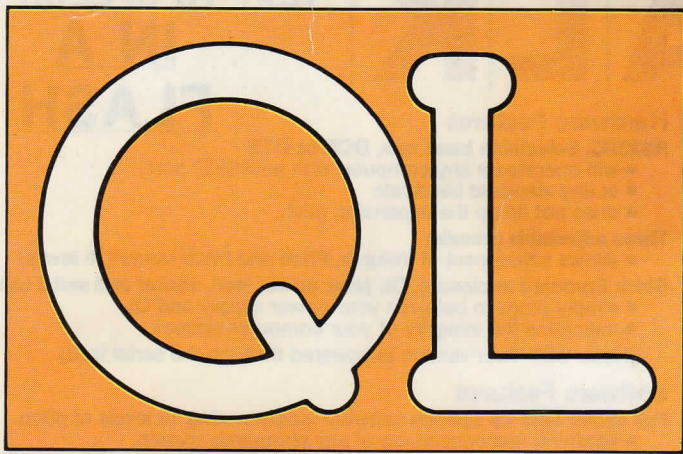


S I N C L A I R

Every month £1.25 January 1988

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GERMANY DM 9.00  
NETHERLANDS DFL 9.25  
SWITZERLAND SFR 6.50



**WORLD**

**Flashback**  
**flexible database**  
**Linear lists**



# BATTLE OF THE KEYBOARDS

**Two new replacements**



**Mastermind**



**Algorithms for skills**



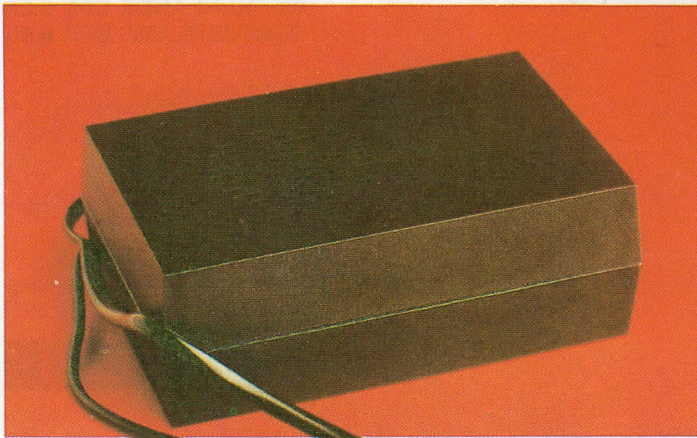
**Getting hard copy**



Introducing

# QTALK

## TEXT TO SPEECH IN A FLASH



### Hardware Features

#### RS232C, Selectable baud rate, DCE or DTE

- will operate on any computer with an RS232 port
- at any standard baud rate
- does not tie up the expansion port

#### Three adjustable presets:

- allows adjustment of Volume, Pitch and Pitch range (16 levels)

#### Black Eurocard enclosure, QL plug, power lead, socket and serial cable

- simply plugs in between your power supply and QL
- maintains the integrity of your computer system

(Note. CST Thor version is powered through the serial lead)

### Software Features

#### Full 68000 Text To Speech software incorporating 16 levels of pitch.

- lightning fast conversion of any string into speech
- any multi syllable word may be split, with different syllables spoken at differing levels of pitch, allowing intonation
- 20K of code. Will work on standard (128K) machine and Thor

#### Built in Exception Table (BET)

- certain words defy all logic and no amount of rules can cater for these. Therefore, their pronunciation has been permanently set in an exception table. eg 'thorough', 'ghoti', 'Lbytes', 'flp1'

#### Size selectable User Exception Table (UET)

- Users can set up their own table of any size and fill it with their own words/pronunciations. This overrides words in the built in table therefore allowing translation of languages. This table can be saved and reloaded for later use.

#### Over 400 rules to convert text to speech.

- If the word or string is not found in either table it will be pronounced via a sophisticated set of rules.

#### Full Device driver implementation.

- a new device called 'QTK' is added to the QL's list of devices. This means that you can use all of the built in basic keywords to send information to QTALK. eg PRINT, LIST, DIR, COPY etc. and also use QTALK with other computer languages (PASCAL, FORTRAN etc)
- a set of clever superbasic extensions is also included to make QTALK a breeze to use
- may be set to pronounce or ignore punctuation

#### Multitasking screen editor

- can be called up any time to set up and add, alter or delete words from the User exception table. Comprehensive on screen help.
  - Hopefully the last word in QL clocks — talking time and date
- Many more thoroughly documented features

### Qtalk Applications

#### 1) Health

- a viable solution to speech impairment/impediment
- allows the blind to write documents and programs

#### 2) Education

- an excellent tool for teaching the relationship between the written and the spoken word
- a valuable aid to those assisting the dyslexic or for students with reading problems
- an amazing new method for teaching or learning the translation of one language to another
- touch typing made easy with keyboard echo

#### 3) Industry

- enables verbal output of readings/warnings from independent peripherals. (BUS, IEEE, RS232 etc)
- can be used to give instructions to an operator
- could be set up as an answerphone or entryphone

#### 4) Entertainment

- allows the user to verbally list programs while checking them against a hardcopy listing
- can be made to hum musical tunes
- provides a whole new dimension to computer games

PRICE	
Qtalk	£75.00
VAT	£11.25
Post/Packaging	£ 2.25
<b>Total</b>	<b>£88.50</b>

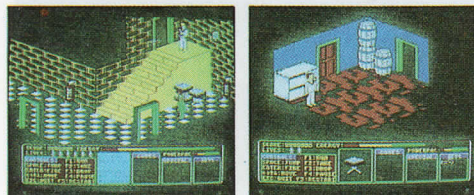
### ALIEN HIJACK

The year is 2003 and you are working on the S.P.C. Forward, as ship's engineer. On the 23rd day you are attacked by an alien space ship and all hell breaks loose. You must regain control of your ship, against some mighty tough opposition.

The first TALKING game for the Sinclair QL. Possibly the most amazing QL graphics seen to date

- 3D graphics
- Full 68000 code
- 192 colour screens
- fast, dynamic, challenging
- talking hero and aliens

**Note.** Alien Hijack does not require QTALK to run but it certainly makes it a lot more fun. Works on a 128K QL.



PRICE	
Alien Hijack	£15.00
VAT	£ 2.25
Post/Packaging	£ 1.00
<b>Total</b>	<b>£18.25</b>

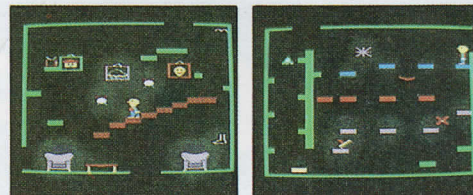
### PUZZLE MANIA

Your mission, should you decide to accept, is to journey about the danger ridden cells of Maniaville to retrieve the lost loot of Lawless Lenny. Several obstacles will attempt to thwart your progress and only the smartest gamer will survive.

The second TALKING game for the Sinclair QL

- full 68000 code — 40 colour screens — fast, arcade action
- spoken clues to help you win (if you are good enough)
- Truly addictive challenge

**Note.** Puzzle Mania can operate without QTALK but is much more fun with it.



PRICE	
Puzzle Mania	£10.00
VAT	£ 1.50
Post/Packaging	£ 1.00
<b>Total</b>	<b>£12.50</b>

## Special Introductory Offer Buy QTALK, PUZZLE MANIA and ALIEN HIJACK and receive £5.00 discount pre VAT total

Name \_\_\_\_\_ SQLW1

Address \_\_\_\_\_

Please rush me \_\_\_\_\_

for my **QL/THOR** (cross out one which does not apply)  
with software on 3½" **disc/mdv** (cross out one which does not apply)

I enclose a **bank cheque** for £ \_\_\_\_\_  
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(New Zealand)

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or

Maxtronics R&D Ltd: 26A Conway Street, Christchurch 2,  
New Zealand. Telephone (64-3) 325-546

*Editor*  
 Helen Armstrong  
*Sub Editor*  
 Harold Mayes MBE  
*Production Manager*  
 Nick Fry  
*Designer*  
 Chris Winch  
*Art Editor*  
 Neil Tookey  
*Advertisement Manager*  
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*Managing Editor*  
 Brendon Gore  
*Publisher*  
 Trish Phillips  
*Group Publisher*  
 Paul Coster  
*Financial Director*  
 Brendan McGrath  
*Chief Executive*  
 Richard Hease  
*Microdrive Exchange 089 283 4783/2952 (2 lines) TIL*  
 Sinclair QL World  
 Greencoat House  
 Francis Street  
 London SW1P 1DG  
 Telephone 01-834 1717  
 Fax 01-828 0270  
 Telex 9419564 FOCUS G  
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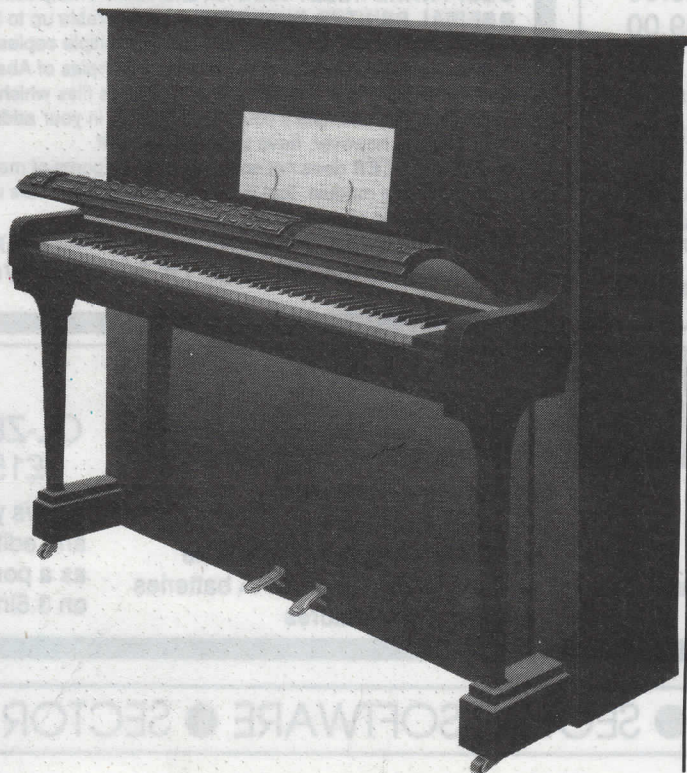
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## NEXT MONTH

### MICRODRIVES, REGULATORS AND INTERFACES

Preventative medicine for machinery: is it worth fixing things which work? Bryan Davies thinks it is, in selected circumstances, and describes several ways in which a little care now will circumvent a catastrophe later.

### OUT OF THE SHELL

Expert systems are expected to take program design power from the hands of specialists and place it in the hands of users. Marcus Jeffrey, SQLW's artificial intelligence specialist, gets to grips with a new expert shell package for the QL.

# S E C T O R

## SPELLBOUND

**REAL TIME spelling checker for Quill or The Editor V1.17 onwards on the expanded Sinclair QL.**

Spell Bound checks input by the character against its 30,000+ word dictionary. It has 5 switchable modes of operation to suit a variety of typing styles with the dictionary available at all times. Spell Bound displays example words on request and operates with no discernable reduction in the operating speed of Quill. The dictionary is fully user expandable to memory/media limits.

**Available on disc or Microdrive at only £29.95**

### SOFTWARE 1

Touch Typist	£12.00
Task Master	£25.00
Spellbound	£29.95
Turbo Quill+	£14.00
Turbo Quill	£12.00
Cartridge Doctor	£13.00
Eye Q	£29.00
Turbo	£99.00
The Editor (DP)	£30.00
Project Planner	£30.00
Forth	£34.00

### SOFTWARE 2

Toolkit 2 (EPROM)	£34.00
TechniQL	£49.00
Media Manager	£40.00
Front Page	£23.00
Scrabble	£15.00
Keydefine	£10.00
Talent Workbench	£25.00
Supercharge	£49.00
Psion Chess	£17.00
Better Basic (DP)	£20.00
Home Finance	£20.00

## FLASHBACK

See opposite for details

## TASKMASTER

### THE ULTIMATE

- **NOT JUST** another multi tasking program, but a complete front end memory management system for the expanded Sinclair QL.
- **ON SCREEN CALCULATOR** with many features including delta percentage mark up.
- **POWERFUL FILE MAINTENANCE** of discs and Microdrives.
- **NOTEPAD** with word wrap and 'send note' feature.
- **SOFTWARE RESET** scans for, and warns of any vulnerable open files at close down.
- **SERIAL PRINTER BUFFER** user configurable up to 32K
- **DUPLICATE CODE SHARING** allows multiple copies of the same program without losing memory to additional code space e.g. 12 copies of Abacus with 230K free.
- **COMMAND FILE MODULE** easily creates files which will operate the machine in your absence. For example it could load quill, fill in your address, type a standard letter and print it.. You will, however, have to post it yourself.
- **TASKMASTER** does not consume vast amounts of memory. If you wish only to use the multi tasking module, that is all you need to load, thus using only a small slice of memory. The choice is always yours
- **USER FRIENDLY.** It was described as "virtually idiot proof" by a major software reviewer.

**Available on disc or Microdrive and still only £25**

## CAMBRIDGE COMPUTERS Z88

-from Sir Clive Sinclair

£287

- Built in screen
- Full size keyboard
- Built in word processor
- spreadsheet and database
- 32K RAM
- Diary and Calculator
- Comms software
- All Z88 accessories available
- Runs for 20 hrs on 4 AA batteries
- Many more features

## QZ

QL-Z88 file transfer software  
£15 (QL-Z88 cable - £8)

Allows you to use the QL for storage and editing of files, or to use the Z88 as a portable data terminal. Available on 3.5in. disc or Microdrive

# SOFTWARE

**NEW FROM  
SECTOR  
SOFTWARE**

## FLASHBACK

### FLASHBACK

An entirely new concept in fast information storage, retrieval and manipulation on the Sinclair QL. Flashback is written by Peter J Jefferies, author of Taskmaster and Spellbound and is designed to be user-friendly, powerful, flexible and very fast.

The master program is memory based and will operate in different forms, dependant on whether running on a standard or expanded machine. Easily build your own reference system from scratch or import existing Quill list files, Archive export files, Editor text files and even Superbasic program listings.

### FLASHBACK

Uses infinitely variable non-destructive windows and is designed to overlay the current program when required. Built-in text editing, free-form structure supporting, varied selecting, sorting and location features.

### FLASHBACK

**ONLY £25**

## TOUCH TYPIST

**Don't even think about buying a replacement keyboard until you know how to use the one you already have.**

Why type slowly when you can be typing at professional speeds? Touch Typist is the fastest typing tutor available for the Sinclair QL. It will teach you to type at up to 211 wpm. It is 100% machine code and has:

- 3 teaching modes ● adjustable speed and accuracy targets
- very fast interactive keyboard ● results display graphs

Customise any or all of the 200 lessons which can then be saved to create a library of custom lesson sets. Touch typist will run from disc, Microdrive or ramdisc. Available on disc or Microdrive for only £12.

*"Succeeding admirably as a serious course intended for beginners and experienced typists alike...includes the professional polish of good quality software"* - QL World

## QL SPARES

**Service Manual** - This is the most up to date book for repairing the QL. It contains all circuit diagrams, faultfinding charts and oscilloscope displays to enable you to repair your own QL or understand how it works - **£25.00**

**QL Test Software** - Including RS232 loopback lead. Tests all major functions of the computer - sound, colour, keys, RS232, Micro-drive etc. Used by repair companies - **£14.00**

Keyboard membrane	£6.00
Bubble mat	£3.00
JS ROM set	£28.00
ZX8301 ULA	£12.00
ZX8302 ULA	£13.00

## VARIOUS

Trump Card	£195.00
QL dustcover	£5.00
Microdrive labels on tractor feed per 100	£3.50
20 Microdrives in Transform storage box	£39.00
Internal 640K memory upgrade	£99.00
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Astracom 1000 modem	£199.00
Microvitec 1451DQ3 dedicated monitor	£260.00
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ALL PRICES INCLUDE VAT AND P & P



## COMPUTERS

QL JS 2.3 software	£169
QL640 JS 2.3 software	£260
Psion 2.3 sets	£10
Psion 2.35 sets	£20

## PSION ORGANISER

Organiser XP 32K	£138
128K Rampack	£100
32K D Rampack	£55
Harvester Superchip	£99
Data Organiser	£35

Z88 + mains adaptor	£297.50
32K Rampack	£20.00
128K Rampack	£50.00
QL - Z88 link	£23.00
Centronics interface	£30.00

**Z 88**

# TK

# COMPUTERWARE

the QL stockist

Tel: 0303-81-2801

## DISC SYSTEMS

Dual 3.5 in. + Trump Card	£350.00
Single D/D 3.5in. drive	£125.00
Single D/D 3.5 in. & 0K SQB	£225.00
Dual D/D 3.5 in drive	£209.00
Dual D/D 3.5 in. & i/face	£295.00
Dual 3.5 in. & 512K SQB	£350.00
Cumana disc interface	£ 86.25
768K Trump Card	£199.00

## SPARES

JS ROM sets	£27.50
Keyboard membrane	£6.25
Keyboard bubble mat	£3.85
ULA ZX 8301	£9.50
ULA ZX 8302	£10.25
MAB 8049	£7.50
CPU 68008	£25.80
M/drive assemblies- complete	£27.50
Voltage regulator (high output)	£4.75
Power supply UK	£23.50
Power supply European	£25.50
QL Test kit	£13.50

## SUNDRIES

10 Microdrive cartridges	£17.50
Cartridge storage box	£5.50
QL Dustcover	£5.00
100 Microdrive labels	£3.75
Powerclean filter	£36.00
Eprom Programmer	£129.00
Battery clock kits	£19.50
10 DS/DD discs 3.5" (u/b)	£18.50
Joystick + adaptor	£16.00
512K internal U/G	£94.00
Centronics Interface	£19.50

## SOFTWARE

### BUSINESS

Flashback (c-d)	£25.00	XRef	£15.00
Cash Trader (PDQL)	£80.00	Compare	£10.00
Cash Trader + Analyser	£105.00	Super Toolkit 2 (Eprom)	£29.00
Decision Maker	£35.00	QIMI + Giga Mouse	£70.00
Entrepreneur	£35.00	QLiberator (c-d)	£60.00
Finance Manager	£19.00	QLiberator (budget)	£30.00
Home Finance (Buzz)	£22.00	QLoad & Ref	£10.00
Investment Monitor	£20.00	Quats	£25.00
Project Planner	£29.00	QRam (c-d)	£30.00
Small Traders Pack	£25.00	QWriter 2	£20.00
Spellbound (c-d)	£30.00	Task Master (c-d)	£25.00
Spellbound + Filebound	£35.00	Speed Screen	£20.00
Touch Typist	£12.00	The Editor	£29.00
Pacioli	£25.00	The Editor - special edition	£49.00

### UTILITIES

Archivist	£30.00	Turbo (c-d)	£99.00
Cartridge Doctor	£13.00	Turbo Quill (c-d)	£10.00
Copymate	£11.00	Turbo Quill + (c-d)	£13.00
CPM Emulator (c-d)	£45.00	Ultra Print	£20.00

Assembly Lang. Toolkit	£25.00	<b>CAD</b>	
Desktop Publisher	£60.00	Concept 3D	£40.00
Desktop Publisher		Eye Q	£29.00
- S/Edtion (d)	£80.00	Mandebrot Magic	£15.00
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ArchRTM	£20.00	The Designer	£15.00
ICE Eprom	£27.00	Viewpoint	£20.00
ICE Drawing Office	£15.00	3-D Designer	£35.00
Key Define	£10.00		

Locksmith	£11.50	<b>LANGUAGES</b>	
Mailfile (256K)	£20.00	Assembler Workbench	£25.00
PCB Designer 1	£99.00	Basic-Ally	£20.00
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QFLASH Ram utilities (c-d)	£10.00	C Compiler	£85.00
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Sideways	£20.00	MonQL (Eprom)	£30.00
Sidewinder	£12.00	Pascal (Computer One)	£40.00
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Super Media Manager (d)	£40.00	Pro Fortran-77	£92.00
		Pro Pascal	£92.00

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Super Forth + Reversi	£39.00

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Snooker	£13.00
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3 Destr. of Army Group	£13.50
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Hoverzone	£15.00
Hyperdrive	£13.00
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Karate	£15.00
Knight Flight	£15.00
Mortville Manor	£15.00
Quboids	£9.00
Stone Raider	£13.00
Tank Busters	£15.00

## BOOKS

Using the Psion Organiser	£10	QDOS Companion	£7
Assembly lang. Programming	£9	Technical Guide	£20
QL Advanced Programming	£15	QL Service manual	£20

Other QL titles available - phone for details

## KEYBOARDS

Schoen replacement	£57
Rainbow remote	£85
Sandy IBM-style	£99
Schoen IBM-style	£99

● ALL PRICES INCLUDE VAT AND UK MAINLAND DELIVERY - WE EXPORT WORLDWIDE ●

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NORTH STANFORD, ASHFORD, KENT TN25 6DF**

TELEX  
966676 PMFAB G



FAX  
0303 812892

## Widget for Psion

Psion Organiser II users will be interested to know that the new *Widget* software pack is available.

The package allows Organiser users to search and print data more efficiently and to sort the machine Datapaks into alphabetical order. The programs can create and edit more than one file on each pack.

The *Widget* pack is available from **Widget Software Sales, Information Department, 21 Landrock Road, London N8 9HR. Tel: 0438 812320**, priced £39.95 including VAT and carriage. For dealer information telephone Mark Needham on 01-348 7300.

## QL expert

Compware is launching an expert shell program for the QL. The *QL Expert System Shell* is a programming tool which makes it possible for users to produce usable knowledge-based systems at low cost. Designed for experienced knowledge engineers and users who want to learn about AI techniques, the *Expert System Shell* includes standard and original features, including Boolean and fuzzy logic, with user-definable probability relationships; intelligent scanning and pre-scanning of the rule base; tokenised

## Custom built

SD Microsystems, which specialises in small business software for the QL and Amstrad CPC, is offering a customising service to meet users' exact requirements.

