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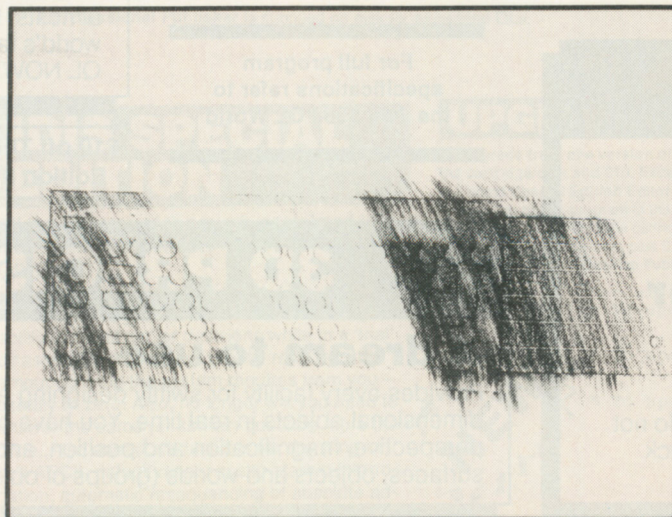
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## NEXT MONTH DIGITAL UPDATES

Mega supplier Digital Precision have updated — and in some cases rewritten — some of their best selling programs. Ron Massey checks them out.

## ARCHIVIST

Leslie Fahidy gets involved in ARK Software's advanced database manager for the QL.

## THE EDITOR SPECIAL EDITOR

### Text handling par excellence

These are the ultimate file-handling programs for your favourite computer. A new concept in hyperspeed information manipulation, Editor serves as a word processor, printer driver, database and programming environment. You name it, Editor does it. Its logic and consistency of approach put Editor in a class of its own. Special Editor only works on expanded machines - it takes the QL to its very limits, and is ideal for handling documents, manuscripts, books etc.

## TURBO

### The supreme SuperBASIC compiler

Turbo is compatible with the entire syntax of SuperBASIC. Its friendliness, features, tolerance, flexibility and fast operation are legendary. TURBOcharged programs run up to 100x faster than BASIC ones. TURBO is supplied with a general-purpose, two-hundred command toolkit.

## LIGHTNING

### The complete QL speed enhancement system

Lightning accelerates the QL's text, graphics, screen and mathematical operations by mind-blowing factors of up to 14x. No technical knowledge or programming is required. Simple to use, but with many bells and whistles - 78 fonts, new nul device, user-variable precision, character-drain, modechange suppression...

**PRICES  
SLASHED!**

## DESKTOP PUBLISHER DTP SPECIAL EDITION

These programs provide wysiwyg document design, with a huge number of RAM and device resident lo-res and hi-res fonts, continuously variable X & Y magnification, compatibility with Editor, Quill and Eye-Q, a preview function, comprehensive graphics facilities, flexible cut & paste, pixel justification etc. Both versions require expansion RAM, and Special Edition is disk only. The Special Edition is supplied with a free copy of grafiX, the well-known PDQL printer controller. Both versions work best with Eye-Q and Editor.

**PRICE  
SLASHED!**

## DIGITAL C

### A C compiler for beginners

Truly portable, but carefully tailored and optimised to produce fast, concise code on the QL. No cash crop conversion this!

## SUCCESS

### The supreme CP/M Code Emulation System

Converts the QL into a fully compatible CP/M operating environment. No ifs, buts or alms. Run thousands of the world's favourite programs on your QL NOW! Emulates Z80 too!

## IDIS

### The first intelligent disassembler for the QL

The ideal disassembler for beginners - with IDIS you do not need to be an expert to crack other people's programs

For full program  
specifications refer to  
the July 1988 QL World

£10 off The Editor and/or ACT Special Edition if bought with anything else

## 3D PRECISION

### A dream to use

Provides every facility for swiftly designing and manipulating three dimensional objects in real time. You have complete control over perspective, magnification and position, and you can create lines, surfaces, objects and worlds (groups of objects). Needs extra RAM..

## MEDIA MANAGER SPECIAL EDITION

NEW

Media Manager is a very early DP release with oodles of functions. However, the design and user-friendliness of the system was not quite up to the standard of Digital Precision's other programs.

Consequently, we have spent a great deal of time rationalising and improving Media Manager, making it much easier to use, much faster, more powerful and more flexible. The result - Media Manager Special Edition. A classic release, a must for everyone who uses the QL to store things of value. Not that MMSE is just for when things go wrong - it is a manager too, with a host of medium control functions. And if you can program, we've supplied SuperBASIC extensions for every conceivable device control.

Additional features include the facility to read from, write to (and even format) IBM MSDOS/PCDOS disks and Atari TOS disks - two-way access both at sector-level and at file-level.

## MORE SUPER SPECIAL DEALS

We want to encourage more and more users to experience for themselves the stunning acceleration imparted to the operation of all Digital Precision programs (and everyone else's programs) by LIGHTNING.

Programs that particularly benefit are editing/word processing programs, databases, graphics/CAD programs, desktop publishers, compilers, games and programs with a high computational overhead (like astrological systems). We will give a 10% discount, additional and supplementary to all other discounts, for any purchase of two or more programs, if one of them is LIGHTNING. This discount applies to the total price - it is not just 10% off LIGHTNING but 10% off the lot!

## DIGITAL C SPECIAL EDITION

NEW

Digital C Special Edition has all the features of the much-acclaimed Digital C System, plus:

- ★ Direct access to all QL traps and vectored utilities is provided.
- ★ Machine code has now been used for writing all the standard library functions - this maximises execution speed and minimizes code size.
- ★ Huge programs can be compiled - no 64K or other code size limit.
- ★ Many new fast library functions including SCANF are supplied.
- ★ User selectable size optimisation gives the choice of efficient 16 bit and flexible 32 bit addressing.
- ★ Long integers are now supported.
- ★ Long pointers are now supported.
- ★ Long constants in octal, decimal and hex are now available.
- ★ User friendliness is improved.

# PROFESSIONAL PUBLISHER

NEW

## Digital Precision is proud to announce an all-new, top-of-the-range desktop publishing system.

Professional Publisher has all the features and controls you require to produce output of the very highest quality.

Professional Publisher has ALL the features of Desktop Publisher Special Edition, plus the following:

- ★ **Linked windows...** Any number of windows can be 'invisibly' connected in a sequence determined by you so that text flows from one automatically into the next. Windows can be of any shape.
- ★ **Wraparound graphics...** Any graphic can be placed on a page and text can be made to automatically flow around the graphic. Pixel-proportional spacing and the integrity of columns will be maintained - the graphic can be of any shape and can wholly or partly overlap any number of windows. The user may define any polygon (up to 64 sides) to demarcate the desired border of the graphic, which need not coincide with its actual outline.
- ★ **Full mouse compatibility...** Smiling mouse owners can start smiling! The incredibly silky smooth feel of this system, when either used from keyboard or mouse, has to be experienced to be believed. It comes from our special scrolling and cursor-handling routines, handwritten in machine code. We suggest you use the system from the keyboard first, and then go in for a mouse if you feel the need.
- ★ **Style and layout designer** allows you to create any number of layout templates, which contain details of columns, margins, gutters, breaks, guides etc. This permits the easy creation of multiple pages.
- ★ **No more fiddling** around with cursor keys for exact positioning - text can be snapped into guides.
- ★ **Full compatibility** (and now absolutely hassle free!) with ASCII files (say from Editor Special Edition), Quill\_doc files and Quill\_lis files - now with complete preservation of paragraphing, indentation, tabulation, superscripting, subscripting, italicising etc. Any size files can be handled - Pro Publisher has an on-screen skip/preview/chunk routine!
- ★ **Huge range of fonts supplied** (hundreds) - memory resident and disk resident - with sizes ranging from 8x8 to a gigantic 48x48! User-adjustable (pixel accuracy) descender position, character spacing, X and Y axis widths etc. In addition there are 26 graphic fonts!
- ★ **Page dimensions** specifiable either in pixels or millimetres - up to an enormous 960x1600 pixels and down to a tiny 48x48 pixels. Inch and mm rules provided.
- ★ **The whole of the ASCII set** is now supported - this is very useful if you want lots of special symbols or if you want to support non-English characters.
- ★ **Fingerprinting** is supported.
- ★ **A virtually infinite** selection of fill textures, with font patterns, graphics, or whatever you choose.
- ★ **There are 256 paint brushes**, with a unique programmable overlap (1/3/9 pixels) function.
- ★ **Automatic shading** and grey scale conversion of colour screens.
- ★ **Automatic Interpolation** of graphics and fonts.
- ★ **Automatic bending/stretching/resizing** of graphics.
- ★ **All Boolean functions** supplied for brushes, fonts, graphics and freehand drawing - AND/OR/XOR
- ★ **Cut & paste** is supported both TO AND FROM the page itself, saved screens and compressed screens - this incredible support of all permutations gives unheard of flexibility!
- ★ **Full support for kerning** and pixel justification, including user-definable % line usage, user-definable maximum and minimum inter-character spacing and inter-word spacing (preventing the ugly spread of characters or words on a line when the first word on the next line is a very long one), preselectable/defeatable auto-hyphenation, auto-indent control, dropcaps, left/right/centre/off justification etc. etc.
- ★ **Walkdown menus** (selections either by a single keypress or by a moveable bar, you decide), context-sensitive help, very greatly enhanced user-friendliness.
- ★ **8/9/24 pin printers**, laser printer support, output any part of the page, individually vary X and Y axis magnification, user-selectable print density and number of passes.
- ★ **Professional Publisher** is supplied on disk for expanded QLs.

## IDIS SPECIAL EDITION

All the features of the much-acclaimed IDIS Intelligent disassembler - but even more Intelligence!

This remarkable Special Edition, Only available to users of expanded QLs, has the amazing ability to recall earlier decisions while in a 'trial' disassembly mode. This greatly reduces the amount of help the system requires from you - usually to zero! Also, no longer will you need to answer the same (or similar) question more than once. Also added are facilities for dumping in hex/ASCII, default responses to startup interrogation, automatic resequencing of absolute addresses, non-destructive windowing etc.

## UPGRADES

To upgrade from one version of a program to a later version of the same program, send us the cartridge/disk and £10. Except in the case of Special Edition Editor owners upgrading to the latest Special Edition Editor, do not return your manual to us.

To upgrade from a program to the Special Edition of the program (say from the standard Editor to Special Editor), send us the cartridge/disk, manual and the difference in current advertised price between the two programs, plus £10. For this purpose we will consider Professional Publisher to be an upgrade from the Desktop Publishers and Professional Astrologer to be an upgrade from Super Astrologer.

For example:

- ★ To upgrade DIGITAL C to SPECIAL EDITION C send us £40 (£49.95-£29.95+£10)
- ★ To upgrade an early SPRITE GENERATOR to the current version send us £10
- ★ To upgrade SUPER ASTROLOGER to PRO ASTRO send us £40 (£59.95-£29.95+£10)

NEW

# MEDIA MANAGER

Manages and controls disks and cartridges, transfers from/to alien formats, recovers corrupt/lost data.

**PRICE SLASHED!**

## PROFESSIONAL ASTROLOGER

The best, most comprehensive astrology system in the world: suitable for beginners and experts alike. **Professional Astronomer** is a companion program of equal quality. **Super Astrologer** is a much simpler program and a lot of fun.

### ACT SPECIAL EDITION

The Adventure Creation Tool enables the user - who need not know how to program - to create the most amazing adventures, with text, pictures and animation. A disk drive is needed.

### TRANSFER UTILITY

Moves stuff from cartridge to disk, performs any translate.

## BETTER BASIC

An expert system to help you improve your BASIC programming.

## SUPERFORTH

Quite simply, one of the fastest FORTH-83 compilers ever written.

## SPRITE GENERATOR

Moves things about, smoothly, quickly, flexibly, 256 planes.

## ULTRAPRINT

Outputs screens (from Eye-Q etc.) to printers (Epson or Oki) beautifully, with lots of options.

## VIDEO GIVEAWAY

Digital Precision will be giving away lots of VHS movie cassettes with randomly selected orders until stocks run out...

## MICROBRIDGE

A generously specified contract bridge tutor and player. Of phenomenal educational and entertainment value!

## THE GAME COLLECTION

Backgammon, Droidzone, Arcadia, Reversi/Othello, Blocklands...Super Fun!

## EYE-Q

### The classic QL graphic system

With all the features you would expect. Its superb, silky, precision feel is what makes this program so special.

## SUPERCHARGE SPECIAL EDITION

The second- fastest BASIC compiler for the QL.. Non-budget power, budget price, improved speed - and no Lenslok!

#### TERMS & CONDITIONS

- \* UK prices are all-inclusive: there is nothing to add
- \* For orders from continental Europe, please add 5% p&p
- \* For orders from outside Europe, please add 10% p&p
- \* For details of hardware, other recommended products or free descriptive literature please write in.

## PRICES

1) Turbo BASIC Compiler with Turbo Toolkit	99.95
2) Professional Publisher	89.95
3) Professional Astrologer with Astronomer	69.95
4) Desktop Publisher Special Edition	59.95
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6) Media Manager Special Edition	49.95
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- \* £2 off if you buy two progs, £3 off three, etc.
- \* Buy any five programs, get the cheapest one free.
- \* Buy any six programs, get the cheapest one free and 50% off the next cheapest one.

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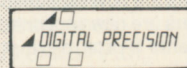
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As usual, the 'experts' said it couldn't be done

DIGITAL PRECISION

Digital Precision is proud to announce the imminent arrival of the most important QL product ever – a full featured IBM MS-DOS Emulation System. This program allows you to run virtually any PC (IBM/Amstrad/Compaq and compatibles) software, other than programs requiring special add-on cards or making direct accesses to hardware (naughty, but some games do it). All you need is an expanded QL with a disk drive – our software will turn it into a PC.

For further information, please write to us without delay – or just Watch This Space!

All trademarks acknowledged.

## COMPUTERS

QL JS 2.35 software	£169
QL640K JS 2.35 s/ware	£260
Organiser XP 32K	£138
Z88	£287.50

## PSION ORGANISER

Games Organiser	£35
Comms Link	£60
32K D Rampack	£55
Centronics Interface	£40
Travel Organiser	phone
128K Datapak	£100

## ZBase

Spellmaster	£70.00
128K Rampack	£60.00
QL - Z88 link	£50.00
QL - Z88 link	£23.00
Centronics interface	£30.00
512K RAM Pack	£200.00

Z 88

# TK

# COMPUTERWARE

the QL stockist

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## ADD-ONS

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## SOFTWARE

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		Lands of Havoc	£19.00
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• Please telephone for details of other products not listed here •

## BOOKS

Using the Psion Organiser	£10	QDOS Companion	£7
Assembly lang. Programming	£9	Inside QDOS	£20
Z88 Computing	£10	QL Service manual	£20

Other QL titles available - phone for details -

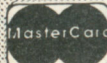
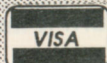
## KEYBOARDS

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Sandy PC	£99.00

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# QL

# SCENE

CST has contacted *QL World* to report that it has now settled into its new premises in Denmark and is expecting to be back in business soon. "Full production will be resumed in the next two weeks. We will keep you informed of further developments," writes sales manager Stephen Cregg.

