, London W1P 9AF
Tel: 01 – 636 2547 Telex: 946240 CWEASY G
EASYLINK 19010170

QL SOFTWARE

LETSURE

Citadel	£9.00
BJ Return	£10.00
Spook	£10.00
BJ 3D Land	£12.00
Match Point	£13.00
Steve Davis Snooker	£13.00
QL Pawn	£18.00
QL Adventure Classics	£9.00
QL Fictionary	£13.00
QL Bounder	£9.00
Chess (Psion)	£18.00
Cosmos (Talent)	£13.00
Astrologer (Digital)	£22.00
Qdraw	£13.00
QL Paint (Talent)	£23.00
Super Bachgammon	£13.00

Special Introductory Offer

CITIZEN 120D Printer features include:

120 cps draft
25 cps NLQ
4K buffer
tractor feed
friction feed
cartridge interface
2 years warranty

£225.00 including Miracle System Interface & VAT

BUSINESS

ICE	£24.00
CHOice	£14.00
Ice Toolkit	£9.00
Artice	£12.00
Qapelt	£19.00
Qapelt (Disk)	£24.00
Decision Maker	£35.00
Project Planner	£35.00
Entrepeneur	£35.00
Intergrated Accounts	£83.00
Cash Trader	£54.00
Mailing List (Trans)	£14.00
Stock Control(Trans)	£14.00
Appointment Dairy	£24.00
Archiver	£17.00

SCRABBLE JUST IN – £14.00

LANGUAGES

Digital Basic Compiler	£53.00
" Forth+Reversi	£26.00
" Super Monitor	£18.00
" Super Sprite	£24.00
Metacomco 'C'	£85.00
" Pascal	£79.00
" Lisp	£51.00
" BCPL	£51.00
" Assembler	£33.00
GST Macro Assembler	£58.00
QL Assembler	£28.00

QL Computer with Version 2.3 Software	£195.00
Microvitec Cub 1451/DQT3 with Stand	£270.00
Philips 8M7502 Green Screen with cable	£89.00
Cumana single 3.5 720K disk drive with	£189.00
Cumana Dual disk drives	£279.00
Above disk drive include Cumana disk interface	
Epson LX 80 printer	£245.00
Taxan Kaga KP810	call for latest price
Sinclair printer	£139.00
Miracle System Modaptor with Qcode term S/W	£38.00
Miracle 512K Expanderam	£119.00

All prices include VAT. Postage on orders above £15.00 is free. Add 50p to order under £15.00. Please add £6.00 for delivery of printers, monitors and diskdrives. Overseas orders are welcomed.

MICRO ANVIKA at (Euro Cafe Store) 224 Tottenham Court Road, London. W1P 9AF.
Tel. (01) 636 2547 Telex :946240 CWEASY G Attn: 19010170
come and visit us at our new shop at 220 Tottenham Court Road London W1.....

PRINTERLAND

ORDERED TODAY – DELIVERED TOMORROW

VISA
MAIL ORDER ONLY

Free... WITH ALL PRINTERS: QL USERS PRINTERS GUIDE · We supply a **free** booklet with all printers which explains how to obtain all the features available on your printer.

KAGA TAXAN KP810	£209-00	£240-35

■ DOT MATRIX	EX VAT	INC VAT
SHINWA CP A80	£165-00	£189-75
EPSON FX80 F/T+	£314-00	£361-10
EPSON FX100 F/T+	£425-00	£488-75

■ DAISY WHEEL		
QUENDATA 1120	£225-00	£258-75
EPSON DX100 SPECIAL OFFER	£356-00	£409-40

■ DOT MATRIX PLUS NEAR LETTER QUALITY		
EPSON LX80 GOOD OFFER	£190-00	£218-50
JUKI 5510 (colour option)	£249-00	£286-35
CANON 1156 17" CARRIAGE	£335-00	£385-25

■ COLOUR PRINTERS		
EPSON JX-80 SPECIAL OFFER	£450-00	£517-50

■ PRINTER INTERFACES		
MIRACLE SYSTEMS	£26-05	£29.95

■ COMPUTERS		
SINCLAIR QL ONLY	£173-05	£199-00

■ DISC DRIVES	EX VAT	INC VAT
Prices include power supply and interface.		
MICRO PERIPHERALS		
3½" SINGLE DRIVE SYSTEM (.75 MBYTE)	£241-00	£277.15
3½" DUAL DRIVE SYSTEM (1.5 MBYTE)	£365-00	£419-75
PCML DISK INTERFACE + 256K RAM & TOOLKIT		
INTERFACE	£240-00	£276-00
3½" DUAL DRIVES	£169-00	£194-95

■ MONITORS		
PHILIPS 7502 GREEN	£75-00	£86-25
MICROVITEC CUB 1451/653	£220-00	£253-00

■ MODEMS		
TANDATA (complete system including FREE TELECOM GOLD/PRESTEL)	£173-00	£198-95

■ SOFTWARE	
	RING FOR BEST PRICES

COMPLETE PACK SPECIAL OFFER

THE WORLDS BEST PRICES ON QL/MONITOR/PRINTER PACKS
Package includes: SINCLAIR QL, MICROVITEC CUB563, PRINTER & ALL LEADS AND INTERFACES

WITH EPSON LX80 F/T	£619-00	£711-85	WITH CANON 1080	£652-00	£749.80
WITH CANON 1156	£842-00	£968-30	OTHER PRINTERS ON REQUEST		

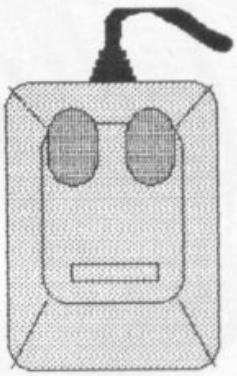
EDUCATIONAL · GOVERNMENT OVERSEAS ORDERS WELCOME

PRINTERLAND
NOW ONLY 3 MINUTES FROM JUNCTION 23 M62
(MANCHESTER 25 minutes/LEEDS 20 minutes) NB. FROM EAST USE JUNCTION 24
156 LONGWOOD GATE, LONGWOOD
Tel HUDDERSFIELD (0484) 646048/9

ABC Elektronic

Huegelstr. 10 – 12 4800 Bielefeld 1 Western Germany

proudly presents the Giga Soft



Mouse

for the SINCLAIR QL

The Giga Soft Mouse comes in a ready-to-use package including a high quality mouse (resolution 0.01″), an interface for the joystickport of the QL and a software package.

The software consists of the following programs:



Giga – Basic **(Tested in QL USER 1/86 p. 58)**

A totally new type of Basicextension for the SINCLAIR QL. It adds more than 70 new commands to SuperBasic. Features:

- Full mousecontrol from Superbasic
- Easily programmable *MACINTOSH* style pull down menus.
- Very sophisticated spritanimation commands.
- Programmable function keys.
- Comfortable texteditor like Basiceditor with 20 functions.
- Commands to program real windows (with background refreshing)



E. A. S. E.

The new MACINTOSH style desktop

Easily Applicable System Environment

- E.A.S.E. is completely mousedriven.
- E.A.S.E. supports real pulldownmenus.
- E.A.S.E. can work with up to 7 real windows.
- E.A.S.E. has an inbuilt scientific calculator.
- E.A.S.E. has an inbuilt puzzle game.
- E.A.S.E. gives you full I/O control, all functions can easily be accessed by using the mouse.
- E.A.S.E. windows can be scrolled and moved across the screen. The size of a window can be changed by using the mouse.

COD £222 DM Ex FRT Cheque with Order £210 DM Ex FRT

How to Order:

1. Send cheque to ABC or
2. Transfer money to Postcheckamt, Dortmund, Account Mr. Budde No. 90283469 or
3. Send an order to the above address. We will despatch it cash on delivery.

Diary of a QL User

PART TWO

The second and concluding (possibly) part of our dipsomaniac's diary. Samantha Mead.

FLUSHED WITH SUCCESS and gin, I plug in the QL to attempt my second Quantum Leap into the intricacies of Sinclair sophistication, only to discover since last month I have mislaid the manual. A fearless foray into freelance programming convinces me I must find it again, fairly rapidly. Perhaps it is under the stairs with the empties.

Safely retrieved, the manual falls open at QUILL, page 24, PRINT. Now that is just the smallest bit tactless, because I haven't been able to track down a printer lead yet.

Once upon a time, nice Sir Clive used to send you a printer lead for being patient about all the delays and things but now that nice Mr. Dixon is selling QLs as complete packages, you have to buy the lead separately from another computer dealer, who does not seem to have one at the moment. Such is progress.

I am beginning to understand the term cursor. Nothing if not resourceful, however, I proceed with loading and copying my Quill Microdrive cartridge, on the grounds that I am unlikely in my present frame of mind to write anything printable anyway.

Having turned to page 2 of Quill section I read "Load Quill as described in the QL Program Introduction," which is not designated as such in my manual. It looks as if I will not be writing even the unprintable at this rate — whatever happened to Computer Assisted Learning? Finally, put cartridge to Microdrive and settle down to work.

"Place the master cartridge in Microdrive 2", it says, and then "Wait until the Microdrive lights go out before removing the master cartridge from Microdrive 1".

After minutes of whirring and flashing of lights between Microdrives, I am willing to believe the Quill cartridge has changed Microdrives in mid-clone but it appears only to be a misprint. It still caused me a nasty frisson or two, after all the dire warnings about what formatting does to your programs, and the need to protect the original at all costs. Still the process seems to have worked and now I have one intact Quill original and one working, back-up copy. Bet Shakespeare never had so much trouble with his quill.

Load Quill and am presented with a mess of on-screen spinach which finally resolves itself into many neat, well-thought-out instructions, like PROMPT, and New Para, CTRL, Typeface, *, and the like. Mercifully, there is also ESCAPE. Take firm CTRL of my rising hysteria, and PROMPT myself to remember that I am familiar with word processors, and that Quill, while "sophisticated and designed to give me maximum power and flexibility, is nevertheless easy to learn and use." Secure in that knowledge, I head for the kettle and strong black coffee.

Back at the keyboard — no, I have not used the little plastic feet which tip the keyboard to a comfortable typing angle — not only can I not use a QL yet, I cannot touch type either. Anyway, they fell off. I try to move the cursor, which refuses to do anything until it has some words to move across. At least it is honest about its non-co-operation. Wordwise, for example, has an infinitely movable cursor, which does not create spaces for you even when there is text present, but it takes valuable time to discover that fact.

Once there are some words on-screen, however, the cursor, which thankfully does not flash, leaps around by words and paragraphs with efficient economy. Automatic justification is a welcome feature but I cannot change the indentation of my paragraphs until Chapter 4. I dislike this dodging-about-the-manual technique. I know there are excellent reasons from the authors' points of view but, as a beginner, I am in no mood to be reasonable. I believe I may have referred to Quill as light relief last month. Well, we all make mistakes.

While I am grateful for the fact that pressing ENTER does at least result in paragraph indentations, whether they are to my liking or not — Chapter 4, where are you? — I decide in mid-sentence that I really do not like having to press two keys to delete one letter. It is not so noticeable when you are playing with programming but when you are typing-up a storm with two fingers, it is decidedly irritating. Also, the SHIFT key is in the wrong place, although Sinclair is in good

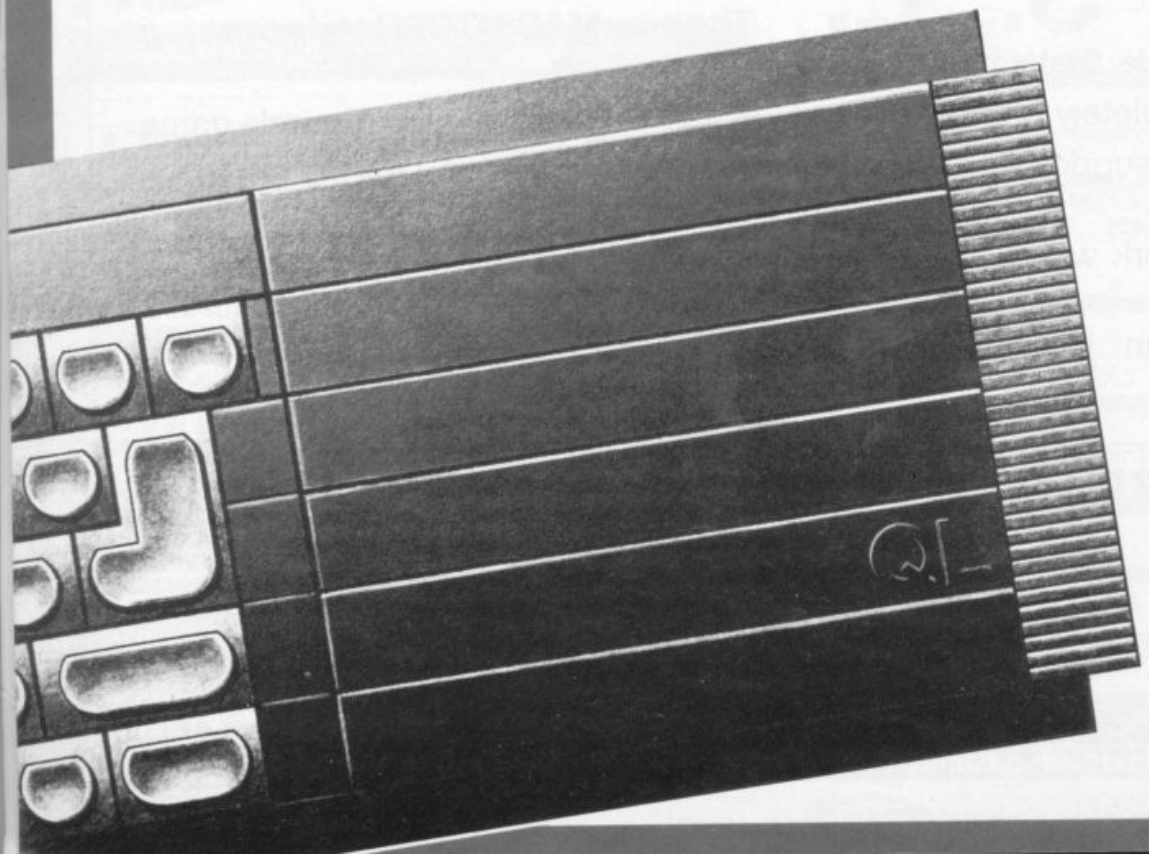


Illustration by Steve Dew



company there, with the Amstrad 6128 displaying the same layout. Why is the CAPS LOCK key so close to SHIFT and CTRL? I ask just out of AcaDEmic INTEresT . . .

Something else which arouses my academic interest is the creation by me of a spare 0 in the middle of my text. Before I have a chance to delete it, it is shunted neatly down the screen where it sits two lines below my text, in the right-hand margin, while I continue to type. When I try to pick it up with the cursor, it hops back into the sentence I am typing and allows itself to be deleted in the usual way.

I offer this gem purely for what it is worth. I can find no explanation and I would not presume to speculate. I am sure it could be a most useful feature of a word processor, creating letters which wait quietly until called for . . . I bet I can't do it again.

There is something else I can't do again. I can't reload my carefully-copies version of Quill. When first I copied it, I loaded it and ran it with no problems. Then I made what appears to have been a fatal error — I finished work for the day, turned off the computer and went away to do various inessential things like eating and sleeping. Today, I return invigorated to the challenge, put the Microdrive cartridge with my copy of Quill on it into Microdrive 1 and watch in disbelief while it whirrs to a stop and throws up a message, "At line 8 bad or changed medium".

Further, an attempt to LIST the program results in a curt "Channel not open". To add insult to injury, I haven't got past the title screen. What I want to know is if it was good enough yesterday, why is it bad today, and if it is not bad, who changed it when I wasn't looking?

I decide to load the program again, using the alternative method lrun mdv1_boot, and get the same result. Now I have to determine whether the problem lies with the original Quill, from which the program was copied, with me, with the Microdrive cartridge I used, or, God forbid, with the QL — and there is only two weeks to my deadline.

I have established that Quill is in working order, so embark on FORMATing a new cartridge to copy it again. Expert points out that now that I am familiar with some programming principles, I should have realised that I can format the cartridge several times automatically by placing the FORMAT command inside a FOR-NEXT loop. That, says expert, will save a good deal of key-pressing and general fiddling, as indeed it does. I just wish I had thought of it myself. The only thing I seem to be really good at is finding bugs which no-one else knows about. I seem to have strayed a long way from an assessment of Quill as a word processor. It will help enormously if I can only get the wretched thing to load again.

I seem to be back in business and am thinking hard about what went wrong with copy 1. The only explanation I can find has to do with the rogue 0 and the SAVE facility. I understood my manual to say that I need a second cartridge only if I am SAVEing more than three pages of text, so I was entitled to use the Quill copy cartridge to SAVE my deathless prose. Something upset it, however, and I never found what the stray 0 was doing. Presumably it gave my cartridge indigestion, since that same cartridge has now taken a second copy of Quill which loads without trouble. The whole incident must take its place among the unsolved mysteries of the world, while I return to the merits of Quill I reach the end of Chapter 1, Getting Started, with a sense of having overcome insuperable odds. There must be easier ways of earning a living.

Chapter 3 makes a diplomatic start by telling me that if I make mistakes in typing text using Quill, it is a good thing, since it will give me plenty of practice with the editing facilities. I begin to see why teachers have been known to recommend it as suitable for children of "lower ability".

The editing facility is logical, however, and works well, and I like the option of over-writing text — very useful for journalists with a libellous turn of phrase.