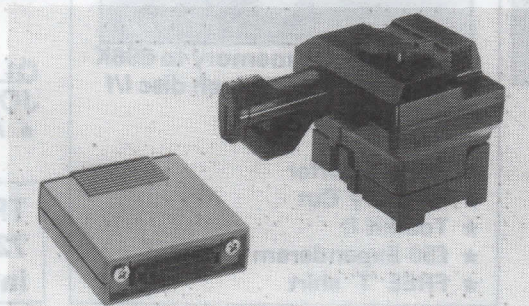
SD Microsystems has experience in modifying programs to run with less common printers, incorporating special features such as a price and product list into its software, and designing special filing systems and spreadsheets.

Prices for adapting existing programs or

developing new ones range from £10 for a simple alteration to £50 and up for a tailored system. Customisation enables business users to computerise their business requirements efficiently, provided, of course, they have a reasonably clear idea of what they need.

For more information or quotations without obligation, **SD Microsystems** can be contacted at **PO Box 24, Hitchin, Herts. Tel: 0462 675106**.

## New image



The device in the photograph is a new image scanner from Epson which will retail for less than £200. It is intended for use with the boom in desk-top publishing in mind and is

available as an option on four of the company's printers, the EX800, and EX1000, and the LQ2500 and the 2500+

**Epson U.K. Ltd, 388 High Road, Wembley, Middlesex.**

rules to save memory — about 100 rules on a 128K QL — syntax-sensitive screen-based rule editor; on-line context-sensitive help; pre-compiled expressions for fast rule evaluation; formatting of input and output plus the ability to construct menus for the user; conditional operators and original constructs;

FIRST OF, MON OF, MAX OF, ALL OF; multiple goal paths, and others.

The expert Shell costs £49.95 including VAT and postage. Dealer and overseas enquiries are welcome. Write to **Compware, 57 Repton Drive, Haslington, Crewe CW1 1SA. Tel: 0270 582301.**

Please send items for inclusion in *QL Scene*, in writing, to *QL Scene*, *QL World*, Greencoat House, Francis Street, London SW1P 1DG. We cannot guarantee to place every item we receive for inclusion in a particular issue but news will, wherever possible, appear in the next available issue, normally the second month after the month of receipt.

## Contents index

Reader Ivor Lewis has produced a printed index to the contents of *QL World* from 1984 to September.

The sample copy we have is well-printed on strong, dark red paper, with a matching card cover featuring a photograph of a QL held defiantly against the open sky. It is a well-produced booklet, in A5 format, with 27 pages plus cover.

The index costs £5 payable to **Ivor Lewis, Ashley Court, Chulmleigh, Devon EX18 7EX**. While it is not cheap it represents a considerable saving in time and trouble for anyone who looks up items regularly.

The headings included are Abacus, Archive, announcements — editorial comments — books, communications, games, graphics, joysticks, hardware, languages, names, printers, progs, puzzles, technical help, and utilities. It might be worth enquiring if Lewis has any plans for updates.

# MIRACLE SYSTEMS LIMITED

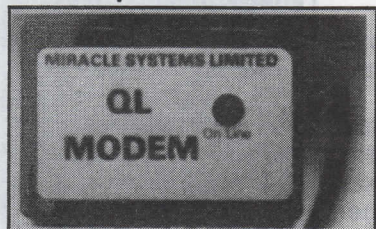
14 day full money back guarantee on all products

12 month warranty on all products

All prices include VAT and P&P

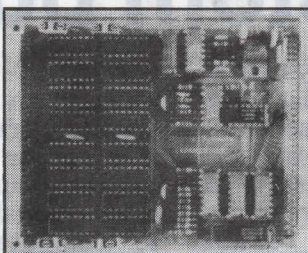
## QL MODEM £49

- ★ New printout software



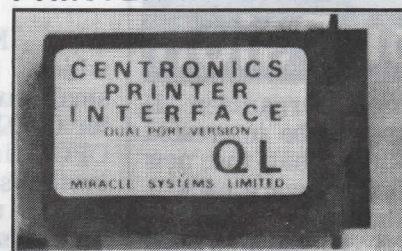
- ★ 1200/75 e.g. PRESTEL, T/GOLD
- ★ Autodial
- ★ 3 metre cable
- ★ Plugs into SER2
- ★ Includes Viewdata software
- ★ Includes 80 column software
- ★ Not BT approved

## QL EXPANDERAM 512K £75



- ★ Increases QL memory to 640K
- ★ Through connector for i/f
- ★ Low power consumption
- ★ Can speed up some programs
- ★ Able to use larger Quill docs etc
- ★ Black cover included

## QL CENTRONICS £19.50 PRINTER INTERFACE



- ★ Plugs into SER1 or SER2
- ★ Standard Centronics plug
- ★ Default baud rate 9600
- ★ 3 metre cable

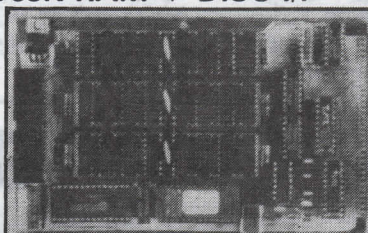
## QL MODAPTOR £39

- ★ New printout software



- ★ Interfaces QL to standard modem
- ★ 300/300, 1200/75, 1200/1200
- ★ Autodials with DTR
- ★ Plugs into SER2
- ★ Terminated by 25 way D
- ★ Includes Viewdata software
- ★ Includes 80 column software

## QL TRUMP CARD £199 768K RAM + DISC I/F



- ★ Increases QL memory to 896K
- ★ Standard 3½/5¼ inch disc i/f
- ★ Screen Dump
- ★ RAM Disc
- ★ Printer Buffer
- ★ Memory Cut
- ★ Toolkit II
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- ★ FREE 'T' shirt

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## QL SERIAL CABLE £7.50

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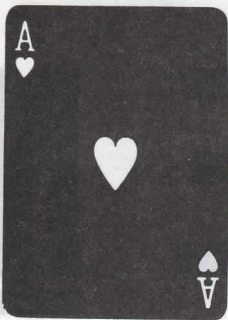
Send to: Name .....

Address .....

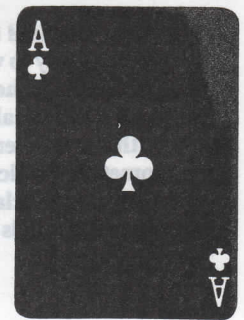
SQLW1

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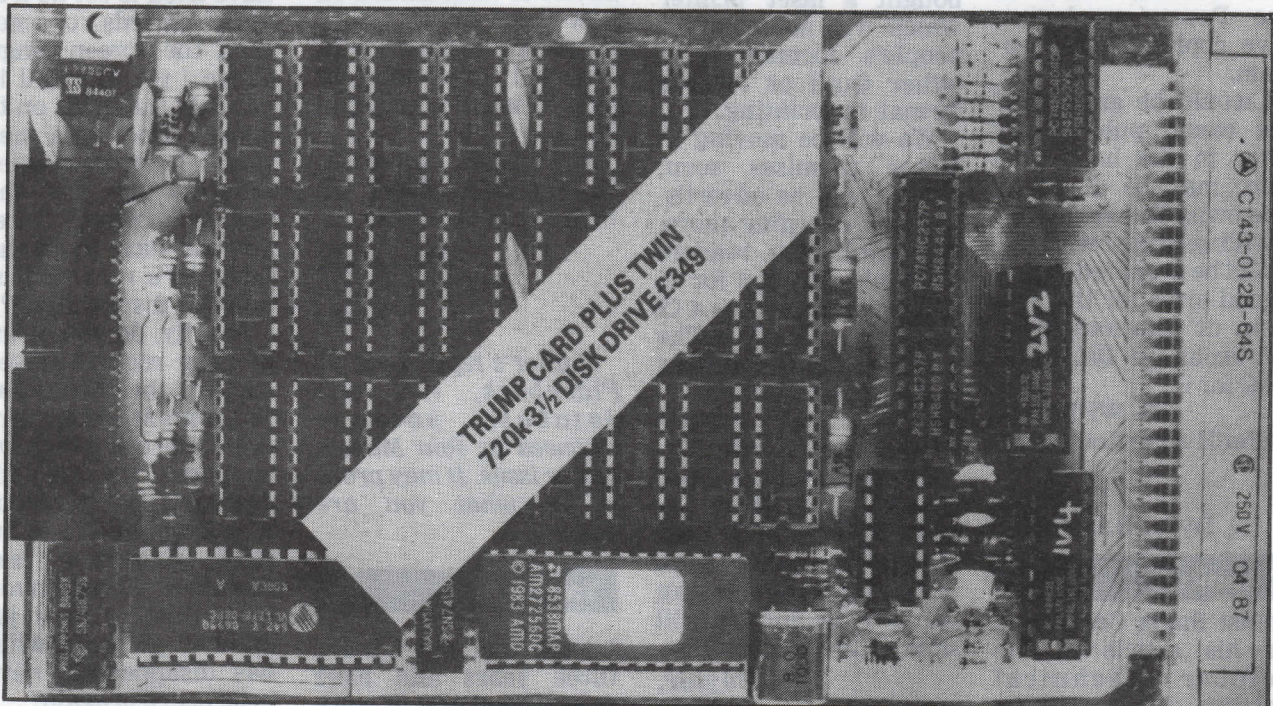


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# TRUMP CARD

- 768K RAM making 896K total
- Disc Interface
- RAM Disc
- Printer Buffer
- Toolkit II
- Screen Dump
- Memory Cut



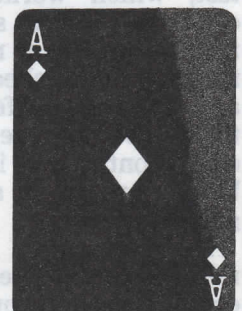
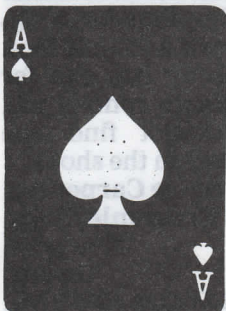
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Open Channel is where you have the opportunity to voice your opinions in *Sinclair QL World*. Whether you want to ask for help with a technical problem, provide somebody with the answer, or just sound off about something which bothers you, write to: Open Channel, Sinclair QL World, Greencoat House, Francis Street, London SW1P 1DG.

# O P E N

## The Pawn

I bought a Sinclair QL last May and since then I have tried unsuccessfully to obtain the original *Pawn* adventure game marketed by Sinclair Research. I have been in touch with Firebird Software which has informed me that Magnetic Scrolls, writer of *The Pawn*, no longer have copies of the program.

I would be grateful if you would publish my letter in the hope that there may be a reader who owns *The Pawn* and is willing to part with it. I would be prepared to pay a good price for the program or alternatively I will exchange *QRAM* or *EyeQ* for it.

G. Williams,  
33 Penllwynrhodyn  
Road,  
Llanelli,  
Dyfed SA14 9NL.

## Thanks

I must thank Colin Opie for his article in the October Technical Helpline. It showed me how to get my Brother HR5 printer working. I bought it nine months ago and sent to Datalink Computer Systems for a serial cable.

Apart from the self-test, which worked, I could not get a spark from it and spent many fruitless hours checking and trying different things, so for the last eight months or so it had been on the shelf gathering dust.

It took only two minutes to re-solder the connections and you can

imagine my delight when it worked for the first time.

T. Schofield,  
Batley,  
W. Yorks.

## New service

I would like to use your pages to inform readers of a new service I am operating. Recently I bought a laser printer which will accept other people's documents, in either Quill or Abacus format, for printing.

We will be moving to larger premises soon, when I will be advertising and charging more, but until then readers can make use of it for 25 pence per page, plus a £2 handling charge. The print quality is excellent and I hope eventually to be able to provide graphics for printing.

In the meantime, I can accept 3.5in. discs or Microdrives with payment. Anyone who wants more details can apply to us and we will send full information.

Neil Taylor,  
Taylor Made Systems  
Ltd,  
135 Ellerton Road,  
Surbiton,  
Surrey KT6 7UA.

## Patient problem

I wonder if anybody can help me with a problem I am having in making the best use of my QL? I am an osteopath and am attempting to use Archive as the database for my patient information.

The problem is two-fold. I have to obtain background information from the patients con-

cerning their medical history, for which purposes I have designed a simple Archive database.

What I cannot do it to make the file open-ended so that after each treatment I am able to add new information to the files.

Can you offer any advice or information on how I can achieve this, or put me in touch with somebody who may be able to write a program for me?

My system comprises an expanded 640K QL with twin 3.5in discs.

Jon Leigh,  
Gillingham,  
Kent.

*Editor's reply: Look at Flashback, the new database package reviewed by Ron Massey in this issue. It may prove to be what you are seeking.*

## Tall order

I have had my QL for three years and have done a good deal of work with it. I also like writing simulation-type games. At the moment I am working on a space shuttle simulation. It will probably take me a year or so to complete in my spare time.

I have two problems which I would like some help. I have the Trump Card, a 3.5in. disc drive and a Brother HR5 printer. The Trump Card works well and the directory trees are very useful.

My first problem is that when I run Quill

from the disc it runs well until I call for the HELP menus. I then get a message that they cannot be found. How do I get Quill to read the HELP files from the floppy and not the Microdrive?

Second, I am trying to catalogue my record album collection and I have tried to set up a file with records of more than the screen length. When I try to recall it I get only the fields on the screen. Does this mean that I have to create a different file for each side of a record? Surely you can have more than fields in a record? If so, how do I display them?

Finally, do you or any of your readers have a copy of the Medic Data Systems *M-Paint* program, the one which was supposed to be like *Macpaint* but in colour? If so I would like to buy this program and manuals. Does anyone have this, or is it just another program which has disappeared, never to be heard of again?

Steve Attrill,  
Apt. 4,  
17th Floor,  
Froeling Strasse 7,  
6380 Bad Homburg,  
W. Germany.

## Disc hunt

I am hunting for a QL disc drive and interface. If anybody has one for sale, please contact me, as I cannot find one anywhere in the shops.

Steve Carpenter,  
42 Clanrenle Place,  
Newport,  
Gwent,  
S. Wales NP9 3AU.

# CHANNEL

## Request time

I am a student of architecture but at the same time I am very interested in informatics, so it is not surprising that I try to link them. You could call this computer-aided architectural design, if you limit that concept to graphic problems. Besides CAD I am also interested in artificial intelligence, expert systems, non-declarative languages like Prolog, object-orientated languages, shape grammars and so on.

So I would like to join the requests for a Prolog interpreter and to see all those subjects covered in *QL World*.

**Rudi Stouffs,  
Overijse,  
Belgium.**

## Basic protection

In the November, 1987 issue, the lead letter was about Colin Holmes' method of keeping Basic programs from prying eyes. On a pre-JS Qdos PC, only the first definition of an identifier is used, although if the first version is a Basic definition, a NEW will junk it.

To circumvent the not-so-delightful habit of numberless Basic programs load programs as a means of protection, Copy, WCOPY or SPL to the screen, or even use Forum #2 RENUM... FILE on a numberless program if you can be bothered.

A good point is that it may leave the Basic area intact if MRUN or MERGED or DOne. Consider the ubiquitous text

editor, for example Quill, Talent Editor and Computer One Editor, which make such techniques a little pointless.

Another point; why protect your work? Is the average user such a rabid plundering character that even Basic programs need forts protection? Also, the FLRUN, QLRUN extensions are not unassailable, thanks to Eddy Yeung's Basic-Ally.

**Billboard Bagginz,  
Just past the Orc,  
Massacre Inn.**

*Editor's reply: Are QL programmers such calm, peace-loving characters that they would not arrange a little massacre all of their own if they know where rip-off merchants gather I am in favour of users being able to make back-up copies and have been known not to disapprove entirely of the odd program changing hands in other than its original form but there is no doubt that some people think it smart to stockpile as much software as possible without paying a penny, which is bad for software developers and everyone else.*

## SOS from Poland

I am Polish. I am 15 years old and I have a big problem. Three years ago I bought a QL. As you know, the QL is not a popular computer in Poland. I do not know any other people who have one. I have only four programs and I cannot buy more in Poland. I subscribe to *QL World* but I cannot order

programs because, first, the Polish bank will not arrange it and second, the price is the same as one month's salary in Poland. My problem is how to capture a game for my computer. Help me and tell me what I can do.

**Dominik Olszewski,  
ul. Szczytowa 4/6 m 1,  
92-114 tODZ,  
Poland.**

*Editor's reply: Perhaps some enterprising reader would like to set up an exchange or mutual help arrangement?*

## Sinclair addict

Through the years, for some inexplicable



reason I have bought every Sinclair device, apart from the C5, ever invented. I tried not to do so but I always convinced myself that each item was of the utmost importance.

My last purchase was, of course, the QL — an excellent machine, a pity about the unhelpful Sinclair at the the time. When Sir Clive sold to Alan Sugar, I felt really let down.

Last August I was wandering along London's Oxford Street and, as usual, peered into Dixons window. I

entered, then left the shop clutching a Z-88. Sir Clive is an addiction. There must be an organisation to help people like me.

I now save my Z-88-applicable stuff through my QL on to disc, print through the QL to my printer and, best of all, create programs for the QL while on the train and just download when I get home. I use spreadsheets a good deal, so I will find this machine exceptionally useful.

How about *QL User* and *Z-88 User* combined?

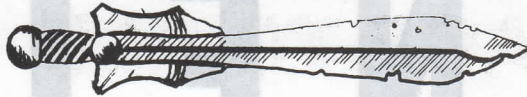
**Barry Cornhill,  
Aylesbury.**

## D-50 to QL

I have recently bought a Roland D-50 synthesiser and I am very interested in connecting my QL to the D-50 via a Midi interface.

I wonder if there are any Midi interfaces manufactured for the QL, or if there are any QL owners who know anything about the QL and possibilities for Midi interfacing?

**Bengt-Ove Fagerhed,  
Box 468,  
SF-68570 Larsmo,  
Finland.**



*the tallsman* — is the new role simulation from PCBS.

Your quest is to discover the Tallsman — a small golden periapt which protects its wearer from physical and supernatural damage and lies within an underground complex inhabited by a myriad of terrible adversaries.

The Tallsman is not a conventional adventure game nor an arcade game; but a combination of both, with elements of strategy and realism. It is unique since the combination is randomly generated each time the game is played — resulting in the unusual situation where the game's author can play it too — incidentally he has yet to find the Tallsman!

Throughout the quest you could be confronted by over one hundred different types of creatures — and use over one hundred different magical aids. This, coupled with the intricate game system and random generation facility, means that it can only be played on expanded machines. The game comes with a comprehensive manual detailing magical items, creatures and information on the four character types available.

Finally we must warn you that this game is completely addictive; our playtesters have indulged in all night sessions, only stopping for calls of nature!

No-one has finished the game yet — will you be the first? The Tallsman is THOR compatible, and is available in 3.5 inch disc or on two micro-drives — priced £19.00

ATTENTION ALL QL ADVENTURERS! CAN YOU BECOME THE HERO OF THE 'PRINCELANDS' IN THE ENTHRALLING NEW EPIC

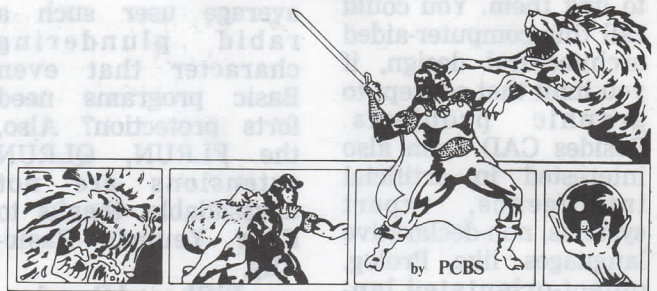
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**Liberator The Ultimate SuperBASIC Development System**

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"Virtually complete compatibility" — QL World, Sept. 1987 **£59.95**

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"An invaluable utility", "certainly not a product to be missed" Q.L. World Aug. 1987

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# A SPECIAL MESSAGE TO ALL THOSE PEOPLE WHO HAD A SINCLAIR COMPUTER FOR CHRISTMAS

*(and those who have had one for years)*

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T



TROUBLE

A

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L

**D**o you ever feel you are the only one making a particular complaint? I have lost count of the number of times QL suppliers, authors or designers have told me a complaint of mine was exceptional. Gradually you discover that perhaps one or two other people have the same problem and that helps assure you that a visit to the psychiatrist is not called for but it does not fix the bug which ails your QL system.

I am compiling a list of the problems of which I am aware so that it can be presented to anyone on the supply side of the QL scene who doubts that the problems exist. One point I can accept is that the more jobs you try to multi-task in the QL, the more likely you are to find interactions between programs and between programs and hardware. It pays to keep your system as simple as possible; try not to have several key or icon macro routines loaded together; I have three or four — nor switching routines, I have one or two — nor housekeeping routines. Most of us do not choose to have that many routines running together.

### Dumb as a post

In the October issue I commented about bad postal service and was subsequently told that it reflected badly on one supplier; that was not the message I intended to convey. The supplier was admirably prompt in despatching the goods but the Post Office was not so good in delivering. In fact, one package was returned to the supplier as being "not called for," despite the fact that I had not been advised by the Post Office that there was anything for me to collect.

Various other points in that article may have given the wrong impression — the reference to Sinclair collecting a royalty on each cartridge sold should have read 70 pence; the ratio given for the space/cost advantage of discs over cartridges was five-six times and Sandy is returning all deposits given for the Futura, not for the future.

There is some difficulty with memory allocations for Quill when using Turbo B Quill with the *Q-Switch* switching program; Athene advises using the 2.30 option when

Bryan Davies tears up his psychiatrist's ticket and rests assured that he is not the only mortal with supply problems.

setting-up *Q-Switch*, even though the version of Quill used is 2.35. If Quill is used with other programs and a dynamic RAM disc routine is active, it seems best to start the other programs first to avoid difficulty with spare memory being cornered and not released to the other programs.