The CST address is now Cambridge Systems Technology, Lundeskovsvej 5, 1, 2900 Hellerup, Denmark. Tel: +45(0)1612422. Fax: +45(0)1 62 88 05. The Dansoft address is Dansoft, Raadhusstraede 4B, 1, 1466 Kobenhavn K, Denmark. Tel: +45(0)1930347. Fax: +45(0)1 93 82 92, and not as reported in a PDQL advertisement. Thor International may be contacted at either address or by telephone at +45(0)1930305.

"Thank you to everyone at *QL World* for their support in the Editor's Notebook of the October issue: it is good to see some balanced reporting," says Cregg.

The CST removal has generated a great deal of heat in the QL community and this is, at least in part, not without its just causes but no good can come to that community from any course other than the successful continued development of the Thor. To that end, it is necessary to avoid quick judgment, if not due caution, in the face of the CST course of action and keep the paths of support open to its efforts to manufacture and market the Thor.

At the same time, Andreas Budde of ABC Elektronik contacted *QL World* to say that Thor International has granted ABC a one-year production licence, renewable for a

## CST has a new home

further year, to manufacture and market the CST combined G-Disc floppy disc interface and SCSI hard disc controller. ABC hopes to sell the disc interface and hard disc controller with floppy disc driver software by Tony

Tebby, hard disc driver by CST, Toolkit 2 and AtariDOS, a program which adds SuperBasic commands to give the QL the ability to read, write and format discs in Atari ST and IBM PC formats.

The G-Disc and 20MB

SCSI hard disc system is expected to cost less than £400, with the G-Disc costing £98 and AtariDOS available on 3.5in. or 5.25in. discs for £19. Prices given are exclusive of VAT.

For further information, contact ABC Elektronik, Hugelstrasse 10-12, 4800 Bielfeld 1, West Germany. Tel: 0521 890381.

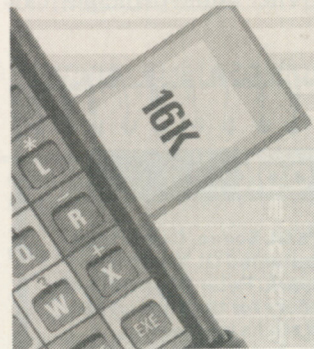
A New Zealand writer, Nick Franks, has produced a calculator program for the Pison Organiser. The result is an alternative to the Organiser CALC option, with a range of operations from basic arithmetic to scientific and trigonometric functions.

The units plugs into the CM or XP model Organiser and is ready to run. The display in use is like that of a conventional pocket calculator but with a second display line, so that the running total remains on display while a new entry is keyed-in.

Features include a wide range of arithmetic functions, six levels of brackets, access to the 10

### CALC

#### PSION ORGANISER II



Organiser calculator memories, random numbers, review and correction of previous entries, retrieval of last total — even after Quit — call and return from the user's procedures, printer linking for number lists with optional text descriptions added to each entry, and others.

User functions can be added to Result by writing an OPL procedure using a special name recognised by the program software.

Result costs £34.74 (NZ\$90) plus £5 (NZ\$13), for registered airmail and packaging, payable on order. For orders or information, contact Nick Frank, PO Box 4075, Wellington, New Zealand.

### In Stock

New for expanded QLs, the SD Microsystems is the *Stock Accounting System*, an integrated package in the *Small Trader* range "designed to take the series into the 1990s," says SD.

Designed specially for the stock-based business, it combines preparation of invoices from a built-in product list, automatic adjustment of stock level lists and transfer of the transaction record to the

sales ledger software. There are four modules — sales ledger, invoicer, stock control and statement printer.

All the modules are enhancements of the original *Small Trader* programs, offering a greater degree of integration than was possible on the unexpanded QL.

The package includes commands to make use of the local area networking capability of the QL, laying the foundation for a basic multi-user office system. Files and peripherals can

be shared between several machines on the network. A heavy-duty network cable is available for £9.95.

SD Microsystems is starting a support service offering advice, cheap updates and discounts to customers, along with more advanced consultancy at special rates. Annual membership is £10.

*Stock Accounting System* is £29.95 — mdv or 3.5in. disc — or £19.95 to existing *Small Trader Pack/Invoicer* owners. Post and packaging is £1 (U.K.), £2 (Europe), £5 (Overseas). PO Box 24, Hitchin, Herts.

# OPEN CHANNEL

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 SW1DG.

## Multi-file

I felt Simon Goodwin's reply to Richard Howe's letter in the April issue over-emphasised the difficulties of using Archive in a multi-file situation. I have such a system and find no difficulties using it.

I can switch between open files using the "use" command which can be hot-keyed. The files are opened and closed using a procedure. Replacing the commands which need to operate on more than one file with procedures to do this is neither complex nor time-consuming, since it has to be done only once.

The following procedure will prompt for a string and then "locate" it in a field a\$ in both file logical "a" and logical "b" breaking out of the procedure when it finds a match:

```
local z$
input "string?";z$
use "a"
locate z$
if a$=z$
  screen
  stop
endif
use "b"
locate z$
if a$=z$
  screen
  stop
endif
```

The same principle can

be used to replace any other command which needs to operate on more than one file.

If the command has to operate on more than one field, it would just require a further local variable and input line to prompt for the field name.

Since the string can be up to 128 characters, it is possible to write a general-purpose "select" procedure into which a complete "select" line can be input. These procedures can be run from just the key presses or hot-keyed and are very simple to use.

The limit on the number of records in an Archive file

is often in the hardware rather than the software. For most people the theoretical maximum file size is a 720K double-density floppy disc. In practice it is less, since room will be needed for screens, procedures and a certain amount of breathing space.

Quickfax claims to be able to handle files of 32,760 records. A little mathematics shows that this leaves very few bytes per record for data. I suspect that in practice most people will run out of disc space before they hit the Archive 2.38 limit of 4,600 records.

Martin Wheatley,  
London.

## Editor's notebook

AS you will see from this month's QL Scene, Cambridge Systems Technology has now contacted QL World with an address for enquiries in Denmark. Peter Chambers of Gap Software, who had many orders for the Thor on his books when the company upped sticks and moved, went through a very anxious time, but was in touch last week sounding more optimistic. What we want to see now is operational Thors going out to users who have already placed orders for them, to restore the confidence of the users and dealers who have been prepared to invest in the Thor's future.

As promised previously, we have the first part this month of a series of reports from readers on their printers. True-life reports from experience often reveal aspects of the machine not met in reviews. We hope this will give users setting up a printer/editor system with new or second hand equipment a clearer idea of how to go about it and what to expect. There will be more next month.

Lastly, we haven't forgotten the QL Art Competition. We ran into a technical hitch. We are working on it.

```
7000 DEFine PROCEDURE Print_card_numbers
7010 PRINT #chan%, card_values
7020 CURSOR #chan%, card_values$
7030 IF card_values$="10" THEN
7040 CURSOR #chan%, 12, 38
7050 END IF
7060 PRINT #chan%, " "; card_values$
7070 END DEFine
```

```
1360 INK #chan%, 3: Print_card_numbers
1400 INK #chan%, 3: Print_card_numbers
1440 INK #chan%, 3: Print_card_numbers
1480 INK #chan%, 3: Print_card_numbers
4860 INK #card%, 3: Print_card_numbers
4900 INK #card%, 3: Print_card_numbers
4940 INK #card%, 3: Print_card_numbers
4980 INK #card%, 3: Print_card_numbers
```

## Qwhist

The card program *Qwhist*, obtained from Microdrive Exchange, can write values of cards off the edge of some TV screens. This means that you cannot have a good game of whist against the computer, since you do not know which cards your opponents have played. If

you have had this problem with your copy of *Qwhist*, load *Qwhist*, break into the program, type-in the new lines above, save the modified program and run. The numbers on the cards should now be shown in both corners of the cards.

Stephen Hurrell,  
Great Sutton,  
South Wirral.

# PDQL

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#### PLUS

a two part procedure trace to indicate the dynamic call hierarchy. In other words all calls are reported, by and from whom. In addition a step-ladder report indicates at what level of the program each call is made.

PDQ-Xref is still available at £15 — To upgrade from PDQ Xref send master, sae and £5.

### TEXT TIDY at £10.00

An ultra-quick stripper of Quill — docs to plain text files for easy conversion to the Editor or when using DiscOVER

Additionally it converts DiscOVER WordStar files to plain text ready for import into Quill or reading in the Editor.

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# PDQUALITY

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-------------------------	----

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Support Scheme members with CT Analyser .....	£15

**S**tarting in the vast field of telecommunications could not be simpler. The basic requirements are a computer, a modem and a telephone line.

Unless you confine your interests to browsing through guest pages you may need to register with one or more of the many bulletin boards, some of which require only informal registration via the board.

This report deals mainly with the broad aspects of comms — QL hardware and controlling software, both usually compatible with standard and expanded machines — setting-up a bulletin board of your own and a sample of what a few of the many boards have to offer.

If your interests extend to national or international affairs, business or technical, you can use one of the many gateways offered by boards such as MicroLink and Micronet to access a wide range of services world-wide.

Smaller U.K.-based boards tend to service specialised interests. A few boards, such as the Micronet QNET 2, Sector Software or the board imminently available via Digital Precision, provide QL-orientated news, offer free PD telesoftware which you can download and special product offers.

Some board systems operate on a call-back basis; you are instructed to ring once or twice, hang up and call again. The free QL board operated by the Super

# THE MODEM WORLD

Modem specifications place them into one of three broad categories; dumb modems — acoustic couplers or simple systems requiring manual dialing; pulse dial modems — can auto-dial by pulsing their data transmit (DTR) lines at the proper intervals; smart modems — compatible with the Hayes Smart modem standard and including a standardised command set.

One of the first modems available for the QL was Q Com; marketed originally as a Sinclair-badged product, it is now sold by Tandata under its own label. Supplied as three separate vertically-interconnecting modules at £80.49, the Tandata represents particularly good value.

At the bottom of the stack, Q Con is a multi-speed interface and provides facilities to set up communications and controls the other two modules. Q Con connects to the QL ser2 port and is inserted between the QL and its power supply. Q Con will also run any standard modem via its integral RS232C port. Data may be transferred at switchable baud rates of 75 to 9,600.

The Tandata middle Q Call module encompasses its auto-dial and answering unit and connects directly to the

Programmers wishing to develop a modem-dialer application can use the Astracom AC1000 Hayes-compatible AT commands. The Tandata can also be programmed but its command set is non-standard and not very well-documented.

One of the first non-interactive boards with which many users gain experience is Teletext. The principal for telephone-based bulletin boards is exactly the same. Pages of interest are selected from a sequence of menus and you follow screen prompts; most systems offer a range of help pages as well.

## Connection

Connection to a network or board is by dialing the access telephone number nearest you and entering a data sequence. Many board systems require a membership number and/or a password. Others ask you only to have the courtesy to leave a message.

The exact input sequence depends on the system on to which you are going. The Sector Software board allows you to browse extensively through its 200-plus pages by logging-on with "Guest".

Micronet offers services available via Prestel and BT Gold. Accessing the system as a guest allows you to browse

**All you need to get started in comms is a computer, a modem and a telephone, says Ron Massey. There are several modems available for the QL, as well as software.**

User Bureau, soon to be back on-line with more than 500 pages or information, is an example of one of the better QL-orientated call-back boards.

Modems are electronic devices for interfacing your QL to other computers, whether another QL or a mainframe, via the telephone system and range from relatively simple systems — switched on-line manually after you have dialled the telephone number — to sophisticated systems offering auto-dial, auto-answer and a host of other features.

Data is transferred at rates consistent with the hardware connected to both ends of a line and is usually a combination of 75, 300 or 1,200 baud; some of the newer systems will accommodate 2,400 baud, a significant saving in assorted cumulative on-line charges.

In common with most other fields of technical endeavour, comms is littered with jargon. The majority of comms services use even bits per byte, ASCII codes below 127 — the QL copyright symbol — no parity and one stop bit.

telephone line, via the upper modem module. Q Mod, which interrupts normal telephone services only when switched on-line.

TF Services, supplier of modestly-priced mains filters, also supplies the Astracom range of modems. The Astracom 1000 interfaces with the outside world via a cable to the QL ser2 port, its own power supply, parallel printer port, with a 6K buffer and your telephone system.

## Data LED

Front panel LEDs indicate power on, on-line, carrier detect and data transfer. The data LED is bi-colour and is red when transmitting data and green when receiving data.

Software provided with the Astracom 1000T can be configured for BT pulse dialing or the newer tone dialing. Like the Tandata, the telephone may remain connected to the modem, whether powered up or not, and is disconnected internally only when it is on-line.

**Local** — Your computer.

**HOST** — The machine to which your computer is talking.

**BAUD** — the rate at which data is transferred. Most systems support split baud rates — receive (Rx) at one rate, Transmit (Tx) at another.

**V21** — 300/300 baud.

**V22** — 1,200/1,200 baud.

**V23** — 1,200/75 baud — popular with many Viewdata systems.

**DUPLEX** — Half or full. The former transmits and receives alternatively; the latter concurrently.

**STOP BITS** — extra bits sent to mark the end of a data 'packet'.

**PARITY** — an extra bit following each byte; ODD, EVEN, NONE (or SPACE).

**SYSOP** — SYSTEM OPERATOR; person in charge of a bulletin board.

through a few of the hundreds of pages available. Connect to Prestel via the telephone number nearest you, entering your 10-digit customer number and four-digit personal password when prompted. Alternatively, input 14 fours to logon as a guest and follow screen prompts.

MicroLink, operating almost exclusively through BT Gold, makes no provision for browsing. If you log-on via one of the 76 Debenhams telephone numbers sited throughout the U.K., ensuring that telephone charges are kept

as close as possible to local call rates, you will use the following sequence:

Some board systems include Closed User Group boards. Both Micronet and MicroLink offer such services and they usually require additional passwords to access them.

QL users are particularly fortunate in that the QualSoft QL Terminal system is one of the best examples of user-friendly comms programs available for any of the machines I have seen. Although it is adaptable to a variety of comms systems, QL Terminal has succeeded in being clever without being confusing.

Like printers, intelligent modems require control codes to tell them how to process the information passing through them. QL Terminal includes modem control code sequences for Astracom, Astracom Hayes, Tandata and a range of manual modems. Directory pages for each of the popular modems, loaded as telephone books, are provided for about 40 popular bulletin boards.

## Telephone file

A point worth noting is that each telephone book file also includes interface parameters for each of the supplied phonebooks suitable for Tandata, Astracom, Astracom Hayes, most manual modems and XModem/CRC file transfer protocols.