I also like the different typeface options, which allow instant emphasis in a variety of ways, a detail conspicuous by its absence from many better-known word processors. Quill will underline, present text in bold type or adjust the position of characters above (High) or below (Low) the line of text. It will also — and this I find fascinating — reproduce a particular typeface if the cursor is moved back into a section which features it. Thus if you type a sentence in Bold, revert to Normal, and then back-track to the Bold sentence, Quill will produce an insert in Bold typeface without your having to tell it to do so. Clever stuff.

It is cute, too, when it comes to controlling the wilder excesses of those who live by the word, be it technical, scientific or creative. There is an ominous little sentence tucked away in the manual which says that if you type-in unusually large quantities of extra-long hyphenated words you may suffer the ignominy of "unpleasant" spaces in your otherwise professional-looking text. Try typing-in, "The anti-disestablishmentarianists' confabulations on the ecclesiastical environmentalist issue was indisputably interpreted by hierarchichal bureaucracies as radical fundamentalism" — and see what happens.

Clearly, this feature of Quill is the Psion contribution to the literacy, not to mention sanity, of a nation. There is, of course, an easily-usable ERASE command for the removal of large blocks of text, which will naturally dispose of "unpleasant" spaces at the same time — and don't do it again.

All those features, together with the "powerful" — I can't think of a better word than the one in the manual — editing, formatting and file operations facilities, are invaluable, both to beginners who want a word processor to live up to its public image as producer of perfect text and to competent users who require speed and professional presentation with minimal fiddling. What more could you ask?

The problem, of course, is that the more established word processors become comfortingly familiar and almost endearing in their shortcomings, to their users, so that the excellent Quill will not necessarily make friends and influence people merely by being very good. There are some who would resent its efficiency, on the grounds that they enjoy being able to feel superior to a high-tech machine.

I am acquainted with several users who should know better, including one avowed afficionadao of the QL who still uses good old Wordwise, despite knowing all there is to know about the advantages of Quill; and, as one who is using Wordwise now, I can assure you that the Quill advantages are obvious to the most incompetent novice.

Having enjoyed this month a relaxing wallow in the depths of one of the best word processors on the market, I shall re-stock the drinks cabinet in time for the next assault on programming the QL, as well as a brief excursion into hooking the micro to my printer — it should not take long, once I have a lead, should it? — and in the meantime, I might just load free cassette number five, the one which simply says Games on the cover. I don't think I'll bother to mention that to the editor.

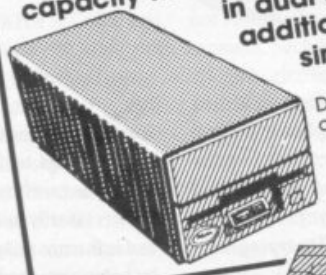
Viglen

offer the best alternative to the microdrive

Speeding up your data access with Viglen disc drives means instant reliable access every time

Specially designed to fit neatly into the case of the Sinclair QL, the Q-Disc Interface Board (CST) and companion disc drives are colour-matched to compliment your QL computer.

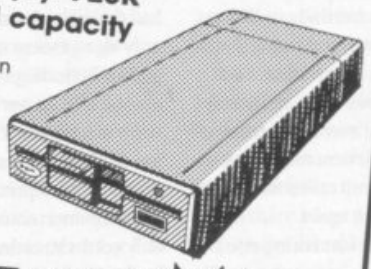
3½ inch Single Drive 720K formatted capacity with built-in power supply, in dual case for later addition of a further single drive unit



Drive in its own case **£119**

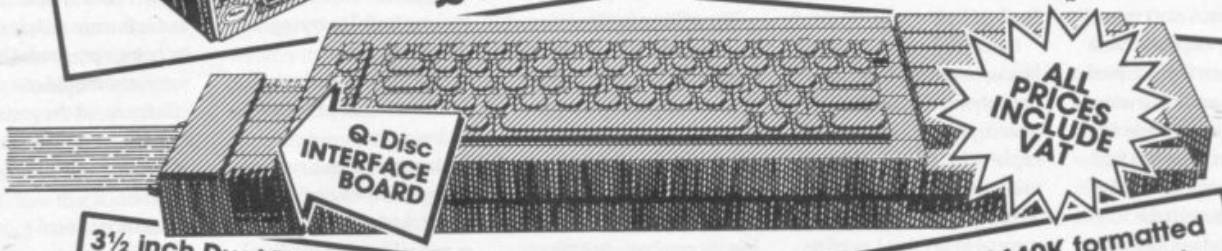
Drive with Q-Disc Interface **£194**

5¼ inch Single Drive with built-in power supply. 720K formatted capacity



Drive on its own **£129**

Drive with Q-Disc Interface **£204**



3½ inch Dual Drive 1440K formatted capacity with built-in power supply



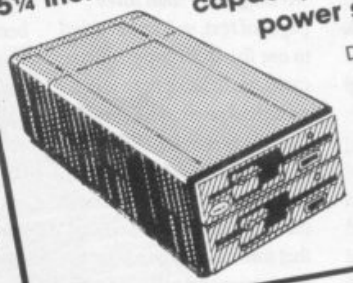
Drive on its own **£209**

Drive with Q-Disc Interface **£284**

Prices correct at time of going to press. Offers subject to availability.

Visit our showroom
Open Monday – Friday
9.30 – 5.30
Saturday 9.30 – 4.00

5¼ inch Dual Drive 1440K formatted capacity with built-in power supply

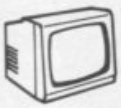


Drive on its own **£239**

Drive with Q-Disc Interface **£314**

All drives are compatible and ready to plug in and use with all currently available QL Disc Interfaces. When bought with the Q-Disc Interface, they are ready to plug in and use.

Other peripherals for the QL



MONITORS	Philips Monochrome Green Model BM7502	£85
	Philips Monochrome Amber Model BM7522	£89
	Philips Colour TV/Monitor Model 1114	£199
	Philips Standard Resolution Colour Monitor CM8501	£199
	Philips Medium Resolution Colour Monitor CM8533	£299
	Taxan Kaga KP810 – Canon PW1080A	£229
PRINTERS	Quen Data Daisy Wheel Printer	£199
	Serial to Centronics Interface lead for above printers	£25
	Centronics GLP including Serial lead – ready to plug in and use	£149
	Perspex printer stand for: 80 col. printer	£16.95
	136 col. printer	£27

Carriage
Please add £12.00 carriage for disc drive, £8 for printers and monitors, £3 for printer stands.

**Unit 7,
Trumpers Way,
Hanwell W7 2QA.
Tel: 01-843 9903**



Post to: VIGLEN COMPUTER SUPPLIES.
Unit 7, Trumpers Way, Hanwell W7 2QA.
Credit card holders may order by telephone on 01-843 9903.

Please send me _____

I enclose Cheque/P.O. for £ _____ including carriage.
Make cheques payable to Viglen Computer Supplies.

Name: _____

Address: _____

_____

_____

I prefer to pay by ACCESS/BARCLAYCARD (delete one).

Card No: _____

Credit Cards valid only if signed by card holder. Address must be the same as card holder.

Signature: _____

BOOKMARKS

Nicky Trevett reviews selected books for the QL and computing in general.

The trend these days is to make microcomputers and software so easy to use that almost anyone can run a program without having the faintest idea what is making it all happen.

That is satisfactory if you are a nervous newcomer to computing, or busy running a business without the time or desire to enmesh yourself in bits and bytes. If all you want is a tool to help you organise your work more effectively, there is no reason why, with sophisticated technology and skilled, professional programmers around, you should have to wrestle with programming languages, operating systems and the like.

At the same time, it seems a pity that a machine as powerful and ingenious as the QL should remain a mystery to its owner when it can do so much more than simply run a pre-packaged application for you. No-one should be frightened of experimenting with SuperBasic for themselves.

Books like Alan Shinwell's *Practical Guide to QL Graphics and Sound* which are written expressly to guide the not-particularly-technical user through the hidden facilities provided by the QL are therefore very welcome, especially when they manage to strike the right note between informative technical reference and chatty text book.

This book is a member of Longman's *Working with the Sinclair QL* series and costs £7.95. Others in the series cover SuperBasic, Quill, Archive and Abacus. It claims to be suitable for all QL users, including the absolute beginner, but since knowledge of SuperBasic and familiarity with program listings tends to be assumed, the novice would soon be floundering.

Since a large part of the book deals with the graphics keywords provided by SuperBasic, and therefore involves a certain amount of programming, the beginner would be well-advised first to get on nodding terms with SuperBasic.

The author also insists that "mathematics can be largely avoided in programming", implying that he does not consider such things as matrices, x- and y-axes, binary numbering, cartesian co-ordinates and so on as real mathematics – Shinwell is a chartered electronics engineer. He does a good job of explaining the more arcane terms as they occur but you will feel more at home with graphics programming if you have O level mathematics.

An introduction to everything else relevant to the exploration of graphics on the QL is, however, to be found in the opening chapter, including some practical but rarely-found advice on output devices. Should you buy a television set or a monitor and what is the difference anyway? What is resolution, modulation, RGB and UHF, a pixel? The chapter ends, like most of the others, with textbook-style problems to make sure it has all been assimilated.

By far the largest segment of the book is given to SuperBasic graphics keywords. They are not listed alphabetically but divided into sections – colour and contrast; windowing; points, lines and curves; text presentation; and turtle graphics. In accordance with the book's stated aim of being practical, there are short programs throughout which apply the programming principles to everyday use.

Only two chapters are devoted to the graphics program supplied with the QL, Easel. Many people who have not explored SuperBasic think graphics on the QL equals Easel, which turns data into graphs. There are several books available which treat Easel in exhaustive detail but the program is so straightforward in its aims and usage that the author manages to deal with most of the salient points in a few pages.

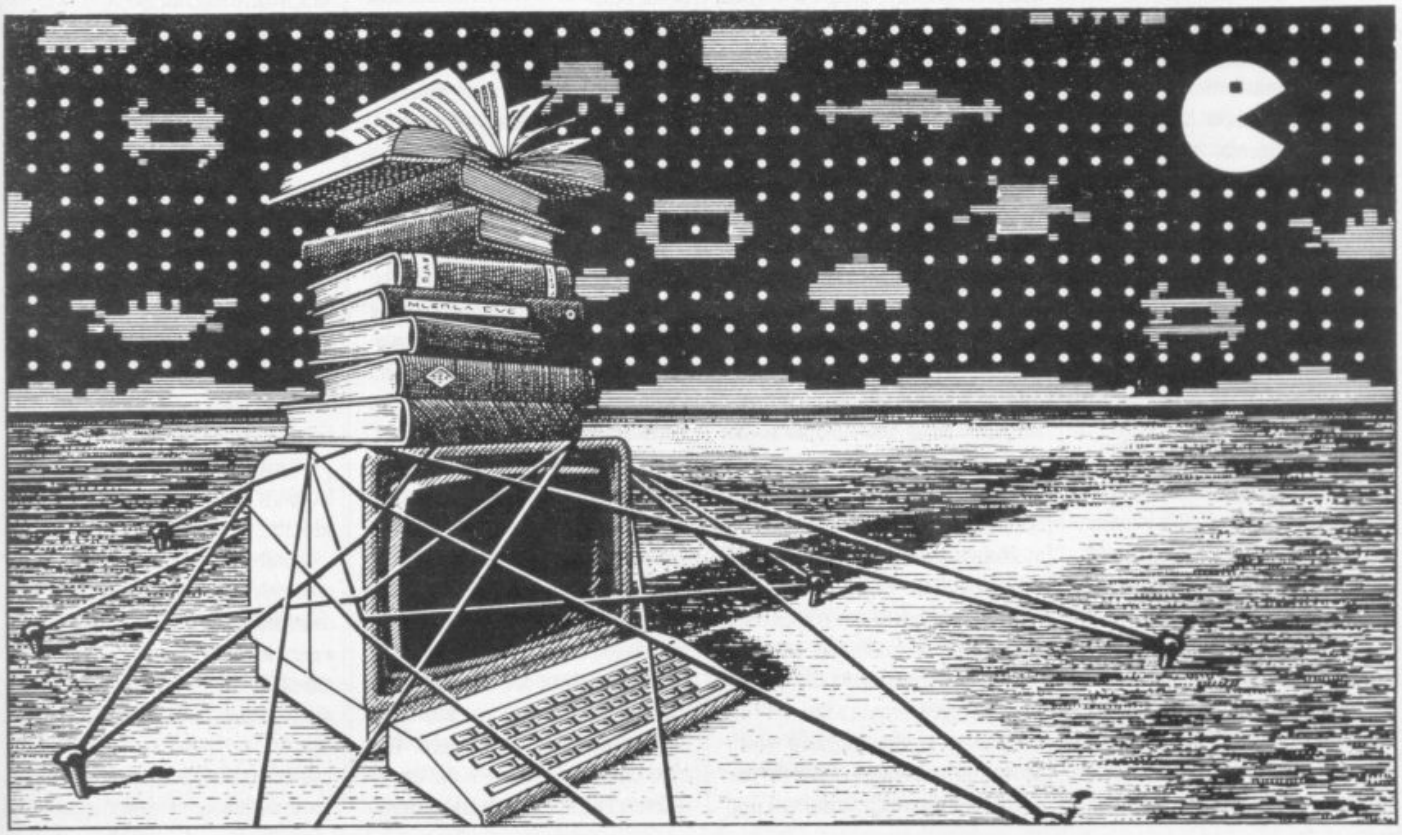
They include loading Easel, the main display, commands, editing facilities, multiple graphs and graph design, storage and transfer, all illustrated with several graphs produced by Easel.

There is a small walk-on part for sound at the end of the book. After a short paragraph in which the author attempts to justify its inclusion — surely unnecessary, who would dream of writing a game without the deafening zaps, for example? — he provides a useful chapter on the uses of the two relevant keywords, BEEP and BEEPING. That includes a look at such fascinating details as pitch, tones and semitones and musical scales, and shows how to set about getting the QL to play simple tunes.

All of which is rounded-off with a handy sound selection program listing, which allows you to vary BEEP parameters to produce the sound effect you want. At roughly four pages of listing, it is by far the longest program in the book.

Appendices include RGB pin connections, binary number information to help you create stipple colour codes, colour palette tables, sine curve generation and, last but not least, the answers to all those problems. There is also an index, which means you can use the book as a look-up reference long after you have finished using it as a text book.

Graphics are an interesting and creative area of computing which should not be overlooked by anyone who needs to present information processed by the computer. Shinwell has produced a comprehensive and informal guide to the subject which shows that graphics on the QL do not start and end with Easel.



SOFTWARE FILE

Selected QL software put to the test by Jason Ball

In the QL art department yet another excellent graphics package has emerged. *QL Paint* is the Talent Software Sinclair-sponsored answer to the fierce competition and high levels of programming demanded in this section of the market.

It si the second Talent graphics package. Its first program, *GraphiQL*, was introduced last year and quickly gained a reputation as one of the most powerful drawing programs for the QL. Since then, other programs have been developed by several companies using different methods to simplify the process of artwork.

Pull-down menus are now commonplace in graphics programs, greatly simplifying the many available commands. Talent has made extensive use of those menus in QL Paint, a feature GraphiQL sorely lacked. Also, while all the features of the original are maintained, several additional features have been incorporated. All are accessed easily via the menus, or may be executed direct from the keyboard using one- or two-letter short-form commands.

In that way, inexperienced users can select options without constant reference to the manual, while experts can select options without having to use the pull-down menus.

The introductory program picture is plain and simple but the demonstration pictures are spectacular – they are the same as those in the first Talent graphics package. They are brought to the screen using the Load option in QL Paint from a seapare Microdrive cartridge.

Unlimited Complexity

Screen resolution is that of TV mode, 256 by 256 pixels. That is not the highest resolution available on the QL but it ensures that each pixel may be one of eight colours, as opposed to four in high-res.

Authors Andrew Colin, Jon Malone and Craig Renfrew describe in the documentation how the large QL memory would allow for an extremely complex graphics program, with hundreds of different commands. Unfortunately this type of program would be extremely complicated to use, so Talent has limited the number of options to about 50, many of which may be used together for various effects.

Pressing function key F5 brings up a line of eight icons across the screen which depict the various categories of functions. Beneath the currently-chosen icon, a menu shows the relevant options from which to choose. Horizontal movement with the cursor keys, or joystick, changes the menus as the cursor moves along the icons. At any point vertical movement highlights the options and the space bar – fire button – executes them.

Alternatively, as yopu become accustomed to the many facilities and their functions, ytou can perform them directly from the keyboard; for example, 'CI' will allow you to draw a circle.

The comprehensive manual describes each command in detail and makes helpful suggestions for artists and photographers using the system. Those commands include the usual circles, ellipses, rubber bands and boxes, with optional information and help lines.

The last two pull-down commands display information concerning your current situation – pixel colour, cursor position or a request such as "move cursor to first radius". The commands are too numerous to describe fully but some of the most interesting options include various cursors, and cursor colours, flashing colours, screen magnification, an airbrush and an assortment of textures.

One of the most surprising features is the zap command which allows you to change the colour of any single unbroken line. Unfortunately it is restricted to lines of one colour completely separate from other coloured pixels on the screen and it cannot cope with 90-degree turns in a line.

A facility is also provided which allows you to define an area of the picture, save it internally, and then copy, reflect, or move it at any point on the screen. Again there are limitations; unless your QL has an expanded memory you can define only a limited area.

Textures is an important feature of the program, allowing you to define your own patterns, fill areas with them and produce some spectacular results. To try special effects without jeopardising your masterpiece, the program can assign the lower section of the screen to become your doodle pad temporarily.