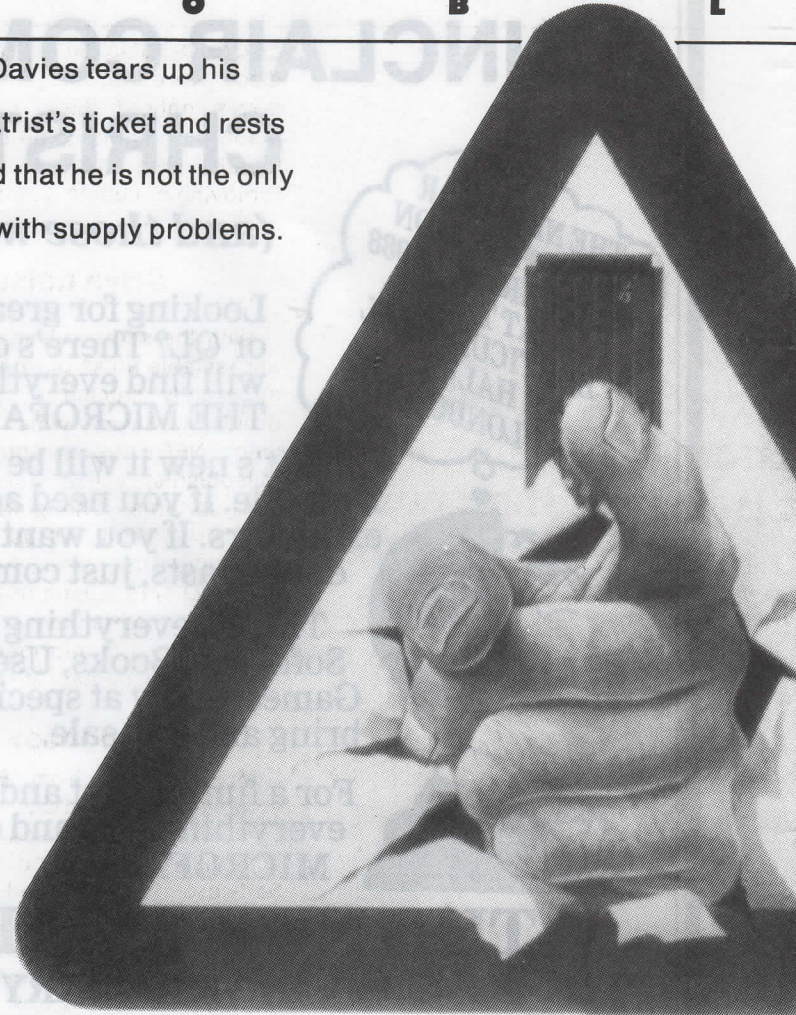
This problem does not occur when *Taskmaster* is being used. The latest version of *Turbo + Quill* is to be compatible with *QRam*; returning an existing cartridge with an 18 pence stamp to cover postage will enable *QRam* users to get the updated *Turbo +* from Athene.

### Stop press

Another version of *Front Page Extra* is expected to be available now. Version 2 will allow high-resolution text to be typed-in, the character size being variable from the standard CSIZE values. Gap Software also expects to

introduce a new utility program in the next few months, with some features which do not appear to have been offered by similar programs previously.

*Desktop Publisher* version 2.0 has now been available for some weeks and is a considerable improvement on version 1. From the point of view of the business user, the potential of the desk-top programs is now much greater than it was. *The Editor* should now be known to most users and the praise for it seems to outweigh the criticism heavily. There have been so many additions and improvement to the program this year that it is difficult to find anything to fault in the specification of version 2 but there is a competitor in the chuck out Quill stakes, in the form of *text87*. As yet, I have heard no comments on the latter program but the features listed for it sound well thought out.



# SHOOTER

E M S O L V E D

disc drive lights did not come on when discs were accessed — Mitsubishi drives only, I think; a modifaction made both lights come on and go off together but that can be fixed by removing or cutting a small link on the PCB.

## Drive noise

With the same drives there can be appreciable noise during disc access, apparently caused by revised disc driver hardware which works well with NEC drives but not with Mitsubishis, which have a shorter start-up time. Changing to the WD 1770 driver chip, as used in earlier-generation interfaces, from the standard WD 1772 is said to cure this and Miracle hopes to have supplies of the chip shortly. For information on either modification, contact Miracle.

## Responses

**M. Zavadsky** from Belgium has some questions about UGSD-Pascal compared to ISO-Pascal and Prolog, advertised some time ago by **TDI Software**; he has tried telephoning and writing to the company without success. I rang the number I have and there was no connection. Does anyone have information on TDI, or comments on Pascal and Prolog for the QL?

**Andrew Clark** wants to transfer text files written to cartridges on a Spectrum into his QL. Can anyone suggest programs/methods of achieving this without too much work?

**John de Rivaz** is having difficulty using the SPEM digitiser with the Sandy SuperQ board. Can any readers give details of problems they have met and overcome with this combination? He mentions incomplete screen dumps in particular.

**Valeria Zanon** in Italy has been called by the new company **Eldersoft-QL** and I trust she is now satisfied regarding her complaint to the original Eldersoft company. There are, however, still a few complaints on my list which were never dealt with by Eldersoft prior to the change of ownership.

**David Owen** wrote from Dubai to

complain that three items ordered from **Byteback** in July have not been received. It could be a case where the shipment route is slow but the fact that Byteback has not responded to requests for comment on complaints from four other readers does not give much confidence.

There have been some reports of keyboards not being supplied in a reasonable time and I know of one supplier which had difficulty obtaining sufficient components to assemble enough keyboards to meet the demand, which has been higher than anticipated.

## Good service

Anyone requiring service on a **Hantarex** monitor can contact the address given below. The Boxer 12 monitor has been sold by several suppliers, including the original Eldersoft. Having just had to take my monitor to Hantarex for service, I was very pleased with the speedy service and helpful comments.

A frequent complaint is that a cheque has been cashed but no goods have been received. What one thinks of this situation has to depend on the time delay; if the supplier does not have the goods in stock when a cheque is received, it should not bank the cheque and that is how the better suppliers behave. When a supplier expects ordered goods to come into stock within one to two weeks, the cheque will usually be banked, to ensure that it clears by the time the goods are ready for despatch. On this basis, U.K. customers can generally expect delivery within about two or three weeks of the cheque being cleared through their accounts; overseas customers have to add an uncertain number of weeks to the period, because of the greater number of possibilities for delay during shipment.

Sales of Trump Card show how much QL users wanted plenty of memory, together with extra command functions, such as Toolkit II and others, provided in the Trump. Miracle is now using extra manufacturing space, largely because of demand for this unit. It still sells its Expanderam and the parallel/serial printer interface. For Samsung and other overseas QL versions, it is available with a "D" connector.

## Coming up Trumps

The Trump has proved a boon in my system and having 896K soon becomes something you accept and scarcely think of. Of course, you find life very difficult if you ever have to revert to a standard QL, without either extra memory or disc drives.

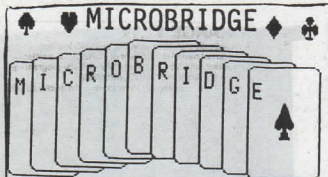
There were two problems with the Trump and solutions have now been found for them. On early PCBs, the

### Information

Hantarex (U.K.) Ltd.  
Unit 2  
243 Kangley Bridge Road  
London SE26 5BA.  
Tel: 01-778 1414.







MICROBRIDGE is a superb contract bridge bidding and playing program. Also, it teaches bidding by a series of 16 lessons (each of which has a whole chapter to itself in the large manual that accompanies MICROBRIDGE), and follows this with a virtually unlimited set of hands for further practice in bidding and play.

MICROBRIDGE thus has something to offer all bridge players, from rank beginners to experts. It is strongly recommended by THE TIMES HIGHER EDUCATION SUPPLEMENT and many bridge players.

MICROBRIDGE uses a special technique to deal at lightning speed. You can elect for deals to either be random or for you and your partner to have a bias in your favour. This offsets E/W's non-interventionist policy during bidding.

As a player, you can choose either to be North and always bid first, or for the deal to rotate as in rubber bridge. In either event, your hand is displayed. Now you can either enter the bid of your choice, or you can request the computer to bid for you. MICROBRIDGE bids for your partner: you can opt to override these bids.

MICROBRIDGE uses the most popular of all bidding systems: ACOL, supplemented by the Stayman and Blackwood conventions. You do not need to possess any knowledge of ACOL or any other system to use MICROBRIDGE, as the manual provides a full tutorial. MICROBRIDGE will not allow you to make a wild or misleading bid (but we've given you a way of forcing crazy bids on MICROBRIDGE - so you can note the corrective action that MICROBRIDGE takes, or enjoy the fracas after reaching a ridiculous contract!) and will tell you exactly WHY your bid is wrong. Often more than one bid is ACOL-legal: if so, MICROBRIDGE will allow you to make any of them, but as it will have calculated the 'best' bid of all, MICROBRIDGE may first warn you that while your bid is OK, there is a better one available.

MICROBRIDGE optionally sets out a detailed explanation of every bid, in up to twenty lines of closely-reasoned narrative. It also gives you what inferences should be drawn from each bid. These commentaries mirror the thought processes that bridge players should perform: they are breathtaking in their insight and in their ability to sharpen your understanding of the game. They put MICROBRIDGE in a league by itself among computer bridge systems.

If bidding turns you off, you can zoom thro' it. At the end of bidding, you automatically assume the role of declarer (it is no fun being dummy). The computer then plays the unseen hands, and strives hard to defeat your attempts to make the contract. During play the defence properly uses all inferences it has drawn from the bidding - these include information on declarer's (and therefore, by deduction, partner's) suit distribution and high cards - as well as knowledge of dummy's actual cards (except for the opening lead) and of cards already played. MICROBRIDGE understands many of the subtle elements of card play. It never "cheats" by peeping at hidden hands. Such is its strength that any failure to achieve your contract may be regarded as an honourable defeat, and any success a creditable victory.

Any deal in MICROBRIDGE can be reconstructed by keying in a unique board ID, yielding 2000000 deals. Hence you may bid and/or play a deal again and again - in one sitting or over many sessions, either as N or S or both - until you feel there is no more to be gleaned from that particular deal. This is a skill monitor tool! MICROBRIDGE needs expansion RAM and a disk drive and costs just **£34.95**

THE EDITOR is a word-, text-, character- and file-processing system characterised by massive power (over 200 commands), very high speed (often 200X over Quill!) and extreme flexibility and ease-of-use. EDITOR can handle text files, Quill files, programs in BASIC and other source languages, data files (it handles the entire character set 0-255), screens, machine code object files (even EDITOR itself) the lot. You have complete control over fonts and over all the system defaults we could think of via a comprehensive configurator (to give you an idea of just how comprehensive, not only can you set up defaults for 3 ink & 3 paper colours, screen mode, average line length, screen shape/size/position, character width/height, insert/overstrike, data/program default devices and names and dozens more mundane features, but you also have access to the settings for the EDITOR's definition of a word (ie; what constitutes a word delimiter), the column position at which scrolling to a fresh screen will occur, and so on). Needless to say, EDITOR is fully multitasking, and it is not uncommon for the more adventurous user to have 2,3,4,5,6 or more copies all running simultaneously, using varying screen positions (overlapping or distinct), shapes, colours or character sizes

BOTH SUPPLIED WITH ALL-NEW PRINTER DRIVER EDTPRT

EDITOR costs £29.95

THOR COMPATIBLE

SPECIAL EDITION EDITOR costs £49.95

- UK delivery costs are all-inclusive. Europe add 5%, elsewhere 10% to cover airmail costs.
  - Program upgrades can be obtained by sending us the original cartridge (NOT the packaging or documentation) plus £10 (£12 Europe, £15 elsewhere).
  - TRUMPCARD DISK INTERFACE.....£189.95
  - or swop for your 512K SuperBOARD...£99.95
- Phone for quotes on swops for other i/fs.

# SUCCESS

CP/M is an operating system for single user computers: the name stands for CONTROL PROGRAM for MICROPROCESSORS. CP/M has been around for fifteen years, and during this time tens of thousands of applications programs written under CP/M have become available. This tremendous collection of software is CP/M's prime advantage over QDOS and other operating systems. Famous (and infamous) programs like Wordstar, Borland's TurboPascal, MS BASIC, SuperCalc, Superwriter, Symphony, Lotus 1-2-3, dBASE, Smart, Perfect Writer, Zorland C, Microfocus COBOL etc are all available in CP/M. Even more inviting is the huge range of cheap public domain CP/M software: 8000 titles from one source alone.

Why tell you this? Because SUCCESS (acronym for Supreme Cp/m Code Emulation System) runs CP/M programs on any QL, by providing an alternative operating environment to QDOS - exciting stuff.

An emulator is a program which permits exact execution on one computer of a program written for another computer, accepting identical data and producing identical results. SUCCESS does this by taking each 280 instruction group from RAM, analysing it and then executing an appropriate M68000 subroutine. Since SUCCESS is written entirely in machine code it is extremely fast - equivalent to a 2.0MHz 280! Speed is crucial - who wants Wordstar if it runs slower than Quill, or dBASE if it crawls along 4.5 times slower than Archive? SUCCESS gives you the acceleration! No more "70% compatibility" or "minor limitations": SUCCESS emulates, not imitates, and does so without extra RAM or ROM cartridge.

NOTHING SUCCEEDS LIKE SUCCESS - cost only **£49.95**

## THE SUPREME CP/M CODE EMULATION SYSTEM

All 3 parts of the CP/M operating system are supplied: BIOS (complete hardware interfacing), BDOS (file handling) and CCP (user communication). The BIOS gives the user 7 drives of varying capacity (microdrives, disk drives and ramdisks) and a flexible drive reconfigurator. Screen/console and printer ports are also accessible, as are two user-definable devices - ample.

"Exactly how do I make a CP/M program run on the QL?"

- 1 Obtain program from a CP/M library - our manual gives a contact address
- 2 Transfer the disk's contents to QDOS using SUCCESS's utility DEFINE
- 3 Run SUCCESS.

It is as simple as 1-2-3: once the CP/M contents are in QDOS file-format you can manipulate them exactly as you can with QL files, even loading them into EDITOR. Stage 2 is a one-off process - the beauty of SUCCESS is that it runs from QL format media. Note that the only time a disk drive is essential is stage 2, when you are "capturing" the CP/M files. SUCCESS is designed for beginners, but the manual also contains detailed guidance for those wishing to access CP/M & QDOS at m/e level via BIOS.

There is much more to SUCCESS: terminal emulation, transfer of CP/M files (as opposed to disks, discussed earlier) to AND from QDOS format, full QDOS file-handling, STAT, hotkeys, ED line editor, 8080 assembler, PIP copier, creation of executable CP/M .COM files, dynamic 280 debugging and all the CP/M utilities. SUCCESS is as big as you want it to be!

## THE COMPANY THAT TAKES

# A PRIDE IN ITS LOGIC

# PRETTY GOOD AT ANAGRAMS TOO

# DIGITAL PRECISION

AND DP CERTAINLY HAS A LOGIC IN ITS PRIDE ABOUT THE TWO BRAND NEW QL/THOR PRODUCTS DIGITAL C & SUCCESS!

## THE EDITOR V2.05 / V1.17

to distinguish them. You can 'teach' Editor what you want it to do by means of command files (like macros, but much more flexible). Throughout, EDITOR's hallmark is absolute consistency of operation (which makes it very friendly, despite the daunting number of commands!) and its philosophy of placing YOU in the driving seat, leaving it up to YOU to decide how, where and in what sequence you should accomplish your objectives, and unlike Quill one of whose major failings was its pedantic way of imposing its preferred sequence on you.

A LIST OF EDITOR'S 200-PLUS COMMANDS APPEARED IN QL WORLD Dec 1987 There are two versions of EDITOR: V1.17 that will work on any QL (comes with a 90 page manual) and a SPECIAL EDITION EDITOR V2.05 with 408 more commands, much greater power, and an brand new (November 1987) extended manual (now 160 pages!) but which requires at least a 128K RAM expansion in order to run. Owners of the ordinary EDITOR who acquire a RAM expansion and wish to upgrade to the SPECIAL EDITION may do so for £25, including an exchange of manuals. The spelling checker SPELLBOUND has a 30000+ word dictionary, works with EDITOR and QUILL, and is available for £29.95.

"Superb... it exceeds feature specifications found in even the best word processors presently available... native multitasking... you will actually look forward to using Editor (this never happened with Quill)... you are in complete control... seldom have I ever come across a program which positively scintillates with such due care and attention"... QL World, January 1987.

# DIGITAL C

## COMPACT C COMPILER

"The one you've been waiting for"

C is the best modern applications and systems language available for a micro. It allows the programmer a level of control over the workings of the computer surpassed only by machine code, with a fraction of the effort. By comparison BCPL (C's grandfather) is outdated, Algol ponderous, APL incomprehensible, PASCAL austere, FORTRAN rigid, LISP inflexible, COBOL absurd and SuperBASIC slow (except with TURBO). A really superb C compiler can generate portable code quicker and more concise than code from any other compiler. Such a compiler is DIGITAL C. DIGITAL C is the fastest C compiler available for the QL. Our priorities were speeds of execution and compilation, flexibility and compatibility with QDOS.

To achieve all our objectives we decided to produce a C more powerful than Small-C (the most popular micro C) but without the speed + size overheads imposed by the big Kernighan and Ritchie implementation (replete with commands terrifying to the tyro) - the result, a sleek and efficient compiler. What better demo of the muscle of DIGITAL C than the fact that the entire system itself was written in DIGITAL C!

As most people considering DIGITAL C are likely to have dabbled in SuperBASIC, we have made this C very SuperBASIC-like. The QDOS library gives a superb degree of QL compatibility, providing the graphics, I/O, display modes, windowing, sound, keyboard-handling, device-independence etc you've become used to. Wherever possible, DIGITAL C uses keywords identical to those of SuperBASIC's, with identical parameters in identical sequence too: no confusion or relearning. DIGITAL C gives lightning 16-bit integer operation plus a complete floating-point library, arrays (numeric and string), pointers, file inclusion, external/global IDs, macros, conditional compilation and smart error messages. Most C compilers comprise 3 programs, an analyser, an assembler and a linker, to be used in sequence. DIGITAL C cuts this to 2 programs - an intelligent parser that produces clean, machine independent symbolic code, and a breathtakingly fast codegenerator with linker (painstakingly optimised for the QL) which generates a speedy, hyper-compact, stand-alone, 100% multitasking, executable machine code task and which can link separately compiled modules into one such task. Typically, where the METACOMC assembler takes an hour to process a symbolic code file, and HISOF's takes 12 minutes, DIGITAL C's codegen takes 45 secs: the ratio is spectacular! Another example of the TLC taken with DIGITAL C is in the library manager and generator we've supplied: it allows users to integrate all their proven C functions into one or more library modules for subsequent re-use, when the codegenerator will select only those functions within the module that are specifically referred to in the source program: this kills run-time flab!

The DIGITAL C compiler is compact: no need for RAM expansions, ROM add-ons, disk drives or zillions of cartridges. DIGITAL C is ideal for beginners while still allowing professionals to get the speed performance they demand.

AMAZING VALUE AT **£39.95**

What? Haven't you received our 52 page PRODUCT BROCHURE, with details of the prize draw and lots of software data? We can send it to you for £1 - but it's free if you are ordering from us at the same time. Request it with your order (coupon or phone). Hurry up as stocks are very finite.

# DIGITAL PRECISION

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The Best QL software from  
**DIGITAL PRECISION**

**S**erious interest in a good working alternative for the original QL membrane keyboard would appear to be continuing. Enthusiasts who have discovered they need a professional-grade keyboard which is both dependable and includes at least some of the features available with the keyboards of other machines have maintained their faith in the eventual appearance of a product meeting their exacting demands. From the results of extensive testing, it seems as if those demands have, at long last, been satisfied.

A follow-up to the report published in *QL World*, March, 1987, concerning the range of new QL keyboards available then, this report concerns two new top-of-the-range keyboards, both of which are available now.

### Original sin

It is a sad fact of economics that the original QL keyboard was built to a price. As such, it is prone to a relatively short working life, with its membrane mechanism requiring frequent replacement. Heavy usage also makes its keyposts prone to binding and touch typing a real nuisance.

Of the four keyboards reviewed earlier this year, only the Schon and the Rainbow are continuing to sustain steady sales. Rather surprisingly, the ABC Elektronik keyboard, which made its first appearance as a non-working display at a Microfair early last year, appears to have become a non-starter. In spite of popular demand, supplies from Germany were either slow or failed to materialise.

By the time ABC

After a long wait and a few false alarms, Ron Massey finds two QL replacement keyboards.



# The Digital Connection

produced a working version of its interface, supplies of other perhaps less well-endowed keyboards became readily available and eager customers readily accepted the fact that they would not be able to obtain an ABC.

I had the opportunity to try a working version of the ABC keyboard in April and discovered that it had one rather interesting property. If you pressed the Sys Req

key you locked out the keyboard and the QL would effectively receive no further input. This "feature" left you with no alternative but to reset the machine.

Both keyboards presented in this report are remote separates connected to the QL by a multi-core cable; both include a degree of ergonomic styling in the shape of the keycaps and both include more keys than is possible for a

keyboard limited to the constraints of the QL case top.

Sales of Schon's first venture into QL keyboards, reported in *QL World*, March, 1987, well surpassed its originator's expectations. The release of the latest Schon keyboard design will undoubtedly satisfy the demands made by a large number of demanding QL users with perhaps, professional applications.



Nominally a PC-type keyboard, the new 86-key Schon, in a cream-coloured case measuring 467mm. x 212mm., incorporates a number of useful QL-specific features. In common with other keyboards patterned after the IBM standard, a number of compound keys have been provided to make computer operation a little simpler.

The key layout, colour-coded with grey control

keys and white alpha-numeric and symbol keys, is in two distinct groups — a 10-key function keypad on the left side of the case and a number pad to the right. Rather than a distinct separation between the number pad and a central key panel, a bridge of control keys joins the two giving a slightly narrower layout.

Both the number lock and caps lock keys have

built-in LEDs, indicating when they are active. Each time the QL is re-set, both the LEDs flash, indicating that the electronics inside the keyboard have also been re-set.

One of the oddities of the QL is that it is possible to POKE the area of memory controlling the QL character case and set the QL into upper- or lower-case directly, independently of the keyboard. Should that occur in a program or should you insert a POKE deliberately, the caps lock LED will become desynchronised with its normal function until either another POKE restores indicator synchronisation or the QL is re-set.

The Schon may be used either flat on the table or tilted forward by inserting dowels of a suitable length into the two holes in the bottom of the keyboard case, similar to the manner used by some of the Amstrads.