On start-up, Terminal displays a blank telephone book. Pressing "L" offers to load a default directory; you can either press [ENTER] or edit the file name. Pressing [ESC] takes you to the main Terminal I/O screen. [F3] accesses the Main Menu from the I/O screen from which you can switch to Basic, select I/O screen paper, ink and border colours, alter modem interface parameters and control strings, call up the simple editor and set printer output device.

Other options available from the Main Menu enable you to transmit prepared files, elect 40/80-column display and auto log-on, writing automatically the data received to a file.

Up to four macros can be associated with each telephone number. By pressing [CTRL] and function keys 1 to 4, you can send response strings for inputting call routes, identification and/or passwords semi-automatically.

Pauses are inserted into strings by inserting a tilde "~" and successive strings can be concatenated by terminating a previous string with "&". If you are using an auto-dial modem, select [D] from the Main Menu, move the menu bar up or down the page to the required number and press [D]. Mode, pre- and post-dial codes will be sent to the modem, the number selected will be dialed.

QL Terminal operates in viewdata and teletype modes. The I/O screen includes the current date, time and stopwatch which can be re-set by pressing [CTRL] [SHIRT] [I].

TF Services also supplies a range of dedicated utilities, a kind of cut-down version of comms software, to enable you to transfer files between other machines, along with appropriate connecting cables for the QL and the Psion Organiser, IBM-compatible PCs and the Atari ST and Mega.

Once you have gained experience with one or more boards you may decide you might like to run a board of your own. To do so, the only addition you will need to make to your system is a new package designed for the purpose called *QView*.

## QView

Starting *QView*, you are offered a default file to load. If you are starting a new file, type: \*new. You are then prompted for an input of the number of pages required for the file, with a suggested maximum number of pages to reserve based on the amount of free memory you have available. Trump Card will accommodate about 700 pages in memory.

Although the contents of a board are entirely user-definable, most boards include common features — Menu(s), Message frames, Log-on, Log-off frames,

Chat pages, Caller's log, System error messages and e-mail pages.

The powerful *QView* editor is used in one of three modes — insert, over-write or pixel — and provides you with all the facilities to design and maintain a bulletin board. Editor features include defining and manipulating page blocks, importing text, printing pages and loading the saving files.

Included with the kit is a very good 32-page demonstration instruction board which includes worked examples of page routes and control flow. Display pages require some consideration regarding content, layout, caller access and flow through your board system. Designing pages using teletext-type graphics, while not difficult, takes practice.

Since only printable characters are valid for telephone line transmission, embedded colour change characters for text, graphics and background occupy screen space preceding each change. It is for this reason that the scope of graphic capabilities for Prestel screens is somewhat limited.

## Graphics

Prestel ESC codes are used to define various attributes of the screen. Pressing [ESC] [A] changes following screen characters to red; [ESC] [Q] changes graphics to red. Other ESC options allow you to set flash on and off, normal or double-height characters and to toggle conceal/reveal for selected parts of a display.

Although designing *QView* graphics is done in much the same way as any graphic program, the graphic structure of the screen is considerably different. To produce the first line of the Micronet logo, the embedded (i.e. viewable by pressing [F4]) — characters consist of:

```
A]Spp0£p0 ppppppppppppppppppppppppppppppp
pp£ 0p0/
```

The "A+S" and "/" are ESC characters used to switch the background to red, use yellow graphics and switch back to a black background respectively.

Once your page designs are completed you can proceed to set your page routing and define caller access based on security levels. Each page includes three additional attributes — access count, incremented by successive callers; security level, enabling access only if a caller's security level is equal to or less than the number set; and the current owner of the page.

Comms is a subject which has something to offer everyone, business users and enthusiasts alike. Without doubt, telecommunications will have an increasingly greater impact on daily life. Systems are, one hopes, likely to become faster and less expensive to use.

On the fun side of things, Micronet offers access to the BT Gold *Shades*, a

Prompt	Response	Remarks
WHICH SERVICE?	*CSA *CSB	For 300/300 baud For 1200/75 baud Press enter until you see:
COMSHARE*	T	Press enter until you see:
PAD> *** Call connected Please sign on >	CALL 72  MAGnnn	Where nnn is your mailbox number
Password:	zzzzzz	Your own password

popular multi-user game. Board chatlines are a good way to meet people and exchange ideas. Smaller boards also offer multi-user games.

A number of companies offer direct purchasing via bulletin boards, from flowers and theatre tickets to complete computer systems. A few banks offer bulletin board banking services as well. The various aspects of business-orientated activities continue to be an attractive alternative for services whose discrete costs are prohibitive for small businesses. Telex services, as just one, are available through both MicroLink and Micronet. The former requires a £10 registration fee; the latter includes access to Telex services with membership. In most cases, a single Telex message can be sent simultaneously to up to 50 recipients.

### Restriction

From a hardware point of view one of the main restrictions to using any modem is that they do not work well, if at all, with one-plus-one carrier systems — a frequency splitter for putting two telephone numbers on a single line.

A less-than-obvious feature of all modem systems is that they can usually be used for transferring files between the QL and almost any other machine system. Using the QL Connect XMODEM

mode, data transfer can be done by a read/write/verify sequence.

If your interests are more of a user than a programmer type it is not necessary to be too concerned with specialist comms jargon. The QualSoft QL Terminal includes built-in command sequences and telephone numbers to interface a wide range of modems with the QL.

Terminal works well with the Miracle modem, Astracom, Tandata and — with a little modification to the interface section of the software (available by pressing [ESC] [F3] [I] — Microlink modems.

If you want to try your hand as a sysop, QView is a particularly delightful program in many ways; is easy to use and enables anyone to set up a bulletin board. Developed by two genuine enthusiasts for their own use, unintentionally it has become the standard system for QL-originated boards.

### Experiments

Because of the peculiarities involved in Prestel telecommunications, QView may require some experiment to develop a workable and exceptional board system of your own but it is a comprehensive system and very easy to use. The results are certainly well worth the effort.

Although the majority of boards are

inexpensive to join, a number of precautions can save you considerable operating costs. The first is to avoid peak-rate telephone calls. The second most obvious course is to develop the habit of sending prepared messages wherever possible.

### Irritations

As with most things, a few minor irritations arise from the most unexpected sources. One of the booklets BT supplies with Prestel membership is its Start-Up directory. It includes a large number of cross-references of the infuriating kind of which dictionary compilers are so fond. About one-third of the Prestel directory is cross-referenced to other headings.

A typical example of bad cross-referencing is demonstrated under the heading of CATS. You are referred to another heading entitled PETS. No such heading exists. Several other headings refer you to other headings at least twice. Ordinarily, this would make little or no difference, unless you are on-line at the time.

In spite of the minimal information available simplifying the comms industry for beginners, with a little perseverance it is a subject which is fairly easy to comprehend. Parallel to the CB craze a few years ago, comms is fun and informative.

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PeaceNet	01-888 8841	
BT Gold	0895 448998	
Prestel	01-583 1275	
Lau's	01-618 1111	ring once, call back
Libertel	01-751 2768	
Lincoln ITEC	01-733 7730	
MicroLink	0522 41080	business office for membership business office for membership
Micronet	0625 878888	
Compunet	01-837 7872	
Digital Precision	01-997 2591	

# BULLETIN BOARD

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Telex	x	x
Prestel	-	x
BT Gold	x	x
Chatlines	x	x
Consumer Interest	-	x
Teleconferencing	x	x
Telemessages (telgrams)	x	-
Telesoftware	x	x
Teleshopping	x	x
Advertising	x	x
Swapshop	x	x
Computer	x	x
Special interest groups	x	x
Information publication	-	x
Entertainment reviews	-	x
Multi-user games:		
Shades	x	x
Starnet	-	x
Business		
Consumer	x	x
Financial	x	x
Legal	x	x
Tax	x	x
Services		
Translation	x	-
Statistics	x	-
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Tandata Communications, Albert Road  
North, Malvern, Worcs.  
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**Astracom, QL Terminal**  
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QualSoft QL Terminal £30.00  
QualSoft PC Terminal £15  
(includes ser2 to com modem lead)  
Psion Organiser to ser2 lead £9.50  
Any two file transfer progs and leads £25  
Linking: QL to Atari  
QL to IBM  
IBM to Atari

**Qview**  
The QL QView Data System, 29 Carnaby  
Close, Godmanchester, Cambs PE18 8SE.  
Tel: 0480 412884

Costs	Call rates:	Cheap	Standard	Cheap	Standard
		£79.95	£119.95	£79.95	£119.95
Subscription — Res./Bus., respec.					
Initial Registration			£5		
Standing charges			£3/mon		£1/mon.
Connect charge (via BT Gold)		3.5p	11p		6.5p
PSS Service — 300 & 1200/75 BAUD respect.		2.5p	3p	2.0p	No charge
Filing charge (Telex & Email store)			20p/2K/mon.		20p/2K/mon.
Telex:					
Registration			£10		No charge
Outgoing — per 100 words			5.5p to 69p	(1) No	5.5p to 69p
Incoming			charge		No charge
BT's Telex Directory insertion			£17.50/6 mos.		na
Radiopaging			No charge		
Telemessages — up to 350 words			£1.45		

NOTES: (1) Telex rates via BT Gold for both systems are categorised as U.K., Europe, North America, rest of the world, with ships at sea charged at the highest rate (£2.75 per 400 words). Total charges are broken down in the following way:

Both systems via BT Gold	Microlink via Prestel
Word charge (according to destination)	Word charge (50p/500 chars)
On-line charge	On-line charge
Normal telephone rate	Local telephone rate
Data transmission (about 4p/512 chars)	

(2) Microlink and Micronet operate their own information systems and provide optional access to a range of BT-operated services such as BT Gold and Prestel. Operating costs, where either system links with BT Gold, are often at fixed tariffs. Filing charges are fitted by BT rates.



# SECTOR

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*The QL World Index is a complete reference to all Sinclair QL World/QL User articles compressed to fit in a standard QL.*

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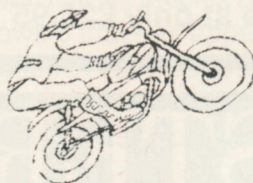
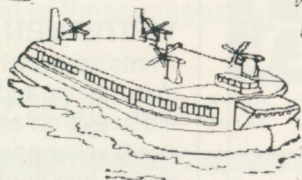
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# SUPER BASIC

Mike Lloyd diverts his attention to the big picture. What is good programming? How do we get there from bad programming?

Occasionally, friends will insist on presenting me with lengthy program listings which they can no longer understand and which they would like debugged. Given time and adequate refreshment I can normally return an improved program in some kind of working order. The most obvious change to the listings is that, without exception, they have been thoroughly re-organised. This is not to satisfy some manic desire for perfect neatness; it is simply that program bugs hide and proliferate in messy code. The first step to eradicating them is to remove the environment in which they flourish. This article shows how to do this, mainly so that my friends will unscramble their listings themselves.

In the Bible there is the parable of a woman who lost some money in her house. After frantic searching, the only way to discover the lost money was to tidy up. If the woman were a programmer and her search was for programming errors she would begin by putting her program listing into a clear order.

To use a more modern analogy and approach the subject on a slightly different tack, a complex program is like a car gearbox. When working properly its internals can safely be ignored but, once it breaks down, an engineering handbook is required to effect repairs. The engineering handbook for a program is its documentation. Professionals regard documentation as an essential part of their work but the same level of interest cannot be claimed by hobby enthusiasts.

Without doubt, good-quality documentation saves time, reduces errors and increases the chances of success of a project. There is a wide range of documentation standards, most involving some kind of symbology, and most of limited value to the hobby programmer. They too often betray the programming languages for which they were developed primarily. Flowcharts,

```

110 MODE 4:CSIZE 2,0:DIM q$(5,40):AT 2,5:x = 1
120 RESTORE 120:DIM a$(5,12):PRINT "A QUICK QUIZ"
121 REPEAT y
122 DATA "What is the capital of Belgium?","Wh
123 at is the capital of Britain?","What is the ca
124 pital of France?","What is the capital of Spai
125 n?","Brussels","London","Paris","Madrid"
130 READ q$(x)
140 x=x+1:IF x=5 THEN EXIT y
150 END REPEAT y
170 FOR a=1 TO 4:READ a$(a):NEXT a
180 PRINT:PRINT:PRINT:PRINT
195 PRINT q$(1):INPUT w$
200 IF w$ = a$(1) THEN PRINT "Right": ELSE :PR
210 INT "Wrong":END IF
210 PRINT q$(2):INPUT w$:IF w$ = a$(2) THEN PR
220 INT "Right": ELSE :PRINT "Wrong":END IF
215 PRINT q$(3):INPUT w$
220 IF w$ = a$(3) THEN PRINT "Right": ELSE :PR
230 INT "Wrong":END IF
225 PRINT q$(4):INPUT w$
230 IF w$ = a$(4) THEN PRINT "Right": ELSE :PR
240 INT "Wrong":END IF:STOP

```

Left: A short program before applying good program management. Right: the same program cleaned up, easier to read and use.

for example, belong to the unstructured Cobols and Fortrans of the 1960s. Structure diagrams and data flow charts are more relevant to today's needs but they in turn are inadequate for the new fourth generation languages.

In the rush to devise and develop more and more complex symbology for showing a program diagrammatically perhaps the most important piece of documentation has been overlooked—the listing. In a sense, structure diagrams, flowcharts, pseudo-code and the rest are there to compensate for the weaknesses of program listings. Where listings are least informative, the need for explanatory documentation is greatest. Where listings are clear in their purpose, it follows that additional documentation must be superfluous.

QL owners are fortunate in that SuperBasic has all the necessary features to produce extremely readable programs. Where SuperBasic programs are convoluted, disorderly and impene-

table, the fault is with the programmer, not the program. Disorder occurs because SuperBasic is fairly lax in its syntactic demands, relying too much on line numbers and, particularly with GOTO and GOSUB, retaining connections with wholly unworthy unstructured dialects of Basic.

Those weaknesses can be overcome, and even turned to advantage, by adopting some programming conventions. This requires a little discipline, a little knowledge and a little planning but it can save hours of frustration. As it is too much to ask for even an experienced programmer to produce neat code at the first attempt, it also requires the determination to go back over rough and ready working copies of listings, or parts of listings, and clarify them for future reference.

Ragged code can be the product of inadequate analysis, poor implementation of the design, or an

incomplete understanding of SuperBasic. It can also be the result of necessary revision to work round some unexpected problems. Adding a little line here, trying a little tweak there, and slotting in GOTOs wherever line numbers are at a premium is the recipe for a substantial mess.

Programs cobbled together in that way eventually will work provided that the solution is found before the listing becomes completely incomprehensible. This is rather like repairing individual potholes instead of resurfacing the road: the holes might disappear but the result is lumpy, rough, ugly and slow.