Pictures may be incorporated into SuperBasic programs or printed-out using one of the printer drivers provided and a suitable dot-matrix printer.

Simple Icons

QL Paint combines the facilities of one of the most powerful graphics applications with icon-driven simplicity to produce a spectactular package rivalling graphics programs for professional business machines. At £24.95 it is one of the better-priced graphics packages but for a serious artist it must be the best.

BJ the Return is Janko Mrsic-Flogel's answer to the increasingly competitive QL games market. It is an excellent sequel to the best-selling *QL Caverns*, also called *BJ in Space*, incorporating many of the excellent features and graphics of the original game.

QL Caverns was based on the character BJ, caught on a spy mission by the ruler Drunx, and ordered to retrieve 395 diamonds from beneath an imaginary planet. Now, in BJ the Return, Drunx has died, presumably as an alcoholic, leaving BJ in the caverns. Escape is impossible unless he satisfied the fairy Matilda by collecting all the miracles from the caves.

It is without doubt one of the best arcade games for the QL. There are notable improvements on the original and it is considerably more complex to play. Again there are 50 coverns to explore, each with its own characteristics, but the style has changed. The most obvious difference is the use of different colours, shades and patterns throughout the screens, creating the most spectacular displays.

The graphics are equally varied and beautifully detailed. Gone are the trampolines, boxing gloves, hearts, diamonds and parachutes, to be replaced by magic boxes, aircraft, potions, miracles and bells. Even the teleports, lasers and jet packs have been re-designed.

There are 50 screens in all, each with its own characteristics. The style of scenery has changed with fewer moving characters on the screens but far more stationary material. There are several problems which have to be solved and small features which you discover only after several hours' play.

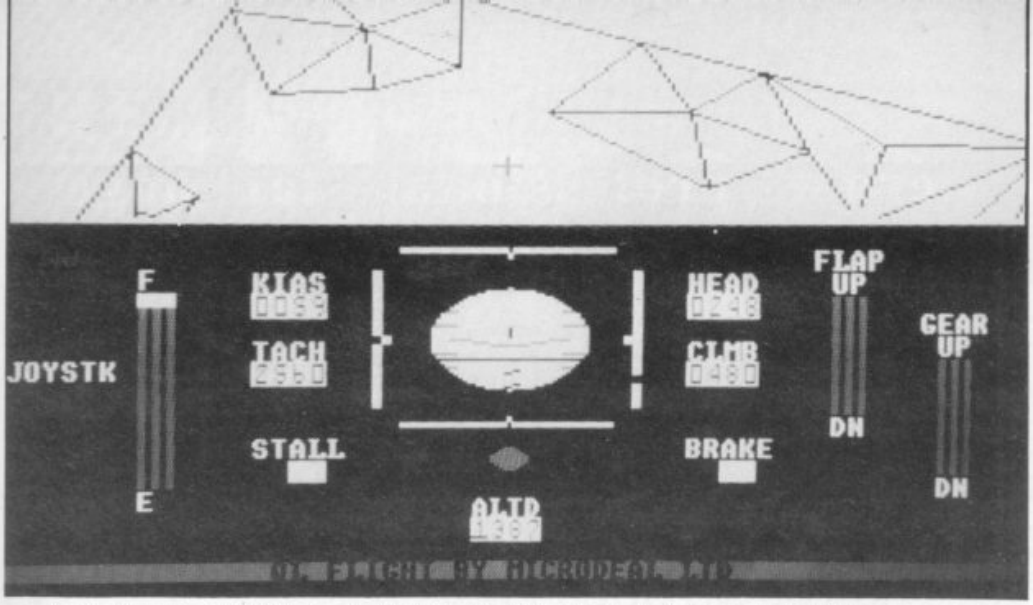
At first it is a simple matter to stay alive and collect the miracles, which resemble red broken Easter eggs. In later screens, however, with a jet pack on your back, it becomes very difficult to stay alive with deadly objects all round you. As you progress, jumping into a magic box transforms you into an easily-controlled aircraft; but beware, there are certain places from which there is no escape.

At first the multitude of squares, platforms, walls and rocks are very confusing and it takes several deaths before you realise which pieces are deadly. Sometimes the game is really unfair; if you jump on the stairs they envelope you as if there were a bug in the program, killing you instantly.

The game is generally more difficult, with fewer spare lives dotted round the screens, and many more ways to lose them. That said, with patience and an expert hand you can go a long way before you die and the different routes you can take through an assortment of locations makes it one of the most addictive.

Sound is sparse in the program, used only when you obtain a life – by collecting the potion – die, or pick up a miracle. Unfortunately the option to run off the sound has been removed, which seems an unnecessary omission.

Another disappointment, perhaps due to the leisurely Eidersoft approach



to software packaging, is the lack of instructions. Not everyone has seen QL Caverns, yet there are no instructions as to how the game is played and no clues on the function of such useless things as the bells.

When QL Caverns was introduced it represented the first really good arcade game for the QL. Since then the market has been deluged by mediocre arcade games which showed the professionalism of this classic. As an improvement on the original, BJ The Return can only do well, even under a new software manufacturer.

If you own a copy of QL Caverns, you should go as far as possible with it before trying the sequel; it is much more difficult and more addictive. If you do not have a copy of the original, buy The Return – you will not lose on the story line.

BJ the Return is available from Eidersoft, The Office, Hall Farm, N. Ockendon, Upminster, Essex RM14 3QH at £12.95.

It is often considered as a low-cost business machines but the spectacular QL graphics, large memory and fast processor are also well-suited for another application – simulation.

Weighty Simulation

QL Flight Simulator from Microdeal is just such a simulation which re-creates the experience of flying a light aircraft. Microdeal had difficulty when it entered the QL market with two disastrous games. Recently, however, its new releases have taken off and QL Flight should reach the highest altitude of sales.

Until now the only game vaguely resembling a flight simulator was *Area Radar Controller*, reviewed in *QL World* Issue 2. It drove flight enthusiasts batty as square aircraft crawled on and off the screen and, inevitably, into one another. For all home aviators, QL Flight is the answer.

The worst part of a flight simulator is the instruction manual. You can be an international airline pilot-cum-QL owner and the manual will still require thorough investigation before you touch the controls. Manuals usually delve into useless trivialities such as the theories of flight, essential for over zealous players who leap from armchairs as the aircraft spirals earthwards yet again.

The simulator is essentially view-orientated – it relies on flight by reference to landmarks visible from the cockpit rather than instruments alone. Written by an aeronautical engineer, the program simulates accurately the flight characteristics of an SAH1 light trainer aircraft in a variety of conditions.

Presented in a smart Microdeal box, the package includes a single Microdrive, manual and two reference cards which serve as a reminder of the complexities of flight.

The manual is unusually short for a flight simulator – Only 30 pages, seven chapters, an appendix and an index. Unnervingly the opening sentence reads "Welcome . . . if you are impatient to get flying, go to chapter 7." Thankfully the first six chapters were not devoted to theories of flight; instead a book dedicated to the subject is recommended. Otherwise the manual is well-written, despite a few errors. The plane has "a cross weight of 600 lb" – could that be its large, bad-tempered pilot?

As a carefully-engineered replica of light aircraft flight, this is the real thing; no game would use 35 keys to control one object. This may appear overly complicated, but it actually improves the game's addictiveness.

The central world is devoid of obstructions except the airport and serves as a practice field for the beginner. Moving out of the Met Office and into the aircraft I selected that field, dispensed with the pre-flight checks and started the engine.

Chocks Away!

Lowering the flaps I increased the throttle and released the brake. As we began to roll down the runway the control tower, fuel pyramid and fire stations moved ever closer. As the airspeed reached 60 knots I pulled back on the control column and looking through the rear window, watched the airport far below.

In flight the screen is divided into two windows; the lower shows an assortment of instruments, including an artificial horizon, fuel, flaps and landing gear. It is disappointing that the controls for air speed, tachometer, rate of climb and heading are not displayed on a dial as usual, but numerically in small squares. Above this the window shows a view of the world outside the aircraft using wire graphics to present mountains, pyramids, buildings and the odd bridge or power line.

The use of wire graphics greatly increases the speed with which the scenery can be re-drawn and therefore allows many more objects to be viewed than normally would be possible.

As you fly from the airport the scenario changes to reveal the characteristics of your chosen world. Mountains, rivers and smaller objects are all used to determine your position according to their distance and direction from you.

Alternatively, a plan view of the world in which you are flying is available, showing the aircraft as a static cross while the world moves beneath it. That excellent feature can be zoomed into or out of, allowing close aerial inspection of any part of the world. As you fly across the border of one world, another emerges with different characteristics.

The panoramic view capability of the program allows you to look in any direction – up, down, left and right. You can even look backwards through your legs but everything turns upside down. The pilot's view is adjusted automatically as the front of the aircraft is raised in flight, keeping the centre of elevation below the horizon so that you can still see the features of the land.

The only disappointment with this escellent package was the feeling that I was not really flying the aircraft. Obviously it is only a computer simulation but it differs from other simulators in that the aircraft flies by itself; you simply adjust height and direction with single keypresses.

Normally you have to keep your hands on the control column to keep the aircraft in the air. You can literally take off and fly it anywhere using only four keys, for the rudder and throttle.

The graphics are slightly disappointing because of their simplicity; many objects are presented at once but many are indefinable – flying under the bridge is like flying under two wonky lines. To pass your night rating the screen can be inverted so that all the lines are white on a back background.

To make the simulation true to life all the aircraft responses have been slowed deliberately. Unfortunately that has slowed the QL acceptance of a keypress; when making adjustments a single press is often not sufficient but too many will cause an over-reaction. That often occurs when making a turn.

Having pressed a key to go left or right, you press another to re-centre the control column and two more to tilt in the opposite direction and straighten. If any keys are not accepted the aircraft goes into an incontrollable spin earthwards.

It is without doubt the best, if only, flight simulator for the QL and incorporates several unusual and excellent features. It is well-documented, with useful maps of the different worlds, and flying the aircraft can be exciting. It lacks some of the feel of other simulators but for £19.95 it is excellent value for what you get.

New: Prospero's professional language compilers for the Sinclair QL

PRO PASCAL & PRO FORTRAN-77 FOR SINCLAIR QL

£99.95 VAT included

Incredible value! - Endorsed by Sinclair Research

ISO-PASCAL

Pro Pascal is validated to ISO 7185 Class A (no errors) on the Z80 processor under CP/M and the 8088 processor under PC-DOS. This provides a guarantee that the compiler is complete and works perfectly.

NO BUGS YOU DON'T HAVE TO FALL ON ALL THE HOLES

FORTRAN 77

Pro Fortran-77 is a full implementation of ANSI Fortran 77 with no omissions and many useful extensions

USE THE LANGUAGES THE PROFESSIONALS DO: PASCAL AND FORTRAN

Ideal for
- Sinclair software developers
- schools and colleges
- students of computing
- development of personal skills
- solving technical problems
- training institutions

✓ Produces compact efficient code

Lazy I/O
All files closed on exit from procedure

PASCAL ⟷ FORTRAN
INTERLINKABLE OBJECT CODE

16 digit
Single and double precision IEEE format arithmetic gives 7 or 16 digit precision

Compilers include: compiler, linker,run-time libraries, librarian, X-ref program, sample programs, graphics routines, 200 page manual. Supplied on 3 microdrives and ROM cartridge. Runs on 128K QL. Supports disk drives.

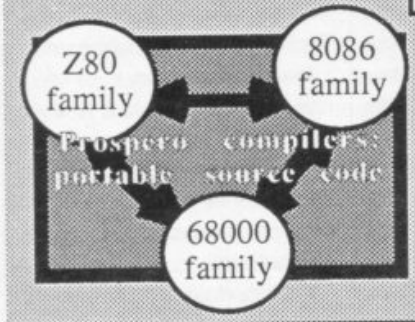
GRAPHICS
Graphics routines included

At Prospero we specialise in writing language compilers. We produce the best possible compilers, conforming to the appropriate standard, and giving programmers a secure base on which to build.

REVIEWS & INFO
Call 01-741 8531 for a free info pack with data sheets and magazine reviews!

"Pro Pascal is not only ISO-validated, it is also a superb-quality and very full software development tool."
Personal Computer World Nov 1985

Also available from Sinclair specialists & distributors



BIG
Compiles big programs
>10000 lines...
>1000 identifiers...
Separate compilation to build libraries and massive program suites

Used at 5000 sites around the world

Prospero Software Ltd
190 Castelnau, London SW13 9DH
England. Telephone 01-741 8531.
Telex 8814396 PROSOF G.

It's easy to order!

Credit card holders phone 01-741 8531
Access, Visa, Diners & Amex taken.

Mail order

Send this coupon with cheque to Prospero Software, 190 Castelnau, London SW13 9DH, England.
Post free in UK - including VAT.
Overseas orders at £86.91 + £3 post and packing.
Allow 28 days for delivery.

Please supply ____ copies Pro Fortran-77 at £99.95
Please supply ____ copies Pro Pascal at £99.95
(Sinclair) I enclose payment for £_____.

Name_____
Address_____
_____
Telephone no_____
In case of query ring 01-741 8531 or telex 8814396

THE P·R·O·G·S

If you've a program that is worthy of consideration, send it to 'The Progs', Sinclair QL World, Wells House, 80-82 Upper Street, London N1. We pay for everything published at the usual page rates.

FCOPY — Pt 1
Rob Sherratt

QL User readers are in for a treat and patient *QL World* readers will be relieved to finally see the sight of Ron Sherratt's long-promised FCOPY program — the first part of which was run in *QL World* Issue 2. For the benefit of those who may not have seen the first part, we are running the whole program — from start to finish — in several parts starting in this issue. For full background to the program, write to us for your back copy of *QL World* Issue 2.

Briefly, FCOPY comprises three programs, a BOOT program to load FCOPY_BAS, the FCOPY_BAS basic program itself and the SPOOL_CODE machine code program. The first two will be published in this issue and the machine code will begin in the April issue. Note that most of the instructions are included as REMark lines.

```
100 REMark BOOT PROGRAM - FAST COPY VERSION
101 REMark
102 REMark This program runs automatically
103 REMark from mdv1_ after a system reset
104 REMark
105 REMark Author    : Rob Sherratt
106 REMark Date      : 29th August, 1984
107 REMark
108 :
109 REMark
110 REMark Load up the "SPOOL" and "NUM_JOBS" machine code
111 REMark extensions so they can be used from SUPERBASIC.
112 REMark Afterwards, clear all variables and workspace
113 REMark
114 :
115 get_extensions
116 LRUN mdv1_fcopy_bas
117 :
118 DEFine PROCedure get_extensions
119   a = RESPR(600)
120   LBYTES mdv1_spool_code,a
121   CALL a
122 END DEFine get_extensions

100 REMark
101 REMark GENERAL PURPOSE FAST FILE SPOOLER
102 REMark ---------------------------------
103 REMark
104 :
105 :
106 REMark Transfers files from a source device (default device
107 REMark names are stored in the following DATA statements) to
108 REMark a destination device (eg flp1_, mdv1_, hdk1_ etc).
109 :
110 :
111 REMark This is the ultra-fast version using machine code
112 REMark extensions SPOOL and NUM_JOBS in order to get very
113 REMark fast paralleled data transfer. Requires the SPOOL_CODE
114 REMark file to have been loaded into the resident procedure
115 REMark area first.
116 :
117 :
```

```
118 REMark A filelist can be created on a microdrive by merely
119 REMark typing "RESET" followed by "LIST_CREATE" with this
120 REMark program (FCOPY_BAS) in memory.
121 :
122 :
123 REMark Author  : Rob Sherratt
124 REMark Date    : 1st May, 1985
125 REMark Version : 1.1
126 :
127 :
128 reset  : REMark That's it - the end of the program !
129 :
1295 REMark ... but procedure declarations are to come ...
133 DEFine PROCedure fcopy
134   LOCal fname$(60,40), fnum$(60), name$(40)
135   LOCal listname$(40), A$(10), S$(10), D$(10)
136   :
137   REMark The parameter "max_jobs" is a tuning parameter
138   REMark which should be increased if you have a memory
139   REMark expansion board fitted, so that the number of
140   REMark SPOOLed jobs running in parallel may be increased.
141   :
142   max_jobs = 10
143   filelist$ = "n" : change$ = "y"
144   :
145   REMark The default drive names are in the following DATA
146   REMark statement. Alter them if you have different devices.
147   :
148   REMark     SOURCE DRIVE          DESTINATION DRIVE
149   DATA       "mdv1_",              "mdv2_"
150   :
151   RESTORE : READ S$,D$
152   :
153   REPeat copy_cartridges
154     :
155     REMark The NUM_JOBS function counts the number of parallel
156     REMark jobs running before we start. Later on we need to know
157     REMark how many jobs this program has started up, and we have
158     REMark to wait until they have all finished before files can
159     REMark be closed from within SUPERBASIC.
160     :
161     initial_jobs = NUM_JOBS
162     :
163     IF change$ = "y" THEN
164       display_initial_text
165       get_directory_on_file
166       list_and_read_directory
167     END IF
168     :
169     open_all_source_files
170     open_all_destination_files
171     spool_data_for_all_files
172     :
173     REMark When waiting for the SPOOL jobs to finish, it is
174     REMark important not to hog the processor's time in the
175     REMark "wait_till_done" loop. Hence the PAUSE 100 statement
176     REMark which waits for 2 seconds.
177     :
178     REPeat wait_till_done
```