Having a range of keys completely new to the QL has been possible because, like the ABC keyboard installation, the sophisticated Schon interface is programmable and displaces the QL 8049 co-processor. New keys and features, providing functions new to the QL, are:

- <Sys Req> — Generates a sequential <CTRL> <C>.
- <Break> — Generates a sequential <CTRL> <SPACE>.
- <Del Left> — Generates a sequential <CTRL> <LEFT>.
- <Del Right> — Generates a sequential <CTRL> <RIGHT>.
- Eight cursor keys — Up, Down, Left, Right and 4-way diagonal.
- Caps Lock LED — Indicates <CAPS LOCK> status.
- <Num Lock> — Enables the number pad

and disables cursor keys.

**Num Lock LED** — Indicates when the number pad is enabled.

An additional feature of the new Schon, since the QL native keyboard is completely redundant, is a replacement top fitted with a blanking plate and DIN socket — at the original keyboard <F5> position — into which the new keyboard terminal DIN plug is connected. This is included in the conversion kit.

### Futura rumour

Reputed to be identical to the keyboard which is to be supplied with the Futura, the Sandy entry into the keyboard market is not unlike the design of the keyboard supplied originally with its QXT 640 conversion upgrade kit.

Measuring 460mm. x 175mm., the Sandy keyboard case is grey with grey and cream-coloured keys and may be tilted by folding out the legs built into the bottom of the case. The keys are in three groups — a 10-key function key pad, <F1> to <F10> in the standard QL layout to the left of the central 60-key main keyboard, and a 19-key number pad positioned on the right-hand end of the keyboard panel.

The home keypads, letters F and J, on the central panel character key group and number five on the number pad, have raised pips for easy location by touch.

A number of features of the Sandy ensure easy tactile adaptation to the new keyboard. Key caps for TAB, CAPS, SHIFT, ALT and CTRL are large and easy to locate by touch. Except for the addition of the five extra function keys and number pad, overall the



key layout is QL standard.

Number pad keys include an additional <ENTER> key, an underscore key which does not require shifting, and the usual range of mathematical function keys. The cable from the keyboard is terminated in a very thin one-piece PCB which is pushed



## The Digital Connection

### CONTINUED

into the two sockets from which the membrane ribbon cable has been removed.

### Inside the QL

Installation of either keyboard requires access to the inside of your QL; both keyboards are simple to install and neither requires soldering. The eight screws around the perimeter of the bottom of the QL case are removed and the top of the case is tilted towards the back of the QL.

The remainder of the installation procedure depends on which of the two keyboards you have acquired. The Sandy conversion retains the original QL top, so the six wires connecting the LED indicators in the top of the QL case must remain connected to the QL printed circuit board.

If you are installing the Schon, open the top, remove the two ribbon keyboard cables, carefully prise up the connector lock into which the six LED wires are positioned, remove the wires and lay the old QL top to one side.

The installation of the Schon also requires the removal of the 8049 co-processor chip, positioned immediately

to the left of the Microdrive one near the front of the QL, pushing the interface board carefully into the vacant socket and re-installing the 8049 on to the interface.

Two precautions must be observed while installing the Schon; if you have carpets or clothing which contain man-made fibre, you should refrain from moving round as much as possible to prevent the build-up of static electricity.

The other precaution concerns the removal of the 8049 from its socket. Extracting the 8049 will probably be the most difficult part of the installation because one end of this chip is positioned very close to the front edge of the QL case.

### First prize

If you have the QJump *Qimi* internal mouse interface you will also have the small tool supplied by QJump for levering ICs from their sockets and that will save considerable wear and tear on your

patience. Alternatively, you will need a tiny screwdriver to lever the 8049 by twisting the screwdriver — not prising — from each side of the front end of the chip in small increments, alternating with the other end.

Following the instructions supplied, replace six wires connecting the LEDs in the new case top to the motherboard and push the wire lock gently back down on to the QL PCB. After checking that the LED wires are fastened firmly in their socket, plug the ribbon cable from the DIN socket in the new top into the left end of the interface and install the new case top.

As with all electronic devices, be sure the connecting is done with all power switched off. Failure to observe this simple precaution could damage the sensitive electronic components of the interface, the keyboard or both, and may not do you much good either.

Installation of the Sandy is even easier. In sequence, remove the

top of your QL — be careful not to pull the LED wires; they have the interesting characteristic that while you attempt to re-install any of the wires you may have dislodged, another will be working loose.

Remove the two ribbon cables connecting the original keyboard to the main board — tape them to the aluminium plate of the underside of the original keyboard — and insert the cable connector carefully from the new keyboard.

### Time to type

The two ribbon cable sockets on the QL PCB are not very robust and the contacts inside them are bent easily. If extreme care is not observed, bad, erratic or non-existent contact will be made with the replacement connector and some or all of the keys will not work.

Although the suppliers of both keyboards make them available as DIY kits, if you are nervous of handling sensitive electronic components both suppliers offer the service of

Command	Orig. keypresses	Quill	Editor
Help	<F1>	<F1>	<F1> (Help from page 1)
Prompts	<SHIFT> <F1>	—	<F6> (Help from page 2)
Repeat Last Cmd.	<F2>	<F2>	—
Command Input	<F2>	—	<F2>
Edit Last Cmd.	<F3>	<F3>	<F3>
Insert/Overwrite	<SHIFT> <F3>	—	<F9>
Screen Re-draw	<SHIFT> <F4>	<F9>	—
Screen Re-size	<F5>	—	<F5>
Typeface	<SHIFT> <F5>	<F10>	—
	<F4>	—	<F4>
	<SHIFT> <F4>	—	<F9>
	<F4>	<F4>	—



installing them for you.

The competition between the Schon and Sandy keyboards is likely to be fierce. Both are built to very high standards; both are a joy to use and a considerable improvement on the original. The Schon keyboard is supplied with a new top, with a blanking plate covering the area of the original keyboard; the Sandy keyboard retains the original but disconnected keyboard.

Regarding purely mechanical considerations, the Sandy requires considerably less pressure to activate its keyswitches than the Schon. Whether that is an advantage or not depends largely on personal preference.

Having additional function keys is more a convenience than a real advantage because, in conjunction with combinations of <SHIFT>, <CTRL> and the five function keys, the QL has access to 19 function key combinations. By adding <ALT> the number of function keys available to the user

effectively is doubled.

Although many programs may have different applications tied to the various function keys, two of the better-known programs, *Quill* and *The Editor*, are good examples of the effect of having single key-presses available.

Obviously other programs which make more liberal use of the range of simulated function keys, those obtained by various combinations of keys used with <SHIFT> and <CTRL>, will prove more convenient to the user.

#### No conquerer

Equally obvious is that there will probably be no clear winner in the present round of keyboard wars. Both have features to commend them and potential purchasers would do well to consider their typing preferences.

My single criticism of the Schon keyboard is that the finger contact points of all of the keycap tops are a uniform size. Although <ENTER>, <ALT>, <TAB>, <SHIFT>

● Far top left: The Sandy keyboard is similar to the QXT 640 conversion kit version.

● Far left bottom: A comparison table shows how two WP packages gave the QL more efficient keystrokes.

● Left: The new Schon keyboard is an IBM type with a number of QL-specific features.



<CAPS LOCK> and the new keys <SYS REQ>, <NUM LOCK> and <BREAK> keycaps follow the usual convention of being larger than the character keys, the area for the finger placement is not.

Users who make frequent use of the number pad may find the requirement of toggling the <NUM LOCK> to use the cursor keys for programs such as *Abacus* a little irksome but once you are accustomed to the requirement there is no real inconvenience. In any case, the Thor and IBM keyboard layouts all follow this convention.

Because the Schon follows a similar key convention common to the IBM, ST and Amiga key layouts, <ALT> and <CAPS LOCK> keys are at positions reserved

from the conventional QL layout but one soon adapts. With the exception of the additional function keys and the number pad, the Sandy keyboard is a direct replacement, both in the way it interfaces with the QL and in the layout of the character and control keys, for the standard QL keyboard.

Keybounce is a serious problem which can sometimes arise when mechanical switches are interfaced to high-speed electronic components. Keybounce seems to occur with some QLs more than others. Neither the Sandy nor the Schon indicated any signs of the problem with either of the QLs with which they were tested.

In the final analysis, there is little to choose between the keyboards. If you are considering upgrading, whether you opt for the Schon or the Sandy you will have to make a certain amount of adaptation to the additional keys provided. More to the point, you will have the pleasure of getting used to the smooth feel of positive key contact.

Since they are within 95 pence of each other in price the final choice would seem to rest on whether you prefer the more symmetrical appearance of the Sandy with its feather-light touch or the Schon with its greater number of features but slightly less tidy key layout. They are both built to the same high quality and both are a joy to use.

**Product:** Schon IBM-type keyboard **Price:** £99.95

**Source:** Schon Keyboards, 15 Northcote Crescent, West Horsley, Surrey KT24 6LX. Tel: 04865 3836

**Product:** Sandy Keyboard **Price:** £99

**Source:** Strong Computer Systems, Bryn Cottage, Carmarthen, Dyfed SA32 7DJ. Tel: 0267 231246

# NEW! SUPER USER BUREAU LATEST UPDATE!

★ Genuine independent professional support for all users of the SINCLAIR QL CS1, III, series, and QL7-640. (Call re: Futura) If you own an ICL One Per Desk, or IBM/IN Tonto, call us.

★ Why should I join S.U.B. when I am in another users group?

★ QUANTA members! The two clubs are complementary organisations, not rivals. We provide full time effort that you can't otherwise get.

★ E.S.S. members! If you want up to date information and independent advice, then you need our service. Don't forget our special deals.

*I do not want to join S.U.B. yet. Can S.U.B. offer me anything?*

★ S.U.B. can supply non members with many advantages too! Contact us for all your QL requirements. We stock the best of QL products, and offer you unbiased advice. Phone us for a quote!

★ Contact us for all your computer supplies. Again, we can offer offer members special discounts, but we'll try to help you find anything.

*Are there any more developments planned for S.U.B.?*

★ Yes! Keep an eye on our adverts for the latest news about us. For example, we are setting up a companion VIEWDATA style bulletin board, open to both members and non members. (There will be special features available to members for a small surcharge).

★ We are producing a library of public domain software available for the QL and compatibles using QDOS, and the QL using CP/M. We will be looking out for programs in all languages and formats.

★ We are considering working with other organisations to launch a budget software label for the machines we support. Members could benefit from some commercial support in marketing their programs.

*What does S.U.B. offer manufacturers and suppliers?*

★ If you haven't already made a deal with us, or you are new to the QL market, contact us, enclosing details about your products.

*Can S.U.B. be contacted other than by mail?*

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# • PSION •

A request for help with the Psion suite has been received from a QL user in Spain and concerns a problem arising when attempting to use Quill from disc. This user has a Micro Peripherals disc interface which, incidentally is not the source of the problem without memory expansion and has transferred his Psion programs to his new system successfully.

Although he can run Archive, Easel and Abacus from disc, attempting to run Quill always produces an error message, despite repeating the back-up procedure a number of times. This would appear to be a common problem with users moving to a disc drive for the first time, especially where budget restrictions preclude the possibility of setting-up a fully-upgraded system at the same time.

When I first moved to a disc-based system I was inadvertently sent an interface which did not include memory expansion. In ignorant bliss and after installing my new components, I transferred my Psion programs to my new system and, testing each in turn, failed to notice that Easel and Abacus indicated less memory than was the case when the same programs were loaded from Microdrive.

## Valiant attempt

By coincidence, I tested Quill last and, as the Spanish letterwriter found, Quill returned an error message, made a valiant attempt to open a *def tmp* file for its own code space and stopped.

After much head-scratching I removed the new interface and, after a cursory examination, discovered that the IC sockets which should have been filled with RAM chips were vacant. Once the omission was rectified the problem was solved.

The reason is that, when a disc drive is accessed, about 1.6K of code space is allocated to slave blocks and other disc-related purposes. Microdrive access requires roughly one-third of this amount of memory. Quill will not run without additional memory.

Numbering pages in Quill documents is limited by a number of

inter-related considerations — by the upper setting limit of 254 pages from within the Quill "DESIGN" facility, by the amount of paragraph formatting data required for a given document and the amount of memory available.

Checking Quill 2.3 version capacity on a 640K machine by repeated copying of two pages of text, both of which comprised two paragraphs, with no other jobs running and page design set to 20 lines per page — Quill minimum — double-spaced — Quill maximum — and starting from page 254 — Quill maximum — produced the following figures:

- Word count continued, as expected, to about 31,000 words.
- Counts in excess of about 31,000 words caused the count to become negative and erratic; this was not what was expected.
- Maximum page number achieved before filling memory was 1,052 pages.

From this simple demonstration, it would seem that users wishing to use Quill to produce books or other very large manuscripts are limited either to confining their documents to chapters or sections or, where that is unacceptable, using Quill to produce the document and another utility to control the printed output.

Two such utilities immediately brought to mind which will cope admirably with requirements for page numbering beyond the Quill's range are *CuePrint* and *QATS*. *CuePrint* will print only in an NLQ mode from a Quill *\_lis* file but has the advantage that a wide variety of typefaces, character sizes and mathematical and a wide range of user-defined symbols can easily be incorporated. *CuePrint*, however, will work only with the Taxan-Kaga/Canon PW1080A range of dot matrix printers.

*QATS* has an optional output control module which will enable you to set up all parameters with regard to page formatting and numbering. Although it is supplied with an Epson-compatible printer driver and control codes, altering any of the printer codes takes only a few moments.

Another advantage of the *QATS*

system is that, if very large, page-numbered documents are required frequently, the page formatting information can be saved as a "Stationery Code" for future use.

Another writer asks about a patch to enable him to increase the number of pages he can write with his Quill version 2.00. The patch supplied originally by Psion, prior to the release of version 2.3, corrected a bug which prevented saving a file in excess of 32K. Copyright restrictions, however, prevent the re-printing of the patch which was, at one time, freely available directly from Psion.

## Slowed handling

Users will find that version 2.00, for small documents, will save a file faster than later versions of Quill but not so reliably. The Psion patch corrected the 32K upper limit bug and, at the same time, somewhat slowed Quill file handling.

The only means of which I am aware which will allow an increase in the size of a Quill document without producing a *def two* file is to increase the QL memory capacity.

Understandably, the question of the upper limit of the 10 translates available to Psion users keeps recurring. Unfortunately the structure of the Psion printer data file makes the relatively simple matter of altering the *Install bas* program a moot point.

It is possible to use a separate utility such as *CuePrint* or *QATS* to provide additional translate functions. In the case of *QATS* for all practical purposes the number of translates is unlimited; it is possible to re-define all of the QL's characters completely.

A newcomer to the QL scene has written to query a problem encountered with some Microdrive cartridges which, apparently, were intended originally to accompany Spanish MG ROM QLs. This writer assumes correctly that this version of Abacus will not run on his English QL and has attempted unsuccessfully to re-format the cartridges for other use.

New Microdrive cartridges, like most other forms of magnetic media such as audio and video cassettes which can





# SOLUTIONS.

be write-protected, have a small tab located on the right-hand side which can be broken off, thereby exposing a shallow recess. When this tab is removed, the cartridges become read only and new data cannot be written to them nor can they be re-formatted.

To convert them back into read/write media, a small strip of tape must be placed over the position where the tab was located originally. Great care should be taken not to touch the tape. Cartridges can be write-protected again, as the term is known, by removing the tape.

Users wishing to print parts of Quill documents, such as addresses on envelopes or small sections of a document, may care to try this procedure:

After completion of a document, print it and save it as a file. When the file is saved, Quill then asks if you wish to continue with the same document. Pressing <SPACE> will perform a

"ZAP" — the page will be cleared and Quill will return to its default values.

Instead, press <ENTER>. That will return you to the top of your document for further editing. Move the cursor to the portion of the page you wish to print selectively. If you have included a header in your document, press <F3> and <H>. Press <SPACE> until the command line reads "Command>-Header,None".

### Forced break

Press <F3> and <F> (for Footer). Press <SPACE> until the command line reads "Command>Footer,None". Press <F3>, <O> (for Other) and <P> (for Page Break). That will place a forced page break line immediately beneath the current cursor position.

Press the down cursor key until you are on the bottom line of the block of text you wish to print. Again press <P>. If you have completed isolating the blocks of text you wish to print,

press <ENTER>, which would print the entire document, enter the number of the page enclosing the block of text you wish to print. After entering the appropriate page number, press <ENTER>. Up to that point the command line will read "Command>-Print,current,from n".

The next option offered is the Quill default of "to end". Type the same page number again and press >ENTER<. The process can be repeated throughout the document as often as required.

If you wish to edit your document further and print it in its entirety you will need to remove the page breaks. Position the cursor directly below the forced page break. Move the cursor upwards by one line. If it stops on a page line the cursor is indicating that it is positioned on a forced page break. Press <CTRL> and the left cursor key — also used to delete left. That will remove the break.

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# QED EDUCATION

QED EDUCATION

## MONTH FIVE: Practical Skills

**L**eslie Fahidy examines ways in which the computer can be put to teaching practical skills outside the usual range of computing.

**A**t first sight it might appear that the computer is not particularly suitable for teaching practical skills. There are, of course, certain fields in which it is not but in others computers may be used to good effect. Think of computer-aided design as one example — technical drawing could be taught using a suitable CAD package.

Generally, a computer could be employed in the teaching of practical skills in fields where the practical skill concerned has a theoretical basis such as drawing or navigation; in those instances where the practical skill is based on the repetition of a number of often involved tasks, for example teaching someone how to draw flowcharts and in all cases in which the computer can usefully be employed to replace some of the manual dexterity required in carrying out a certain task. As an example, people who lack the necessary skill may become adept at certain art forms using a drawing package. The same remarks would apply to a music generator program.

In some fields it is imperative that practical skills are learned on a computer and not in real life; think of flight simulators. All dangerous tasks

would fall into this category. Some of them such as war strategies can be learned on a computer. We could not have the blues destroying the reds so that somebody might learn a lesson.

We should also take a broader view of education than merely teaching a subject for a particular examination. So far as I know, chess is not an examinable school subject but the computer is certainly suitable for teaching it and it is arguable that, having learned to play chess, the learner is better-equipped for other tasks in life. Would those same remarks apply not only to first aid, safe driving, or the ability to tell a mushroom from a toadstool?

### Wire a plug

At least one program on those lines has been published in Microdrive Exchange, the *Clock* program. Telling the time is a practical skill and it can be argued that the computer is eminently suitable for teaching it.

Instead of quoting examples of various skills which can be taught using the computer, I present some mini algorithms for teaching some of the skills.

An algorithm to teach how to connect a mains plug should be fairly elementary. Connecting wires to a mains plug theoretically is not very demanding but the consequences of an incorrect connection could be disastrous. The program should rely heavily on graphics, including the use of colour and sound.

Draw a picture on the screen of a plug, making its shape as lifelike as possible and showing clearly the lettering for the three terminals. At the bottom of the picture, show the wire to be connected, distinguishing clearly

between its three core colours. Select at random which wire is to be connected. Re-draw the appropriate wire in flashing colours and, in a window separate from that which contains the drawing, invite the user to indicate to which terminal it should be connected.

### Well-connected

You could supply an evaluation of the response at this stage or, alternatively, leave it for now. If an evaluation was given, and if the suggested connection was incorrect, re-present the problem. Otherwise, choose the next connection which is required and repeat the process for the third connection.

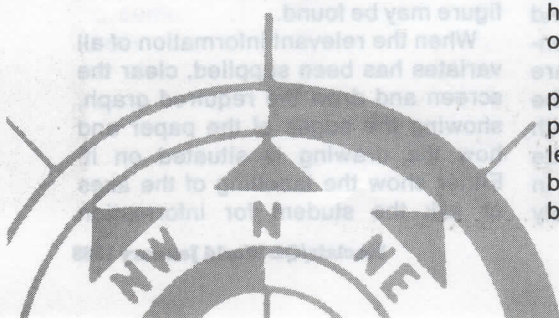
Alternatively, the process may be reversed and the user may be asked to specify the colour of the wire which needs to be connected to a given plug terminal. The process may be repeated either a set number of times or until the learner decides to stop, at which stage a final evaluation of performance may be given.

There are many teaching situations in which an algorithm to teach the recognition of objects, or a similar one, may be used. In nature study, it could be used for the recognition of plants and animals but a very similar method may be employed to teach craft students how to recognise their tools or, for instance, students of buildings how to recognise architectural styles.

### Creative colour

By their nature, teaching programs serving such purposes should rely heavily on detailed graphics. This, however, may not be a suitable approach. We must realise that in spite of its

# N



## MONTH FIVE: Practical Skills

many advantages the QL does not possess graphics capabilities of sufficiently high resolution to produce a true-to-life drawing of fine detail. It is, in my experience, better to admit defeat in such situations and evolve a different strategy which does not rely heavily on perfectly correct representation of objects.

Similar remarks apply to colour. If it is necessary to distinguish between only a few primary colours they can be represented adequately by the QL. The colours may not be accurate. In fact, 100 percent accurate colour rendering is seemingly possible, as any photographer will confirm.

In many situations where colour merely serves the purpose of recognition, approximate colours are acceptable. Whenever shape, details or colour are of great importance it is better to rely on a written description of the subject, possibly supported by some approximate images, so long as the programmer makes the point that the images are only approximations.

The following algorithm describes one possible approach in this field, for teaching the recognition of trees by the shapes of their leaves. It would be most valuable to supplement this program with high-quality photographs of the appropriate leaves and the trees, to counteract the inadequacy of both the resolution and the colour capabilities of the equipment.

Create a data file containing both graphic image and description of a sufficient number of leaves.

### See a tree

Select one leaf at random and produce its image on the screen. Arrange the descriptive statements in such a way that they form a natural progression. By the time the last clue is given the average student is expected to have recognised the tree.

Present the clues in a separate window, one after the other, and at each stage invite the learner to state the name of the tree. Make allowances for the fact that some trees may

have more than one name. Evaluate the answer at each stage. If the response is correct, acknowledge it; otherwise go ahead and present the next description.

Your marking scheme should reflect the stage at which the student supplied the correct solution. So as not to allow the marking scheme to present unreasonable difficulties for the programmer it is necessary to design the structure of the program in such a way that all questions have the same number of clues; the progression in each from the most difficult to the easiest should follow a similar pattern.

A final evaluation may be given when the student decides to finish the exercise.

An algorithm to teach diagnosis is a very general approach and it could mean diagnosis in a large number of situations. For the sake of example, we will discuss the question of finding electrical faults on a malfunctioning radio receiver.