As soon as a segment of code has been drafted, revised and twisted into some semblance of working order, it might seem a little masochistic to rewrite

lines normally should not exceed the line length available to display them. Where long expressions or long strings make this unavoidable it is usually possible to align the continuation line with its predecessor so that the indentation is not lost.

Structures consisting of an opening command, a series of statements and a terminating command are the easiest to indent. Unfortunately, SuperBasic has more complex structures which have control statements interspersed with the procedural statements. One way of making the presence of these additional controls obvious is demonstrated by the figure below.

SuperBasic is particularly rich in control structures with two kinds of loop, two types of conditional clause and two

designed for infinite iteration or when the number of iterations is conditional.

◆ GOTO and GOSUB are almost always more trouble than they are worth; write procedures instead.

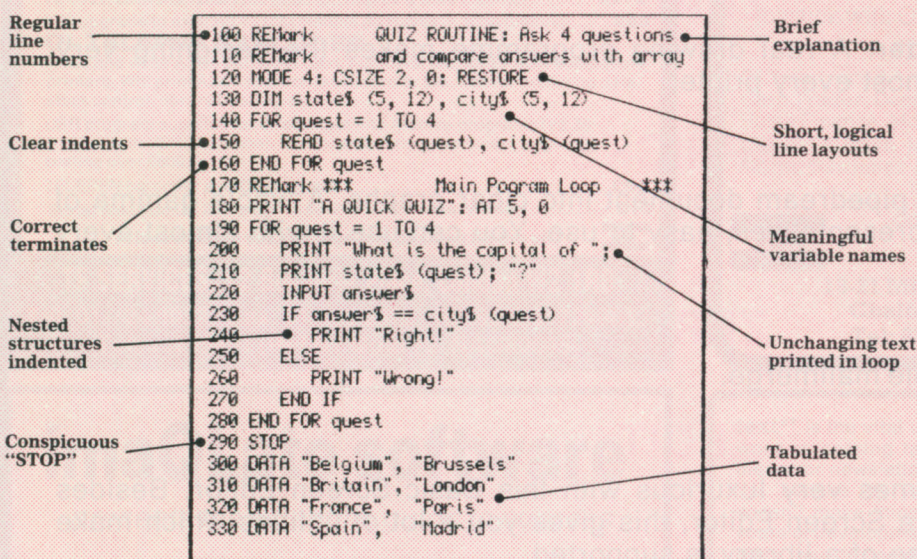
SuperBasic syntax is fairly strict for procedural statements but less rigorous for command structures. Readability is improved, however, by keeping to a consistent method of presenting each structure. This should not over-rule the use of the "short forms" of IF, FOR...NEXT, SELECT and REPEAT structures. Although some purists insist wrongly on adding END statements to single-line structures there is no benefit in doing so; it merely makes the code more verbose.

*"Program bugs proliferate in messy code. The first step to eradicating them is to remove the environment in which they flourish."*

There has been some debate about whether multi-line structures should end with NEXT or with END. In SuperBasic it is a matter of neither style nor preference; using NEXT to end a loop is wrong, no matter what happens in other Basic dialects. END marks the final line of a control structure while NEXT, where it appears, is used in the body of the structure to force a premature conclusion of an iteration.

Repeating groups, where the sections of code are repeated many times with perhaps only minor changes, should be eradicated from listings. By and large, repeating groups can be enclosed in loop structures and reduce program length and reveal additional structure.

A comparison of the two accompanying listings will reveal the impact these considerations have on a fairly simple program. Both listings will function and appear almost identical to the user but the first example is densely-packed, poorly-constructed and is very difficult to read. The style of the second listing will be more familiar to regular readers of the magazine. Its structure is immediately obvious from the indentation, local sequencing of the commands and the use of short lines. SuperBasic facilities have been used to the full to produce terse, comprehensible code without needless repetition or redundant statements. The choice of variable names adds to the overall clarity of the program so that the brief introductory REMarks are sufficient guidance to the reader to reveal the purpose of the program. In next month's issue, the documentation theme is continued with a detailed look at recommended programming conventions.



it for the sake of neatness, but this is the best time to do it, while the logical flow of the code is still fresh in the programmer's mind.

There are no formal documentation standards for SuperBasic but several conventions which improve its readability have been widely adopted. By all means develop your own standards or change those listed to suit your particular needs but the ultimate criterion by which listings are judged is the ease with which they can be read.

The most useful enhancement to a listing is made by indenting lines to show the program structure. This means that when loops or conditions are specified the program lines within them are prefaced by a number of spaces. As structures are nested the indenting increases. This technique is most effective when at least 80 columns of output are available.

Indenting is most successful when the commands which begin and end structures appear alone on one line. Program

varieties of user definition. Picking the incorrect control structure for a job can make it difficult to understand a listing even if the required objective is achieved. These simple rules may help to select the best control structure for the particular job:

◆ If is best for binary decisions, i.e., for decisions which can be answered "yes" or "no".

◆ If also works well for exact matches or for open-ended ranges, e.g., IF x = 5 THEN ... or IF y > 300 THEN ...

◆ SELECT ON is best for multiple decisions, where there are three or more options which can be selected.

◆ SELECT ON is superior to IF for bounded ranges, e.g.:  
SELECT ON r = 5 TO 95.

◆ FOR...NEXT loops are preferable when the number of iterations can be specified or calculated at the start of the loop.

◆ REPEAT... UNTIL loops are

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# Kaga-Taxan KP-810

Bought from W. H. Smith in November 1984; price £365 including VAT, this printer is not easy to find under Kaga name but available under the name Canon PW1080A. Offered originally in wide-carriage version as KP-910 also. Manufacturer's recommended price approx. £350. Advertised as PW1080A at about £176 by Almo Computer Systems — Tel: 0730 68877 — and at about £203 by Crown Computer Products — Tel: 0704 895815. These prices are about £100 less than was typical until mid-1988, suggesting that the models are now out of production.

## Features

Typestyles available are Pica (10-pitch), Elite (12-pitch), enlarged Pica (5-pitch), enlarged Elite (6-pitch),

This is print from the Kaga-Taxan KP-810, using the **Text<sup>87</sup>** word-processing program. Different styles & sizes of character can be accommodated within individual columns. The different types appear on-screen, and the line lengths are **matched automatically to character widths.**

This is Elite 12-pitch and **bold Elite**. Changing to Pica 10-pitch on the same line produces a reduction in line length **in proportion to the pitches,  $12/10$ .** "Line length" here is the number of characters on a line, rather than the length in inches. If you match your on-screen counts to the printer output, the actual width of each line on the screen will be the same.

enlarged-condensed Pica (8.57-pitch), condensed Pica (17.14-pitch), near letter quality (10-pitch), with double-struck, emphasised, italicised, underlined, superscripted, subscripted, proportional spacing (Pica only) typestyle modifiers.

Character sets include 256 standard characters plus 128 (basic) or 256 (optional) NLQ characters, stored in ROM. An additional 256 'ordinary' characters and (optional) 128 NLQ characters can be generated by the user and stored in RAM. The paper feed method is continuous pin feed and friction roll or single sheet feed standard, making a maximum of one original plus two carbon copies. Front panel switches allow it to be set to print all-NLQ. The line-spacing is standard six per inch but alternatively in 1/216 in. steps.

Graphics modes available are 8-, 9- and 16-dot graphic image. Single-, double- double-speed double- and quadruple-density.

The DIP switches are decidedly inconvenient in the KP. Get the settings correct first time, then leave them alone, because it is necessary to remove the casing to change them. My settings are:

SW1-1	OFF	These four determine the international character set used.
SW1-2	OFF	The settings listed are for the U.S.A. set, so that the # and \$ characters are available. The £ and foreign characters are obtained through printer driver "Translates".
SW1-3	OFF	
SW1-4	OFF	
SW1-5	OFF	Optional NLQ ROM set not fitted.
SW1-6	OFF	
SW1-7	ON	Italic ("alternate") characters available.
SW1-8	OFF	
SW2-1	OFF	
SW2-2	OFF	Buzzes when out of paper.
SW2-3	OFF	Allows your own character in RAM; bigger input buffer if ON.
SW2-4	OFF	These four set normal Pica as the standard characters. Any
SW2-5	OFF	of the other styles — Elite, enlarged, NLQ — can be selected through software, provided the appropriate printer driver Translates have been set up.
SW2-6	OFF	
SW2-7	OFF	
SW2-8	OFF	80 columns of Pica, 96 Elite, 134 condensed.
SW3-1	ON	
SW3-2	OFF	Page length 11in. satisfactory for A4 (70-line page).
SW3-3	OFF	Page feed under software control.
SW3-4	OFF	Line feed under software control.

Figure one: Kaga Taxan KP-810 DP switch settings

## Specifications

Printhead: 9-pin  
Character matrix: 11 x 9 standard, 23 x 18 NLQ.

Printing speeds: nominal 140 characters/second (10-pitch Pica), bi-directional printing. 25cps NLQ, two uni-directional passes.

Paper width: up to 254mm. (10in.).  
Fanfold continuous and cut sheet, 216mm. (8.5in.) roll.

Paper thickness: up to 0.13mm. (no carbons), 0.25mm. (with carbons).

Paper weight: Fanfold single 64 g/m<sup>2</sup>, multi-part 40 g/m<sup>2</sup>, cut sheet 52-64 g/m<sup>2</sup>. That is what the instruction manual says but it accepts 70 and 80 g/m<sup>2</sup> fanfold with no significant trouble and much heavier single sheets.

Interface: Centronics parallel — serial optional extra.

Canon and Taxan are well-respected names in the computer peripherals field and the quality of the KP-810 is high. No failures of subject machine and no sign of deterioration in four years of fairly serious usage. Definitely a heavy-duty machine. There has never been any evidence of interference of printer with QL or AT in the systems mentioned.

The rear connector is standard parallel interface 36-pin type. It can be linked directly to a parallel interface port if you have a Medic, SuperQ or similar interface in the QL. The more usual connection is to Ser1 or Ser2 through a Miracle Serial Parallel interface - about £30 now; one of these has been used for four years on

# THE PRINTER REPORT

In the first part of the QL printer report, four users describe their relationships with their personal printers. We hope that these success stories will be a guide to others.

the subject machine, with no problem. Miracle supplies this interface with either a PCC telephone-type connector or a 9-pin D for German QLs.

The interface is standard Centronics parallel and there should be no difficulty connecting to any common brand of office computer. The subject set-up has printer input from a two-way 36-pole switch; one connection to the switch is from the 36-pin output — LPN1 port — of a PC/AT, the other from the serial/parallel interface, itself connected to a second switch which selects either of two QLs.

## Reset

This arrangement works well, provided you make sure the printer is re-set to a standard basic condition after each use, so that switching from AT to QL does not cause printing to start in an unexpected style. By searching for cheap switches and cables you can make up this whole switching and interconnection layout for about £60.

Epson FX80 compatibility is good and use with Epson printer drivers is usually satisfactory but you have to do some customising to make use of features which the Kaga has which the basic Epson lacks. Usually it works immediately with Epson FX-type drivers on both QL and PC. See comments about setting-up Quill and Editor drivers.

Many computer people have some difficulty getting a printer to do what they want of it. You can rarely plug in and go. The Kaga is no exception but there are no special difficulties making it work. The manual is very comprehensive; after four years a proportion of mine remains unread — mainly the large sections on graphics and character generation.

Once you get to grips with the form of code input required and the way your software requires codes to be set down, all the Kaga features can be accessed from Quill or Editor. Even with the later Quill versions, which has 10 Translate entries, you cannot call all the features you might like to use but most users should generally be content with what one printer-dat file permits.

When I used Quill for all my work, two printer—data files seemed necessary — one for 10-pitch (Pica) print and another for 12-pitch (Elite) — with a Key Define macro to swap them as required. Because 10-pitch is rather demanding on paper, I standardised later on the 12-pitch driver, finding the Elite print looks better and keeps documents shorter. The total of 18 translates in Quill — eight for the “embedded” functions such as Bold, plus 10 “free” ones — is really insufficient to control a printer and later work with *Editor* convinced me to change the approach.

## switch off

Instead of using separate translate entries for each “on” and each “off” call, it is more economical to use the one “off” entry and make that switch off all functions — the embedded ones excepted, since it is easier to leave them as they are. The disadvantage to this is that each time you use the “off” keying, it switches off all functions you had previously switched on and you may want to switch off only some of them. For most people this will not be a major difficulty; if you want a heading to be in bold, enlarged NLQ, the chances are you will want to switch off all three functions together at the end of the heading. Using this approach, a single printer—dat file should suffice for most purposes.

With Editor, one file is all that is needed, because you have virtually unlimited translate facilities and can call any character style your printer has at any time. I use only 12 translates in my driver—dat file for character styles, as opposed to code conversions to produce characters such as £, 0. The driver—dat and printer—dat files are performing much the same task and are constructed in a similar manner; if you get the hang of making the one, you should have little difficulty making the other.

One advantage of the Editor driver is the ability to put in any amount of code conversions; you can arrange for the full range of “foreign” characters to appear on-screen and produce the same characters, in the printout. The sample of KP-810 print includes some of these characters, as well as the usual character styles.

## WYSIWYG

If WYSIWYG is your requirement, *Text*<sup>87</sup> allows you to generate character sets matching the appearance of your printout and display them on-screen. There is now a PW1080 printer driver available for *Text*<sup>87</sup>; the disadvantage at present is that it is primarily for NLQ, which is treated as something different from all the other styles and cannot easily be combined with them — using the same driver, although you can change driver and print single lines within a document using another driver. The sample was printed with the FX80 driver supplied with the program.

Paper costs the same for most printers, about £20 for 2,000 sheets of continuous 70g/m<sup>2</sup> A4. Printer ribbons vary considerably in price; they are usually about £6-£8 each but can be found for about £3. Apart from black, colours such as red and blue are obtainable.

This printer was rather expensive when bought but has proved to be a good investment. At the offer prices quoted, it is a good buy now. I would not hesitate to buy one again; 24-pin printers give better-quality print; for around £300, you can have the better quality, plus additional fonts, and I would expect to buy one of these if looking for a printer now.