THE P+R+O=G<S

```
1790       current_jobs = NUM_JOBS
1800       IF current_jobs = initial_jobs THEN EXIT wait_till_done
1810       PAUSE 100
1820     END REPeat wait_till_done
1830     :
1840     close_all_files
1850     announce_completion
1860     IF again$  == "n" THEN EXIT copy_cartridges
1870   END REPeat copy_cartridges
1880   :
1890   reset
1900   :
1910 END DEFine fcopy
1970 DEFine PROCedure display_initial_text
1980   :
1990   INK #2,0: PAPER #2,4: CLS: CLS #2
2000   STRIP #2,2: CSIZE #2,1,1
2010   AT #2,0,20: PRINT #2,"FAST FILE COPIER"
2020   CSIZE #2,0,0
2030   AT #2,17, 1: PRINT #2,"y = yes"
2040   AT #2,17, 9: PRINT #2,"n = no"
2050   AT #2,17,66: PRINT #2,"e = exit"
2060   :
2070   CSIZE 0,0
2080   PAPER 4: INK 0: STRIP 7
2090   :
2100   get_device_names
2110   PRINT "Do you want to copy all files    ? ";
2120   all$ = GET_YN$
2130   IF all$ == "n" THEN
2140     PRINT "Do you want to use a filelist    ? ";
2150     filelist$ = GET_YN$
2160     IF filelist$ == "y" THEN
2170       INPUT "What filelist name ? ";listname$
2180       IF NOT ("_lst" INSTR listname$) THEN
2190         listname$ = listname$ & "_lst"
2200       END IF
2210       PRINT "Copy all files on the list       ? ";
2220       all$ = GET_YN$
2230     END IF
2240   END IF
2250   :
2260   PRINT "Do you want a beep when done     ? ";
2270   noise$ = GET_YN$
2280   PRINT "Do you want to format " & D$ & "      ? ";
2290   format$ = GET_YN$
2300   IF format$ == "y" THEN
2310     INPUT "What name    ? ";name$
2320   END IF
2330   PRINT \"Press any key when you are ready.   "\\
2340   PAUSE
2350   :
2360 END DEFine display_initial_text
2370 :
2380 :
2390 :
2400 DEFine PROCedure get_device_names
2410   :
2420   REPeat get_dev
```

```
2430     PRINT "Source drive = ";S$;" .... Alter  ? ";
2440     IF GET_YN$ == "y" THEN
2450       INPUT "Source drive ? ";S$
2460     END IF
2470     PRINT "Dest.  drive = ";D$;" .... Alter  ? ";
2480     IF GET_YN$ == "y" THEN
2490       INPUT "Dest.  drive ? ";D$
2500     END IF
2510     IF drive_ok(S$) AND drive_ok(D$) THEN
2515       IF (NOT (S$ == D$)) THEN  EXIT get_dev
2530     END IF
2540     PRINT \"Drive names typed incorrectly. Note "
2545     PRINT "that source and destination device  "
2546     PRINT "names must not be identical ...      "\\
2550     RESTORE
2560     READ S$,D$
2580   END REPeat get_dev
2590   :
2640 DEFine FuNction drive_ok(drive$)
2650   LOCal ok
2660   ok = 1
2670   IF NOT ("_" INSTR drive$) THEN drive$ = drive$ & "_"
2680   IF LEN(drive$) < 5 THEN ok = 0
2690   RETurn ok
2700 END DEFine drive_ok
2710 :
2720 :
2730 :
2740 DEFine PROCedure get_directory_on_file
2750   IF format$ == "y" THEN format_destination
2760   DELETE D$ & "dir_lst"
2770   IF filelist$ == "y" THEN
2780     COPY S$ & listname$ TO D$ & "dir_lst"
2790   ELSE
2800     OPEN_NEW #4,D$ & "dir_lst"
2810     DIR #4,S$
2820     CLOSE #4
2830   END IF
2840 END DEFine get_directory_on_file
2850 :
2860 :
2870 :
2880 DEFine PROCedure list_and_read_directory
2890   INK 0: STRIP 2
2900   PRINT "Directory of ";S$;
2910   IF all$ == "n" THEN
2920     PRINT ". Type ";
2930     STRIP 0: INK 7
2940     PRINT " y ";
2950     STRIP 2: INK 0
2960     PRINT " after  "
2970     PRINT "each file if you want it copied.    "
2980   END IF
2990   STRIP 7: INK 0
3000   OPEN_IN #4,D$ & "dir_lst"
3010   n=0
3020   :
3030   REPeat getfile
3040     INPUT #4, fname$(n)
```

THE P+R:O=G<S

```
3050     IF n>1 THEN
3060       PRINT n-1;" ";fname$(n);
3070       FOR k = LEN(fname$(n)) TO 26: PRINT " ";
3080         A$ = n - 1
3090       FOR k = LEN(A$) TO 4: PRINT " ";
3100       IF all$ == "n" THEN
3110         PRINT ": ";
3120         fnum$(n) = GET_YN$
3130       ELSE
3140         fnum$(n) = "y": PRINT
3150       END IF
3160     ELSE
3170       PRINT fname$(n)
3180     END IF
3190     IF EOF(#4) THEN EXIT getfile
3200     n=n+1
3210   END REPeat getfile
3220   :
3230   nfiles = n
3240   CLOSE #4
3250   PRINT
3260   DELETE D$ & "dir_lst"
3270 END DEFine list_and_read_directory
3310 DEFine PROCedure format_destination
3320   FORMAT D$ & name$
3330 END DEFine format_destination
3340 :
3350 :
3360 :
3370 DEFine PROCedure open_all_source_files
3380   STRIP 2
3390   PRINT "Opening all source files        ... "
3400   source_chan = 10
3410   FOR n = 2 TO nfiles
3420     IF fnum$(n) == "y" THEN
3430       OPEN_IN #source_chan,S$ & fname$(n)
3440       source_chan = source_chan + 1
3450     END IF
3460   END FOR n
3470   last_source_chan = source_chan - 1
3480 END DEFine open_all_source_files
3490 :
3500 :
3510 :
3520 DEFine PROCedure open_all_destination_files
3530   STRIP 2: PRINT "Opening all destination files   ... "
3540   dest_chan = last_source_chan + 1
3550   FOR n = 2 TO nfiles
3560     IF fnum$(n) == "y" THEN
3570       IF format$ == "n" THEN DELETE D$ & fname$(n)
3580       OPEN_NEW #dest_chan,D$ & fname$(n)
3590       dest_chan = dest_chan + 1
3600     END IF
3610   END FOR n
3620   last_dest_chan = dest_chan - 1
3630 END DEFine open_all_destination_files
3640 :
3650 :
3660 :
```

```
3670 DEFine PROCedure spool_data_for_all_files
3680   STRIP 7
3690   dest_chan = last_source_chan + 1
3700   file_num = 2
3710   :
3720   FOR source_chan = 10 TO last_source_chan
3730     REPeat get_file_number
3740       IF fnum$(file_num) == "y" THEN EXIT get_file_number
3750       IF file_num > nfiles      THEN EXIT get_file_number
3760       file_num = file_num + 1
3770     END REPeat get_file_number
3780     PRINT "Copying ";fname$(file_num)
3790     file_num = file_num + 1
3800     SPOOL #source_chan TO #dest_chan
3810     dest_chan = dest_chan + 1
3820     REPeat test_for_done
3830       IF NUM_JOBS - initial_jobs < max_jobs THEN EXIT test_for_done
3840       PAUSE 50
3850     END REPeat test_for_done
3860   END FOR source_chan
3870   :
3880 END DEFine spool_data_for_all_files
3920 DEFine PROCedure close_all_files
3930   STRIP 2: PRINT "Closing all files              ... "
3940   FOR chan = 10 TO last_dest_chan
3950     CLOSE #chan
3960   END FOR chan
3970 END DEFine close_all_files
3980 :
3990 :
4000 :
4010 DEFine FuNction GET_YN$
4020   LOCal inp$
4030   REPeat get_inp
4040     REMark Flush keyboard buffer before using INKEY$
4050     inp$ = KEYROW(0)
4060     inp$ = INKEY$(-1)
4070     IF inp$ == "y" THEN EXIT get_inp
4080     IF inp$ == "n" THEN EXIT get_inp
4090     IF inp$ == "e" THEN
4100       reset
4110       CLEAR
4120       STOP
4130     END IF
4140     BEEP 2000,5
4150   END REPeat get_inp
4160   PRINT inp$
4170   RETurn inp$
4180 END DEFine GET_YN$
4190 :
4200 :
4210 :
4220 DEFine PROCedure announce_completion
4230   STRIP 7: INK 0: CSIZE 2,1
4240   PRINT "FINISHED          ";
4250   CSIZE 0,0 : PRINT \\
4260   IF noise$ == "y" THEN
4270     BEEP 0,1,50,100,1,15
4280     PAUSE 100
```

THE P·R·O·G·S

```
4290   END IF
4300   BEEP 5000,255
4310   PRINT "Do you want to do another copy   ? ";
4320   again$ = GET_YN$
4330   :
4340   IF again$ == "y" THEN
4350     PRINT "Is it a different set of files   ? ";
4360     change$ = GET_YN$
4370     IF change$ == "y" THEN ELSE
4380       change$ = "n"
4390       PRINT "Do you want to format " & D$ & "      ? ";
4400       format$ = GET_YN$
4410       PRINT "Press any key when you are ready    ";:PAUSE
4420       IF format$(1) == "y" THEN format_destination
4430     END IF
4440   END IF
4450   :
4460 END DEFine announce completion
4500 DEFine PROCedure reset
4510   MODE 512
4520   :
4530   WINDOW #0,512,256,0,0
4540   PAPER #0,0: INK #0,7
4550   CLS #0
4560   WINDOW #0,454,46,30,206
4570   BORDER #0,1,2: CSIZE #0,0,0
4580   CLS #0
4590   :
4600   WINDOW #2,454,192,30,10
4610   PAPER  #2,4: INK #2,0: CSIZE #2,1,1
4620   CLS #2: PAPER #2,2
4630   :
4640   WINDOW #1,218,144,148,40
4650   PAPER #1,2: INK #1,7
4660   CSIZE #1,0,0
4670   :
4680   AT #2,0,20
4690   PRINT #2,"FAST FILE COPIER"\\\
4700   AT #2,2,8
4710   PRINT #2,"Type FCOPY        to start copying files"
4720   AT #2,4,8
4730   PRINT #2,"Type LIST_CREATE  to create a file list "
4740   AT #2,6,8
4750   PRINT #2,"Type RESET        to redraw this screen "
4760   AT #2,8,8
4770   PRINT #2,"Type FORM         to format 5 times     ";
4780   CSIZE #2,0,0: PAPER #2,0: INK #2,7: PRINT #2,\\\
4790 END DEFine reset
4800 :
4810 :
4820 :
4830 DEFine PROCedure form
4840   LOCal D$(10),name$(20)
4850   REPeat get_drive
4860     INPUT #0,"Which device is to be formatted ? ";D$
4870     IF drive_ok(D$) THEN EXIT get_drive
4880     PRINT #0,"Device name typed incorrectly ..."
4890   END REPeat get_drive
4900   INPUT #0,"What format name ? ";name$
4910   FOR n=1 TO 5
4920     FORMAT #0,D$ & name$
4930   END FOR n
4940 END DEFine form
4950 :
4960 :
4970 :
4980 DEFine PROCedure list_create
4990   LOCal D$(10),name$(20)
5000   REPeat get_device
5010     INPUT #0,"On which device is the list to be created ? ";D$
5020     IF drive_ok(D$) THEN EXIT get_device
5030     PRINT #0,"Device name typed incorrectly ..."
5040   END REPeat get_device
5050   INPUT #0,"What name do you want for the filelist    ? ";name$
5060   IF NOT ("_lst" INSTR name$) THEN name$ = name$ & "_lst"
5070   DELETE D$ & name$
5080   OPEN_NEW #4, D$ & name$
5090   DIR #4, D$
5100   CLOSE #4
5110 END DEFine list_create
```

OMNI QL
J D Thomson

Here's the program referred to in Open Channel.

```
100 REMark Omni-Reader to Sinclair QL
110 REMark use HR5 Brother Printer cable
120 REMark connect to ser2
130 REMark set 300 baud on the Omni-reader
140 REMark prog by J.D.Thomson Tel:711337
150 REMark line alignment is very critical
160 REMark
170 REMark Import to Quill or a Metacomco editor
180 CLS:CLS£0:CLEAR
190 BAUD 300
200 PRINT£0, "Press F1 Press Enter"\"Save line to
    tape       Discard"
210 :
220 DIM b$(80,1)
230 OPEN£3,ser2z
240 OPEN£4,mdv1_text
250 i%=0:j%=0
260 REPeat loop
270 i%=i%+1
280 IF NOT i% MOD 6 :CLS
290 FOR k=1 TO 80:b$(k)=""
300 k=1
310 b$(k)=INKEY$(£3,-1)
320 REPeat loop
330 a$=INKEY$
340 k=k+1
350 b$(k)=INKEY$(£3,10)
360 IF b$(k)=CHR$(13):b$(k)="":EXIT loop
370 END REPeat loop
380 PRINT b$;
390 IF CODE(INKEY$(-1))=232:PRINT£4,b$;:PRINT£4:
    j%=j%+1:PRINT \"+saved to tape+
line number "!j%:PAUSE 50:END REPeat loop
400 PRINT \"+Discard line+"
410 END REPeat loop
420 REMark exit by control/break
```

THE PROGS

WORLD MAP
Alan Prior

Ever wondered how long it would take to figure out all the data statements and screen-mapping necessary to draw an on-screen map of the world on your QL? Alan Prior did and sends up this program which will do just that.

```
100 REMark 'QL WORLD MAP'
110 REMark 'Alan Prior August 1985'
120 DIM col(32)
130 init
140 REPeat loop
150   RESTORE 540:draw
160   RESTORE 720:draw
170   RESTORE 1040:draw
180   RESTORE 1200:draw
190   RESTORE 1770:draw
200   RESTORE 2540:draw
210 END REPeat loop
220 DEFine PROCedure init
230   RESTORE 2740
240   FOR m=1 TO 32:READ col(m):NEXT m
250   xs=250
260   MODE 4:OPEN #5,con_512x256a0x0:PAPER #5,0:CLS #5:CLOSE #5
270   OPEN #1,con_448x204a32x40:OPEN #2,con_224x24a256x16
280   OPEN #3,con_224x24a32x16:OPEN #4,con_224x12a32x244
290   OPEN #5,con_224x12a256x244
300   PAPER #1,0:PAPER #2,0:PAPER #3,0:PAPER #4,0:PAPER #5,0
310   INK #2,4:INK #3,4:INK #4,7:INK #5,7
320   BORDER #1,1,2:BORDER #2,1,2:BORDER #3,1,2
330   BORDER #4,1,2:BORDER #5,1,2:
340   CLS #1:CLS #2:CLS #3:CLS #4:CLS #5
350   CSIZE #3,3,1:PRINT #3,' Q';:INK #3,2:PRINT #3,'L';
360   INK #3,7:PRINT #3,' WORLD'
370   CSIZE #2,3,1:PRINT #2,'    Q';:INK #2,2:PRINT #2,'L';
380   INK #2,7:PRINT #2,' WORLD'
390   PRINT #5,'          - August 1985'
400   PRINT #4,'             Alan Prior'
410   SCALE 250,-12,10
420 END DEFine init
430 DEFine PROCedure draw
440   INK col(RND(1 TO 32))
450   READ x1,x2
460   IF x1=0:x1=x2:READ x2:y=y-1:x3=x:GO TO 460
470   IF x1<252:x3=x3+x1:x4=x3+x2-1:LINE x3,y TO x4,y:x3=x3+x2:GO TO 450
480   IF x1=252:x3=x2:x=x2:xs=x:GO TO 450
490   IF x1=253:y=x2:x=xs:x3=x:GO TO 450
500   IF x1=255
510 END DEFine draw
520 REMark 'MAP'
530 REMark 'AFRICA'
540 DATA 252,150,253,149,1,1,37,2,0,31,6,1,3,0,28,13,0,22,2,1,16,0,21,21
550 DATA 0,21,19,0,20,23,7,2,0,20,25,4,5,6,2,1,1,0,20,25,4,16,0,20,28,1,17
560 DATA 0,14,1,2,50,0,16,50,0,10,1,1,2,1,50,0,9,1,5,51,0,12,53,0,11,55
570 DATA 0,11,56,0,10,56,0,10,58,0,11,58,0,11,57,0,11,58,0,12,59,0,12,58
580 DATA 0,1,1,2,1,7,59,0,2,2,7,61,0,4,1,5,63,0,3,1,6,64,0,11,63,11,1
590 DATA 0,11,65,5,2,0,12,71,0,12,70,0,14,68,0,15,66,0,15,66,0,16,65
```