First, present the faulty symptoms. Either of two possible approaches may be used — generate a faulty symptom at random or list a number of possible symptoms and ask the learner to choose. Either way, establish the symptoms to be used.

### Fault diagnosis

Present a block diagram of the equipment on the screen and ask relevant questions, dependent on the symptoms, such as is there DC present on the supply line? What is the amount of current drawn from the supply — compare this to the design current? Is there a signal present at the input? What is the shape of the input signal? What is its amplitude? Is an output signal present? What is its amplitude? What is its shape?

There are two possible approaches in asking those questions. The program may supply both the answers and the questions, the student stating the conclusions and stating the required path of the follow-on enquiry. Alternatively, simulation techniques may be used, a set of voltage and current readings being available in the data file.

Once the student had asked the question the program would supply the answer with respect to voltage and/or current amplitudes and shapes, for the student to draw conclusions. Programs of this type are expected to be fairly lengthy but the 128KB of memory would cope with that and the data files would also be large. I would write such a program in the four-colour mode set, preferably

using a monitor rather than a TV set to enable me to use small characters to display permanently on the screen the path of the enquiry so far, together with its results.

An algorithm to teach the drawing of statistical graphs is a border-line case between theory and practical skills. Judging by my experience as a teacher, a large number of students have the necessary theoretical basis in statistics but their drawings leave much to be desired. Few students, particularly in the 12-15 age group, appreciate the importance of accuracy or the necessity of using as much of the available drawing space as possible to draw large, clear graphs. A teaching program of the type described could be used in conjunction with a program to teach simple statistics.

### Graphs

Present the data on the screen, which should be graphed. It should not be raw data but prepared suitably for presentation. The preparation of data should be taught separately from the teaching of graphs.

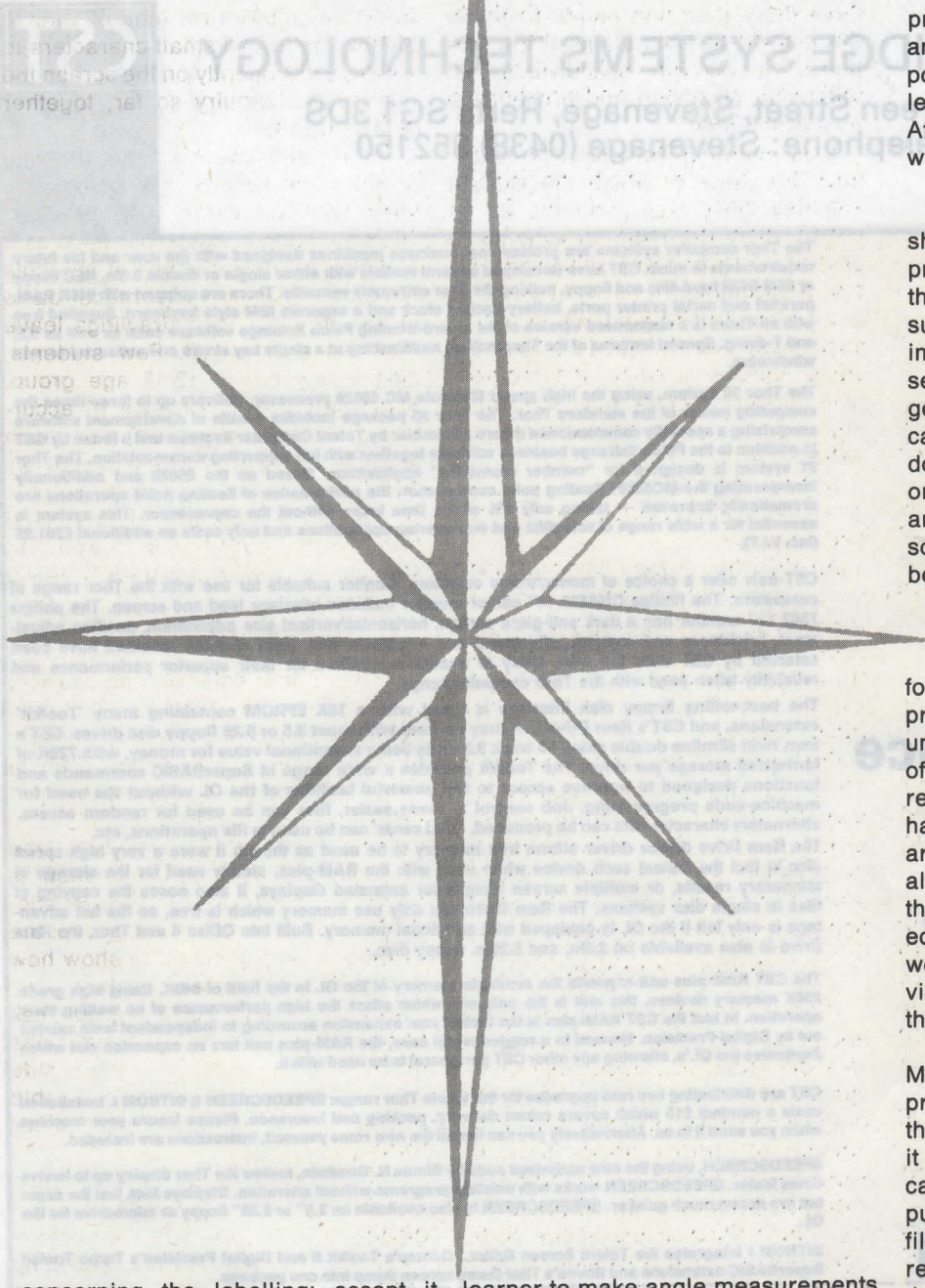
Ask the student to suggest the type of graph. Unless the suggestion is unrealistic, e.g., a pie chart is suggested for 30 items of data, accept the suggestion and proceed to show how to draw the appropriate graph.

Depending on the type of graph, ask questions relating to the dimensions of the paper — length of shortest side for pie charts, number of available divisions in both directions for other types of graph.

Ask the student for suggestions concerning the dimensions and geometry of the graph. If the suggestions are not satisfactory, resulting either in too small a graph or one which would not fit on the paper available, show calculations on-screen to find acceptable dimensions for the proposed chart. Otherwise accept the suggestions made by the user.

In the case of bar and line charts, ask the student to supply the required height of each point or bar to be plotted to represent the data correctly. In the case of pie charts, ask for the central angle of each variate. In both cases accept the answers if they are correct, or show how the correct figure may be found.

When the relevant information of all variates has been supplied, clear the screen and draw the required graph, showing the edges of the paper and how the drawing is situated on it. Either show the labelling of the axes or ask the student for information



concerning the labelling; accept it only if satisfactory.

An algorithm to teach compass reading is a practical skill needed in the study of mathematics and geography. It also appears indirectly in other subjects. The teaching of compass reading provides scope for graphic presentation; the use of graphics is essential.

We should assume that the theoretical aspects of the compass and elementary map reading have already been mastered. If that is not so a separate teaching program is needed to cement that knowledge first. The basis of all teaching programs should be that we teach one aspect of knowledge or skill at any given time, otherwise the program becomes too complicated and the results will be weakened.

Since it is not practicable to ask the

learner to make angle measurements on the screen we must work in conjunction with a drawing on paper. It is, however, possible to request the student to produce drawings on a dot matrix printer and make measurements on the drawing. The printed copy could be simple, consisting of no more than a few dots or asterisks, with a compass rose produced on the top of the paper.

Draw the compass rose. Plot a number of random points and ask the student to type-in the bearings from several points to several others. The drawing should be presented on the screen and on paper.

Evaluate the input and state whether or not it is correct. If incorrect, show the correct answer, possibly by superimposing a protractor on the drawing — on the screen — and show, by rotating the

protractor, how to obtain the required answer. Return to the plot of random points and repeat the process until the learner signals the intention to stop. At that stage an evaluation of the whole session should be given.

The outline algorithms presented show one possible solution to each problem. It is not implied that they are the only successful methods, nor is it suggested that the reader should not improve or extend them. Mainly they serve the purpose of providing suggestions and possible solutions. In all cases, if the author of the software does not possess the necessary skill or knowledge to cover the subject area it is advisable to seek help from someone who does. Such help should be easily obtainable.

### Less obvious

There is a vast area to be explored for using the computer in teaching practical skills. My observation is that until recently only the obvious areas of computer-aided learning have received attention and practical skills have been largely neglected. There are exceptions. Flight simulators have always been very popular. The fact is that would-be software writers of educational programs could do much worse than investigate some less obvious but important areas such as those mentioned.

Last month's supplement in Microdrive Exchange deals with the problems of teaching punctuation at the lower end of the age range, though it is suitable for any age group. The cartridge contains a program to teach punctuation, a demonstration data file, a program to generate more realistic data files of the type which the user finds necessary, and a file called READM—ME. As the name suggests, it gives instructions for using the package. It was written in Quill and you should start by printing it out or reading it on the screen.

Finally, please type-in the following short listing and run it:

```
100 CLS: CLEAR
110 FLASH 1: UNDER 1
120 AT 10,3
130 FOR J= 1 TO 15
140 READ A
150 PRINT CHR( A);
    CHR(32);
160 IF A = 89 THEN PRINT
    CHR(32);
170 END FOR J
180 FLASH 0: UNDER 0
190 DATA 72,65,80,80,89,67,72,82
200 DATA 73,83,84,77,65,83,33
210 STOP
```



# CAMBRIDGE SYSTEMS TECHNOLOGY



24 Green Street, Stevenage, Herts SG1 3DS  
Telephone: Stevenage (0438) 352150

THE

# THOR

RANGE

## MONITORS

## QDisc Interface



NEW

# INTROM I AND

# THOR SPEEDSCREEN

The Thor computer systems are professional business machines designed with the user and his future requirements in mind. CST have developed several models with either single or double 3.5in, NEC floppy or 20M SCSI hard disc and floppy, making the Thor extremely versatile. Thors are equipped with 640K RAM, parallel and serial printer ports, battery-backed clock and a separate IBM style keyboard. Supplied free with all Thors is a customised version of the award-winning Psion Xchange software suite as well as ICE and T-dump. Special features of the Thor include multitasking at a single key stroke and enhanced screen windowing.

The Thor 20 system, using the high speed Motorola MC 68020 processor, delivers up to three times the computing power of the standard Thor. The Thor 20 package includes a suite of development software comprising a specially commissioned macro assembler by Talent Computer Systems and a linker by GST. In addition to the Psion Xchange business software together with full supporting documentation. The Thor 21 system is designed for "number crunching" applications. Based on the 68020 and additionally incorporating the MC68881 floating point coprocessor, the performance of floating point operations are dramatically improved — taking only 1% of the time taken without the coprocessor. This system is essential for a wide range of scientific and engineering applications and only costs an additional £201.25 (inc. VAT).

CST now offer a choice of monochrome or colour monitor suitable for use with the Thor range of computers. The Philips CM8833 14" colour monitor includes interface lead and screen. The Philips 7502 12" monitor has a dark anti-glare screen, horizontal/vertical size adjustment, position adjustment, brightness and contrast adjustment and a foldable foot. Both of these monitors have been selected by CST from the wide array of available monitors for their superior performance and reliability when used with the Thor computer range.

The best-selling floppy disk interface is fitted with a 16K EPROM containing many 'Toolkit' extensions, and CST's Ram Drive 2. It may be used with most 3.5 or 5.25 floppy disc drives. CST's own twin slimline double sided 80 track 3.5 units being exceptional value for money, with 720K of formatted storage per drive. The Toolkit provides a wide range of SuperBASIC commands and functions designed to improve access to the powerful facilities of the QL without the need for machine-code programming. Job control is made easier, files can be used for random access, alternative character sets can be produced, 'wild cards' can be used in file operations, etc.

The Ram Drive device driver allows free memory to be used as though it were a very high speed disc in fact the fastest such device when used with the RAM-plus. Ideally used for the storage of temporary results, or multiple screen images for animated displays, it also eases the copying of files in single disc systems. The Ram Drive can only use memory which is free, so the full advantage is only felt if the QL is equipped with additional memory. Built into QDisc 4 and Thor, the Ram Drive is also available on 3.5in. and 5.25in. floppy disc.

The CST RAM-plus unit expands the available memory of the QL to the limit of 640K. Using high grade 256K memory devices, this unit is the only one which offers the high performance of no waiting state operation. In fact the CST RAM-plus is the fastest ram expansion according to independent tests carried out by Digital Precision. Housed in a rugged metal case, the RAM-plus unit has an expansion slot which duplicates the QL's, allowing any other CST peripheral to be used with it.

CST are distributing two rom upgrades for the whole Thor range: SPEEDSCREEN & INTROM I. Installation costs a nominal £15 which covers return delivery, packing and insurance. Please insure your machine when you send it to us. Alternatively you can install the new roms yourself, instructions are included.

SPEEDSCREEN, using the new optimised code by Simon N. Goodwin, makes the Thor display up to twelve times faster. SPEEDSCREEN works with existing programs without alteration. Displays look just the same but are drawn much quicker. SPEEDSCREEN is also available on 3.5" or 5.25" floppy or microdrive for the QL.

INTROM I integrates the Talent Screen Editor., QJump's Toolkit II and Digital Precision's Turbo Toolkit SuperBASIC extensions and Buver's Thor Dump screen dump into one package.

Please supply:-

	UK inc VAT	Overseas
Qdisc Interface 4 (3.5in. util. disc)	£79.95	£72.70
Qdisc Interface 4 (5.25in. util. disc)	£79.95	£72.80
QEP-III Eprom programmer (QL/THOR)	£129.95	£116.00
RAM-plus 512K QL memory	£139.95	£125.20
CST Dual 3.5in. cased floppy discs	£219.95	£200.40
CST Q-488 GPIB instrument interface	£224.25	£198.40
CST QDISC SCSI interface	£230.00	£203.40
Qdisc 4 + dual 3.5in drives	£275.00	£249.40
Qdisc 4, RAM-plus + dual 3.5in. discs	£405.00	£363.60
QL SPEEDSCREEN 3.5" <input type="checkbox"/> 5.25" <input type="checkbox"/> mdv <input type="checkbox"/>	£20.00	£18.00
Thor 1F (Single floppy)	£688.85	£650.00
Thor FF (Dual floppy)	£803.85	£750.00
Thor WF (Winchester + floppy)	£1608.85	£1450.00
Thor 20 1F (Single floppy)	£1292.60	£1179.00
Thor 20 FF (Dual floppy)	£1407.60	£1279.00
Thor 20 WF (Winchester + floppy)	£2212.60	£1979.00
Thor 21 1F (Single floppy)	£1493	£1354.00
Thor 21 FF (Dual Floppy)	£1608.85	£1454.00
Thor 21 WF (Winchester + Floppy)	£2413.85	£2154.00
Thor User Guide	*£20.00	*£23.00
MC68020 User's Manual	*£20.00	*£23.00
MC68881 User's Manual	*£20.00	*£23.00
Talent 68020/68881 Assembler	*£34.50	*£39.00
*refundable on purchase of appropriate Thor		
For the Thor Range:		
Philips Monitor (Monochrome)	£92.95	£111.40
Philips Monitor (Colour)	£295.00	£300.40
Beige Mouse	£74.75	£72.00
Psion Chess	£24.95	£22.70
INTROM I from Interlogic	£49.45	£44.00
SPEEDSCREEN rom for Thor	£29.90	£27.00
ROM Installation on your Thor	£15.00	
Floppy Discs 3.5", pack of 10	£15.00	
Additional 12m Service contract (1F&FF)	£85.25	£14.00
Additional 12m Service contract (WF)	£115.00	
QL Trade-in against Thor		
Deduct £70 (UK) £60 (O/S)		
Export administration		£5.00
Airmail outside Europe		£10.00

Please complete in full

Name .....

Address .....

.....

.....

Post Code..... Telephone .....

I enclose a cheque/PO of £ .....

Please deduct my Access/Mastercard/Eurocard/Diners Club/Vector a/c

Card No.

.....

Expiry Date .....

Signature .....



Prices are inclusive of carriage  
CST reserve the right to alter prices and specifications without prior notice

## Ritzaus success story

THE CELEBRATIONS have gone on a little longer this year at Dansoft, the Danish software house. It's the first anniversary of their advanced multi-tasking news handling system going on line. Developed with the Danish news agency, Ritzaus, using CST hardware the system is now linked to the Norwegian and Swedish news services and Thors have been installed at more than 60 major customer sites.



At work: Ritzaus manager Uffe Staggmann

Satisfied customers include Danish Television and Radio, using Thors to keep their news and sports shows up to date and more recently the President of the EEC Commission.

### UNSTOPPABLE

Ritzaus receives and sends news items and updates constantly from all over the world. Before the system was computerised the customers could only receive the news continuously by telex. That generated as much as 100 metres of print a day. An impossible amount of paper to deal with efficiently!

Now in newspaper offices the news is collected, edited, typeset and laser printed automatically by networked Thors. From the news coming in to the master copy going out the Thor manages everything.

The Thor was chosen as the only low cost, high quality computer available that can effectively multi task. Another important factor was the proven reliability of the Thor; Ritzaus must be on line around the clock day in day out, so there's no room for system failure. It's a tribute to CST reliable workmanship that the first computers installed have been running continuously for over a year now.

## THE NEWS AS IT HAPPENS

Ritzaus Generelle Nyhedstjeneste

V2.30 - 1987 Dansoft

Vis artikel=F1 Kommandoer=F3 Søg=F4 Skriv=F5 Ud=F7

4 Søgte artikler tilhører U/P/FILIP

260800: FILIPPINSK/TYFON	Præst melder om 1600 omkomne ved tyfon:
260857: FILIPPINSK/TYFON-NJ	Præst erkender fejl i opgivet dødstal:
270428: FILIPPINSK/TYFON-MJ	243 dræbt af tyfonen >Nina( i Filippinerne:
280944: FILIPPINSK/TYFON-2	Dræbt 361 drønmet ved hvirvelstorm:

### The headline: Philippine typhoon

THE Dansoft news management software allows the user to see all the news as it arrives, at the same time as it is being stored on floppy. Thanks to special encoding and data compression methods developed by Dansoft, the system can store up to 1MB of data on a standard 720KB 3,5" disc.

When the disc is full the system switches from flp1— to flp2— and when both are full (if nobody is on hand to change the discs), it starts

erasing the oldest bulletins making space for incoming data.

The incoming news is put under one or more of fourteen headings — "home industrial" or "EEC news" for example. These items are also "searched" for pre-set names or text strings and important items are highlighted. Stored data can be similarly searched thus cross referencing and the correlation of separate items is always simple and rapid.

## Dear Hilde . . . THOR TIMES AGONY AUNT

—DEAR HILDE

I am a German physics student studying in London and my Thor 21 is a great help with my astronomical data analysis but my professor at home seems to have lost interest in my print outs. Should I try the student councillor?

Yours  
Misverstanden

Dear Miss Verstanden  
You don't need counselling, you need to write home in German! SET—LANGUAGE DEUTSCH gives you the right keyboard layout (CST can supply the keytops). Now just set up your printer and Bob wird dein Onkel sein!

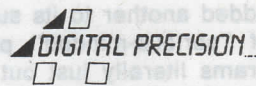
PS: If none of the other nine SET—LANGUAGES work either, hand annotation might give satisfaction.

Hilde

## QEP III the finest!

"THIS is the finest EPROM programmer I have used," says Ron Massey, reviewing the QEP-III for QL World. "Even if you have no previous experience with a programmer you will find the QEP-III exceptionally easy to use."

CST claim that it is suitable for the complete range of EPROMs from 16 to 512K. Three programming voltages are provided: 12.7, 21 and 25 volts. In addition to selecting the type of EPROM, the pin layout may be changed allowing easier PCB layout. Eprom pinouts may be saved to a file. To quote Ron Massey: "QEP-III [is] the epitome of state-of-the-art EPROM programmers."



NOW ALL

**THOR  
COMPATIBLE**

TURBO V2.0

EYE-Q V2.1

SUPERFORTH V2.0

EDITOR V2.05/V1.17

SUPER SPRITE GENERATOR V4.0

PROFESSIONAL ASTROLOGER V1.5

The Power Behind The Button

# A HAPPY NEW YEAR TO ALL OUR READERS!

# FIELDS WITHOUT FENCES

A database with a difference, Flashback uses markers to expand the field capacity of files as the need arises. Ron Massey meets Flashback, and feels welcome.

**Product:** Flashback

**Price:** £25

**Source:** Sector Software, 39 Wray Crescent, Ulnes Walton, Leyland, Lancs PR5 3NA. Tel: 0772 454328.

Sooner or later all computer enthusiasts find they develop a requirement, no matter how humble, for storing and manipulating information in useful ways. For the average user, one of the most common types of record-keeping system is a file for names and addresses.

Sector Software has added another to its suite of "serious-minded" programs literally just out of beta testing quarantine. *Flashback* is a particularly flexible and user-friendly system for manipulating text files without purporting to be yet another database. Even so, because of the various applications for which Flashback can be used, a certain amount of terminology relevant to database management is used to describe its attributes.

When describing the

operation of a database the most common simile is a filing cabinet. Individual records can be likened to filing cards. Field names are normally labels common to every card in the file and fields are the items of information identified by the field names.

When a file is ordered you are, in effect, re-arranging the apparent order in which records appear according to the alphabetical sequence of an item within a field common to each card. Selection can be compared to collating a group of cards according to a particular criterion based on the valued indicated by flags/markers which are the equivalent of the database field names.

## Nothing

The Flashback interactive first module has been designed deliberately for people who know nothing

about programming or text management. Separate modules will provide a wide range of additional facilities to the interactive module for the complex management of information.

The difference between Flashback and conventional data management systems is that, unlike the fixed format of an Archive file, a flexible system of inserting markers used as flags indicating the start of a portion of a record is used instead of the traditional static field titles.

A marker, consisting of a white box, is placed at the start of each part of the current record, the field where you wish to indicate to the program that the information following is significant for subsequent searches or for grouping with the same fields from other records.

Labels used as field names, up to 16 characters

in length, can be attached to each marker and the ordering of records using those markers is done by means of the ASCII code. Upper-case characters are followed by the relevant lower-case characters. Unlike an Archive file, labels may be added or altered at any time without destroying the integrity of the file.

## User-defined

One of the many features putting Flashback well above the average specialised database is that it is user-definable throughout. A single file may contain a mixture of record types and additional fields may be inserted at any time.