Bryan Davies

### Information

Canon (U.K.) Ltd, Text & Data,  
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# Oki Microline 84

I own an Oki Microline 84 dot matrix printer. It has the following features: 136 columns; bi-directional logic seeking; draft mode, 200cps — 400cps skip; NLQ mode, 100cps; dot-addressable graphics; downline-loadable character set; graphic characters; 10, 12 or 17cpi and double-width characters 6 or 8 lpi; true descenders; bold, underlining, subscripts and superscripts; vertical and horizontal tabbing; software and hardware controlled page length; paper, fanfold or cut-sheet, tractor and friction feed; cut-sheet feeder available; RS232, Centronics, or 20mA

```
DRAFT
10 OPEN_NEW#4, RAM1_TEST_LIS
20 PRINT#4, 'DRAFT'
30 LIST#4
40 BPUT#4, 10, 27, 84
50 PRINT#4, 'BOLD'
60 LIST#4
70 BPUT#4, 10, 27, 73, 27, 49
80 PRINT#4, 'NLQ'
90 LIST#4
100 BPUT#4, 27, 48
110 CLOSE#4
120 COPY RAM1_TEST_LIS TO SER1

BOLD
10 OPEN_NEW#4, RAM1_TEST_LIS
20 PRINT#4, 'DRAFT'
30 LIST#4
40 BPUT#4, 10, 27, 84
50 PRINT#4, 'BOLD'
60 LIST#4
70 BPUT#4, 10, 27, 73, 27, 49
80 PRINT#4, 'NLQ'
90 LIST#4
100 BPUT#4, 27, 48
110 CLOSE#4
120 COPY RAM1_TEST_LIS TO SER1

NLQ
10 OPEN_NEW#4, RAM1_TEST_LIS
20 PRINT#4, 'DRAFT'
30 LIST#4
40 BPUT#4, 10, 27, 84
50 PRINT#4, 'BOLD'
60 LIST#4
70 BPUT#4, 10, 27, 73, 27, 49
80 PRINT#4, 'NLQ'
90 LIST#4
100 BPUT#4, 27, 48
110 CLOSE#4
120 COPY RAM1_TEST_LIS TO SER1
```

Figure two: Oki type samples

current loop interfaces available.

In 1983 the price including VAT was £1,091. I bought mine last year from a company for which I was working for £50. It had been in continual use for eight hours a day, five days a week for four years. It needed a new printhead and a new ribbon. I obtained a new printhead from the importer of Oki equipment, Technitron X-Data.

A new printhead costs about £100

and should be good for 200 million characters. I fitted it in about two minutes. Ribbons are freely available. They are of the twin spool type and cost about £3 each. They are a little fiddly to fit but there is a saving on cartridge ribbons.

My printer has the Centronics interface so I bought the Miracale Systems Centronics adaptor. Unfortunately it would not fit into the socket because the case of the adaptor was too big. By removing the lid of the adaptor and cutting off about one centimetre, it fits into the socket. To use the printer it is then a matter of opening a channel to ser1 or ser2 and printing to that channel. The owners' manual gives information on the DIP switches. They should be set for 7 bits (on), CR off, DC1 and DC3 codes ignored (off), and the character set selected as desired.

Setting-up a printer driver for the Quill word processor is relatively straightforward provided you have the owners' manual containing the codes in front of you.

My driver settings are baud rate, 9,600; parity, none; lines/pages 60; chars/line, 136; cont. forms, no; end of line, CR,LF; preamble code; CAN,RS,ESC,0,ESC,6; postamble code: CR,RS,ESC,6,SI; bold on, ESC,T; bold off, ESC,I; underline on ESC,C; underline off, ESC,D; subscript on, ESC,L; subscript off, ESC,M; superscript on, ESC,J; superscript off, ESC,K.

I use the translate functions to provide access to additional printer functions and to translate the '\$' sign into a '£' sign created in the downline-loadable character set enabling the '#' sign still to be used — ASCII set turns chr\$(35) into '#π', British set turns chr\$(35) into '£'. Printing a '£' straight to the printer will cause a different character to be printed.

Translate 1:ESC,1	NQL on
Translate 2:i,ESC,0	NLQ off
Translate 3:i,RS,	10 cpi
Translate 4:i,GS	12 cpi
Translate 5:i,FS	17 cpi
Translate 6:ó,ESC,6	6 lpi
Translate 7:ó,ESC,8	8 lpi
Translate 8:ó,US	double-width characters
Translate 9: (not used)	
Translate 10: £,ESC,2,ESC,0	(see above)

Before using the printer I send this piece of code to it to create the '£' sign in the downline-loadable character set so that the translate 10 function

works:

```
OPEN#3,SER1:BPUT#3,27,37,65,32,0,0
9,2,61,64,9,64,33,0,0:CLOSE#3
```

If you do not have a toolkit containing BPUT, use CHR\$ with the codes in brackets.

I use Quill a good deal and have found the driver works well. Some of the translate characters are foreign characters which can upset the justification of a line if used carelessly because they occupy no space on a printout.

I also own QRAM and set the usage and device names on the 'PRINT' menu to ser. This inserts a buffer into all serial output, freeing the computer for further work while printing, but it is hungry on memory. Alternatively, a document could be printed to a file and then spooled to the printer using the QRAM spooler. The latter option is light on memory usage but requires that the disc is not removed while spooling.

I have just finished writing a special printer driver which works either with or without the Quill driver and provides extra translation functions. This enables mathematical, Greek and graphic characters to be printed. I will be adding new characters as and when my need arises. It can over-ride the Quill driver to provide printouts in NLQ or bold or to disable printing in either.

I bought the Oki screendump utility Ultraprint from Digital Precision but found that it does not work with the Oki 84. My money was refunded. Since I found no others on the market, I wrote a screendump utility for both modes in SuperBasic and compiled it using Supercharge. It multi-tasks and can be called at any time. It produces only straight dumps, i.e., no random shading or selection of just one window on a screen but if there is any interest in my utility I would consider working on an improved version. Anyone interested in a screendump utility for the Oki 84 should contact me.

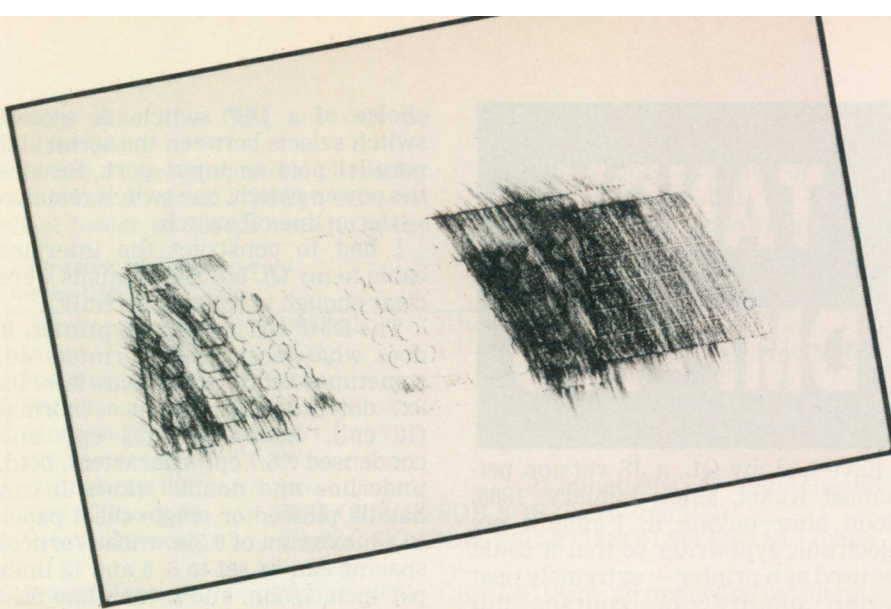
I have used this printer for more than a year with no mechanical problems. It is fast and efficient but rather on the noisy side; I have mine inside an acoustic hood which makes it considerably quieter. I use it for printing letters and reports, listings and graphics work. I use standard A4, note and full 136-column paper available from stationers and computer supplies shops. The tractor can be adjusted to take paper from 3in. to 16in. wide.

Nick Redgrave

## Information

Technitron X-Data, 750-751 Deal Avenue, Slough Trading Estate, Slough, Berkshire SL1 4SH.





# HR-5

The HR-5 printer is a cheap printer launched early in 1986. It has not had the popularity it merited and has been abandoned by high street stores which once stocked it eagerly. It cost about £150 then but was on offer at the July ZX Fair for about £45. It was

will reach them. Switch 1 has light segments; no. 6 can be altered to give 1/9in. line-space temporarily for software dumps, while nos. 7 and 8 command U.K., German, French and U.S. special character alternatives. U.K. is preset but the others may be preferred for listings.

Switch 2 is pre-set with suitable parity but 2-4, 2-5 and 2-6 set the speed expected. All switches to the right ("off") increase the baud rate to 9,600 to suit the QL but the Spectrum

should have 2,400 (2-5 "on") to reduce the risk of hiccups in transmission. The external switches are for power, on-line/off and line-feed only; switching on power while depressing on-line starts a self-test display.

HR-5 is a thermal-transfer printer, printing directly and conveniently on to special thermal paper or from a one-time ribbon on to smooth paper. The paper can be in single sheets but a simple provision is made for the rolls of paper available in 30-metre length. Only friction feed is provided; it is effective but obviously not so accurate as tractor feed. Considerable economy in paper is possible with short documents if the page-design (F3 D) is set to zero (P O') and the sheet torn off at the length required.

## Tired ribbons

The ribbons are soon exhausted — about three to a roll of paper — but they give a better and more permanent printout. A long loop of ribbon is exposed and care is needed to avoid creasing it. Thermal paper fades slowly; it also blackens if you try to steam open an envelope.

The HR-5 is Epson-compatible, which means that it recognises the set of commands most widely-used and QL default for setting or changing style in a piece of text. At 30cps the print is relatively slow.

Only one font is provided; it is a standard ASCII set with additional graphics characters including 12 Japanese date symbols. Bold, extended or compressed printing is at command, while subscript and superscript are unusual but effective; they rotate the platen half a line on call and cancel.

Neither italic nor proportional spacing is available but this is not

### COMPUTIUS says:

M N E M O N I C S  
R E M I N D U S  
that once upon a  
time we knew what  
they stand for.

孔 譜 子

### COMPUTIUS says:

W H E N A L L  
E L S E F A I L S  
and you read the  
Instructions; they  
will be ambiguous.

孔 譜 子

imported by Jones+Brother, which always provided excellent back-up service, including the supply of stores by mail order when Boots ceased to stock the paper and ribbons.

The HR-5 is small and light — 303x74x65mm., 1.6kg. It will run on batteries but is very heavy on them and the small mains PSU proved economical. HR-5 is available with serial connections but needs its own special lead or a standard lead in which pins 4, 5, 6 and 8 are connected and the lead to pin 6 is cut off and insulated carefully.

The manual is slim — 48 pages — but well-paced and very well illustrated. The text is terse and needs several readings and type-ins to be appreciated fully.

Connection is simple but some dip switches need setting; this is best done before a ribbon is installed, because they are under the timing belt. A knitting needle or tweezers

PRINTER	HR-5	HR-5	HR-5
INST. NAME	table	elite	132 cpl
END OF LINE	13,10	13,10	13,10
CHARS./LINE	80	96	132
PREAMBLE	-	27,77	15
POSTAMBLE	13,10	18,13,10	18,13,10
BOLD ON	27,69	-	27,69
BOLD OFF	27,70	-	27,70
UNDERLINE	27,45,1	27,45,1	27,45,1
U-LINE OFF	27,45,0	27,45,0	27,45,0
SUBSCR.ON	27,83,4	-	27,83,4
SUBSCR.OFF	27,84	-	27,84
SUPERSCR	27,83,0	-	27,83,0
SUPER.OFF	27,84	-	27,84
TRANSL 1	145,27,85,1,	35,96	35,96
tr 1 ctd	27,65,8,152		
TRANSL 2	146,149		
TRANSL 3	147,153		
TRANSL 4	148,151		
TRANSL 5	149,147		
TRANSL 6	150,146		
TRANSL 7	151,154		
TRANSL 8	152,155,27,50		
tr 8 ctd	27,85,0		
TRANSL 9	-		
TRANSL 10	35,96		

serious; for a few pounds Inkwell will provide them and any fonts you care to design — even Chinese. Elite type can be commanded; it looks well in correspondence but will not tolerate subscript. All these options can be installed and it is a virtue of the QL that several Quill cartridges can be cloned, each with a different printer installation. The compressed face goes well in Abacus and can be called in the preamble. The emphasised face is as near to NLQ as the HR-5 can get without Inkwell; unfortunately emphasised “.” can be mistaken for “=

The HR-5 has a comprehensive set of 17 symbols for boxing a table but as Quill can “translate” only 9 (and £), you have to choose between vertical and horizontal dividers. The set shown in “table” gives a horizontal divide. The top-left code (CTRL 1) calls unidirectional printing and 8/72in. line-spacing, then prints the symbol; the bottom-right (CTRL 8) prints the last corner and cancels the temporary settings.

### Turboquill

If you have Turboquill+ it is convenient to teach a hot-key to put an empty table for shaping to suit the current need. It is best to leave a blank line between lines of text, otherwise lines can touch.

Screeendumps are arranged easily but limited to 480 pixels or 960 double-printed. It is convenient to borrow the Easel dump for copying most screens; if the distortion of circles this produces is objectionable, the SuperBasic dump in *The Working QL* — D. Lawrence, Sunshine Press — can be used to give 92 percent. Modifying the program to repeat every seventh line improves this to 105 percent. Some software dumps expect the printer to be set for 8/72in. line spacing; this can be done temporarily by moving dip 1-6 to the left (“on”); otherwise gaps appear in the dump. If the size is not what you want, Sidewinder will give dumps of almost any size.

Altogether this Cinderella of a printer is suitable for a hobbyist whose output of printed paper is modest. I have used one for two years with satisfaction.

#### Information:

Jones + Brother, Shepley, St. Guide Br, Manchester M34 5JD agent;  
EEC Ltd, Misbourne House, Chalfont St Peter SL9 9UE HR-5 offers;  
Palantir Products, 78 Leighton Road, Bristol BS3 1NU Inkwell DL;  
Athene Consultants, 33 Holly Grove, Fareham PO16 7UP Turboql+;  
Zitasoft, 93 Foxbourne Road, Tooting Bec, London SW17 8EN Sidewinder.

# TANDY DMP-105

I have had my QL, a JS version pet-named Kukel, since January, 1986. Soon after buying it, I rebuilt my electronic typewriter so that it could be used as a printer — extremely neat letter quality, of course, but extremely slow. I used it more and more for making reports and after about a year it became tedious waiting six minutes for every page to enter the next piece of paper. I decided to buy a cheap little matrix printer for the draft versions and started looking for something less than £120.

In June, 1987 I finally saw what I wanted. A DMP-105 sale, making room for newer models at Tandys. Priced at about £100, it became mine.

One more reason for buying it was its serial port, which is very convenient for the parallel-less QL. It operates at 2,400 or 600 baud by

choice of a DIP switch. A second switch selects between the serial and parallel port as input port. Besides the power switch, one switch remains — the on line/off switch.

I had to construct the interface cable to my QL but the manuals were clear enough to do that correctly.

The DMP-105 is a simple printer. It does what most simple printers do, sometimes more, sometimes less. Its 9x7 dot printhead produces normal (10 cpi), compressed (12 cpi) and condensed (16.7 cpi) characters, bold, underline and double width. It can handle pinfeed or single sheet paper to a maximum of 9.5in. wide. Vertical spacing can be set to 6, 8 and 12 lines per inch; 7/72in. and n/72in. line feed is also possible.