THE P+R:O=G<S

```
600 DATA 0,17,12,4,47,0,19,3,5,1,6,29,3,13,0,35,1,1,25,3,13,0,39,23,4,11
610 DATA 0,35,1,3,24,3,9,0,38,25,3,9,0,35,1,2,25,3,8,0,38,25,2,8
620 DATA 0,38,26,1,7,0,38,21,1,11,0,39,20,1,9,17,1,0,40,20,1,9,18,1
630 DATA 0,41,19,1,10,0,42,19,1,8,0,42,19,1,9,0,42,30,5,1,1,1,1,2,0,43,29
640 DATA 0,43,22,1,7,0,43,22,1,7,0,42,23,1,6,9,1,0,42,23,2,5,8,3
650 DATA 0,42,24,1,5,7,3,0,41,25,1,5,6,4,0,41,30,5,6,0,41,27,7,7
660 DATA 0,41,26,8,6,0,41,26,9,5,0,42,25,9,5,0,42,25,8,6,0,43,24,8,6
670 DATA 0,44,23,8,5,0,44,22,9,5,0,44,22,10,3,0,44,20,12,2,0,45,19,0,45,19
680 DATA 0,45,19,0,46,17,0,46,16,0,47,16,0,48,13,0,48,12,0,48,11,0,48,8
690 DATA 0,48,4,0,49,2,253,55,84,1,0,70,1,253,50,101,2,0,101,1,253,39
700 DATA 51,1,1,1,255,255
710 REMark 'EUROPE'
720 DATA 252,150,253,249,38,12,1,2,0,39,11,1,2,0,39,4,1,1,1,4,0,39,4,2,3,4,2
730 DATA 0,40,1,3,4,2,3,0,43,5,2,3,0,45,3,3,3,0,44,4,2,3,0,43,4,5,1,0,44,3
740 DATA 0,44,2,0,44,1,53,2,0,98,2,0,92,3,1,4,0,92,7,0,90,6,0,90,5,0,89,5
750 DATA 0,88,4,0,87,4,0,87,3,0,86,4,0,86,3,0,86,3,0,86,2,,87,1,0,85,3
760 DATA 0,84,4,0,84,3,0,84,3,0,83,4,0,83,4,0,56,2,28,1,0,83,1,1,3
770 DATA 0,52,1,1,1,2,1,27,4,0,54,6,28,1,0,54,7,29,1,0,47,1,2,9,3,1,28,1,1,3
780 DATA 0,49,13,18,2,10,4,0,44,1,2,16,17,1,12,6,0,43,1,3,20,13,1,4,1,4,1,2,6
790 DATA 0,44,1,1,23,5,1,8,2,2,4,1,7,0,43,1,2,24,4,3,5,3,1,13
800 DATA 0,44,27,4,3,3,3,1,14,0,43,28,4,1,4,3,1,14,0,43,29,3,1,3,18
810 DATA 0,42,21,2,7,3,3,1,17,0,42,22,2,5,4,20
820 DATA 0,4,1,3,1,2,2,29,23,4,2,3,1,1,19,0,3,2,1,1,14,30,10,2,11,6,22
830 DATA 0,1,4,1,8,27,10,3,11,6,21,0,4,9,28,10,4,11,1,1,3,21
840 DATA 0,3,10,27,11,3,12,2,2,1,20,0,5,8,26,11,3,14,2,22
850 DATA 0,4,7,25,1,2,11,2,38,0,6,4,28,11,3,38,0,36,12,3,39
860 DATA 0,21,1,13,12,3,40,0,20,1,13,12,5,39,0,34,12,5,10,1,28
870 DATA 0,21,1,13,11,5,9,3,28,0,33,14,4,8,4,28,0,34,14,5,8,2,28
880 DATA 0,35,5,1,7,5,8,1,29,0,25,1,8,6,1,7,3,1,1,38,0,24,1,10,4,2,6,6,39
890 DATA 0,26,1,7,5,2,5,5,1,1,39,0,21,1,1,2,11,2,3,5,8,38
900 DATA 0,22,2,15,1,1,4,2,1,3,1,2,38,0,21,5,12,1,2,4,2,1,3,41
910 DATA 0,23,2,12,2,3,3,6,41,0,22,4,11,2,3,3,6,41,0,22,4,11,2,3,1,8,41
920 DATA 0,20,1,2,4,11,1,12,41,0,19,3,2,3,11,1,3,1,3,2,1,42
930 DATA 0,17,4,4,3,9,2,1,2,2,47,0,18,4,1,1,1,3,8,55
940 DATA 0,18,4,1,7,4,57,0,17,4,3,6,3,60,0,17,3,3,6,3,60
950 DATA 0,23,7,1,60,0,22,3,5,48,0,29,49,0,27,51,0,22,1,1,54
960 DATA 0,25,54,0,26,42,2,9,0,27,35,1,3,3,10,0,27,35,3,1,3,11
970 DATA 0,27,14,2,18,2,4,1,10,0,27,14,3,16,4,1,4,9,0,26,10,2,4,2,15,11,7
980 DATA 0,18,13,1,3,4,4,3,12,14,7,0,18,13,6,1,2,3,4,12,14,7
990 DATA 0,19,12,6,1,3,4,3,11,14,7,0,19,10,13,4,4,7,16,8
1000 DATA 0,19,10,8,1,6,3,4,1,1,1,19,5,1,2,0,18,11,8,2,6,1,4,2,5,1
1010 DATA 0,19,9,9,1,7,1,3,2,4,2,0,19,9,15,1,1,1,6,2,0,19,7,16,2,7,2
1020 DATA 0,21,5,17,1,0,22,1,30,2,0,52,4,255,255
1030 REMark 'SOUTH AMERICA'
1040 DATA 252,80,253,119,23,1,1,1,0,22,2,1,3,0,20,4,1,3,1,1,1,2,1,2
1050 DATA 0,11,1,2,3,3,3,2,8,0,11,6,2,16,0,11,3,2,21,0,17,22,0,17,26
1060 DATA 0,17,28,0,17,28,0,16,29,0,16,31,0,16,30,0,14,33,0,14,36
1070 DATA 0,3,2,8,39,0,1,1,11,44,0,13,47,0,13,48,0,14,48,0,13,49,0,14,48
1080 DATA 0,15,47,0,16,47,0,16,46,0,17,44,0,17,44,0,19,39,0,18,8,1,31
1090 DATA 0,18,8,1,32,0,19,6,2,32,0,21,4,2,31,0,23,3,1,31,0,24,34,0,25,33
1100 DATA 0,25,32,0,25,32,0,25,31,0,25,28,0,25,25,0,25,24,0,25,23,0,25,23
1110 DATA 0,24,24,0,24,24,0,24,24,0,24,23,0,24,23,0,24,22,0,24,20,0,23,21
1120 DATA 0,23,21,0,23,15,2,3,0,23,16,0,22,17,0,22,17,0,22,18,0,22,16
1130 DATA 0,22,12,1,2,0,21,13,0,21,13,0,21,10,0,21,12,0,21,1,1,10,0,23,8
1140 DATA 0,20,1,1,9,0,20,1,1,7,0,20,1,1,7,0,22,7,0,20,1,1,8,0,22,9,0,21,10
```

```
1150 DATA 0,21,8,0,22,7,0,20,1,1,6,0,19,1,2,5,0,21,6,9,1,1,2
1160 DATA 0,19,1,2,3,1,1,9,1,1,1,0,19,1,3,2,0,20,1,2,2,0,21,1,5,2
1170 DATA 0,22,1,1,1,2,1,30,2,0,24,3,1,3,1,1,27,1,0,23,1,3,1,1,1,0,27,1
1180 DATA 253,27,74,1,253,25,50,2,1,1,1,1,0,40,2,0,42,1,0,37,3,255,255
1190 REMark 'ASIA'
1200 DATA 252,207,253,249,75,1,2,4,0,78,6,0,78,3,0,78,2,4,2,0,78,1,3,1,0
1210 DATA 0,82,1,0,81,3,0,81,3,1,1,0,72,2,5,4,0,79,6,43,1,0,78,6,3,3
1220 DATA 0,73,1,2,7,2,6,46,1,0,71,2,4,14,0,69,4,4,14,25,3,3,2
1230 DATA 0,70,21,23,1,1,4,2,3,0,67,24,22,2,1,4,2,3,2,2
1240 DATA 0,66,25,25,5,2,2,2,3,0,65,26,27,5,7,3,0,64,24,28,3,9,3
1250 DATA 0,63,25,2,1,29,1,0,62,24,2,2,23,2,3,2,0,63,22,21,1,18,1
1260 DATA 0,59,4,1,21,2,2,1,1,11,2,15,4,0,44,2,13,4,1,20,4,3,1,3,7,3,1,1,14,2
1270 DATA 0,45,1,5,1,5,27,2,5,1,6,5,2,1,1,0,49,1,7,26,2,13,2,2,5,1,11,2
1280 DATA 0,44,3,7,1,2,26,1,20,2,1,12,6,0,43,5,2,1,6,48,2,1,10,6,3,2
1290 DATA 0,44,4,2,1,3,2,2,48,12,8,1,2,0,44,4,2,1,1,5,2,49,3,1,7,5,2,3
1300 DATA 0,44,3,2,2,3,53,4,2,1,2,1,14,29,4
1310 DATA 0,43,4,2,10,1,47,3,6,1,15,4,3,23,2,0,42,5,3,8,2,49,1,30
1320 DATA 0,42,6,2,8,2,80,0,42,6,1,9,2,80,9,1,2,2,0,42,6,1,10,1,86,2,2,1,9
1330 DATA 0,41,7,1,99,2,10,0,42,6,1,99,3,11,0,42,6,5,96,2,12
1340 DATA 0,43,5,1,3,2,96,1,13,0,41,1,2,4,2,2,2,111,0,41,7,2,2,2,112
1350 DATA 0,41,7,2,2,3,112,0,40,7,4,3,3,111,1,2,0,39,8,2,122
1360 DATA 0,38,6,1,1,2,114,1,9,0,37,10,1,114,1,8,0,36,11,1,114,4,3
1370 DATA 0,34,127,5,3,0,33,125,8,3,0,33,127,8,2,0,32,129,0,32,129
1380 DATA 0,31,131,0,31,126,2,2,0,31,111,1,14,0,31,107,2,2,1,12
1390 DATA 0,31,106,2,2,1,12,0,31,106,3,1,2,9,0,31,106,5,4,1,2,3,1
1400 DATA 0,31,104,6,4,0,32,96,2,4,6,4,0,32,89,1,5,4,5,3,4,2,1
1410 DATA 0,32,89,7,1,1,3,5,5,0,32,87,19,5,0,32,87,17,7,0,32,86,17,8
1420 DATA 0,33,84,18,9,0,33,83,19,8,0,33,82,19,8,0,33,53,1,26,21,8
1430 DATA 0,33,52,1,27,21,5,1,1,0,33,52,1,28,1,1,4,1,14,4
1440 DATA 0,33,51,2,30,1,2,1,1,14,4,14,1,0,32,51,2,34,1,1,14,2,1,1,16,1,1,1
1450 DATA 0,32,50,2,35,1,1,14,2,16,1,4,1,1,1,0,32,48,3,36,1,1,14,2,22,1
1460 DATA 0,23,1,9,47,1,38,1,2,0,22,3,8,85,3,1,11,1,0,21,5,2,2,3,85,3,1
1470 DATA 0,20,98,2,3,10,1,0,20,98,2,1,1,1,9,1,0,20,98,2,1,0,20,97,3,1,9,1
1480 DATA 0,21,96,3,2,0,21,3,2,9,1,13,7,60,4,2,6,1,0,21,2,4,6,3,12,2,4,1,60,11,1
1490 DATA 0,27,6,2,12,2,65,5,1,4,1,0,25,7,4,12,1,65,6,2,2,1
1500 DATA 0,24,8,3,78,6,4,0,25,7,1,1,1,77,6,5,0,26,81,10,1,1,2
1510 DATA 0,26,1,1,79,12,1,1,1,0,5,5,4,3,11,69,1,9,9,2
1520 DATA 0,2,15,9,1,1,66,1,2,2,7,11,2,0,1,16,3,1,5,66,5,3,1,3,13,2
1530 DATA 0,3,15,1,2,6,64,6,1,3,4,11,2,0,3,18,6,68,6,5,10,2
1540 DATA 0,4,18,5,72,5,2,8,5,0,8,17,3,70,6,3,7,3,0,8,88,8,3,3,8
1550 DATA 0,8,88,7,2,4,2,1,2,3,1,0,8,89,6,1,4,1,3,2,0,8,89,10,2,1,2
1560 DATA 0,7,91,10,1,0,6,91,0,6,92,0,7,15,2,73,0,8,14,3,74,0,9,13,3,73
1570 DATA 0,9,14,3,70,1,2,0,9,15,7,65,1,2,0,9,14,1,1,3,1,2,64
1580 DATA 0,10,15,4,2,11,53,3,1,0,11,14,2,4,11,53,2,1,0,11,22,10,50,4,1
1590 DATA 0,12,22,11,45,1,1,4,1,0,12,22,10,2,1,15,5,17,2,2
1600 DATA 0,12,21,12,1,1,15,6,14,0,13,19,13,1,1,15,6,13,5,1
1610 DATA 0,14,18,15,13,9,12,4,2,11,1,0,14,16,18,11,11,12,15,2
1620 DATA 0,15,12,1,2,18,9,13,14,12,1,1,1,0,15,10,22,8,14,2,1,12,11,1
1630 DATA 0,16,9,24,6,18,12,12,2,0,16,6,27,6,13,1,4,11,14,2
1640 DATA 0,17,2,31,5,20,11,15,1,0,50,5,14,1,5,1,3,6,11,1,4,1
1650 DATA 0,50,5,20,1,3,6,10,1,3,1,1,1,0,51,3,16,1,3,2,3,4,4,12,1,18,1
1660 DATA 0,52,1,2,1,15,2,1,2,5,1,11,2,5,2,0,54,1,19,2,23,4,7,1
1670 DATA 0,54,2,14,1,4,2,24,2,0,54,2,20,2,15,2,2,2,2,1,0,54,2,15,3,3,2,13,3
1680 DATA 0,48,1,22,4,2,2,11,1,1,3,8,1,0,47,1,24,3,2,3,8,6
```

THE P+R:O=G<S

```
1690 DATA 0,48,1,24,3,2,3,6,7,11,1,0,74,3,2,2,4,10,9,1
1700 DATA 0,75,4,1,2,3,9,2,6,2,2,0,74,1,1,3,6,9,10,1,2,1,1,1,3,1
1710 DATA 0,76,5,4,10,4,2,8,2,4,1,0,75,1,1,4,1,1,4,9,1,5,4,2,2,2,2,5
1720 DATA 0,78,4,6,1,1,1,1,3,2,3,2,1,1,2,3,11
1730 DATA 0,79,3,12,1,3,2,2,1,10,7,0,109,1,1,1,3,4
1740 DATA 0,81,4,2,2,1,2,2,1,1,1,14,1,4,3,0,83,6,3,1,9,1,3,1,1,1,2,1,4,3
1750 DATA 0,87,4,3,4,2,1,2,1,3,1,10,1,0,94,2,6,1,0,97,1,3,1,255,255
1760 REMark 'NORTH AMERICA'
1770 DATA 252,-1,253,249,72,3,1,5,3,3,3,6,9,53,0,72,3,1,6,2,3,3,6,9,55
1780 DATA 0,61,1,5,4,1,3,1,4,4,2,4,8,5,58,0,58,5,5,3,2,2,2,5,2,2,2,10,2,2,1,58
1790 DATA 0,60,3,5,4,1,3,1,1,2,2,5,12,1,58,1,1,0,57,1,11,2,2,3,7,3,1,10,3,58
1800 DATA 0,56,1,3,2,6,3,1,4,5,16,3,59,0,58,4,7,1,2,2,7,14,8,56
1810 DATA 0,58,3,5,1,9,3,2,15,5,1,2,3,1,52,0,54,2,10,2,8,3,3,14,7,1,4,52
1820 DATA 0,53,2,11,2,14,1,4,5,10,2,2,53,0,52,4,21,1,6,2,1,7,8,53,2,2
1830 DATA 0,50,3,1,1,9,3,1,1,2,1,4,4,3,13,7,51
1840 DATA 0,50,4,13,6,4,3,1,1,3,4,1,5,9,52
1850 DATA 0,48,5,8,2,4,7,3,5,1,1,3,2,3,2,11,52
1860 DATA 0,47,3,7,3,1,2,4,6,7,2,10,2,20,43
1870 DATA 0,47,3,2,1,3,4,1,5,2,2,1,3,8,4,3,5,21,43
1880 DATA 0,52,2,2,5,2,4,6,2,3,2,3,12,21,40,1,1,1,1
1890 DATA 0,54,5,3,4,6,2,4,3,1,12,22,39,3,1
1900 DATA 0,55,3,3,4,2,2,3,2,3,4,1,12,23,39
1910 DATA 0,59,4,14,4,2,10,25,40,0,58,4,17,2,3,6,28,38,1,1,0,48,1,69,37
1920 DATA 0,47,4,1,2,8,1,2,1,14,2,37,36
1930 DATA 0,45,10,7,1,1,2,5,2,1,1,3,5,36,32,3,3
1940 DATA 0,46,9,16,5,2,5,3,2,3,1,1,4,22,32,1,1
1950 DATA 0,47,10,15,3,3,4,3,3,2,2,1,5,22,32,2,1
1960 DATA 0,47,8,3,1,6,1,7,1,3,4,4,3,1,3,1,4,22,33
1970 DATA 0,46,7,3,3,1,1,1,1,2,2,3,1,1,4,1,4,3,3,2,4,27,32,2,1
1980 DATA 0,46,6,3,3,3,3,1,2,3,5,3,2,4,3,2,4,1,6,18,1,1,33
1990 DATA 0,45,7,1,7,1,6,4,6,7,3,2,3,2,6,20,35
2000 DATA 0,45,6,2,15,5,4,1,2,3,5,2,12,17,2,2,27,1,4
2010 DATA 0,46,5,1,16,6,1,3,2,3,5,2,13,21,22,2,3
2020 DATA 0,46,4,2,14,10,3,3,6,1,13,18,2,1,25,1,1,2,3
2030 DATA 0,11,1,34,1,6,11,10,5,2,17,2,1,20,25,1,2,1,3
2040 DATA 0,6,1,2,5,38,6,1,9,8,6,4,18,17,2,2,22,6,1,1,1
2050 DATA 0,5,14,22,2,17,8,3,1,4,7,2,20,15,1,1,28,2,2
2060 DATA 0,5,16,21,1,3,1,7,4,2,10,6,5,6,6,1,13,13,1,3,30
2070 DATA 0,5,18,2,2,8,1,3,2,1,2,2,1,1,1,4,18,6,5,11,1,1,12,13,2,1,29
2080 DATA 0,4,27,6,12,5,14,6,2,1,1,1,4,6,2,7,8,19,27
2090 DATA 0,4,27,3,17,6,14,2,3,3,4,1,2,3,3,5,1,1,8,14,2,1,24,1,2
2100 DATA 0,4,28,1,23,2,5,10,4,2,6,4,4,7,6,16,26,1,2
2110 DATA 0,1,55,3,2,3,2,8,2,2,8,3,3,4,2,1,1,1,6,15,2,1,20,1,2
2120 DATA 0,1,54,8,4,1,1,5,2,1,8,2,5,4,1,3,7,16,20
2130 DATA 0,1,54,5,1,3,6,4,2,1,8,2,6,3,1,2,11,11,22
2140 DATA 0,3,59,2,12,2,8,1,6,2,2,1,13,1,1,9,23
2150 DATA 0,4,58,2,28,6,13,11,21,0,4,45,3,11,1,25,1,2,6,15,8,20
2160 DATA 0,6,41,4,1,1,33,4,2,7,8,2,4,9,19
2170 DATA 0,2,2,2,40,7,32,1,1,7,1,3,7,3,4,9,15
2180 DATA 0,1,48,4,27,4,3,1,1,7,1,1,9,3,2,11,13
2190 DATA 0,1,46,2,1,2,27,9,1,1,1,4,13,3,1,11,13
2200 DATA 0,2,46,1,1,1,33,1,1,2,1,1,2,3,14,14,12
2210 DATA 0,2,3,2,86,3,2,3,9,12,13,0,8,68,5,1,4,4,1,2,8,8,14,12
2220 DATA 0,8,73,7,2,2,1,4,4,1,4,1,3,14,11,0,7,73,1,2,5,2,6,1,6,4,2,2,13,11
```