The first of a series of modules of what will become a sophisticated system for manipulating information, Flashback needs only two commands to get started, READ equivalent to load, and WRITE, equivalent to save.

When Flashback runs it looks initially to the driver for which it is configured for a default filename database—dba. If that file is not available a window will be opened with the prompt stating that the default filename was not found, followed by the default drive and filename, offering you the option of changing either or both.

## Elbow room

Although Flashback is supplied with a defined data file expansion space of about 10K, in addition to any files read by the program users optionally may reconfigure the program for either more or less, according to requirements and the elbow room required by the programs which are multi-tasked with it.

Command compatibility for navigation is the same as Archive, FIRST, LAST, NEXT and BACK will take you to the relevant records



anywhere in a file. Cursor commands are used in the same way as the command line in the SuperBasic window #0. Editing a Flashback file is done in the same manner as Quill with a ragged right hand margin.

Three methods have been provided for entering directives into Flashback. By pressing <F3> to gain access to the line command input line; by using <CTRL> and the first letter of the command, or by pressing <CTRL> twice and selecting the required command using <ENTER> or the first letter of the command.

### Commands

Commands available to the first module of Flashback — the interactive module — consists of:

case-dependent and independent searches.

The SEARCH option can provide a search for a string of up to 20 characters and may be specified as all or by user-definable field names. Another very important feature is the UNDO option which will remove all alterations made to the current record.

Flashback provides three screens for customising the presentation of your information. Selecting the SIZE option you can set the size and positioning of the window for viewing your data. A window at the bottom of the screen indicates the window position in terms of both X,Y pixel co-ordinates and width and height in characters.

Control is provided by the cursor keys for altering

concerning the records displayed, as well as the user-definable field name and the command line. Information provided in this window includes:

Ref. no: nnnn of nnnn.

Field number: 0 to 59.

Field name: user-definable up to 60 names but theoretically unlimited number of fields per record.

Work space remaining in current file: user definable.

Current file: drive filename.

Two windows are provided for displaying records and the manner in which they are handled. Each window is provided with an information line, consisting of as much information as possible within the limits of the width of the window, about the contents at the start of the current record.

Although there is a limit of a maximum of 60 field names in a Flashback file, the only constraint with regard to the number of possible records a single file can contain is the capacity of the QL RAM. Typically it amounts to about 8,000 name and address records.

### View

Selecting the VIEW option in this top level of management displays the first line of each record equivalent to the information line. Pressing the cursor keys moves a menu bar and scrolls through the contents of the entire file. Pressing <SPACE> or <ENTER> selects the entire record for viewing and returns you to the top level.

<F4> opens a second window which can also be re-positioned and re-sized. Information included in this window is closely-related to a "\*" marker used in the top level of selection as a flag or marker for sub-records. The information line over the second window contains details starting from the position of

the first sub-record marker.

Selecting the VIEW option at this sub-level, records are displayed from the top of the first sub-record at the marker position. If a record is too long to display in the selected window height, using the up/down cursor keys scrolls the record. In common with all of the display modes, a red box indicates the end of the current record. Whenever SELECT and ORDER are chosen you are also taken into the VIEW option.

Input to Flashback may be made directly from the keyboard or with \_\_\_exp files from Archive, Abacus or Easel. Other sources of input include *The Editor* or Quill-lis files.

Export files can be processed with the Flashback import utility. The utility menu displays an alphabetical listing of all files generated by Archive, Abacus and Easel with an \_\_\_exp extension.

A file may be selected by pressing one of the numbers positioned to the left of the file name or typing characters into the command line. The size of the displayed media directory is reduced as you type-in the name until the specified file is the only one remaining and is then loaded automatically into the utility.

Once the file is loaded, the display consists of two windows. The left window lists the field names from the \_\_\_exp file; the right window is blank. The transfer of a file may be converted for use by Flashback and field names may be transferred from one window to the other and in any order. Fields may be merged and two or more fields, requiring separate names in Archive may be given the name in Flashback. After the field names have been transferred, pressing <ESC> starts the automatic pro-

Command	Flashback	Archive Equivalent
First record	<CTRL> <F>	First
Next record	<CTRL> <N>	Next
Back record	<CTRL> <B>	Back
Last record	<CTRL> <L>	Last
Search	<CTRL> <S>	Find, Search, Locate
Group	<CTRL> <G>	Select / Order
View group	<CTRL> <V>	View
Kill group	<CTRL> <K>	Reset
Edit name	<CTRL> <E>	_____ (1)
Execute number	<CTRL> <X>	_____ (2)
Transfer record	<CTRL> <T>	_____
Undo changes	<CTRL> <U>	_____
Adjust window	<CTRL> <A>	_____
Insert marker	<CTRL> <I>	_____ (1)
Create record	<CTRL> <C>	Insert/Append
Delete	<CTRL> <D>	Delete
Read	<CTRL> <R>	Open
Write	<CTRL> <W>	Close
Printer	<CTRL> <P>	Lprint

### Notes

1. Once record is created this function is immutable.
2. Must be done with a procedure.

Other hotkeys provide a range of useful program controls.

<SHIFT> <ENTER> returns you to the start of your current file when you are performing a SEARCH. This combination of keys otherwise will insert a record, with the same marker sequence used throughout the file. <SHIFT> <CAPSLOCK> toggles the SEARCH/SELECT option between

window position and <ALT> and the cursor keys to alter size. Pressing <ENTER> accepts the alterations; <ESC>, as with all of other Flashback options, cancels them.

Alterations made to window size adjust the positioning and layout of the subsequent screen prompts automatically; the display window number one provides information

cess of transferring from one format to the other.

Output from the Flashback interactive module automatically word-wraps for insert or editing within the size of the window. The standard printed format without the Report module consists of an 80-character line. The width of the printed document consists of a maximum of 80 characters.

### Combination

The program checks to see if the <ESC> key has been pressed after it completes printing each

Flashback data, such as names and addresses or paragraphs and other text block extracts from contracts or standard letters, into Quill, The Editor or any other program running beneath Flashback.

When considering the obvious Flashback database applications, it is almost impossible not to make some kind of reference to Archive. The bench-test figures were obtained with files formatted to be compatible with their respective programs and were otherwise identical.

control codes and can use the Psion printer—dat file for printer control. Because the majority of users have built their own drivers for use with the various Psion programs, using a printer—dat file eliminates the need to building yet another.

Specific field markers will be used for the range of control codes available to the majority of printers and will be indicated as field markers on the screen version of the finished document.

Further, you will have access to sophisticated

programming tool, Flashback can send variable values into SuperBasic programs.

Looking at the Sector Software range of other products such as *Taskmaster* and *Spellbound*, I am not surprised at the sheer processing power of Flashback. Virtually every conceivable control has been provided for handling text in a wide variety of permutations.

### At home

While not a database system in the conventional sense, there is little doubt that the majority of users will find applications for Flashback in the field of data manipulation. It is equally at home with the production of manuals, as an adjunct to word processing for the storage of standard paragraphs, writing and testing SuperBasic programs or sub-routines, think-tank applications, household and business management and many more.

Since Flashback is entirely memory-based, users with standard 128K QLs will be unable to utilise the windowing available with memory expansion. Apart from that limitation, Flashback is compatible with the entire range of QL systems.

There can be little doubt that Flashback is a very exciting product and of real value for applications, whether it is used as a means to retrieve names and addresses, recipes or complex word processing functions for contracts or standard letters from files which may be as constructed in as complex a manner as required for your applications.

Of even more importance the chances of corrupting a file because you forgot to close it are entirely non-existent. File corruption by cockpit error is now a thing of the past.

**File Data: 214K in length consisting of 2,063 name and address records.**

#### Operation

##### Best case:

1. Unordered, case-dependent, search anywhere in file:

##### Archive

##### Flashback

(1) 40.89 sec 1.116 sec

2. As above but case-independent:

1.79 sec

##### Middle case:

1. Select named county from all records

(2) 9min 10 sec 1.24 sec

2. Select "Mr." from all records

5 min 45 sec 2.84 sec

##### Worst case:

1 Select all, order by surname — first time:

5min 37 sec 6.41

Second time (3)

4 min 36 sec

#### Notes

1. *Archive* FIND is case-independent.

2. *Flashback* performs a combined SEARCH and order; *Archive* requires two separate commands.

3. Reduced time for the second ordering was possible because of the QL slave blocks. The *Archive* RESET command allowed sufficient time to make a cup of coffee.

4. *Flashback* SEARCH is virtually instant when a file is ordered and the SEARCH is on the ordered field. This mode is the same as *Archive* LOCATE, which is also virtually instant.

record. If so, printing is halted with a final printed message "\*\*\*\* ABORTED ESC PRESSED \*\*\*\*".

A typical Flashback application includes combining any number of SuperBasic procedures or routines into a single file and, by selecting the <CTRL> <T> option, — transferring the record containing it into SuperBasic in a similar manner to the *Keydefine* or *Turbo* TYPE-IN command procedure. By heading each routine with a line number and REMark you can identify or SEARCH for specific routine modules.

Other TRANSFER applications include a facility for transferring

Whereas *Archive* provides three forms of looking for a specified field with FIND, SEARCH or LOCATE, *Flashback* requires only one SEARCH.

Two additional Flashback modules are nearing completion. Run in conjunction with Flashback the modules will provide facilities for processing data in very complex ways. The first, *Report Generator*, will provide sophisticated features such as formatting data output to the screen, a printer, a file medium or transferring data to the program underneath it.

Printer output may be formatted with defined left and right margins, at which time you can insert printer

commands for selecting multiple field criteria and full mail-merging options, which will maintain word wrap on unjustified text and be able to generate many different types of report from one set of data.

The Flashback Basic module will have most *Archive* functions, except for screen formatting the *Archive* SEDIT option. In addition you will have delete left and right, as well as move left and right, by character or field.

You will also be able to turn the QL screen graphics, so that Flashback can be used for applications software in a manner similar to the *Archive* RTM module. Used as a pro-

# ABC Electronic

Andreas Budda  
Högelstr. 10-12  
D-4800 Bielefeld  
West Germany

tel: 0521/690381  
telex: 932974 budda d  
telex: 0521/61412

## 1. POINTER'S TOOLKIT

Pointer's Toolkit is intended to be a complementary toolkit for QJUMP's Super Toolkit II and/or QRAM or for Sandy's SuperQBoard with mouse. Naturally you can use it also without any of this hard software. It contains a background string-exchange command, for example, a command to kill all currently running jobs, a function which works like INPUT, but you may give a pre-defined text to edit (like the input used by PSION), a new RESPR which never returns not complete, even if there are jobs running, a monitor-save-job, and, if you have a command called POINTER or a file called PTR-IMI or PTR-KBD (from QRAM), there are commands which give you access to the pointer and real pull-down-windows from SuperBASIC!

## WRITER'S TOOLKIT

Writer's Toolkit gives you new fonts (no normal QL Fonts), which you can use to write anywhere to the screen (with the new command WRITE). The new fonts include Old English, Antiqua, Helvetica, (and more) in different sizes. Fonts with a height of 8, 12, 16, 20, 24, 32 etc. are also possible. Now you can forget the ugly CSIZE 3, 1 QL fonts; Writer's Toolkit gives you beautiful fonts which you can use for example to make overlays for disk-labels. All fonts are defined as proportional, so Writer's Toolkit gives you not only nice looking fonts but also a nice face.

PRICE: 15£

PREIS 45,- DM

## 2. QL-BUS

Plug in your QL-Bus buffercard and the Expansions Port of your Sinclair QL enlarges from one to five slots with the possibility of an additional power supply. Apart from the Miracel Trump Card it can be used with

- \* CST Floppy Disc interface
- \* CST SCSI - Floppy interface
- \* Sandy Super QBoard
- \* Sandy 512k memory expansion
- \* Miracel 512k memory expansion
- \* QEP III E-Prommer
- \* and all interfaces using the QL-Standards

PRICE: 98£

PREIS: 298,- DM

## 3. DOT SCIENCE + SRENCOPY

This program, which enlarges your QDots, is usable for all scientific and mathematical texts. It can be used with all standard software programs even your own basic programs. You need no special codes to work with it because the BOOT program loads all files and programs after checking the necessary parameters. The possibility of using several characters - for example greek letters, chemical and mathematical formulas is no longer a problem. All additional and of course the normally used characters can be printed on a EPSON compatible printer.

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QLW1



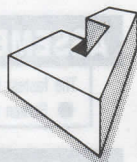
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MEETING 335  
10/15 A10:30

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DANCE LESSON  
5 FRI 06:00

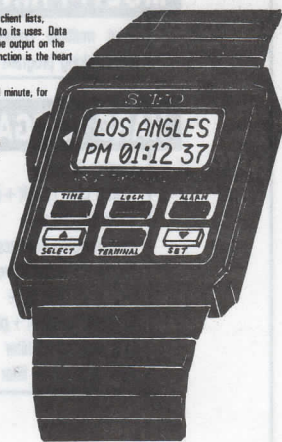
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FRANKFURT  
AM 02:08 42

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# 84 10/14 A  
SUN 10: 08 42

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QLW1

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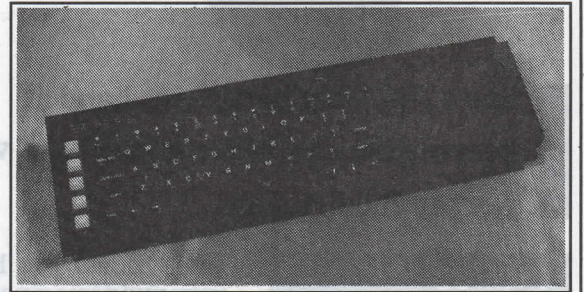
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# SOFTWARE

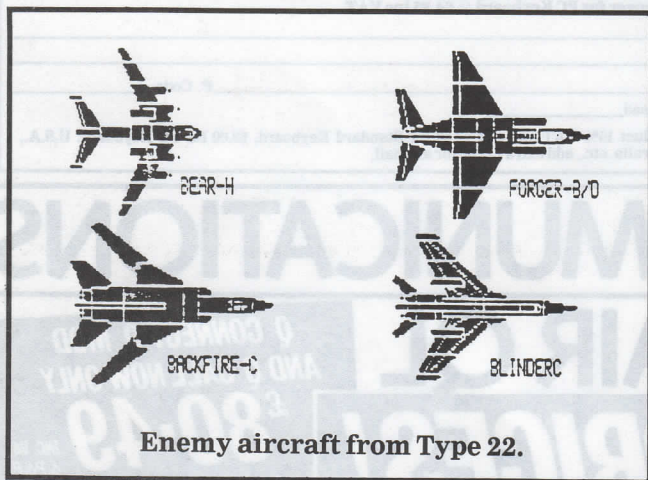
Steve Applebaum tries his hand at keeping the ship afloat and relaxes with a worthy shoot-'em-up.

## Type 22 Talent

**T**ype 22, from Talent, is a striking departure from the frenetic zapping of *Hoverzone*. Unlike that game, Type

game unless you have a very vivid imagination.

For a wargame, the Type 22 scenario is extremely uncomplicated. Your objective is to stay afloat for as long as possible, shoot down enemy aircraft and sink enemy shipping. In return, you are bom-



Enemy aircraft from Type 22.

22 is a complex wargame which tests players' mental as opposed to physical reflexes. It is a game of strategy rather than mindless blasting. It is also more down to earth, or at least as down to earth as a computer game can be.

So far as I can gather from the rather obscure instructions, the game puts you at the helm of a Royal Navy Type 22 frigate. If you do not know what that is you are unlikely to find yourself any wiser after playing Type 22, because neither it nor its manual serves to enlighten you. You will not get any information out of the

barded with missiles and plagued by fighter aircraft, submarines and surface ships.

Type 22 is perplexing because too many things happen at the same time. All the action takes place in two adjacent windows, each of which features a radar. The one on the left of the display plots the positions of all surface vessels, submarines and your own Lynx helicopter within a 56km. radius. They are displayed as different-coloured dots which move around the radar scope.

The radar in the right-hand window is used to pick up aircraft and

missiles. It has two modes, normal and zoom, used for early warning and close surveillance respectively.

Below the radars is a blank strip representing a Telex. As the game develops, it flashes messages warning of enemy weapon launches, enemy hits, and general information about the current state of play.

The bottom half of the display is divided into two more windows containing a number of command options and information about those commands. They perform such functions as altering your ship's heading, loading and launching a missile, firing chaff to confuse the enemy radar, and even moving the Lynx helicopter at your disposal.

Exciting as all this sounds, the only indication you have that any of the commands has had an effect is a change in the movement of the dots on the radar display and a few incoming messages. Even then it is difficult to decipher the radar screen, as it fills with increasingly greater numbers of coloured dots until it looks like an optician's test for colour blindness.

Overall, Type 22 is something of an oddity. The action is fast and furious but the confusing display makes it virtually impossible to assimilate what is happening. It is not a game I would recommend to arcade aficionados and I would be equally hard-pressed even to point any but the most battle-

scarred wargamer in its direction. Definitely one for seminal wargame fans only.

## Hoverzone Talent

**A** look at the cassette inlay card for *Hoverzone*, showing an alien arachnid adrift in space, made me think Talent Computer Systems might, uncharacteristically, have an original concept. Talent games are generally very good but often lack imagination, an essential quality in a computer game.

Its record remains intact, because *Hoverzone* is another reworking of the old *Defender* formula, plus a few new ingredients.

Originality aside, I have to concede that *Hoverzone* contains some very good graphics and a number of inspired ideas, which I think improve on the original *Defender*.

In *Hoverzone* you play the pilot of a Delta Class defence ship. For some reason you seem to be the only one with sufficient guts to make a stand against the alien hordes threatening to invade not only your planet but the entire planetary system of which it is a part. Such massive discrepancy in numbers is standard in games of this kind.

There are three alien species with which to contend — Grabbers, Psychocubes and Podules. The former try to grab — hence their name — little figures

SOFTWARE — HARDWARE — TAILOR-MADE SYSTEMS

which run along the surface of the planet below you and represent your fellow humans; Psychocubes sound like an hallucinogenic drug and are potentially just as mind-blowing, since they lay space mines which explode on contact; finally, the Podules are flying carriers which, when shot, disgorge a number of zippers which dart around maniacally in an attempt to collide with your Delta Craft.

Anyone who has played Defender will immediately acknowledge the debt R. G. Riley, Hoverzone's programmer, owes to that game's creators. Along the top of the screen is a

scrolling window which acts as a radar and gives advance warning of approaching aliens; below, a larger window, with the undulating surface of your home planet drawn along its base, scrolls horizontally in either direction.

Your Delta Craft looks like an airborne bubble car. It is controlled using all four cursor keys. Pressing the left or right arrow keys accelerates the ship in the respective direction; to stop, you change the direction of the craft.

Being able to stop is important, because when you shoot a Grabber holding a human it releases the latter, who plummets to

the planet and certain death. To save your buddy you must shoot the Grabber and catch the former before he collides with terra firma. The idea is to save as many persons as possible because, for each one remaining at the end of a wave of aliens you are awarded bonus points before moving to the next level.

If, on the other hand, you are lax and let every human be irretrievably grabbed, the Grabbers metamorphose into Muties. There is little worse than having hordes of rabid Muties on your tail.

Hoverzone graphics and sound are excellent. The lateral scrolling is

virtually flicker-free and the animated characters skitter about the screen without the hint of a jerk. Despite the limited QL sound capabilities, Riley has managed to produce an effective engine noise which builds to a crescendo as the gas is turned on; gunfire and explosions are equally good and help to make Hoverzone one of the best QL shoot-'em-ups I have seen in a long time.

Its limited originality notwithstanding, Hoverzone is a good variation on the old Defender theme. If you are looking for a good zap-'em, check Hoverzone — you could do much worse.

## text<sup>87</sup>

The Advanced Wordprocessor  
for the Sinclair QL

text<sup>87</sup> Alpha Block Context Doc File Goto Layout Mode Print Ruler Search Type Zap (esc)  
Text leaflet Words: 616 Lines: 8 Frames: 1

- **text<sup>87</sup>** is a powerful WYSIWYG general-purpose wordprocessor for the Sinclair QL. **text<sup>87</sup>** provides all common editing commands plus block operations, search and replace, file insert, block save and many other commands through quick menus. Auto-word-count, Auto-reformat and Freeze options are available
- **text<sup>87</sup>** uses special video display founts with variable character size up to the size of text window. Many founts can be loaded and mixed on the same line. Characters can be displayed in each of the three colours. Six founts in different sizes are provided with the program. New founts can be designed with **founted<sup>87</sup>**.
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- **text<sup>87</sup>** is a well-behaved executable multi-tasking program with resizable text window. **text<sup>87</sup>** is compatible with **Spellbound** and can import **Quill** Doc files retaining all the tabs and highlights.
- **text<sup>87</sup>** was launched at the ZX Microfair on 12 December and is available exclusively by mail-order from **Software 87**. A free leaflet with full list of commands, features and timings is available on request.
- **founted<sup>87</sup>** is a display fount editor available at extra cost.

Prices inclusive of airmail worldwide: text<sup>87</sup> £45, founted<sup>87</sup> £10

Software 87 33 Savernake Road, London NW3 2JU

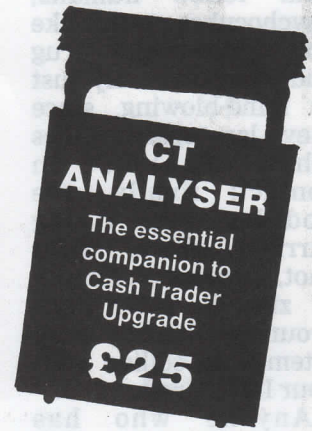
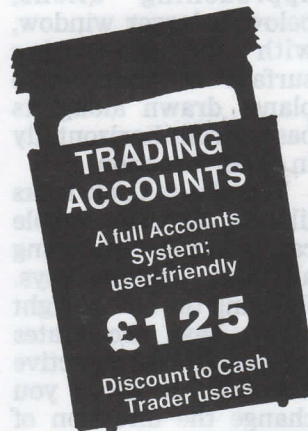
# PDQL

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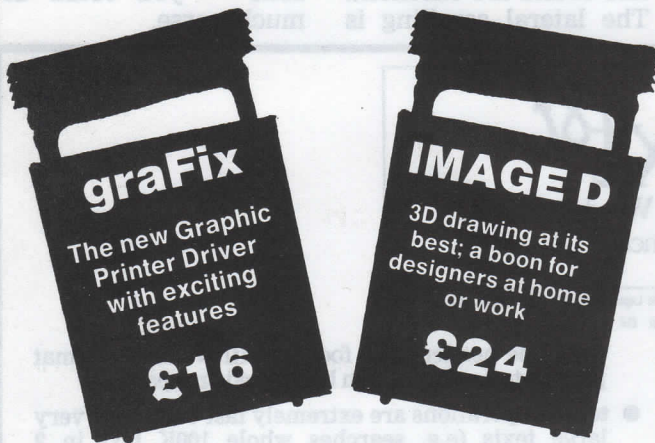


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# DIY TO

Each month Simon Goodwin adds new commands to the QL repertoire. This time he puts the line editor under the control of SuperBasic programmers.