### Intelligent

Printing speed varies from 80cps for normal characters to 46cps for condensed. Double-width printing is twice as slow. For optimising speed it uses ‘intelligent’ bi-directional printing and a one-line buffer. It has no special NLQ but just a very pleasant letter type. Not mentioned so far but also important is the graphics mode. In this mode drawings and special computer-composed characters can be printed.

In character mode blocks and lines

**Figure four: a screen dump program for the DMP-105**

```

1 REMARK DMP is a printerdriver for DMP-105.
2 REMARK © Machiel A. Prins 1988.
3 REMARK It dumps a complete monochrome
4 REMARK screen on SER2 at 2400 baud.
5 REMARK Command: DUMP "filename"
6 :
10 DEFINE PROCEDURE Dump(f$)
12 IF NOT (" " INSTR f$)>5 THEN f$="mdv2 "&f$
14 IF NOT ("pic" INSTR f$)=LEN(f$)-4 THEN f$="
f$"pic"
16 LBYTES f$,131072
18 cr$=CHR$(13)&CHR$(1)&CHR$(1) : e$=CHR$(27)
20 byt=131072 : rows=256
22 BAUD 2400 : OPEN #3,ser2
24 PRINT #3,cr&e&CHR$(20)&e&CHR$(85)&CHR$(1)&
CHR$(18);
26 REPEAT Dumploop
28 DIM g$(7,513)
30 IF rows<7 THEN k=rows : ELSE k=7
32 FOR i=1 TO k
34 b$=FILL$( " ",520)
36 FOR j=0 TO 128 STEP 2 : b$(j*4+1 TO j*4+8)=
BINS(PEEK(j+byt),8)
38 byt=byt+128 : g$(i)=b$(1 TO 512)
40 END FOR i
42 FOR i=k+1 TO 7 : g$(i)=FILL$( "0",512)
44 FOR i=1 TO 512:b$(i)=CHR$(128+BIN(g$(7,i)&
g$(6,i)&g$(5,i)&g$(4,i)&g$(3,i)&g$(2,i)&
g$(1,i)))
46 Dmp b$
48 rows=rows-7 : IF rows<=0 THEN EXIT Dumploop
50 END REPEAT Dumploop
52 PRINT #3,CHR$(30)&e&CHR$(23)&e&CHR$(85)&
CHR$(0) : CLOSE #3
54 END DEFINE
55 :
56 DEFINE PROCEDURE Dmp(x$)
58 FOR i=1 TO (LEN(x$) DIV 129)
60 PRINT #3,x$(1 TO 128)&CHR$(30)&e&CHR$(21)&
cr&e&CHR$(22)&CHR$(18);
62 ni=INT(1/2) : n2=128*(i MOD 2) : x$=x$(129 TO)
64 PRINT #3,e&CHR$(16)&CHR$(n1)&CHR$(n2);
66 END FOR i : PRINT #3,x$cr$;
68 END DEFINE
69 : REMARK Skip BIN and BINS if already
implemented in your Toolkit!
70 DEFINE FUNCTION BIN(nr$)
72 nr=0
74 FOR j=0 TO 6 : nr=nr+nr$(7-j)*2^j
76 RETURN nr
78 END DEFINE
79 :
80 DEFINE FUNCTION BINS(nr,k)
82 nr$=FILL$( "0",k) : m=2^(k-1)
84 FOR n=1 TO k
86 IF nr>=m THEN nr=nr-m : nr$(n)="1"
88 m=m/2
90 END FOR n
92 RETURN nr$
94 END DEFINE
95 :

```

Listing A: Simplified DMP-105  
screeendump program.

much alike the IBM set can be addressed.

It has no programmable character set, it has no multi-k buffer, auto-cut sheet feeder or 200cps speed. On the

**Figure five: installation data for the DMP-105**

Driver name	DMP105	
Port	SER2	(My other printer is on SER1)
Baud rate	2400	
Parity	None	
Lines/page	72	
Characters/line	96	
Continuous forms	No	(I sometimes use single sheets)
End of line code	SOH,CR,SOH,SOH,SOH (SOH = chr\$(1))	
Preamble code	RS,ESC,SYN,SOH,ESC,ETB,SOH,SO,ESC,SI	(char. mode,
Posamble code	None	(CR = CR + LF, 12cpi, no underline, no elong.)
Bold on	SOH,ESC,US,SOH	
Bold off	SOH,ES,SOH	
Underline on	SOH,SI,SOH	
Underline off	SOH,SO,SOH	
Subscript on		(Not possible; you can choose to
Subscript off		(use this for a different pitch)

other hand, I never expect that from a £100 printer.

There are a few things which would be useful. My DMP cannot backsapce or do reverse line feed. It means that you cannot produce new characters by back-spacing or, more important, use super- or sub-script in text processors like Quill.

Further, the interaction between QL and DMP is not spotless. Most noticeable is that a problem arises when a carriage return is performed. This is definitely not by the book.

### Autobreak

I made the interface cable and started sending the usual strings over the line from SuperBasic to see what happened. Everything worked well but the first character after the carriage return was invariably left away in the printout. When the autobreak function of the printer broke a too long string in two, the first and the third character of the second line were omitted. I decided that I probably could circumvent the problem.

Much later I discovered that in graphics mode also every 128th graphic character did not appear on paper.

An explanation might be that as a result of the necessary length of the interface cable, eight metres or 25 feet, my QL reacts too late when my DMP sends a 'busy' signal. I developed as a general solution the habit to have every chr\$(13), the carriage return character, followed by one or two chr\$(1), which gives no action.

I send lines to the printer only truncated, usually automatically by the text processor for example, so that they do not activate the autobreak routines.

I used Humpty Dumpty with all four Psion programs. No problems arise with Quill, Archive or Abacus when the install-bas is installed correctly. I use the following codes:

For the TRANSLATEs I give a list of differing codes here for some characters of QL and DMP:

QL		DMP
96	£	163
127	(c)	171
128	ä	182
131	é	187
132	ö	183
135	ü	184
136	ç	162
141	à	161
144	è	189
154	ù	188
156	β	185
157	Ç	180
158	Ψ	176
160	Ä	177
164	Ö	178
167	Ü	179
176	ù	165
186	.	166

If you would like a character to appear on the printer which is not in its character set, like the Greek character Pi (π), you can use the Translate to switch to graphics mode, build the character by pixels and return to character mode. It works well, although not with bold or underline.

If other DMP-105s do not forget characters after carriage returns, then the dummy chr\$(1) can be omitted. There are many possible translations. The Psion install-bas cannot handle more than 10 but there is another way. Some versions of the QL, for example my JS, recognise the TRA command. This command installs a list of characters for real-time character translation while printing to ser1 or ser2. Using TRA also means

that printing from SuperBasic causes no extra trouble of taking care of the translations. Anyhow, TRA is really a command to know more about if you have a printer which requires more translations than 10. Talking with Easel is different, since Easel uses a graphic routine to dump a screen-picture to paper.

Having bought a matrix printer for draft printing did not mean I was not interested in other applications. Could I produce a smashing Easel pie on paper? No way. The screendump routine with Easel does not work with the DMP, for the DMP is not Epson-compatible. As a solution, I make a screendump to file and process that file with a self-written screendump program.

The original program takes many pages and is very user-friendly. It can select any part of the screen to dump and can use different patterns to reproduce colours as grey tones. For the people who have a Tandy printer with graphics abilities and like to make a screen dump now and then, I have cut the program to its most essential form — see listing A. This program performs a screendump of the whole screen in one colour. If you do not have a Toolkit with the BIN and BIN\$ routines, you can use the simplified functions in the listing.

### Take time

Take your time. Without Toolkit functions it takes about an hour per screen; with Toolkit functions it is much shorter. An advantage of this program is that it has a fairly one-to-one reproduction ratio.

More than a year after the purchase of my DMP-105 I cannot do without it. I use it for what I bought it, and even more. I have tailored it to my needs, and it co-operates very well now. Most of what I say, will be valid for more printers from the Tandy range; of course, every model has its own specifications and price. I guess that a comparable model these days will sell for about £200.

My QL has a 512K RAM-plus interface and memory expansion and double 3.5in. disc drives from CST. I do not think there is any difference in communication with the DMP-105 compared to a basic QL.

I never needed after-sales support. I clean and grease it myself from time to time. I buy the ribbons at Tandy, since they are a special Tandy type. All other things I buy in cheaper shops.

### Information:

Tandy U.K., Bilston Road,  
Wednesbury, West Midlands  
WS10 7JN.

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# SOFTWARE FILE

**Product:** The Spy  
**Price:** £14.95  
**Source:** Ark Distribution, Corve Farmhouse, Chale Green, Ventnor PO38 2LA. Tel: 098 379 496

ARK Distribution, better-known for its range of Archive RTM-based applications programs such as *Cardfile*, *Mailfile*, *Libraryfile* and its newest database application, multi-file *Arkivist MF*, has released its multi-purpose editor, *The Spy*. With other editors already available for the QL, one might reasonably ask of what possible use is yet another file editor?

The Digital Precision *The Editor* is an exceptionally powerful programmable system, suitable for editing any kind of file. It can be used in three broad modes of operation — text, binary and word processing. Although the modes share similarities they have different applications.

The German editor, *QD*, has one principal advantage in that it is the only file editor which in-

***"The Spy is a stand-alone program, requiring no other extensions or utilities, is compact and, written entirely in machine code, is very fast. It can be multi-tasked alongside other programs, even on an unexpanded QL."***

terfaces with the QJump QRAM pointer system. To be able to use the program, you must have QRAM. Overall, *QD*, together with its ancillary programs, also uses a fairly large portion of memory.

*The Spy*, on the other hand, is a stand-alone program, requiring no other

extensions or utilities, is compact and, written entirely in machine code, is very fast. Comprising a program size of something less than 20K, it can be multi-tasked alongside other programs, even in an unexpanded QL.

One of the principal advantages of *The Spy* over other editors is that its compactness makes it ideal in a programming environment where you may be assembling, testing, crashing, re-loading *ad infinitum* during program development.

## Powerful

Another advantage is that, to have more than one file available for editing, you do not need several versions of the program running concurrently.

A powerful *Spy* feature is that it will read and stack as many files as your memory will allow. More to the point, blocks of lines can be transferred globally between and locally within files.

On start-up, *The Spy* screen displays only the Status Line at the bottom of the screen — unless *Spy* has been reconfigured to

default to Status off — which has three switchable modes of operation — off, include only basic information or set it to provide advanced editing information.

The basic Status line displays drive-filename, insert/overwrite mode, current line number/total

**Does the QL need another multi-purpose editor? Ron Massey takes the measure of *The Spy* by ARK Distribution and offers an emphatic 'yes'.**

file lines and current column number/total file columns. Switching to Advance Status, you are provided additionally with information regarding Offset — current/total; byte value in the range of 0 to 255 the chr\$ code — and Hard/Soft hyphen. Both basic and advanced Status windows display a capslock indicator.

If you wish to alter the configuration of *The Spy* for your applications, the only way to do so is to run the program, read the program file into itself and modify the parameters, such as default drives you wish and write it back again. For obvious reasons, users are urged strongly to modify only back-up copies of the program.

## Three windows

Most of *The Spy* default parameters are user-redefinable. You can also save several versions of the program for use in a multi-tasking environment. Typically, users may wish to define maximum line lengths — 128 to 32,767 characters/bytes.

Since *The Spy* uses three console windows they may be re-set independently with regard to size and position, border, ink and paper colours for the main, error and Status screens. Default cursor control parameters, such as tab intervals, may also be re-set.

A range of the usual commands, both immediate and secondary, associated with file editors is avail-

able. The former can be accessed either by single or combination keypresses, the latter after pressing F3+.

I liked the way cursor movement occurs across a line. If the cursor moves past the width of a window, the cursor line pans with it without pausing to shift the contents of the entire window before continuing.

## Two options

In common with most file editors, *The Spy* does not include provision for printing. If you require hard copy output you have two options — you can either write the entire file or a defined block to your printer port via ser or par.

Also if you wish to include printer control codes, such as underline or bold, Ark suggests that you can use the Psientific Software *Keydefine* for the purpose. Alternatively, if you have *Toolkit II* available you can use the ALTKEY command.

If you use either system for inserting printer control codes it is a good idea to use mnemonic characters, such as "u" for underline or "b" for bold, to switch on your control codes.

Although, on the surface, intended mainly as a programmers' tool, *The Spy* has legitimate applications for virtually any type of file manipulation; that it is an asset for standard QLs is an added bonus. Full marks for a very good product which is also very good value.

**P**reviously I have used space to discuss the way SuperBasic keeps track of the program which it is running. It is easy enough to access the inner workings of SuperBasic from machine code but it is very tricky to do so from a task or Basic program. The problem is that the entire SuperBasic area moves up and down the QL memory as RAM is allocated and de-allocated. SuperBasic moves every time a task is loaded or removed, or RESPR is called, or one of the internal interpreters tables overflows. This can happen between any one instruction and the next so there is no safe way to PEEK or POKE SuperBasic data structures.

The interpreter keeps track of its data via register A6, which always points at the start of SuperBasic while task 0,0 is running. Interpreter routines use A6 as an offset whenever they access memory, so moves do not matter so long as the system routine which does the move adjusts A6 before re-starting Basic.

Unfortunately the value of A6 is normally inaccessible unless you are using machine language and your code is running as part of task 0,0. This month DIY Toolkit presents routines which read and write SuperBasic memory reliably from any task.

There are three new functions — to read bytes, words and long words from SuperBasic memory. They are similar to the standard, crude but powerful PEEK, PEEK-W and PEEK-L. I have called them BPEEK%, BPEEK-W% and BPEEK-L; the 'B' stands for Basic and the percent signs indicate that the first two return integer values.

You can also store values, although I have listed only one such command, BPOKE, which stores single bytes. You can see this repeatedly for 16- and 32-bit values but you may prefer to expand this month's code to include word and long word storage com-



# DIY TOOLKIT

Each month Simon Goodwin adds new commands to the QL repertoire. This month he answers readers' questions and gives you access to the shifting bytes of SuperBasic.