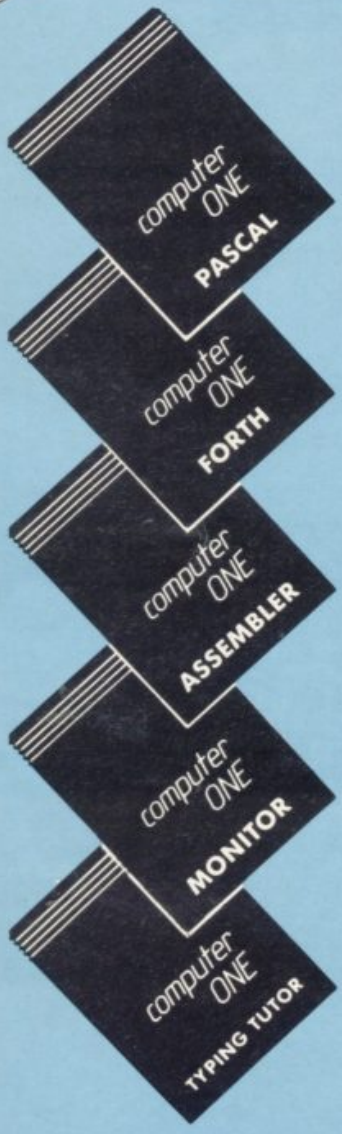
THE P+R:O=G<S

```
2230 DATA 0,6,49,2,2,4,18,1,1,8,2,12,2,2,1,14,9
2240 DATA 0,5,52,3,21,9,2,4,5,6,2,17,8,0,4,53,3,20,16,6,6,1,1,1,15,8
2250 DATA 0,3,52,3,21,17,8,6,1,16,1,1,5,0,3,15,2,34,5,20,17,9,23,1,2,2
2260 DATA 0,4,13,7,31,1,22,19,9,5,1,18,1,1,2
2270 DATA 0,4,3,2,7,2,3,4,53,18,9,5,1
2280 DATA 0,1,2,1,3,3,6,1,4,8,33,1,15,19,8,5,2
2290 DATA 0,6,1,2,6,2,3,11,30,4,13,18,9,5,2
2300 DATA 0,8,7,3,1,12,4,2,23,4,6,1,7,17,12,2,3
2310 DATA 0,9,1,2,4,16,2,4,23,2,8,3,8,14,18
2320 DATA 0,11,4,1,2,15,1,2,1,2,32,2,8,16,16
2330 DATA 0,11,3,21,1,4,41,13,1,2,16
2340 DATA 0,10,4,1,2,19,1,1,1,2,40,1,3,9,1,3,16,0,9,3,29,45,8,1,3,16
2350 DATA 0,8,3,26,1,3,45,12,17,0,6,3,29,1,2,48,8,19,0,5,2,34,50,5,23
2360 DATA 0,40,51,4,22,0,41,33,2,15,6,19,2,3,0,43,31,3,14,1,1,4,24
2370 DATA 0,42,2,1,30,2,15,5,24,0,45,31,1,16,4,22,0,44,32,1,18,1,21,3,1
2380 DATA 0,44,32,2,38,3,1,0,46,31,1,31,10,1,0,43,2,2,30,2,29,5,2,4,3
2390 DATA 0,45,1,2,38,3,17,2,4,5,6,0,46,1,1,36,6,15,2,4,6,6
2400 DATA 0,48,35,3,1,3,15,1,4,1,1,5,3,1,1,1,2
2410 DATA 0,47,34,4,1,5,22,2,1,5,1,1,1,0,47,36,1,6,4,24,0,47,40,6,18,2,5
2420 DATA 0,48,39,2,2,2,16,3,3,1,1,0,48,39,2,2,2,2,4,9,2,3
2430 DATA 0,48,39,1,3,2,2,3,9,0,48,39,1,7,1,9,0,48,42,4,12,0,48,57
2440 DATA 0,48,56,0,48,55,0,49,53,0,50,51,0,50,50,0,50,51,0,50,50,0,51,49
2450 DATA 0,52,46,0,53,44,0,54,42,0,56,39,0,56,2,2,34,0,56,2,2,34
2460 DATA 0,56,3,2,26,3,1,1,2,0,57,3,1,19,4,2,6,2,0,59,1,2,16,14,3
2470 DATA 0,58,3,2,15,15,2,0,59,3,2,14,15,2,0,60,3,1,13,17,1
2480 DATA 0,60,3,2,12,20,1,0,62,2,2,11,0,63,1,3,10,21,1
2490 DATA 0,63,2,3,9,15,1,7,1,2,1,0,68,9,8,4,2,5
2500 DATA 0,68,10,6,5,2,1,3,3,4,2,0,69,9,6,4,9,3,3,3
2510 DATA 0,69,11,2,6,8,1,5,4,0,71,16,14,7,0,74,13,16,4,2,2,0,77,9
2520 DATA 0,82,4,30,1,0,83,4,2,3,0,86,5,0,87,3,0,89,3,0,90,2,255,255
2530 REMark 'OCEANIA'
2540 DATA 252,294,253,128,53,1,0,0,52,1,0,54,1,253,120,58,1,1,1,0,57,1,3,1
2550 DATA 0,39,1,19,1,0,38,1,4,1,18,1,0,36,1,12,1,0,48,1,3,2
2560 DATA 253,110,70,1,0,70,1,0,66,1,0,0,41,1,0,32,2,8,1
2570 DATA 0,32,4,3,1,1,1,25,1,0,31,6,2,2,3,1,23,1,0,31,6,8,1,1,1,23,1
2580 DATA 0,31,8,10,1,19,1,0,31,2,3,3,8,1,12,1,0,38,4,8,1,1,1,5,1
2590 DATA 0,39,4,10,1,3,1,0,27,1,4,1,25,1,11,1,0,18,1,3,2,8,1
2600 DATA 0,20,7,5,2,0,19,8,5,2,0,16,2,1,8,5,4,22,1,0,15,3,1,8,5,4,23,1
2610 DATA 0,12,1,2,14,1,1,1,5,0,12,1,1,16,1,6,22,1,0,12,25,23,1
2620 DATA 0,11,27,20,1,0,10,29,17,1,0,6,34,17,1,1,1,0,3,1,1,37,15,1
2630 DATA 0,3,38,0,3,40,0,3,40,0,2,42,0,3,42,0,4,24,1,16,0,4,23,1,16
2640 DATA 0,4,23,2,15,0,4,2,1,37,0,5,1,1,5,1,31,0,5,6,1,7,4,20
2650 DATA 0,5,10,9,19,0,4,5,2,3,11,2,1,15,0,4,4,17,1,3,13,22,1
2660 DATA 0,6,1,22,13,23,2,0,30,11,25,1,0,30,11,25,2,1,2,0,30,10,26,4
2670 DATA 0,33,2,1,2,28,4,0,65,4,0,33,1,4,1,27,3,0,35,1,28,1,2,1
2680 DATA 0,35,4,24,3,1,1,0,35,4,23,4,0,36,2,24,3,0,37,1,22,5,0,58,5
2690 DATA 0,58,5,0,58,5,0,58,4,0,0,59,1,70,1,253,47,55,1
2700 DATA 252,10,253,126,3,2,0,1,1,2,1,253,106,3,1,253,94,7,1,0,23,1
2710 DATA 0,8,1,1,1,0,0,12,1,253,87,7,1,0,6,1,0,6,1,4,1
2720 DATA 253,81,26,1,253,78,32,1,8,1,253,74,18,1,255,255
2730 REMark 'COLOURS'
2740 DATA 2,4,6,16,18,20,22,32,34,36,38,48,50,52,54,80,84,96,98,112,114
2750 DATA 144,148,160,176,178,208,212,224,226,240,242
```

FEBRUARY OFFER
£10 OFF ALL TITLES

L POWER

T YOUR FINGERTIPS FROM COMPUTER ONE



PASCAL ~~£49.95~~ £39.95

Computer One PASCAL is a powerful implementation of this classic programming language. Produced specifically for the QL, this package provides a professional and highly educational programming system. Complete with comprehensive 100 page manual, this is the ultimate language package that no QL enthusiast can do without.

FEATURES: ★ Full screen editor ★ QL graphics and sound extensions
★ Example programs ★ Complete 100 page User Guide ★ Produce stand-alone programs
★ Full implementation close to ISO-standard ★ Typically 15× faster than BASIC

FORTH ~~£39.95~~ £29.95

A full implementation of the latest FORTH-83 standard with full integration to QDOS. This compiled language runs very fast and allows you to produce fast machine code application programs for your QL.

FEATURES: ★ FORTH-83 system ★ Forth screen editor ★ 100-page manual
★ Produce stand-alone programs ★ QL-graphics and sound extensions
★ Example FORTH programs ★ FORTH macro-assembler
★ Multitasking extensions with many powerful features

ASSEMBLER ~~£29.95~~ £19.95 NEW: Now includes FREE linker

COMPUTER ONE Assembler is a comprehensive assembler program toolkit comprising a full 68008 assembler and full screen editor. This is a professional multitasking assembler and is written in machine code for speed and compactness.

FEATURES: ★ 68008 Assembler ★ Full syntax checking ★ Full scree, editor
★ Assembler linker ★ Comprehensive User Manual ★ Integrates to Pascal and Superbasic

MONITOR ~~£24.95~~ £14.95

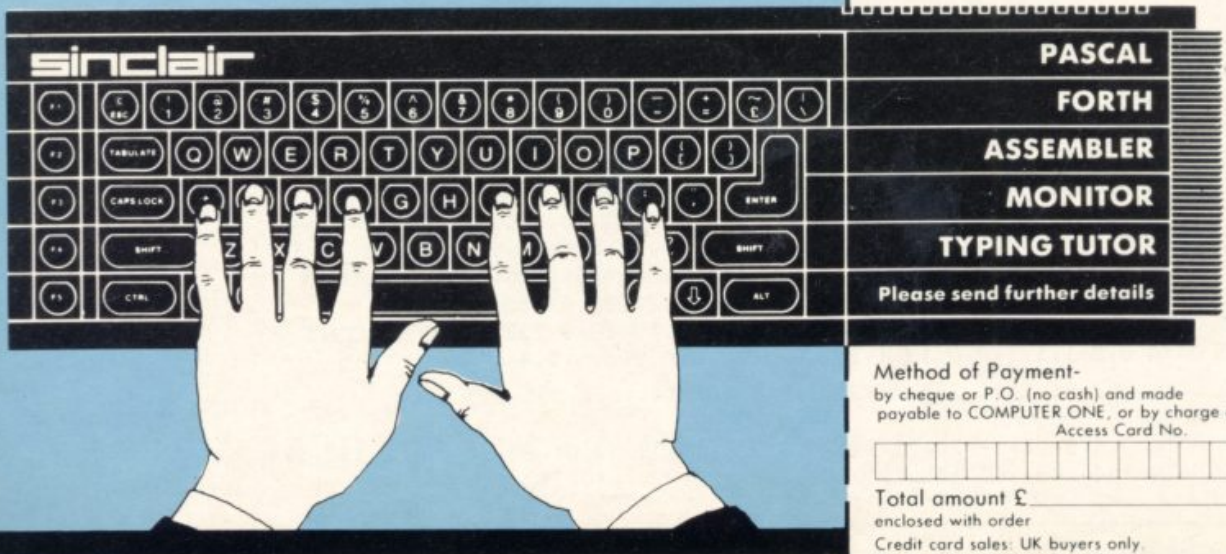
The Computer One MONITOR is a powerful multitasking, multi-window debugging monitor. The MONITOR is an invaluable software tool for anyone developing software for the QL and is ideal for use in conjunction with the Computer One Assembler.

FEATURES: ★ Memory disassembly and display ★ Trace code in RAM or ROM
★ Breakpoints and watchpoints ★ Full channel management ★ User defined screen layout
★ Set and display registers ★ Alter memory ★ Move and search memory ★ Full job control
★ Ability to monitor several jobs simultaneously

TYPING TUTOR ~~£24.95~~ £14.95

Let your Sinclair QL teach you to type! Computer One's Typing Tutor is a fast, easy and enjoyable way of learning true touch-typing on your QL.

FEATURES: ★ Self-paced tutorials
★ Speed and accuracy diagnosis
★ Interactive colour graphics ★ User Guide



computer ONE

SCIENCE PARK, MILTON ROAD, CAMBRIDGE

Name_____

Address_____

_____

Signed_____

	Tick Order
PASCAL	
FORTH	
ASSEMBLER	
MONITOR	
TYPING TUTOR	
Please send further details	

Access

Method of Payment-
by cheque or P.O. (no cash) and made payable to COMPUTER ONE, or by charge card.
Access Card No.

Total amount £_____
enclosed with order

Credit card sales: UK buyers only.
Please allow 28 days for delivery.

Inc. VAT & p&p

MICRODRIVE EXCHANGE

In return for a small administration charge (per program — including a royalty for the author), we will copy onto blank microdrives any or all of the featured programs.

Each program will be a direct copy of the published listing, or an extended version of that listing where the program in question was too long to print in full (programs for which an abridged version has been published are marked with an asterisk).

It must be stressed that we are not selling the software itself, nor providing any guarantee that it performs any particular function (though we do check every program that is to appear in *Sinclair QL World*), we are merely offering a service to readers who wish to obtain *Sinclair QL World* programs on drive rather than by typing them in straight from the page.

HOW TO ORDER

Listed below are programs which have appeared as listings inside *Sinclair QL World.*

To the right of each program entry is a small box, which you should mark with a bold cross if you want to order that program.

Once you have put a cross next to all the programs you wish to have copied onto microdrive, simply complete the rest of the order form and send it along with your PO/cheque AND BLANK FORMATTED DRIVE to:

MICRODRIVE EXCHANGE,
Sinclair QL World,
Wells House,
80-82 Upper Street,
London N1.

If you wish us to supply the drive, please add an extra £2.50 for every drive required and mark the order form appropriately.

Please allow 28 days for delivery.

ORDER FORM

Author	Language	Program Name	Price	Issue	Size
Giles Todd	(B)	DIY Assembler	£5.00	Jun/Mar	120 ☐
Converts Assembler source into m/c object code					
Richard Cross	(AO)	Mini Monitor	£3.00	Oct	60 ☐
Pocket sized monitor with comprehensive facilities					
A Didcock	(B)	Connect4	£1.00	Sept	15 ☐
Pit your wits against the QL					
Shergold & Tose	(B)	* Golf	£2.00	May	35 ☐
From fairway to green on 50 different courses of varying difficulty					
Williams & Holliday	(AO)	Paladin	£5.00	Apr	70 ☐
The basis of our games programming series – a space invaders type game written entirely machine code					
Richard Cross	(MB)	Sprite Animation	£2.00	Apr	50 ☐
A subtle blend of machine code and SuperBasic that produces a versatile sprite designer and high speed animator					
Steve Deary	(B)	Pacman	£1.00	Mar	20 ☐
A reasonably fast rendition of the famous arcade favourite					
Andy Carmicheal	(B)	Family Tree	£3.00	Aug	100 ☐
Archive program and database for setting up and displaying large family trees					
James Lucy	(B)	Composer	£3.00	Oct	50 ☐
Compose and play sheet music on the QL					
Mathew Capp	(B)	Miners	£2.00	Aug	30 ☐
A nail biting management simulation that puts you in charge of the NCB					
PJ Smith	(B)	* DIY Adventure	£1.00	Feb	60 ☐
A skeleton framework where you simply have to slot in the details to create your bespoke adventure					
R Green	(B)	Othello	£1.00	Aug	25 ☐
A 3D version of the well known board game Othello for one or two players					
S J Ackers	(B)	*Touch Type	£4.00	Aug	80 ☐
Touch typing course – 14 lessons, on-screen keyboard, 800+ word vocabulary and WPM readout					

B = SuperBasic, AO = Assembler + Object Code (ready to run), MB = Machine Code + Basic loader

Name_____

Address_____

No of programs ordered ..... Total cost £.....