**H**ave you ever wanted to trap the QL INPUT statement to prevent long entries spoiling the rest of the display? Have you ever wished you could supply default text so that the user can edit it or just press Enter to confirm the whole line? That is this month's Toolkit project.

EDLINE\$ is a string function, as its name implies. It takes three parameters — a SuperBasic channel number the maximum length of the input in characters; and the text you want the user to be able to edit:

```
PRINT EDLINS$  
(channel%,42,  
"flp1—")
```

When you call the function the text appears on the screen with the cursor at the end. The left and right arrow keys can be used to move back and forth in the line and

characters can be deleted or inserted as usual for INPUT.

If the user tries to type more than the maximum number of characters the last one on the line will vanish and the cursor will move to the end of the line to emphasise what is happening. The up and down arrow keys also move the cursor to the end of the line. It is easy to change the code if you want to use them for

in the QL repertoire. In the next few months DIY Toolkit will take you on a practically-oriented tour of the QL system, explaining its philosophy as well as its function.

EDLINE\$ is listed in two ways. Listing one is the assembly code program, assembled using the HiSoft *DevPac*. You can type this text into your assembler if you want to customise the code. Listing two loads

"Sometimes it is difficult to see the wood for the trees."



some other purpose, say to abort entry or to recall the original text. The code for EDLINE\$ is not much more than 100 lines long but it is fairly intricate. I chose deliberately to start my stint as toolkit tutor with this example because it makes heavy use of the QL ROM and illustrates many techniques I have learned in four years of bending Qdos to my will.

## Favourite

QL ROM routines are documented in many books. My favourite is Andy Pennell's *Qdos Companion* but sometimes it is difficult to see the wood for the trees when you are presented with a list of every trick

the equivalent machine code from compact DATA statements — line 620 onwards — and saves it in a file which you can load as a resident procedure like this:

```
x=RESPR(350):LBYTES  
"file name",x:CALL x
```

The first part of listing two is a standard loader, used in every month's DIY Toolkit project. The DATA statements change from month to month.

In principle, EDLINE\$ is simple — a link between SuperBasic and the ROM 10.EDLIN routine which is used normally to edit Basic program lines. As Pennell notes in his book, "10.EDLIN is potentially very useful

but is tricky to use." EDLINE\$ must do a good deal of work before and after calling 10.EDLIN. It uses no fewer than 10 ROM routines.

The three lines at START and the table labelled DEFINE are used only once. When you first load EDLINE\$ and CALL it these lines add the new function to SuperBasic. From that point the code always starts at the next label, EDLINE. That is the entry point whenever SuperBasic or a compiled task wants to use the new function.

Like most other SuperBasic commands, EDLINE\$ expects parameters. Interpreters and compilers evaluate parameters and build a table describing them before calling the command code. Each command checks its parameters by examining the table. It is very important to have this code correct; bad parameters can cause chaos if they are passed through to the operating system.

Three registers indicate the position of the parameter table. Register A6 points at the base address of all the information held by SuperBasic and can change at any time — SuperBasic moves up and down in RAM as other tasks grab or release memory. All addresses in the SuperBasic area are relative to the value in A6 so that the code still works when Basic moves.

Register A3 points beyond A6 at the start of the parameter table and A5 contains the offset from A6 to the end of the

# OLKIT

table. Each entry in the table is eight bytes long and EDLINE needs three parameters, so the code starts by checking that the difference between A3 and A5 is 24.

The first two parameters are of the same type, integers or whole numbers, so EDLINE\$ processes them together, using the ROM routine CA.GTINT which fetches the values and stores them in an area called the Maths Stack, normally pointed to by A6 and A1.

SuperBasic uses simple channel numbers but internally Qdos requires you to identify channels with 32-bit values called 'channel IDs.' The next block of code looks up the channel number in the SuperBasic internal index of 'channel table' which consists of 40 bytes of information for each channel number. The code checks that the table covers that number and extracts the first four bytes of the appropriate entry, the channel ID.

## Re-entrant

EDLINE\$ needs somewhere to store text as it is entered and edited. It is not a good idea to include a data area with the code as SuperBasic commands are meant to be re-entrant they should work properly even if several tasks try to use the code at once.

It would be annoying to compile two programs and find them using each other's text if both used EDLINE\$ at the same time. To circumvent this I have stored the text and other task-specific

information in the 'buffer' area which exists at the start of each SuperBasic task.

## Room to edit

The current cursor position fits in the first eight bytes of the buffer and the rest of the buffer holds the text. The buffer size may vary; SuperBasic program editing tends to expand it

"It would be annoying to compile two programs and find them using each other's text."

and it includes all free memory inside Turbo and Supercharge tasks but there is always room to edit at least 118 characters.

EDLINE\$ gives a 'buffer full' error if you specify a maximum input length which would overflow the buffer. It complains 'bad parameter' if the default text is longer than the maximum input allowed.

Before EDLINE\$ can let the ROM edit the text it records the current screen position so that it can move back there if it needs to start again, say if the buffer overflows. The routine labelled WHERE uses the system call SD.CHENQ to read the cursor position into the start of the

SuperBasic buffer. Qdos is not worried that the buffer is movable because the TRAP #4 instruction warns it that the next TRAP uses addresses expressed relative to A6.

Before the editor is called, EDLINE\$ sets the cursor position with SD.POS and prints the default text with 10.SSTRG. Finally it positions the cursor over



a blank character at the end of the line with 10.SBYTE to print the blank and SD.PCOL to move the cursor back a place. That keeps the screen tidy even if the editing operation goes wrong.

## Ready to call

At last we are ready to call 10.EDLIN which allows the line to be edited. Several things can stop editing. If the user types Control Space in SuperBasic, 10.EDLIN gives a 'not complete' error, code -1. Early QL ROMs could leave the cursor on at this point, so EDLINE\$ makes sure that it is turned off, with SD.CURS, before re-

turning the error code to Basic.

The other likely error is 'buffer full,' code -5. If this happens EDLINE\$ discards the last character in the buffer and starts again with the rest of the text. That explains why I save the cursor position before starting to edit and print a blank at the end of the text.

If 10.EDLIN stops with a positive number in DO, no error can have occurred. EDLINE\$ checks the last character in the buffer to make sure that it was Enter. 10.EDLINE also lets you end a line with up or down arrow for convenience when editing Basic but EDLINE\$ starts again unless it finds Enter.

Before EDLINE\$ has finished it must move the edited text out of the buffer and back to the Maths Stack from whence it came. It is likely that the text has grown longer, so EDLINE\$ cannot assume that there will be room for it. The BV.CHRIX routine checks that there is space for another D1 bytes on the maths stack, expanding it if need be.

Finally, EDLINE\$ uses the routine which moved the text into the buffer to move it back again. It returns to Basic with zero in D0, to indicate that everything went well, and one in D4 to show that the result is a string.

*Apology: due to circumstances beyond our control, the listing which should accompany this article has been omitted and will appear next month.*

# The QJUMP Pointer Interface

The QJUMP Pointer Interface is the core of our development plans for the QL. This is the new standard in multi-windowing multi-tasking environments. It gives you mouse, cursor key or single keystroke control of your QL. Only QJUMP brings you a completely new environment for your expanded QL, providing non-destructive windows for any well written program (and most badly written ones too!) no menus to set up, no silly limitations, just CTRL C to switch between programs. This is the way forward for QL users, while most software will work with it, the best of the new software coming will not work without it. The QJUMP Pointer Interface makes your QL really work!!

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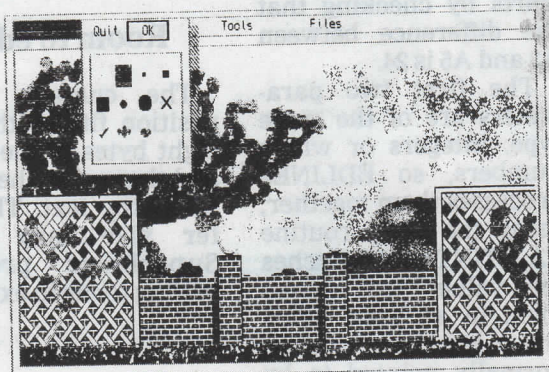
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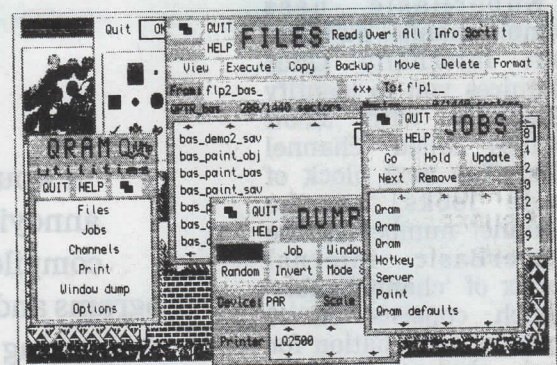
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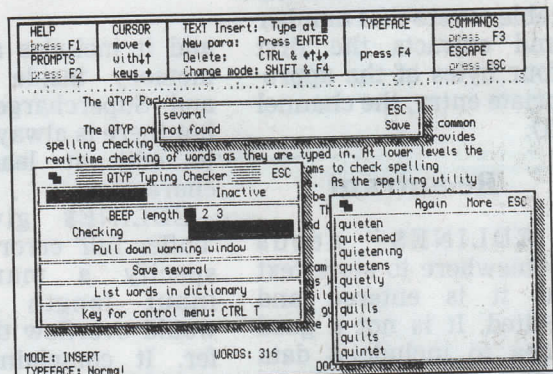
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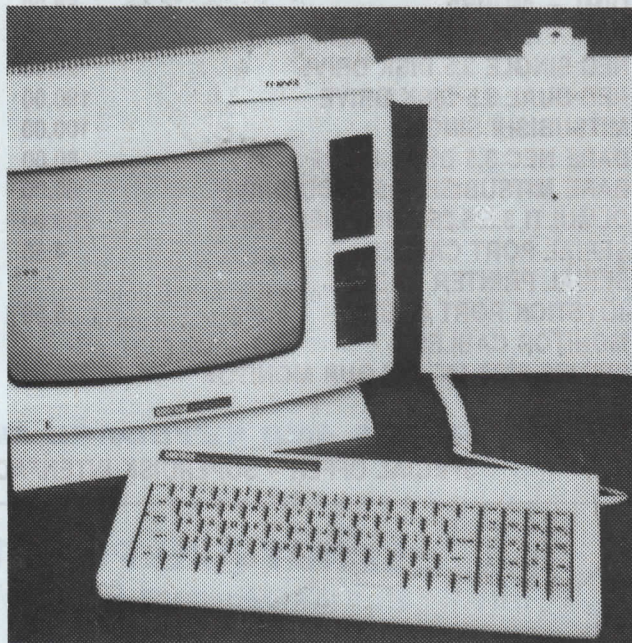
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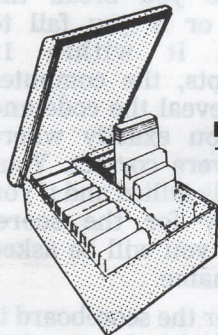
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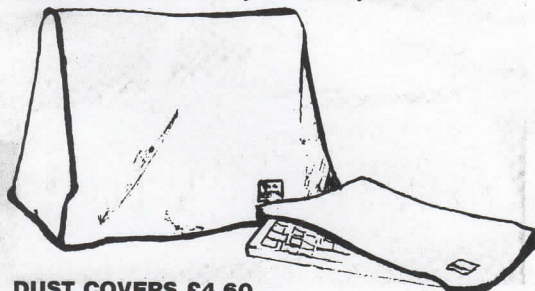


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## Program of the month

### SPEEDMIND by WILLIAM HENDERSON

**S**peedmind is based on the old Master Mind game with coloured pegs, where you try to break your opponent's code in the least number of turns. You have only 12 attempts at breaking the code and, if that is not taxing enough, I have incorporated a counter which will enter your guess — whether you are ready or not — after a number of seconds.

The program consists of two screens. The first is a menu for editing the game, so that you can change the number of colours used from three to eight; the maximum number of times a colour could appear in a code, e.g. if this is 1, colours

will not be repeated; the amount of time you have to enter your guess — from five to 120 seconds.

The counter may be turned off by reducing the time to zero. Use the up and down arrows to move around the menu, the left and right arrows to change variables, and the space bar to start a new game.

The layout for the game is: left: a menu of colours from which the code is made; note that not all the colours need be used. Bottom left: the counter. Right: the 12 spaces where you enter your guess. Far right: the corresponding information telling you how close you are to the original code. Again, use the up and down arrows

to select a colour, left and right arrows to position the colour, and ENTER when you are ready to submit your guess. It is possible to change your mind and swap colours so long as you do it before you press ENTER.

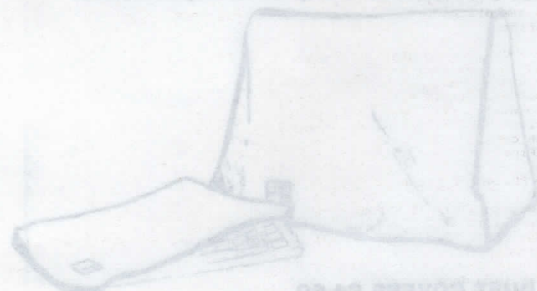
The computer will then award you with a number of Ps and Cs — a P for every peg placed which is the same colour and in exactly the same position as one of the code pegs; a C for any other pegs which are the same colour as one of the code pegs but in the incorrect position. If you are awarded PCC you have three pegs which are the correct colour, one of which is in the correct place.

Once you break the code, or if you fail to crack it within 12 attempts, the computer will reveal the code and tell you exactly where you were correct. Your score is tallied and if you qualify for the scoreboard you will be asked your name.

After the scoreboard is printed, hit the spacebar to start again or ESC to edit the game.

There are a possible 32,768 combinations if you use all eight colours and set the maximum number of appearances to five, so you had better get cracking. Type LRUN MDV1 SPEED\_MIND. Alternatively — the program will automatically BOOT when the computer is reset.

```
100 REMark **      SPEED MIND      **
110 REMark ** by William Henderson **
120 :
130 set_variables:edit_game:play
140 :
150 DEFINE PROCEDURE play
160 set_clock
170 screen
180 combination
190 REPEAT loop1
200 type
210 check
220 alter
230 END REPEAT loop1
240 END DEFINE play
250 :
260 DEFINE PROCEDURE set_variables
270 MODE 8
280 SCALE 100,0,0
290 DIM colour$(8,7),sequ(5),guess(5),temp(8),store$(12,5),board$(8,19),set$(3,1
7),val(3),many(8)
```





# PROGS

```
300 RESTORE 2780
310 FOR fu=1 TO 3:READ set$(fu):READ val(fu)
320 FOR a=1 TO 8:board$(a)(1 TO 19)=a & FILL$( " ",17) & 0
330 OPEN #4,com:512:255a:0:32:PAPER #4,0:CLS #4
340 WINDOW #2,448,224,33,16
350 PAPER #2,2:CLS #2
360 WINDOW #1,448,209,33,47
370 OPEN #5,scr_448:198a:33:42
380 OPEN #6,scr_448:16a:33:240
390 shadow=1:last=1
400 wint #4,400,26,56,5,1,6
410 CSIZE #4,1,1:dletter 4,"!?!? SPEED MIND !?!?!",22,3,6,0
420 END DEFINE
430 :
440 DEFINE PROCEDURE edit_game
450 shadow=1:wint 4,350,74,81,55,3,6
460 CSIZE #4,2,0:dletter 4,"GAME TYPE",115,5,6,0:been=0
470 FOR fu=1 TO 3
480 dletter 4,set$(fu),32,fu*14+12,7,0
490 dletter 4,val(fu),309-LEN(val(fu))*11,fu*14+12,5,0
500 END FOR fu
510 IF val(3)=0 THEN been=1:OVER #4,0:CURSOR #4,300-LEN(val(3))*11,54:PRINT #4,F
ILLS(" ",LEN(val(3))+2):dletter 4,"OFF",278,54,5,0
520 fu=1:OVER #4,1:INK #4,2:CURSOR #4,32,fu*14+12:PRINT #4,set$(fu)
530 wint 4,300,60,106,150,3,6
540 dletter 4,"AFTER GAME PRESS ",5,5,6,0
550 dletter 4,"space" for new game",5,26,7,0
560 dletter 4,"escape" to edit game",5,40,7,0
570 WINDOW #4,350,74,81,55:OVER #4,1
580 INK #4,3:fu=1:ofu=funo=1
590 REPEAT loop2
600 key$=INKEY$(1)
610 co=CODE(key$)
620 SELECT ON co
630 =208:IF fu>1 THEN fu=fu-1
640 =216:IF fu<3 THEN fu=fu+1
650 =10,32:PAPER #5,2:CLS #5:PAPER #6,0:CLS #6:EXIT loop2
660 =192:val(fu)=val(fu)-1:no=0:IF fu=3 THEN val(3)=val(3)-4
670 =200:val(fu)=val(fu)+1:no=0:IF fu=3 THEN val(3)=val(3)+4
680 END SELECT
690 IF ofu=fu THEN GO TO 720
700 OVER #4,1:INK #4,7:CURSOR #4,34,ofu*14+13:PRINT #4,set$(ofu)
710 INK #4,2:CURSOR #4,34,fu*14+13:PRINT #4,set$(fu)
720 IF val(2)<1 THEN val(2)=1:no=1
730 IF val(3)=0 AND NOT(been) THEN been=1:OVER #4,0:CURSOR #4,300-LEN(val(3))*11
,54:PRINT #4,FILLS(" ",LEN(val(3))+2):dletter 4,"OFF",278,55,5,0:no=1
740 IF val(3)=0 THEN been=0
750 IF val(3)<0 THEN val(3)=0:no=1
760 IF val(1)>8 THEN val(1)=8:no=1
770 IF val(3)>120 THEN val(3)=120:no=1
780 IF val(2)>5 THEN val(2)=5:no=1
790 IF val(1)<3 THEN val(1)=3:no=1
800 IF no THEN GO TO 830
810 OVER #4,0:CURSOR #4,289-LEN(val(fu))*11,fu*14+12:PRINT #4,FILL$(" ",LEN(val(
fu))+3):no=1
820 dletter 4,val(fu),311-LEN(val(fu))*11,fu*14+13,5,0
830 ofu=fu
840 END REPEAT loop2
850 END DEFINE
860 :
870 DEFINE PROCEDURE set_clock
880 max=5:IF val(1)*val(2)<5 THEN max=val(1)*val(2)
890 time$="197 Mar 24 00":IF val(3)=0 THEN time$="anything"
900 mins=VAL(3) DIV 60:secs=VAL(3) MOD 60
910 min$=mins:sec$=secs
920 IF LEN(min$)=1 THEN min$="0" & min$
930 IF LEN(sec$)=1 THEN sec$="0" & sec$
940 time$=time$ & min$ & " " & sec$
950 RESTORE 2790
960 FOR a=1 TO 12:store$(a)(1 TO 5)=FILL$(" ",a)
970 row=0:place=7:oplace=place:pnum=0:cnum=0
980 END DEFINE
990 :
1000 DEFINE PROCEDURE screen
1010 shadow=1
1020 col
1030 shadow=0:FOR t=12 TO 1 STEP -1:thing 1:END FOR t
1040 END DEFINE
1050 :
1060 DEFINE PROCEDURE col
1070 SCALE 100,0,0
1080 wint 4,47,18,80,40+190,1,6
1090 wint 4,117,150,45,65,1,6
1100 CSIZE #4,0,0
1110 dletter 4,"COLOURS",13,5,6,0
1120 FOR r=1 TO 8:val(1):READ 1$
1130 FOR a=r:val(1) TO 7
1140 INK #4,a:FILL #4,1
1150 CIRCLE #4,5,a*10+10,3,5
1160 INK #4,0:FILL #4,0
1170 CIRCLE #4,5,a*10+10,3,5
1180 READ col$:colour$(a+1)=col$:INK #4,7
1190 dletter 4,col$,22,129-a*15,7,0
1200 END FOR a
1210 END DEFINE
1220 :
1230 DEFINE PROCEDURE thing(dfg)
1240 wint 4,36,15,190,29+t*17,dfg,6
1250 ts=13-t:IF t>3 THEN ts=" " & ts
1260 dletter 4,t$,3,2,7,0
1270 wint 4,120,15,234,29+t*17,dfg,6
1280 wint 4,105,15,362,29+t*17,dfg,6
1290 END DEFINE
1300 :
1310 DEFINE PROCEDURE bead
1320 SCALE 208,0,0
1330 x=column*14,8+164-14,8:y=row*17-2
1340 FILL 1:INK place:CIRCLE x,y,5:FILL 0:INK 0:CIRCLE x,y,5
1350 END DEFINE
1360 :
1370 DEFINE PROCEDURE combination
1380 FOR r=1 TO 8:many(r)=0
1390 FOR count=1 TO max
1400 num=RND(9-val(1) TO 8)
1410 IF many(num)=val(2) THEN GO TO 1400
1420 sequ(count)=num:many(num)=many(num)+1
1430 END FOR count
1440 END DEFINE
1450 :
1460 DEFINE PROCEDURE check
1470 p=0:c=0
1480 FOR count=9-val(1) TO 8:temp(count)=0
1490 FOR count=1 TO max
1500 IF guess(count)=sequ(count) THEN p=p+1:store$(row)(count)="p":temp(guess(co
unt))=1:pnum=pnum+1
1510 END FOR count
1520 IF p=max THEN done
1530 FOR count=1 TO 5
1540 FOR iter=1 TO 5
1550 IF guess(count)=sequ(iter) AND temp(guess(count))=0 THEN c=c+1:temp(guess
(count))=1:store$(row)(count)="c":cnum=cnum+1
1560 END FOR iter
1570 END FOR count
1580 END DEFINE
1590 :
1600 DEFINE PROCEDURE alter
1610 CSIZE 0,0
1620 status="p" & p & " c" & c
1630 INK 7:PAPER 1:dletter 1,status$,340,205-row*17,5,0
1640 END DEFINE
1650 :
1660 DEFINE PROCEDURE done
1670 nscore=(13-row)*100+pnum*5:cnum
1680 INK #0,7
1690 CSIZE 3,0
1700 going=row:IF row=13 THEN going=12
1710 FOR a=1 TO going
1720 FOR h=1 TO max:IF store$(a)(h)=" " THEN store$(a)(h)="*"
1730 CURSOR 332,205-a*17:PRINT " ";CURSOR 332,206-a*17:PRINT "
1740 dletter 1,store$(a)(1 TO max),343,7,205-a*17,5,0
1750 END FOR a
1760 WINDOW #4,117,150,45,65:BORDER #4,1,6:PAPER #4,1
1770 FOR t=1 TO 15*val(1)+22:SCROLL #4,-1
1780 dletter 4,"THE",36,6,6,0
1790 dletter 4,"CODE WAS",7,20,6,0
1800 FOR a=1 TO max
1810 row=9+column=-9,67+a:place=sequ(a)-1
1820 bead
1830 END FOR a
1840 dletter 4,"YOU",36,62,6,0
1850 dletter 4,"SCORE",25,76,6,0
1860 dletter 4,nscore,47+5.5-LEN(nscore)*5.5,90,7,0
1870 small=board$(8)(15 TO):IF 10*nscore<small THEN score_board
1880 dletter 4,"NAME",25,118,6,0
1890 INK #4,7:CURSOR 25,118:INPUT #4,name$
1900 IF name$="" THEN name$="ANONYMOUS"
1910 sort:score_board
1920 END DEFINE
1930 :
1940 DEFINE PROCEDURE type
1950 SDATE 1987,3,24,0,0,0
1960 odate$="rubbish"
1970 CSIZE 2,0
1980 IF val(3)=0 THEN dletter 1,"OFF",53,28+160,4,0
1990 FOR q=1 TO 5:guess(q)=B-val(1)
2000 column=1:row=row+1:IF row=13 THEN done
2010 guess(column)=place+1:bead
2020 t=13-row
2030 WINDOW #4,117,150,45,65
2040 PAPER 1:OVER #4,1
2050 REPEAT loop
2060 INK #4,7:CURSOR #4,24,130-oplace*15:PRINT #4,colour$(oplace+1)
2070 INK #4,3:CURSOR #4,24,130-pace*15:PRINT #4,colour$(pace+1)
2080 oplace=place
2090 REPEAT here
2100 key$=INKEY$(0)
2110 ates=DATE$:io$=ates(16 TO 17):mi=io$:io$=ates(19 TO 20):se=io$:lal=val(3)-(
mi*60+se):lal=lal
2120 IF val(3)=0 THEN IF ates<odate$:CURSOR 55,28+160:OVER 0:PAPER 1:PRINT "
dletter 1,lal$,70-LEN(lal)$*6,28+160,4,0:odate$=ates:IF DATE$=time$ THEN BEEP
2000,11,33,1,1,6,6,6:EXIT loop
2130 IF DATE$=time$ THEN OVER 0:lal$="0":PAPER 1:CURSOR 55,28+160:PRINT " !d
letter 1,lal$,70-LEN(lal)$*6,28+160,4,0:odate$=ates:BEEP 2000,11,33,1,1,6,6,6:EX
IT loop
2140 IF key$="" THEN END REPEAT here
2150 co=CODE(key$)
2160 SELECT ON co
2170 =27:edit_game:play
2180 =216:place=place-1
2190 =208:place=place+1
2200 =10:EXIT loop
2210 =192:column=column-1:IF column=0 THEN column=max
2220 =200:column=column+1:IF column=max+1 THEN column=1
2230 END SELECT
2240 IF (co=192 OR co=200) AND guess(column)<>B-val(1) THEN place=guess(column)-
1
2250 IF place=7-val(1) THEN place=7
2260 IF place=8 THEN place=B-val(1)
2270 guess(column)=place+1:bead
2280 END REPEAT loop
2290 END DEFINE
2300 :
2310 DEFINE PROCEDURE wind(chw,lw,bw,xw,yw,pcw,bcw)
2320 PAPER #chw,0
2330 WINDOW #chw,lw,bw,xw+8,yw+6
2340 IF NOT(shadow) THEN WINDOW #chw,8,bw+2,xw+lw,yw+6
2350 CLS #chw
2360 PAPER #chw,0:WINDOW #chw,lw+4,bw+4,xw-2,yw-2:CLS #chw
2370 PAPER #chw,pcw
2380 WINDOW #chw,lw,bw,xw,yw
2390 BORDER #chw,1,bcw
2400 CLS #chw
2410 END DEFINE
2420 :
2430 DEFINE PROCEDURE dletter(ch,pr$,xp1,yp1,cp1,cp2)
2440 OVER #ch,1
2450 FOR count=1.8 TO 2.4 STEP .2:FOR iter=-1 TO 1 STEP .2:INK #ch,cp2:CURSOR #ch
,xp1+count,yp1+iter:PRINT #ch,pr$:END FOR iter:END FOR count
2460 INK #ch,cp1:CURSOR #ch,xp1,yp1:PRINT #ch,pr$
2470 OVER #ch,0
2480 END DEFINE
2490 :
2500 DEFINE PROCEDURE score_board
2510 shadow=1:wint 4,236,140,210,76,3,6
2520 dletter 4,"SCOREBOARD",61,5,6,0
2530 FOR a=1 TO last-1
2540 name$=board$(a)(1 TO 18)
2550 dletter 4,name$,7,a*14+10,5,0
2560 END FOR a
2570 REPEAT inp
2580 key$=INKEY$(1)
2590 IF key$="" THEN play
2600 IF CODE(key$)=27 THEN edit_game:play
2610 END REPEAT inp
2620 END DEFINE
2630 :
2640 DEFINE PROCEDURE sort
2650 FOR a=1 TO last
2660 th=board$(a)(15 TO 19):IF 10*nscore>th THEN
2670 FOR b=7 TO a STEP -1
2680 board$(b+1)(3 TO 13)=board$(b)(3 TO)
2690 board$(b)=th
2700 GO TO 2740
2710 ELSE
2720 END FOR a
2730 END IF
2740 IF last<9 THEN last=last+1
2750 board$(a)(3 TO 13)=name$:board$(a)(19-LEN(nscore) TO 18)=nscore
2760 END DEFINE
2770 :
2780 DATA "No. COLOURS",8,"Max. APPEARANCES",1,"COUNTER (seconds)",60
2790 DATA "Black","Blue","Red","Magenta","Green","Cyan","Yellow","White"
```