QL World DIY Toolkit December 1988, Listing 1 page 1 of 2.

```
* QL WORLD DIY TOOLKIT - BASIC ACCESS routines
* Ver. 0.5, Copyright 1988 Simon N Goodwin.
*
start      lea.l   define,a1
           move.w  $110,a2      BP.INIT vector
           jmp    (a2)
*
define     dc.w    1           One procedure
           dc.w    bv_poke-*
           dc.b    5,'BPOKE'
           dc.w    0,3         Three functions
           dc.w    bv_byte-*
           dc.b    6,'BPEEK%'
           dc.w    bv_word-*
           dc.b    8,'BPEEK-W%'
           dc.w    bv_long-*
           dc.b    7,'BPEEK-L'
           dc.w    0           End of functions
*
find_basic moveq   #0,d1       SuperBASIC task ID
           moveq   #0,d2       = task at top of tree
           moveq   #2,d0       MT.JINF
           trap    #1         A0 -> Base of task 0,0
           rts
*
bv_poke    lea.l   16(a3),a4    Check for 2 parameters
           cmp.l   a4,a5
           bne.s   bad_param
           move.w  $118,a2      CA.GTLIN
           jsr    (a2)         Get long integers
           bne.s   bad_exit
           move.l  0(a1,a6.l),d4 Get address offset
           move.l  4(a1,a6.l),d6 Get new value
           trap    #0         Stop SuperBASIC moving
           bsr.s   find_basic
           move.b  d6,0(a0,d4.l)
           bra.s   return_ok
*
bv_long    moveq   #-1,d5
           bra.s   bv_peek
bv_word    moveq   #1,d5
           bra.s   bv_peek
bv_byte    moveq   #0,d5
bv_peek    move.w  $118,a2      CA.GTLIN
           jsr    (a2)         Get a long integer
           bne.s   bad_exit
           move.l  0(a1,a6.l),d4 Leave room for an integer
           addq.l  #2,$58(a6)    Allow access to odd bytes
           tst.w   d5
           beq.s   maybe_odd
           btst   #0,d4
           bne.s   bad_param    Reject odd offsets
           subq.w  #1,d3
maybe_odd  beq.s   good_enuf    Allow just 1 parameter
bad_param  moveq   #-15,d0
bad_exit   rts
*
```

```

100 REMark Sinclair QL World HEX LOADER
110 REMark by Marcus Jeffery & Simon N Goodwin
120 :
150 CLS: RESTORE : READ space: start=RESPR(space)
160 PRINT "Loading Hex..." : HEX_LOAD start
170 INPUT "Save to file...";f$
180 SBYTES f$,start,byte : STOP
190 :
200 DEFine FuNction DECIMAL(x)
210 RETURN CODE(h$(x))-48-7*(h$(x)>"9")
220 END DEFine DECIMAL
230 :
240 DEFine PROCedure HEX_LOAD(start)
290 byte = 0 : checksum = 0
300 REPEat load_hex_digits
310 READ h$
320 IF h$="" : EXIT load_hex_digits
330 IF LEN(h$) MOD 2
340 PRINT"Odd number of hex digits in: ";h$
350 STOP
360 END IF
370 FOR b = 1 TO LEN(h$) STEP 2
380 hb = DECIMAL(b) : lb = DECIMAL(b+1)
390 IF hb<0 OR hb>15 OR lb<0 OR lb>15
400 PRINT"Illegal hex digit in: ";h$ : STOP
420 END IF
430 POKE start+byte,16*hb+lb
440 checksum = checksum + 16*hb + lb
450 byte = byte + 1
460 END FOR b
470 END REPEat load_hex_digits
480 READ check
490 IF check <> checksum
500 PRINT"Checksum incorrect. Recheck data.":STOP
520 END IF
530 PRINT"Checksum correct, data entered at: ";start
560 END DEFine HEX_LOAD
570 :
580 REMark Space requirements for the machine code
590 DATA 268
600 :
610 REMark Machine code data
620 DATA "43FA000A34790000","01104ED200010038"
630 DATA "0542504F4B450000","0003005806425045"
640 DATA "454B2500004A0842","5045454B5F572500"
650 DATA "003A07425045454B","5F4C000072007400"
660 DATA "70024E414E7549EB","0010BBCC66463479"
670 DATA "000001184E92663E","2B31E8002C31E804"
680 DATA "4E4061D811864800","604E7AFF60067A01"
690 DATA "60027A0034790000","01184E9266182831"
700 DATA "E80054AE00584A45","6706080400006604"
710 DATA "5343670470F14E75","4E4061A04A456708"
720 DATA "6B1E323048006006","720012304800226E"
730 DATA "00583381E8007803","027CD8FF70004E75"
740 DATA "22304800027CDBFF","38012A01671C383C"
750 DATA "081FD28169145344","2A0170102205E1A1"
760 DATA "69049B402A01E240","66F2720430790000"
770 DATA "011A4E90226E0058","59492D4900582385"
780 DATA "E8023384E8007802","70004E75","*",18570

```

mands, like BPOKE-W and BPOKE-L. This has been left as an easy exercise for the reader; you need only 12 extra lines of machine code, plus four lines to define the new commands.

Once you have access to SuperBasic memory you can write all kinds of useful utility routines. You can trace the Basic line number from another task with BPEEK-W%(104) or stop the program currently running with BPOKE 143,128.

You can look through the name list and edit every instance of a name throughout the program with a few BPOKEs, as in Listing 3. Alternatively, you can check the current data line-number with BPEEK-W%(148); BPEEK%(151) tells you the number of the next item in the DATA list.

Other values for BPEEK and BPOKE are listed in Adrian Dickens' *QL Advanced User Guide* and Andy Pennell's *QDOS Companion*.

The routines should work reliably on any QL-compatible computer, including the ST emulator, CST Thor and Thor 16. They work in compiled tasks and always refer to the memory used by SuperBasic task 0,0.

The assembly code is in Listing 1. As usual, the START routine calls BP.INTT, the ROM vector which adds new routines to SuperBasic. The table labelled DEFINE gives the names and addresses of one procedure and three functions.

FIND-BASIC is a subroutine which returns with the address of SuperBasic in register AO. It finds the address by calling MT. JINK,

which can find the start of any task, given a task identifier in D1. In this case I set D1 to 0, the task identifier of SuperBasic.

BV-POKE is the start of the code for BPOKE; it fetches both its parameters as long integers, to make it easy for you to add BPOKE-W and BPOKE-L; all you need to do is add extra entry points and use a flag in a safe register, say D5, to determine the size of data to be stored. The BPEEK routines work just this way.

Only the last eight bits of the value are used when storing a byte, so BPOKE X,770 stores two, just like POKE X,770. The binary form of 770 is 1100000010, so the bottom eight bits are 00000010 or 2 in decimal.

You can BPOKE negative values. Again, the result is the same as for POKE, except that the address is offset from the start of SuperBasic.

Normally SuperBasic can move at any time to make room for tasks or resident procedures. It would be a disaster if SuperBasic moved after the address of Basic was found and before a value was stored, because the value would be in the wrong place, with unpredictable but usually unpleasant results.

I use TRAP #0 to switch the processor into 'supervisor mode' while SuperBasic is meant not to move. This trap prevents the QL using its 'scheduler' to swap to another task; it locks the current task in control until we clear the 'supervisor' bit in the status register.

Once we have done our stuff we can switch back to 'user mode' by tweaking the processor status register (SR) and ANDI#\$DFFF,SR. The scheduler re-starts when the next interrupt occurs. ANDI#\$D8FF,SR is similar but also ensures that all interrupt signals are allowed.

You can change the value of SR only while in supervisor mode. It is important to stay in user mode as much as possible. If you hop between modes the QL ignores some timing interrupts, so multi-tasking becomes erratic.

The 68008 has two different stacks, one for each mode. It swaps between them automatically when you switch modes but it is vital to remember when a swap has occurred. I use TRAP #0 immediately before both calls to FIND-BASIC but I could not put the TRAP inside the subroutine because the RTS instruction would then look on the wrong stack for its return address. You can switch modes inside a subroutine but you must return in the mode you were in when the routine was called to ensure the correct value of A7.

The BPEEK functions are very similar to the channel access

functions, listed in the May edition. The difference is that they read values relative to the start of Basic rather than the start of a channel definition. Once again D5 is a 'flag' to indicate the type of result needed; much of the code is shared between all three functions.

Basic can be more than 32K long, which is why BPEEK expects a long integer parameter rather than an integer. After the parameter is fetched I tweak BV.RIP, the maths stack pointer, to leave room for an integer result.

Long word values must be returned in floating point form, so BPEEK-L uses the May 'normalise' routine to convert the value and check there is room for it on the stack.

The code for the SuperBasic access routines is listed in two forms. Listing 1 is the source text, assembled using HiSoft *DevPac*. You can type this text into your assembler if you want to customise the code or tweak it to see how it works.

Listing 2 gives you a quick way to enter the code without using an assembler. It loads the equivalent machine code from DATA statements and saves it in the file. The first part of listing two is Marcus Jeffery's hex loader, used in each month's DIY Toolkit project. Only the DATA, from line 590 onwards, changes from month to month.

When you RUN listing two the data is read and checked. A message appears if you have made a typing mistake. Otherwise the loader asks you to enter the device and file-name and creates a concise code file. You must load and link this file before loading Basic programs which use the new functions. These three commands will link the code into Basic:

```
base=RESPR(268) : LBYTES "file
name",base : CALL base
```

Once you have typed these commands you can use BPEEK%, BPOKE, BPEEK-W% and BPEEK-L in your programs.

The June and November episodes of DIY Toolkit contained extra information about SuperBasic memory areas. The most comprehensive source is Jan Jones' book, *QL SuperBasic, the definitive handbook*, but that is now out of print and difficult to find. There is no space for a detailed discussion but if readers are interested I will conduct a guided tour through the interpreter's work areas in a future article.

In the meantime, these routines will let you explore for yourself. The first 18 long words, from BPEEK-L(0)

```
good_enuf trap #0 Beware: A7 changed
          bsr.s find_basic
*
get_value tst.w d5
          beq.s get_byte
          bmi.s get_long
          move.w 0(a0,d4.1),d1
          bra.s return_int
*
get_byte moveq #0,d1 Return values 0-255
          move.b 0(a0,d4.1),d1
*
return_int move.l $58(a6),a1 Fetch BV.RIP
          move.w d1,0(a1,a6.1) Put result in space
          moveq #3,d4 Indicate type is INT
return_ok andi #$D8FF,sr Restart multi-tasking
          moveq #0,d0 Return, no error
          rts
*
get_long move.l 0(a0,d4.1),d1
          andi #$D8FF,sr Restart multi-tasking
*
* Convert D1.L into a floating point value (see May DIY TK)
*
return_fp move.w d1,d4 D4 will be exponent
          move.l d1,d5 D5 will be mantissa
          beq.s normalised Zero is a trivial case
          move.w #2079,d4 First guess at exponent
          add.l d1,d1 Already normalised?
          bvs.s normalised
          subq.w #1,d4 No, halve exponent weight
          move.l d1,d5 Double mantissa to match
          moveq #16,d0 Try a 16 bit shift
*
normalise move.l d5,d1 Take copy of mantissa
          asl.l d0,d1 Shift mantissa D0 places
          bvs.s too_far Overflow; must shift less
          sub.w d0,d4 Correct exponent for shift
          move.l d1,d5 New mantissa is more normal
too_far asr.w #1,d0 Halve shift distance
          bne.s normalise Try shift of 8, 4, 2 and 1
*
* Check there's enough space for the result: (6-2) bytes
*
normalised moveq #4,d1 No. of extra bytes needed
          move.w #11A,a0 BV.CHRIX vector
          jsr (a0)
          move.l $58(a6),a1 Get safe A1 value
          subq.l #4,a1
          move.l a1,$58(a6) Grab 4 more bytes safely
*
          move.l d5,2(a1,a6.1) Stack mantissa
          move.w d4,0(a1,a6.1) Stack exponent
          moveq #2,d4 Floating point result
          moveq #0,d0
          rts
*
end
```

onwards, point to nine SuperBasic tables — the input buffer, token buffer, program file, name table, name list, variable values, channels, return information, and line-numbers for the listing window. For each area the first long word is the offset of the start of the area inside SuperBasic. The second long word points just past the end of the area.

Listing three is a short example which uses all four of this month's routines. It scans through all the entries in the name table, checking for SuperBasic procedures and functions which have name types 4 and 5 respectively. When the entry for a SuperBasic definition is found, the program looks up the name in the name list and changes any lower-case letters into capitals.

SuperBasic always mimics the capitalisation used when it first

found a name, so this is a good way to make your programs consistent if you mis-type a name when you first enter it. It is a good idea to define routines in capitals, while doing most of your typing in small letters; you can then spot mis-typed names easily, because they are not converted into capitals when they appear in the listing window.

Alistar Wood of Menston has written to ask about the EDLINE\$ function, discussed in the January *QL World* and listed in February. The code lets you edit a line and confirm it with ENTER. Wood wants to edit several fields in lines on the screen and would like to use the up and down arrow keys to enter a field and move to the next.

As it stands, the up and down arrows are ignored but it is easy to modify EDLINE\$ so that they are



QL World DIY Toolkit December 1988, Listing 3.

```

100 REMark BASIC PROC/FN name capitaliser
110 REMark Copyright 1988 Simon N Goodwin
120 :
130 FOR i=BPEEK_L(24) TO BPEEK_L(28)-1 STEP 8
140   name_type=BPEEK%(i)
150   SElect name_type
160     =4 TO 5 : text_ptr=BPEEK_W%(i+2)+BPEEK_L(32)
170     FOR j=text_ptr+1 TO text_ptr+BPEEK%(text_ptr)
180       char=BPEEK%(j)
190       SElect char=CODE("a") TO CODE("z") : BPOKE j,char-32
200     END FOR j
210   END SElect
220 END FOR i

```

returned to Basic. In essence, all you need to do is remove the four lines after the label 'edited' on line 133 of the assembler listing.

If you do not want to re-assemble the program you can get the same effect by directing the branch on line 119 to the label 'enter' instead of to 'edited'. This short-circuits the lines which reject the arrow keys. The easiest way to make this change is to load the code and POKE a new branch offset before linking the code into SuperBasic.

```

X ÷ RESPR(350)
LBYPES "MDV1-EDLINE-CODE",X
POKE X + 237,44
CALL X

```

This POKE leaves the terminating character at the end of every string returned by EDLINE\$. You can tell which key ended the edit by checking the code of the last character; it will be 10, for Enter, 208 for 'up arrow' or 216 for 'down arrow.'

G. J. Blake writes to ask if I can add the Microsoft Basic statement WEND to QL SuperBasic. He says: "This would enable the building of an expert system for the QL within the scope of most programmers."

WEND marks the end of a WHILE loop. In Microsoft Basic you might write something like:

```

WHILE busy
PRINT "Go away!"

```

## WEND

In QL SuperBasic you would use a REPEAT loop instead:

```

REPEAT loop
  IF NOT busy : EXIT loop
  PRINT "Go away!"
END REPEAT loop

```

This is longer but more flexible than WHILE. You can put tests at any point in a REPEAT loop, whereas WHILE allows only one test, after the WHILE; this is checked at the start of each loop. REPEAT loops also have individual names, so programs which use them tend to be easier to read than ones using WHILE loops.

WEND is not much help in writing a Basic expert system. The main problem with expert systems is that they are touted as a way to computerise problems which are not sufficiently well understood to be programmed in a conventional way. Expert systems try to move the burden of applications programming from the user to the machine. This is tricky, whatever the grammar of your implementation language.