Total sectors (max 200 per drive) .....

No of drives sent .....

No of drives required ..... @ £2.50 each £.....

Plus postage & packing £ 0.75

Sub total £.....

Subscribers reduction *(if applicable) @ −10% £.....

Add VAT @ 15% £.....

TOTAL TO BE SENT £.....

Please copy onto microdrive the programs above which I have indicated with a cross. I enclose a cheque/PO to the value of £ ..... (made payable to *QL World*). I understand that *Sinclair QL World* only undertakes to SUPPLY these programs (copied onto microdrive) and accepts no liability for their operation as defined by the author. Neither can *Sinclair QL World* supply additional information about any of the listings other than that originally printed (any article reprints required must be ordered and paid for separately at £1 each inclusive of post and packing).

*Subscribers to *Sinclair QL World* may deduct 10% off the Sub Total on their orders.

INSTANT ACCESS

HARDWARE

A>Line Computer Systems
0533 778724
4-way mains filter/adapter
Action Computer Supplies
01 903 3921
Mains spike eliminator
Anglo Services Ltd
0705 671421
QL Eprom Programmer
Broomspring Specialities
0742 737000
Table-top stands
Cambridge Microelectronics Ltd
0223 314814
Q-PROM Eprom Programmer
Care Electronics
0923 777155
Philips and other monochrome monitors
Commpak Data
0792 473697
Computer Supplies
146 Church Road, Boston, Lincs
Joysticks
Compware
0270 582301
CST
0438 352150
Data Distributors Ltd
0990 28921
Kaga, Sinclair Vision
Eidersoft
0808 852647
Quicksoft II Joystick and accessories
Eprom Services
0532 667183
Tony Firshman Services
01 267 3887
Mains Spike Filter
4 Systems
68 Foxwood Close, Feltham, Middx
Cartridges & box
Management Science Ltd
17 West Hill, London SW18
QL case
Microworld
0293 545630/0273 6711863
Kaga, Epson, Smith Corona, Microvitec, Philips, Vision
Miracle Systems Ltd
0272 603871
Opus Supplies Ltd
Redhill 65080
JVC
PCML Ltd
0372 67282/68631
QL+ RAM cards
Power International
0705 756715
Mains spike eliminator
Printerland
0484 514105/687875
Epson, Brother, Kaga, Canon, Juki
Q-Links
0436 6660
Cables & accessories
Silicon Express
0533 374917
Sinclair Research
0276 685311
Slave Software
050 846 8866
Q-Disc
SMC Supplies
01 441 1282
Joystick adaptor, Centronics & Epson Serial
Spectrotek
0669 20565
QL repair service
Strong Computer Systems
0267 231246
Brother, Shinwa, Epson, Kaga, Mannesman Tally, Canon, Daisystep, Smith Corona, Microvitec, Philips
Tandata
06845 68421
(OEL)
Technology Research Ltd
0784 63547
Technomatic Ltd
01 208 1177
Microvitec, Kaga, Epson, Juki, Brother
Transform Ltd
089 283 4783
QL dust cover, microdrive storage box, RS232 lead
Twickenham Computer Centre
01 891 4991
Kaga, Ensign, Canon
Viglen Computers Supplies
01 843 9903
Voltmace Ltd
Park Drive, Baldock, Herts
Printer stand

SOFTWARE

Adder
0223 277050
Q-Doctor, Assembler
Aleph (Finland)
358 67 77408
QL-Numerical, QL/OR
Brainstorm
4 Lindsey Close, Cramlington
Westminster Palace
Bridgebrook Intek
45 Burleigh Avenue, Wallington, Surrey SM6 7JG
Bank Manager, Diary Manager, Thought Manager
Champagne Computers
Amsterdam 020 149130
QL boek, DR Q Leap
Co-op Soft Ltd
0272 22223
Civil/Structural Engineering
Compugem Ltd
01 731 7948
Master Blaster
Computer One
0223 862616
Pascal, Forth, Assembler, Typing Tutor, Monitor
CP Software
10 Alexandra Road, Harrogate
Bridge Player
DA Bandoo
81 Mount Pleasant, Wembley
Assembler, Screen Editor
Data Management
0904 760351
SBUTIL, Mbackup, Terminal, Chargen, SBextras, FM
DataGEN
0989 67469
Packages for Solicitors, Accountants, Video Libraries, Double Glazing Sales & Miscellaneous Credit Control.
Digital Precision
01 527 5493
QL Super Sprite Generator, Games Designer, Monitor + Dissassembler, QL Super Backgammon
Eidersoft
0708 852647
QL Art, Zapper, QSPell, Archiver, QL Art
English Software
061 835 1358
QL Hyperdrive
Equate
2 Ffordd Denwyn, Penyffordd, Chester
Solar Invaders, Wall Breaker, Draughts, Mind Your Path, Statistical Averages, Calendar
Flite Software Ltd
01 353 7423023
Equate (maths package)
GST Computer Systems
0954 81991
QL Assembler, 68K/OS, QC C Compiler, Macro Assembler
Hisoft
0582 696421
MonQL
Israel Software Research
41 Kfar Chabad, ISRAEL 60978
Matzah Ball Game
J&D Software
3 Alfred Road, Lowton, Warrington
Metacomco
0272 428781
Assembler, BCPL, Lisp
Micro Processor Engineering Ltd
21 Hanley Road, Southwater, Horsham, E Sussex
QL Terminator Emulator
MicroAPL
01 622 0395
Microdeal
0726 68020
Havoc, Frogger, Cuthbert
Micrologic Consultants Ltd
57 Station Road
MPC Software
0602 820106
Most popular games
New Horizon Software
Fourwinds, 30 Cwm Lane, Rogerstone, Gwent
Pacman, QBERT, Gold + others
Paddy Software
0726 832718
Educational Programs
PCS
8 Oak Grove Way, Bridgwater, Somerset
PCS Utilities
Peak Electronics
32 Clifton Avenue, Hartlepool, Cleveland
QL Colour Quest
Portfolio Software
PO Box No 15, London SW11
Positron Computing
0554 759624
Hi-res screen dump
Printerland
0484 513105/687875
Psion Chess, Metacomco Assembler
Psientific Software
0482 649187
Keydefine, Q-Calc Calculator, Real Windows
Psion
01 723 9408/0553
Quill, Abacus, Easel, Archive, Psion Chess
QCode
42 Swinburne Road, Abingdon, Oxon
Terminal Emulation, 68000 Assembler/ Editor
QSoft
01 499 7417
Agenda
S&B Software
20 St Nicholas Street, Diss, Norfolk
Fantasia Adventure
Saltgrade Software
31 Royal Terrace, Edinburgh EH7
File Manager, File Editor
Shadowsoft
0296 669740
Area Radar Controller, Strategy
Sinclair Research
0276 685311
Psion Chess
Slave Software
050 846 8866
Arable Farmer Software
Strong Computer Systems
0267 231246
Super Plant Software
097 423 223
Plant & gardening software
Swansoft
164 Vicarage Road, Morriston, Swansea
Space Trek
Talent Computer Systems
041 552 2128
SKUL, WEST, GraphicQL
TDI Software Ltd
0272 742796
USCD Pascal, USCD Fortran 77, Advanced Development Toolkit, USCD P-system, USCD Prolog
TR Computer Systems
093 924 621
QL Payroll
Tropic Software
09274 27497
Bongolia Escape
WD Software
0534 81392
Hilltop, St Marys, Jersey
WD Morse Tutor
Xpert Software
0460 42023
Business software

BOOKS

Century
01 434 4241
Collins
01 493 7070
Duckworth
01 485 3484
Ellis Horwood Ltd
0284 789942
Granada
01 493 7070
Harper & Row
01 836 4635
Hutchinson
01 387 2811
McGraw Hill
0628 23431
Melbourne House
01 940 6064
MicroPress
0892 39606
Prentice Hall
0442 58531
Sunshine
01 437 4343

CLASSIFIED

BREAKTHROUGH SOFTWARE

GREAT INNOVATIONS FOR THE QL AT SENSIBLE PRICES

Each Real Window is stored off screen. It can be swapped with the part of the screen it overwrites, altered and then swapped back again. Several windows can be overlapped and 'shuffled' onscreen. Makes professional Pull Down menus, possible as the screen is restored to its original state when the window is put away! Text and graphics are both handled! Real Windows are controlled from basic using only three commands (all machine code):–

BREAKTHROUGH ON-LINE SUPERBASIC MANUAL £8.50 inc cartridge/p&p

Press the F1 key and the screen you are working on (text, listing, graphics including multiple windows) is saved instantly! Enter a Superbasic Keyword and everything you want to know is displayed on screen. Flip between screens to check syntax etc. Contains ALL Superbasic commands and much more. Create your own help files with Quill. Includes instant recall of the last line typed (F5) for edit and re-entry. Essential for all new users of the QL.

MULTITASKING PRINT SPOOLER £6.50 inc cartridge & p&p

Touch a function Key then type in the input filename and the output file device. It will be sent to the printer or network or even another file, whilst you continue with what you were doing. Fully machine code and multi tasking.

★ ★ FREE ★ ★ FREE ★ ★ FREE ★ ★ FREE PROGRAMS ★ ★ FREE ★ ★ FREE ★ ★ FREE ★ ★ ★ ★ ★ ★ ★ 8 M/C BASIC COMMANDS + SCREEN DUMP FREE WITH ALL PURCHASES ★ ★ ★ ★ ★

GETN & GETS Allow you to edit variables on screen. MCUR Moves the cursur up, down, left or right. TAB Moves the cursor to the given column no (left or right). FONT Allows you to reset the font address. Makes user designed graphics possible. RMODE returns the current display mode. DUMP dumps 1 or more lines from the screen to the printer. BVAR returns address of Basic Variables. PLUS HI RES SCREEN DUMP to printer at the touch of a key AND RECALL. F5 gets back the last line you typed (as in archive), edit your errors and re-enter the line.

17 SHAFTESBURY WAY, ROYSTON, HERTS, SG8 9DE (0763) 45482

BANK MANAGER

CONTROL YOUR BUSINESS OR PERSONAL EXPENDITURE

High Function, Low price, Full Screen Update, Auto Standing orders, Analysis, Selection, Simulation, Statement Print, Help Text, Special Offer £10.

BRIDGEBROOK INTEK, 45 Burleigh Avenue, Wallington, Surrey, SM6 7JG

COMPUTER CLEANERS



STOP LOCK-UPS AND DATA CORRUPTION
(due to mains interference)
DO YOU GET LOCK-UPS?
DOES YOUR DATA GET CORRUPTED?

If this is due to mains interference then our plugs may be the answer

As well as cutting high voltage spikes they smooth the cut spikes and filter RF interference from 1 to 30 MHz (30db) and up to 130 MHz.

Some customer comments:
"With the cleaner . . . (locking up) . . . is no problem now" – *Electrical engineer.*
" . . . these computer cleaners work" – *Computer user group.*
" . . . the device is the answer . . . (loading problems)" – *BBC owner.*
"Lock-ups are cured" – *Golf Club QL.*
"It seems to work fine. No lockups yet" – *for use in Papua New Guinea.*
"Thank you for *unbelievably* prompt delivery" – concrete manufacturer.
"I shall recommend your product . . . " – *Bedford customer.*

ADAPTOR – 1 three pin socket ..... **£14** inclusive
TRAILING 4-WAY SOCKET ..... **£24** inclusive

Simply plug either in – no wiring required

TONY FIRSHMAN SERVICES
43 Rhyl Street, London NW5 3HB. 01-267 3887

PRESTEL
MICRONET
VT52

QCODE

MODAPTOR enables QL to be used with almost any 1200/75 or 300/300 Modem, includes software for access to PRESTEL, MICRONET and Bulletin Boards, etc **£39.90**

FOUR GAMES on one Microdrive cartridge (2 M/c code)–
Sprite Shoot, Lander, Moon Landing, Wall-up **£4.95**
ASSEMBLER/FULL SCREEN EDITOR with fast M/c linker **£12.95**

QCODE, 42 Swinburne Road, Abingdon, Oxon OX14 2HD Tel: 0235 28359

QL JOYSTICKS

Self centering – Trigger/Top Firing Buttons.
Plugs directly into control port.
ONLY **£6.99** inclusive.
Delivery by return.
Make cheque/postal order payable to J. Wragg and send to:
DJW SOFTWARE, 11 Pound Close, Bramley, Hants. RG26 5BL.

QL WORLD **CLASSIFIED**

FOR DETAILS
RING 01-359 3525

TASWORD ——→ QUILL

SPECTRUM TASWORD Docs transferred to QL QUILL Docs £2 per doc (min £8).

SPECTRUM *BASIC* Programs	transferred to QL *Listing**	1p per line (min £5)
SPECTRUM DATA	transferred to QL data files	phone for quote

Send us a *backup* copy on cassette or microdrive cartridge *(no originals)* for an accurate copy for use on your QL. Confidentiality guaranteed, no copies retained. Similar services available. Phone or write for Quotation.
* Notes supplied to get your program running.

COLLEGE TYPING COURSE FOR QL.
W.P.M. and accuracy assessment for 100 Exercises. Increase your typing speed to 45 WPM with this College method. Program £5.

Please add 75p postage and packing (£1.50 outside Europe) and cost of medium:–
Microdrive Cartridge – £2. 3.5" Floppy Disc – £4

SOLENT SYSTEMS (IW), 13 Forest Road, Winford, Isle of Wight, PO30 0JY. Tel: 0983 865694.

American QL

QL Connection is an authorized distributor of the Sinclair QL in the United States. We are also suppliers of the highest quality hardware and software for the Sinclair QL. Call or write for our current catalog.

QL Connection is looking for quality suppliers of QL products who wish to reach the American market.

QL Connection • 15 Kilburn Court
Newport, RI 02840 U.S.A. • 401/849-3805

curry computer **Your Complete Sinclair Stockist**

Hardware, Software, Peripherals,
Printers, Books, Magazines, Accessories
P.O. Box 5607 • Glendale, AZ 85312-5607 U.S.A.
1-602-978-2902 • Telex (via WUI): 6501267701
DEALER INQUIRIES WELCOME

Ideal presents for all QL GARDENERS



Take the guesswork out of gardening.
Our Archive compatible plant data banks the planners will help you. Each data bank comes on 2 microdrive cartridges in a neat plastic box with a 12 cartridge capacity.

Choice of 4 planners at £11.95 each
(25% discount for more than one)
Shrubs, trees and climbers planner
Fruit trees and bushes planner
House plants planner
Wild flowers for gardens planner

Phone: **097 423 223** for more details/orders or send cheques, Access Card Nos. to:

Superplant Software, Llangeitho, Tregaron, Dyfed, Wales, SY25 6QG

QL POOLSWINNER

The ultimate pools prediction program

- **MASSIVE DATABASE** Poolswinner is a sophisticated Pools prediction aid. It comes complete with a large database – 22000 matches over 10 years. All English and Scottish team names are in the database.
- **PREDICTS** Not just scoredraws, but no scores as well.
- **SUCCESSFUL** We guarantee that Poolswinner performs considerably better than chance.
- **UNIQUE** The precise prediction formula calculates the actual efficiency of every team as the results come in and with speed. As far as we know there isn't another pools predicting program that uses this method.

ONLY £14.99 (all inclusive). 48 hours delivery from: Techsoft, Dept QL2, 24 Wharncliffe Street, Barnsley, South Yorkshire S70 6BP.

ALL TEAM NAMES ARE ENTERED USING UP TO THREE FIGURES.

REDVIEW COMPUTERS QLs for Business and professional users. Accounts, Database, Communications. Hermitage: (0635) 200491. Freepost Newbury RG16 7BR.

TOOLKIT (£4.95p). *Find* % STR.FP.INT. Pt.STR. WILD CARDS. *Sort* % ASC. DESC.STR.FP.INT: A$(1000,10) = 72 sec: WORST CASE. A(1000) = 40 degs: WORST CASE. A% (1000) = 25 degs: WORST CASE. PARZ % Postal Sort Code Verification 1000:55 degs. *Tape & SAE to:* Toolkits Ltd, 8 The Crescent, Pontypridd Rd, Barry, S. Glam CF6 8LY. (0222) 711337.

MONEY on your QL typing addresses for us (Archive-mln). Details: Vandec, 172 Ladbroke Grove, London W10 5LZ.