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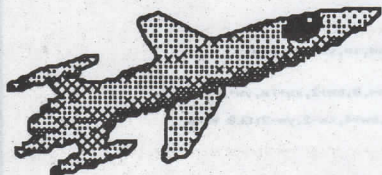
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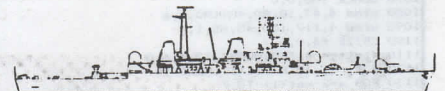
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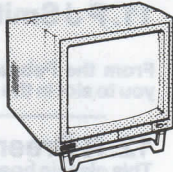
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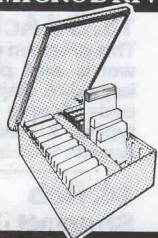
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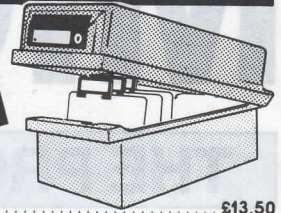
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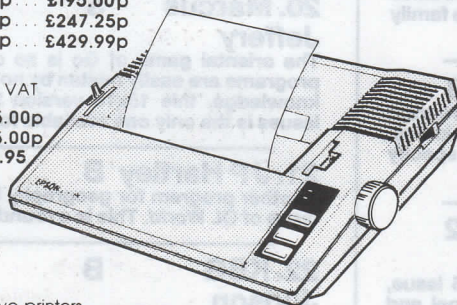
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# MICRODRIVE

## THE PROGRAMS

Author Language Program Name Price

1. Giles Todd B DIY £5  
Assembler

Featured in the March to June 1985 issues of *QL User*, this complete two-pass assembler will assemble all 68008 code and support the assembler directives DRG, END, EQU, DC and DS.

2. Richard A+O Mini Monitor £3  
Cross

Using approximately 3K of RAM, this handy utility will multi-task on your QL, leaving plenty of room for other programs. Commands include dumping registers, memory — and ASCII — machine code trace, register store, memory move, memory store — byte, word and long — and jumps. Featured in *QL User*, October 1985.

3. A Didcock B Connect4 £1

A SuperBasic version of the classic four-in-a-row game where counters drop down slots in the vertical board. First printed in *QL User*, September 1985.

4. Shergold B Golf £2  
& Tose

With up to 50 courses of varying difficulty, lakes, rivers, bunkers and trees, this is a fine golf simulation. You decide the power and direction of each stroke, striving for a birdie, eagle or even an albatross. Your scorecard may be saved. This program was printed in the May 1985 issue of *QL User*.

5. Williams A+O Paladin £5  
& Holliday

Written completely in machine code, this excellent *Space Invaders* game was the basis of our games programming series, started in April 1985.

6. Richard M+B Sprite £2  
Cross Animation

This contains two programs from the April 1985 issue. The first is a SuperBasic multi-coloured sprite designer. The second contains machine code routines to animate the sprites on the screen.

7. Steve Deary B Pacman £1

A well-written maze game from the March 1985 issue. Almost 20 screens of increasing difficulty, including an invisible maze, make it a very versatile rendition of the arcade favourite.

8. Andy B Family Tree £3  
Carmichael

Based on an article in the August 1985 issue, this is an Archive program and database for setting-up and displaying large family trees.

9. James Lucy L Composer £3

Completed in *QL User*, October 1985 this QLiberated program will allow you to compose, play and amend your own melodies. The program will handle sharps, vary tempo, and even specify staccato and legato playing styles.

10. Matthew B Miners £2  
Capp

This interesting simulation, printed in the August 1985 issue, puts you in the role of the NCB, buying and selling coal and mines, hiring and firing miners, and raising or decreasing wages to match economic forces. The object is to be profitable but inexperienced players will find it difficult even to remain solvent.

11. P J Smith B DIY £1  
Adventure

From the February 1985 issue, this skeleton program requires you to slot in the details to create your own adventure programs.

12. R Green B Othello £1

This classic board game, printed in *QL User*, August 1985, can be played by one or two players. The display uses a 3D representation of the board. Average response time by the computer opponent is about 15 seconds.

13. S J Ackers S Touch Type £4

This program consists of a 13-lesson course for typing-in letters, words and phrases, a 700-word vocabulary, an interactive keyboard display and a fingering chart inas more than 30K of code. Scores are displayed based on the time and accuracy of typing. A reduced version of the program was printed in the August 1985 issue.

14. Rob A+O Fcopy £4  
Sherratt

The first part of this program was printed in the March 1986 issue of *QL World*. The program is an ultra-fast, general-purpose file spooler.

15. Alan Prior B World Map £2

From the March 1986 issue, this program will draw a full-screen, multi-coloured map of the world for geography buffs.

16. J M Dower B Mushyman £2

Printed in the June and July 1986 issues, this provides speedy SuperBasic arcade action as you munch your way round the screen.

17. Tony Quinn S CAD QL £4

CAD design programs are particularly suited to the QL. This version from the September 1986 issue includes features such as rubber-banding and a user-definable symbol library.

18. Stuart M+B Attack of the £3  
Campbell Things

Typical science fiction horror arcade action as yet more nasties descend on harmless QL owners. Featured in the October 1986 issue of *QL World*.

19. Karl Jeffery M+B Starport £3  
2001

Fast machine code action in this November 1986 version of the *Galaxians* arcade game.

20. Marcus S QL Go £4  
Jeffery

The oriental game of Go is so complex that even mainframe programs are easily beaten by novice players. To the best of our knowledge, this 15x15 version from the April and May 1986 issues is the only one available for the QL.

21. J P Hartley B Britain £2

Another program for geography buffs from the November 1986 issue of *QL World*. This is a round-Britain geography quiz.

22. KBG B Darts £2  
Judson

Program of the Month from December 1986. This popular pub pastime requires good hand and eye co-ordination to stop a moving cursor on the on-screen board.

# EXCHANGE

READY TO RUN SOFTWARE

**KEY**    B = SuperBasic  
 A+O = Assembler and Object Code  
 M+B = Machine Code and Basic Loader

A+B+O = Assembler and Basic Loader and Object Code  
 S = Supercharged  
 L = QLiberate

**23. Neil Taylor S Window Designer £2**

This useful routine from the February, 1987 issue allows you to design your SuperBasic windows using the cursor keys. It creates a one-line procedure which, when merged into your program, will re-create that window.

**24. JF S Design 3D £4 Tydeman**

Published in the March and April 1987 issues, this program will allow you to produce 3D screen designs with the minimum of fuss and aggravation.

**25. D Carmona B Stellaris £4**

Program of the Month from June 1987. This is an extensive real-time space adventure game against the computer, including economic simulations, lunar landing and superb graphics.

**26. Robert A+B+O Video Effects Box1 £3 Noble**

These machine code SuperBasic extensions allow you to manipulate your screens, save and recall them from memory and clear them in interesting ways. Program of the Month for July 1987.

**27. H R Pendry B Pontoon £3**

A graphic version of the classic card game. You play against the computer. Features include changing banker on royal pontoons, accurate betting, five card tricks and so on. Printed in the July 1987 issue of *QL World*.

**28. Kenneth B Picture Puzzle £2 Cameron**

This short but interesting program from the July 1987 issue sets up an 8 x 8 sliding block puzzle with on-screen graphics. You can select sliding numbers or load your own picture to solve.

**29. Peter B Bridge £4 Etheridge**

An excellent version of this popular card game. Features include accurate computer bidding, automatic or manual play, replay hands, correct scoring, save and load positions and much more. Essential for card enthusiasts.

**30. Charles B Psycho £4 Gerrard**

We must apologise but we have had to remove this program temporarily from microdrive exchange. People who have sent orders will have their money refunded and details will appear as soon as the program is again available.

**31. B Otridge Crossword £5**

Sold originally as a commercial program, this is the perfect aid for crossword fanatics. The program provides access by word length to a dictionary of about 12,500 words, to help solve those elusive crossword clues. Note: This program requires two Microdrive cartridges.

**32. Phillip B Advent2 £4 Sproston**

SuperBasic arcade adventure with a humorous slant. A variety of rooms, robots and problems will keep you on your toes. Full instructions included.

**33. Leslie B Clock £3 Fahidy**

This is a complete version of the clock program, described in the June and July 1987 issues of our QL Education series. An on-screen clock can be used to set or read the time.

**34. E. Bamber QL Conversion/ Calculator £2**

Comprising weights and measures units conventions and reverse Polish calculation, this excellent utility will convert almost anything to anything. Completely menu-driven, it is very easy to use.

**35. John B Qwhist £3 Wakefield**

Our August 1987 Program of the Month. It is an excellent implementation of the classic card game, Whist. Designed for one player (south) who partners a computer hand (north) against the computerised east and west opponents.

**36. Stanley B Mail Merge £1 Sykes**

This cartridge contains very handy utilities providing a mail merge and labeller for Quill files. The cartridge includes a simple demonstration.

**37. P.G. Ives B The Double £4**

A large strategy game in which you manage a football team through the four league divisions. The program features buying and selling, team line-up, morale, and so on, through the full league and F.A. Cup season. The cartridge includes full instructions Quill document showing how to play the game.

**38. Leslie B Education £2 Fahidy**

As part of our series of educational programs, this is designed to help teach the solution of simple linear equations. It is aimed specifically at the 11-plus age range.

**39. JF Tydeman S Design 3D £4**

Featured in the March, 1987 issue, this extensive program includes a large suite of graphics and filing utilities for the production of 2D and 3D graphics. It is supplied complete with instructions in the form of a Quill document.

**40. Santiago B Roulette £3 Rubio**

Our September, 1987 Program of the Month, this is an excellent Spanish/English version of the traditional gambling game. It also includes the Leigh Pattern, a system to break the bank.

**41. Leslie Fahidy B Money £2**

Continuing with our series of educational programs, this one sends you on a shopping expedition, calculating prices from shopping lists and trying to determine what coins you will receive as change.

**42. Neil Davidson A+B+OLife £2**

A machine code version of the classic simulation of a colony of living cells which survive, reproduce or die according to mathematical rules. Quill instructions included.

See over page for order form.



**43. Alan S Qsquidge £2**  
**Glassbrook**  
**Ian Swinton**  
 An arcade hunt through an 8x8 grid expandable series of rooms for the necessary nine parts of Squidge's rocket. October, 1987 Program of the Month.

**44. David Marsh B Compress £2**  
 Compress is a utility to compress SuperBasic program files into a more compact form without losing the structure of the program. That uses less storage space and means slightly faster loading.

**45. Ronnie M+B SuperBreak- £2**  
**Davidson out**  
 A fast machine code version of the classic wall game where, using a bat and ball, you must try to break through the wall of bricks. Special features include optional double bats and/or balls.

**46. Norman Marks B Navigator £2**  
 To calculate the distance and direction for travel between longitude and latitude positions on the Earth. The program includes an expandable list of cities on points can be input manually. The calculation formulae can be seen from within the program.

**47. Richard B 3D Maze £2**  
**Clements**  
 Chase round the generated maze, shown in three dimensions, searching for the key to the next level before going through the exit. Extra points can be gained by passing over Point Squares but do not be carried away because it is all against the clock.

**48. Jason B Yahtzee £2**  
**Price**  
 The November, 1987 Program of the Month was this version of the popular dice game. The on-screen graphics make the two-player program particularly enjoyable and easy to use.

**49. Charles B FileBound £3**  
**Dillon**  
 A November, 1987 special for *SpellBound* owners. This extension allows users to utilise their *SpellBound* dictionaries on existing files. An additional feature allows new words to be added to the dictionary. A compiled version is available from PDQL.

**50. Jay B Bank £4**  
**Lewington**  
 This well-written, menu-driven program will allow you to keep track of a number of bank accounts, including credits and debits, dated standing orders, printed statements and much more.

**51. A B Perspective £1**  
**Didcock**  
 Space is big. This program aims to prove it, with a graphical guided tour of the earth, the solar system, neighbouring suns, galaxy and the whole of creation.

**52. Simon M+B Space £3**  
**Quinn Pods**  
 This 100 percent machine code arcade game was our December, 1987 Program of the Month. Your lone ship must protect six central energy pods against marauding aliens.

**53. S M B Graphic £2**  
**Walker Writer**  
 Featured in our December, 1987 issue, this is a graphic design program with a difference. In addition to all the usual design commands, your completed picture can be saved as a series of SuperBasic commands for use in your programs.

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**54. L Miles M + B Zapman £3**

This fast-action, machine code game is of the classic Pacman genre. Variable skill levels and a wide variety of maze formats will keep your interest high.

**55. Alan B Adventure £3  
Pemberton Playtime**

An extensive adventure where you must complete tasks for the inhabitants of a strange and unusual land. A Quill document gives details of the possible commands and some help in the form of a series of coded messages.

**56. Paul M Space £3  
Mckinnon Invaders**

A very fast, very challenging version of what must be one of the best-known arcade games. Includes Quill instructions, ugly descending aliens and protective shields.

**57. Timo B Spelled £3  
Salmi**

A complete spelling checker at a very cheap price. The system works on Quill \_lis files, checking them against its dictionary of somewhat more than 7,500 words. The dictionary can be expanded automatically as new words are found. This program requires a 512K expansion and occupies two Microdrive cartridges. Quill instructions are included.

**58. Nigel B Radar £2  
Ford**

As Control, you must monitor a radar, watching the skies, acknowledging aircraft, scrambling jets to intercept UFOs and, if necessary, lining your sights on and shooting down enemy aircraft.

**59. Geoffrey B Dungeons £4  
Evelyn**

As Wizard, Mega-Hero, Super-Hero or Elf, you must explore the Dungeons, fighting monsters and collecting treasure in this expansive one- to four-player game. Requires two Microdrive cartridges.

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Microdrive Exchange has always been a popular feature of Sinclair QL World and, in our constant efforts to improve the magazine, we are expanding the Exchange to bring you even more quality programs at budget prices.

To achieve those results we have altered the format of the Exchange. Rather than calculating the number of sectors required by each program and sending the appropriate number of cartridges, we have now made it a one-program, one-cartridge system. So if you would like, say, four programs, then, regardless of length, you will need four cartridges.

There are a number of advantages to the system. First, the service will be much faster, because programs can be copied in advance. Second, rather than having to ensure having the article for documentation, we will be able to supply Quill documents on the Microdrive, if needed, for future programs.

Finally, for all new programs on the Exchange, rather than just receiving the machine code version, the Supercharged version or whatever, we will be able to supply assembly listings, hex loaders and original SuperBasic versions on the same cartridge, so that you can look at and amend programs.

Naturally, this service will require the transfer of more than the usual number of Microdrives but bear in mind that the number of Microdrives you send will be returned with the software. We have reduced the price of Microdrives to £2 per cartridge.

With the new system, we have started to include programs which have not necessarily been featured in the magazine, either because they were too long or because we already had too many listings. Consequently we are now looking for quality programs of any length to feature in Microdrive Exchange. If you have any programs which you feel are good enough, please send them for review. The address and details for program submission is given in The Props.



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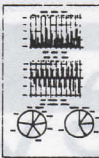
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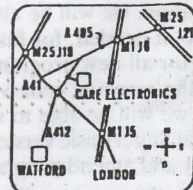
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- STONE RAIDER II ..... £ 13
- SQUADRONS ..... £ 13
- TOUCH TYPIST ..... £ 12
- DATALINK 3D SLIME ..... £ 11
- HEART OF GERN (NEW ADVENTURE) ..... £ 15
- DIGITAL SUPER ASTROLOGER ..... £ 22
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EXPORT AND TRADE ENQUIRIES PLEASE CALL.