CLASSIFIED

- THINKING ABOUT EXPANSION?
- LOOKING FOR LOW PRICES?
- WANT IMMEDIATE DELIVERY

THEN CONTACT BRAINSELL NOW

Typical Systems Available

	EXCLUSIVE VAT	INCLUSIVE VAT
1 PCML 256k ram + Rom Toolkit + Disc Interface	£225.00	£258.75
2 PCML Rom Toolkit + + Disc Interface	£84.00	£96.60
3 Single 3½" Cumama Drive to 720 kb	£92.00	£105.80
4 Double 3½" Cumama Drive to 1440 kb	£165.00	£189.75

PRICED SYSTEMS READY CALCULATOR

2 + 3	£176.00	£202.40
2 + 4	£249.00	£286.35
1 + 3	£317.00	£364.55
1 + 4	£390.00	£448.50
Delivery	£8.70	£10.00

BRAINSELL,
14 Penns Road, Petersfield, Hants GU32 26N
Tel: (0730) 66700

★ BYTEBACK QL SOFTWARE ★

BJ THE RETURN	9.50	SUPERCHARGE	51.00	QUBOIDS	9.00
NJ IN 3D.LAND	11.50	SUPERFORTH	24.00	WEST	12.75
SPOOK	9.50	SUPER ASTROLOGER	19.00	ZKUL	12.75
ZAPPER	9.00	SUPER ARCADIA	12.00	CARTRIDGE DOCTOR	12.75
CITADEL	9.00	SUPER SPRITIE GEN.	19.00	COSMOS	12.75
I.C.E. (ROM)	23.00	SUPER BACKGAMMON	11.00	MATCH POINT	13.00
I.C.E. TOOLKIT	9.00	PAWN	18.00	CHESS	16.50
I.C.E. CHOICE	13.00	FICTIONARY	11.50	SNOOKER	13.50
I.C.E. ART	11.50	BOUNDER	9.00	HYPERDRIVE	12.75
I.C.E. FULL PACKAGE	54.00	QL PAINT	22.50	SCRABBLE	12.75
FLIGHT	16.00	CLASSIC ADV.	9.00	BOOTY	9.00
LANDS OF HAVOC	16.00	JABBER	9.00	JOYSTICK INTERFACE	4.50

Plus many more software and hardware bargains ... phone for details. All prices include VAT and delivery! Send cheque/P.O. to:

BYTEBACK
20 Spring Gardens, Newark, Notts NG24 4UW
Telephone: 0636 79097

QL COMPENDIUM TWO

CALENDAR:	Generates a calendar for any month of any year, even calculates the date of Easter.
DRAUGHTS:	Computer plays at 6 levels to challenge players of every standard. On-screen instructions, ability to save partially played games, full board display and more.
MIFOR:	Utility with 12 commands making microdrive file organisation easy.
***MINED YOUR PATH:**	Help the soldier across a minefield to base. 10 difficulty levels, 1 to 4 players.
***SNAKE:**	Guide the snake around the garden to eat-up creatures. Thrilling arcade game.
***SOLAR INVADERS:**	Space battle with exciting action, 1 to 4 players.
***WALL-BREAKER:**	Keep the ball in play to break the wall. 5 difficulty levels, 1 to 4 players.

** – indicates the program is 100% machine code.*

All of the above programs for the incredibly low price of £14.95 (£10.95 if you send your own two microdrive cartridges).

Instruction and p&p included. Fast delivery from:

EQUATE, 2 Ffordd Derwyn, Penyffordd, Chester CH4 0JT.

TECHNICAL EDITOR
urgently required by
Sinclair QL World

Applicants must have a good working knowledge of the QL and, preferably, some journalistic experience (though training will be given).

Write enclosing a current CV to:

Paul Coster, Executive Editor,
Sinclair QL World,
Wells House, 80-82 Upper Street, London N1

ADVERTISERS INDEX

ABC Electronics	41
Care	7
Computer One	58
Compware	30
Datalink	16
Digital Precision	8 & 9
Eidersoft	2 & 64
Farmintel	7
4 Systems	4
Kempston	37
Mannesman Tally	37
Metacomco	63
Microsoft	62
Micro Ankika	40
Micro APL	18
Microdeal	24
Micronet	25
Miracle	40
MPC Software	30
Silicon Express	32-33
Strong Computer Systems	6
Talent	16
Tandata	30
Transform	21
Viglen	44
WD Software	16

Micr_A_Soft
QLuality software

C·A·D & 3D GRAPHICS ON THE QL with "DESIGN BOARD 2"
Suitable applications: Architects ★ Technical_Drawing ★ Maps ★ Science ★ Art_Design ★ Students ★ D·I·Y_Enthusiasts. Includes ★ C·A·D design of Single & 3-D graphics + mirroring N·S·E·W ★ Rubber_banding ★ On screen X,Y co_ords with optional linking grids ★ 4 texts mixable with graphic ★ 3 brush paintbox ★ Extras to C·A·D & QL graphics, Single or 3D BOX·OCTAGON TRIANGLE·HEXAGON·PENTAGON rotatable 360° ★ Image_designer ★ Graphics angle indicator ★ Advanced screen dump·(EPSON cmp) With 3D & C·A·D graphics + it's many features Design Board 2 has to be considered as the TOP QL design package. **£24.95**

ART MASTER: Includes ★ Rubber_banding ★ Freehand sketching ★ 3 brush sizes ★ Full colour range ★ Colour sampler ★ Graphics angle indicator ★ Image_designer ★ Perspective grids ★ Advanced screen dump(EPSON comp–) This program contains many features of packages costing three times it's price. **£12.95**

FRUIT MACHINE: All the arcade sound & action of the very popular arcade bandits, with HOLDS – NUDGES – JACKPOTS. Now all the office and family can pit their wits & gambling skills against this highly addictive game of chance. **£6.95**

GRAPHICS TUTOR: A must for all newcomers to & programmers of the QL. Lets even a novice design dynamic 3D graphic & text screens with automatic printed program listings. Simplifies use of Turtle graphics. Polygons. Cursor. Mixing text & graphics Point_locating. Shadow_writing + lots more. Single key input of QL graphic commands + Single or 3D autodraw of TRIANGLE HEXAGON·BOX·PENTAGON·OCTAGON As used by Micr_A_Softs in house program designers. A must for any software library. **£14.95**

CASINO ROULETTE: On screen game board simulates all the action & excitement of a casino. Roulette is a game of skill allied to chance with a fascination of it's own, with players seeking the ultimate winning system. *This game is fast becoming the cult game in offices and homes whether played for high stakes or just for fun.* **£12.95**

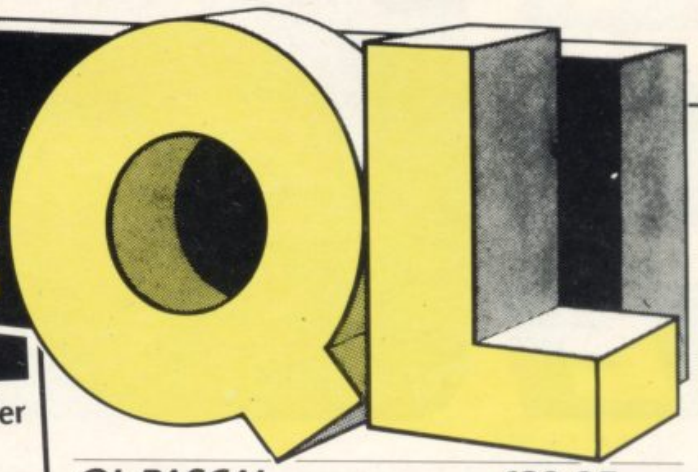
FREE SOFTWARE OFFER

Fruit Machine with every order over £20.
For further program details Send to or Phone 0204 29643.

Micr_A_Soft 134 Hardy Mill Road,
Harwood, Bolton BL2 3PJ

Cheques or postal orders payable to Micr_A_Soft + 50p p/p UK.

RELEASE THE POWER OF THE QL



QL C £99.95 INC. VAT

New - a professional specification C Compiler for the QL! Designed by LATTICE®, QL C is a complete implementation of the Kernighan and Ritchie definition of C. QL C is endorsed by Sinclair Research; it is the most powerful and fully featured C compiler available for the QL.

- > Complete Kernighan and Ritchie implementation.
- > Proven LATTICE® design, compatible with LATTICE® compilers on IBM PC, etc.
- > True compiler producing native 68000 code.
- > Full floating point arithmetic.
- > Powerful data types such as pointers, arrays, structures, and unions.
- > Comprehensive library of UNIX, QDOS and utility functions.
- > Over 90 detailed error messages.
- > Separate compilation.
- > Macros, conditional compilation, and other pre-processors.
- > Linker to link program modules; will also link to other relocatable binary modules.
- > Chosen by Sinclair Research as the C Compiler for the QL.

Every DEVELOPMENT KIT includes Metacomco's popular screen editor, and a detailed manual. All KITs will operate either on a standard QL or else using QL peripherals such as floppy disks or memory expansion.

Available from W.H. Smith, John Lewis, HMV, Menzies, Dixons and other leading retailers or direct from Metacomco.

METACOMCO

26 Portland Square, Bristol BS2 8RZ.
Tel: Bristol (0272) 428781

Trademarks: UNIX-AT+T Bell Laboratories. QL, QDOS - Sinclair Research Limited

QL PASCAL £89.95 INC. VAT

Pascal compiler which conforms fully to the ISO 7185 international standard. Approved by Sinclair Research.

Features: fast single pass compilation — no intermediate stages; produces native 68000 code; full ISO 7185 level 0; direct addressing of complete QL address space; easy to use QDOS interfaces; very large sets and arrays.

ASSEMBLER £39.95 INC. VAT

A high specification macro assembler supporting the full Motorola instruction set.

Features: external references; absolute, position independent, and relocatable code; linker; precise error messages; formatted listings; macro expansions; conditional assembly; and a large range of directives.

BCPL £59.95 INC. VAT

A true compiler, ideal for systems programming - writing utilities, games and applications.

Features: generates native 68000 code; run time library includes easy QDOS interfaces; link loader links separately compiled segments; modules can be linked with Pascal or Assembler.

LISP £59.95 INC. VAT

A LISP interpreter for exploring "The language of artificial intelligence".

Features: Turtle graphics; compatible with LISP for the BBC micro; full support of QL features; structure editor; prettyprinter; garbage collector and tracer.

ATARI ST

Ring or write for details!

WE NOW HAVE SOFTWARE AVAILABLE FOR THE ATARI ST.

Phone today or post this coupon to: Metacomco, 26 Portland Square, Bristol BS2 8RZ.

Please send me QL C £99.95 ☐ QL PASCAL £89.95 ☐ ASSEMBLER £39.95 ☐ BCPL £59.95 ☐ LISP £59.95 ☐ MORE INFORMATION ☐ I enclose a cheque for £ _____ or debit my ACCESS/VISA No: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Card Expiry Date _____

NAME _____

ADDRESS _____

SIGNATURE _____

POSTCODE _____ TEL NO: _____

Price includes VAT, postage and packing UK mainland only. Delivery: allow up to 28 days. QL 11

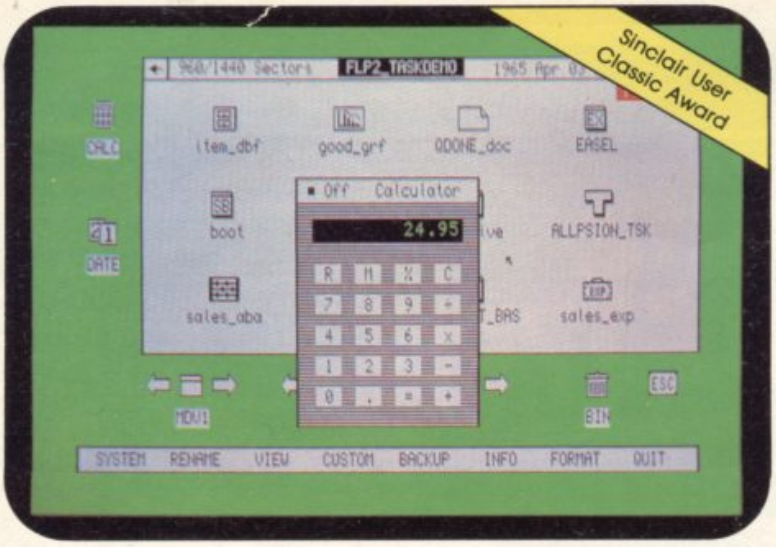
ICON

ICE

CONTROLLED

ENVIRONMENT

SYSTEM



ICE The complete icon based desktop system for the Sinclair QL.

ICE comes on EPROM cartridge that plugs into the cartridge ROM port at the rear of the QL.

ICE uses next to no user RAM! ICE is always available to the user instantly no need to load from microdrive or disk ICE is fully compatible with the Psion™ applications and most QL commercial software ICE is fully compatible with Superbasic programs and can be called from Superbasic ICE is fully compatible with microdrives, disk drives and RAM disks ICE can be used in conjunction with the cursor keys, a joystick or a mouse ICE is multitasking Boot into ICE or boot program TV/Monitor

ONLY £24.95

ICE makes all of the day to day housekeeping operations on your QL easy. ICE uses pictures (icons) to represent the functions and programs you are using. ICE is extremely powerful and can take action on multiple files, saving you typing commands over and over again. Most of all, ICE is very easy to use and can be managed by almost anyone!

ICE complete system £59.95

ICE SYSTEM PROGRAMS (These programs will only work with ICE)



ICE Toolkit is a library of extensions to Superbasic that allow you to use many of the ICE features in your own programs. Mouse cursor, pop-up menus, alert boxes, icons, in fact most of the ICE routines can easily be incorporated into your programs giving them that professional appearance.

ONLY £9.95



CHOice is a powerful multitask editor that allows you to run several programs simultaneously. It can be used to multitask the four Psion packages as well as many others. Most important of all, CHOice gives you direct access to ICE from other programs so that housekeeping need not mean leaving your chosen program. CHOice comes with RAM DISK software, a name and address database for Archive and a Quill/Archive mailmerge facility.

ONLY £14.95



Artice is the ICE drawing program. Artice works in both TV and Monitor mode. Artice features freehand drawing with a full screen, choice of brushes, colour change, texture fill, magnify and reduce, pop-up and pull down menus, mouse style cursor, rubber, rubber band lines, circles etc, and many other features. It is fully multitasking and can be used with the CHOice software if required.

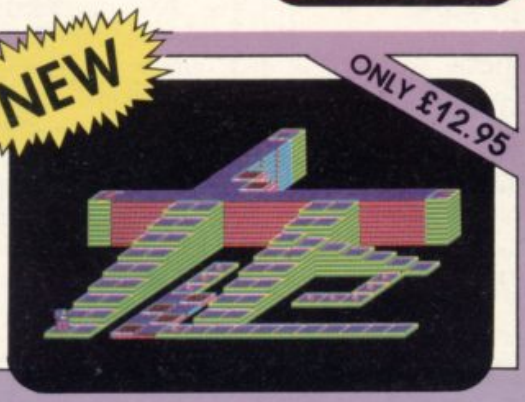
ONLY £12.95

BJ in 3D Land

NEW

ONLY £12.95

Amazing! BJ is off again, this time in a 3D maze that will pose a challenge to all. Over 75 screens of 3 dimensional action, as BJ battles against fireballs, energy zappers, lazers and even giant Chess pieces! Definitely a must!





Joysticks for Super Smooth Action. Suit all games and ICE.
Sureshot QL £19.95 The ultimate in Control.
Quickshot QL £12.95 Standard.
QL Convert Lead for ATARI Joysticks **£5.49**
***£1 Discount if purchased with program.**



BJ The Return



Citadel



Spook



Zapper/Eagle

BJ The Return Drunx has died leaving BJ helpless in the caverns. Good Heavens Above!! Matilda the magic fairy has agreed to let BJ go providing he collects all the miracles from the caverns. A formidable task awaits you as you join BJ in this mega sequel to QL Caverns

ONLY £10.95

Citadel Unravel secrets of a giant city as you steer your craft through over fifty screens of danger and excitment. Superb value for money.

ONLY £9.95

Spook This is one of the best muncher games we have seen on a micro! Full features include multiple screens, fruits, sliding doors, swing doors and much more! Joystick/cursor/sound.

ONLY £10.95

Zapper/Eagle Two great machine code QL games for the price of one! Zapper the snappy arcade game is now joined by "Defender" style eagle.

ONLY £9.95

Our Software Success Means Lower Prices for YOU

Other programs If you require other Eidersoft programs not mentioned in this advertising please telephone for assistance.
QSPELL £19.99+£1 p&p **ARCHIVER** £18.95+£1 p&p
IMPACCT INTEGRATED ACCOUNTING £179.95

BARCLAYCARD VISA · AMERICAN EXPRESS · Access

Trade enquiries welcome phone 0708 852647 administration.
Credit Cards — phone 0708 851099

EIDERSOFT
SYSTEMS & SOFTWARE

EIDERSOFT THE OFFICE, HALL FARM, NORTH OCKENDON, UPMINSTER, ESSEX RM14 3QH.
Please supply the following items:—

☐ ICE	£24.95 + £1.50 P&P	☐ Atari Joystick convert lead £5.95 + £0.50 P&P
☐ CHOice	£14.95 + £1.00 P&P	☐ BJ in 3D Land £12.95 + £1.00 P&P
☐ Artice	£12.95 + £1.00 P&P	☐ BJ the Return £10.95 + £1.00 P&P
☐ ICE Toolkit	£9.95 + £1.00 P&P	☐ Citadel £9.95 + £1.00 P&P
☐ ICE Complete System (all above)	£59.95 + £2.00 P&P	☐ Spook £10.95 + £1.00 P&P
☐ Quickshot Joystick (QL fittings)	£12.95 + £1.50 P&P	☐ Zapper with Eagle £9.95 + £1.00 P&P
☐ Sureshot Joystick (QL fittings)	£19.95 + £1.50 P&P	

Name.....
Postcode.....
Address.....

tick if you require disk drive system information

tick if you require ARCHIVER information

I enclose a cheque/PO for £.....

*EUROPE £2.00 WORLD $3.00

Please deduct my Access/Visa/American Express
Card No. .....
Exp. date .....