● Next month I will present more Toolkit code and commentary. If you would like me to explore a specific area in this column, or implement new commands, particularly ones unavailable in commercial toolkits, please send your suggestions.

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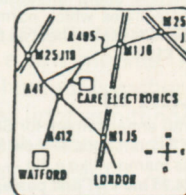
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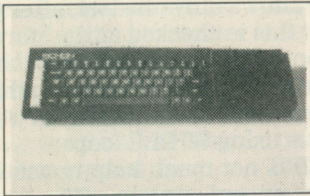
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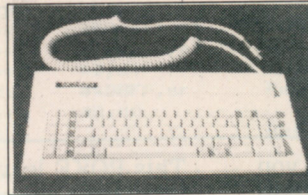
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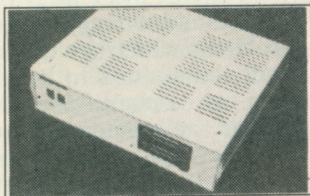
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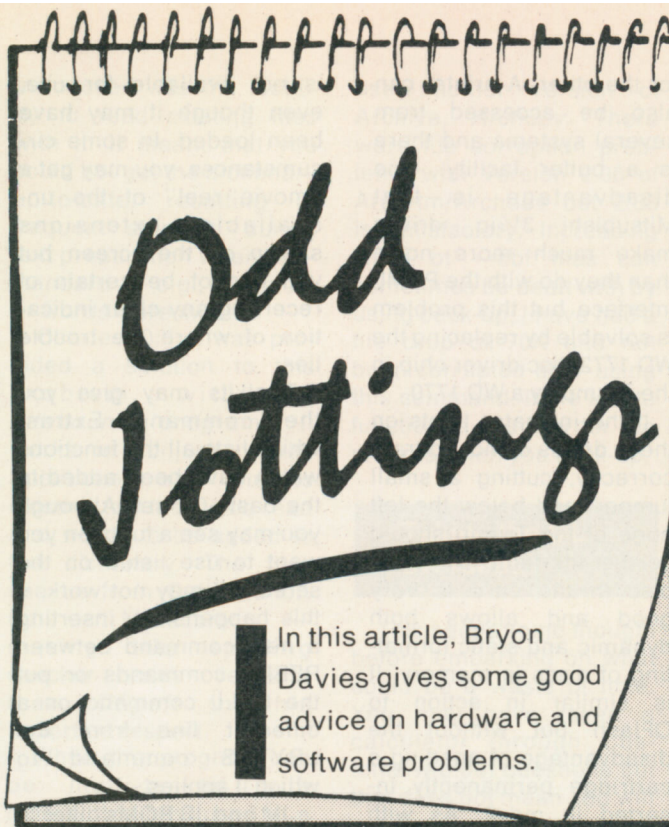
**T**he small routine — see Software Applications, *QL World*, May, 1987 — and page 11 of

the October, 1985 issue — for reducing the time taken for a re-set on an expanded-memory QL usually works well but the boot file which follows the re-set may occasionally not be read. This seems to happen when discs are changed. The boot will be "in use" if directoryed. To avoid this, when warm resetting, hold down the ALT key until the drive concerned has stopped turning and then press F1/F2.

Neither the Ice version of this routine nor a general one work on my system when a Trump Card memory expansion is fitted; the problem is connected with how the re-set command routine is utilised and it may be fixable by using a poke instruction — check with *Miracle*. The re-set function in *Taskmaster* may also fail to work with the Trump but this has now been attended to in a revision to this program.

Until recently, I thought that discs and their drives did not suffer from the same compatibility problems as Microdrives. It is common knowledge that program files on a cartridge which give no problems with one Microdrive may be useless on another but I have only just experienced a similar phenomenon with discs. Three discs with the same program cause my #1 drive to emit unusual noises, although #2 seem less unhappy with them; files on the first disc could not be copied, some on the second were as bad, but those on the third allowed copies to be made.

The copies work without problem. None of my other discs gives the problem, on either drive. It is certainly significant that I acquire relatively few discs with programs already on — working copies are mostly



taken from Microdrive masters. The problem seems to lie in differences between NEC and Mitsubishi one-third-height drives; the former are used by several software suppliers for duplicating program discs and Mitsubishi drives do not take kindly to some of those discs.

This situation should not be confused with the one where a disc is faulty; if the latter is the case, a format operation is likely to fail, whereas the discs referred to here give no trouble when formatted. Beware with cartridges; if a program is not copy-protected it may be possible to copy it from one floppy to the other and get it to run then.

Errors can occur with discs but by no means as frequently as with cartridges; in more than 7,000 hours of usage I have yet to detect any error with my drives but can almost guarantee to hit some snag each time I go back to using Microdrives. To ensure this kind of disc performance, however, it is important to avoid the drives and discs getting dirty and to be choosy when buying discs; use a disc cleaning kit — *Inmac*

— at least once a month, vacuum the system area frequently — a car vacuum is useful — and buy either good branded discs — e.g., 3M, Fuji — or ones known to be from the same makers.

On the latter point, I have used blue discs which were sold as being made by Fuji, although marked only Made in Japan, and had no trouble with them. Noise from discs may be just a feature of the particular manufacturing process; supposedly, Japanese discs have a coating on them which makes them noisier than U.S. ones but this does not affect the performance. One well-known figure in the QL world spent thousands of pounds on replacement discs after very bad experience with sub-standard ones on office computer systems.

Corruption is a word which is not so much used these days, being mainly a feature of the bad old days of poor Microdrives and cartridges and the tape-resident versions of the *Psion* programs. You do not remember Version 1.00? Then I had better not dwell on it, but do not think

that you have "the ultimate" if your version number is 2.00. If that is your level, obtain version 2.35, because there is a difference in the memory department which prevents switching programs working to best advantage with 2.00.

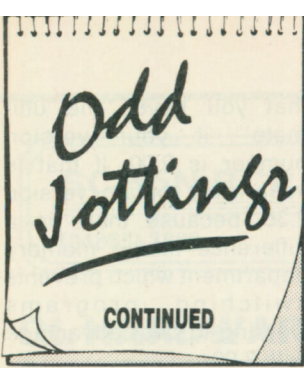
The best method of approach to errors produced on cartridges is to use discs instead; that may sound facetious but the cost of a disc system may well be less than that of your lost time, or revenue, after losing cartridge files. If money prevents this approach, try and work in RAM rather than accessing the Microdrives all the time. This necessitates buying a RAM-disc program — often provided as part of an interface. Read the reviews, because such programs vary considerably in speed; the fastest at this time seem to be *QFlash*, the one provided in the *Trump Card*, and the one with *QRam*.

They are different from the usual RAM-disc programs and allow better utilisation of memory. The switching program *Q-Switch* also improves Microdrive saving times dramatically. On earlier QLs, increase the number of sectors available by removing the drive rollers, then cleaning and re-fitting them the other way up. Clean the read/write heads also.

Clean your mouse every so often. The internal pick-up rollers collect some dirt in a few months. If printer behaviour is rather ragged, the light emitting/sensing mechanism in the mouse may be faulty, or the connection of the mouse to the QL may be bad.

Having used one of these for a few months, I find it well worth having, although it took some time to alter my system to make full use of it. The big increase in memory must be





the main attraction and I have found all that memory to be usable and trouble-free. For those who have found memory to be in very short supply when *Taskmaster* is in use, the Trump is an answer. If you already have an internal interface, such as the 256K, take it out, because you will not get more than 896K and you may find one memory bank interfering with the other.

The Trump is rather difficult to insert into the expansion connector. If you are nervous about bending pins on this connector — it has happened — open the QL and watch to see that the Trump lines up correctly with the connector before you apply pressure to insert it. I think it desirable to fit a small piece of insulating material under the left front corner to support the card. A very comprehensive instruction booklet is supplied but you may need a magnifying glass to read it.

Toolkit II is included, containing a host of handy commands; the networking commands save much time during the process of re-configuring systems. It is easy to access one set of disc drives from two systems, allowing one to make system software changes on one system and then transfer them via the network lead to the other system for checking. I find this desirable is that *Editor* is a vital tool for modifying boot programs and it took me many hours to get all the necessary extensions to load on each system — I needed *Editor* working on one system to be able to modify the boot

for the other. A printer can also be accessed from several systems and there is a buffer facility. One disadvantage is that Mitsubishi 3½in. drives make much more noise than they do with the PCML interface but this problem is solvable by replacing the WD 1772 disc driver chip in the Trump by a WD 1770.

If the indicator lights on these drives do not operate correctly, cutting a small jumper lead below the left edge of the Trump should correct the fault. The RAM disc in the card is very good and allows both dynamic and static formatting of discs in memory. It is similar in action to QFlash but without the disadvantage of needing a cartridge permanently inserted in mdv2. As with that program, you can load all files from a cartridge in about six to nine seconds. When in doubt about memory, you can find how much is fitted and working by typing-in PRINT PEEK—L (163872). The answer on the screen should be 1048576 when the Trump is fitted. To calculate the figures for other amounts of memory, use the formula Displayed Memory =  $1,024(256 + X)$ , where X = the expansion memory fitted. For example, if you have a 256K expansion fitted to a basic 128K QL, the screen value should be  $1,024 \times (256 + 256) = 524,288$ , for 384K total.

### Extensions

When you have several SuperBasic extension files loaded at the same time you may find that programs which work with their aid give trouble. It is worth altering the order in which the files are loaded, or called, to see if that will solve the problem; apparently different versions of Qdos react differently from SB extensions. The message "not implemented" makes it clear that some extension

is not available for use, even though it may have been loaded. In some circumstances, you may get a "movie reel" of the unavailable extensions shown on the screen but you cannot be certain of receiving any clear indication of where the trouble lies.

Toolkits may give you the command Extras, which lists all the functions which have been added to the basic QL set. Although you may see a function you want to use listed on the screen, it may not work; if this happens, try inserting a new command between RESPR commands or put the CALL command on a different line from the LBYTES command to which it applies.

JM and JS ROMs differ in the way they look at extensions; whereas an extensions file may work when put at the start of a boot routine with a JM, it may be necessary to put it on later for a JS; this may be the answer if you have had difficulty getting *Editor* to work under *Taskmaster*.

### Networking

When using Toolkit II, whichever way it is loaded, there are a few points to remember to avoid some cursing. If the Toolkit is on an interface, activate it by the TK2—EXT command; with the Toolkit ROM, the commands are active automatically. Identify each QL in the proposed network by typing-in NET 1 on the master and NET 2 and so on on slaves, followed by Enter. FSERVE and Enter have to be typed-in on the slaves; to avoid hiccups, type it in on the master also, in case you make requests to that from a slave.

As commands such as FSERVE are not in the basic QL you can use them only from a QL which has TK2 active — you will need TK2 to be present in each QL on which these com-

mands are to be given. Re-enter the commands after a QL has been re-set. If you use a master boot routine which is loaded whenever there has been a re-set, the TK2—EXT and NET commands can be put at the start of it but FSERVE may have to be entered subsequent to running of the boot. Typical operations which can be performed are:

DIR n2—flp1— (keyed in at the master, this gives a Directory of a slave drive);

WCOPY flp2—,n2—flp1— (this copies all files from a master drive to a slave drive);

R.n2—flp1—boot — used in *Editor*, this reads thefile <boot> from a slave drive.

When copying files, remember that the QL can recognise cartridges from information contained on them; you might transfer a file satisfactorily from one system to another, then find that the file is not available if you move the cartridge from one to the other. This situation can also happen if a file is transferred and Quill is asked to load it; the receiving system may have to be re-set to get Quill to load such files.

Printers as well as drives can be accessed from QLs to which they are not connected directly. When accessing a printer attached to a slave QL, some programs will print to a device <n2—Ser1> but others will not accept this. With Quill and *Editor*, alter the device name in the printer—dat files. Although the way of printing from programs in which you cannot easily alter the printer driver file would appear to be in insert the <PRT—USESer1,n2—Ser1> command. I have not been able to get this to work. If you have the SDUMP, SDP—DEV commands, the screen picture from one QL can be dumped to a printer connected to another, using a hotkey so that no extraneous matter gets on

to the screen when the command is given. The required left margin should be set on the printer before the dump is started; a typical SuperBasic line of this is:

```
OPEN#6,n2—Ser1:PRINT#6  
chr$(27)&chr$(40):CL  
OSE#6.
```

This sets the left margin to 40 on a Kaga Taxan/Canon printer.

### Printing from Editor

The addition of a printer driver for the Editor program has made it much more useful and a serious alternative to Quill. The driver allows more printer functions to be selected than does Quill, and the spooling of more files than most people will print in one session. As you might expect, you have to work at it to get the driver configured the way you want it but the results make the effort worthwhile. If you like to stop printing after each page, specify some unused keyboard character to signify a pause and put it at the start of each page or document; this will cause the driver program to stop before printing the line on which the character occurs.

### Missing last line

When printing a Quill document, you may have found that the last line does not appear. To ensure it is printed put a Page Break after it and press Enter to get the cursor on to the first line of the next page. Doing this also assists correct stepping of continuous paper if you have set Quill to stop after every page printed. You have to press ESC then space after the print to free Quill for further use.

### Spellbound retrospective

One big disadvantage of *Spellbound* when it was

introduced was the inability to read existing files with it. It meant that you could not get the dictionary up-to-date, resulting in frequent stopping during text preparation when non-standard — e.g., technical — words were input.

Charles Dillon has provided a solution to this problem, with his *Filebound* program. It works in conjunction with *Spellbound* and enables existing text files to be read and words to be added to the dictionary. The files can be from Quill, Editor, Ed — Metacomco — making this spelling checker more versatile than *QSpell* in this important respect.

While the program can be multi-tasked with others, it is best used in a completely clean QL because it can stop during checking of files if there are other programs loaded. *Spellbound* stops much less frequently when you have read in a few thousand words from your existing files. *Filebound* is available from PDQL, price £5 — enclose a blank cartridge and stamped, addressed envelope; *Spellbound* plus *Filebound* costs £35. *Filebound* is also available from Microdrive Exchange — see November issue for program details.

### Database

There is an alternative to Archive also but it is a derivative of the program rather than a competitor to it. *Run-time Archive* — Archrtm — is a stripped-down version of Archive, retaining just the functions necessary for running a program. It is about 15K smaller than Archive and is generally more suitable for stand-alone programs; the Eidersoft *Impacct* accounts package, and the Quanta library guide, both use it.

You cannot use Archive to edit — pro files for use with Archrtm; you have to

use another version of Archive, *Archdev*. There were file corruption problems with Version 2.36 of Archrtm/Archdev but 2.38 is satisfactory. Increasing sizes of —dbf files can sometimes be dealt with by using back-up; I have had a file drop of 70K and not been corrupted after using this command. If the locate function is used, order the records when you back-up.

### Taking the QL overseas

This needs some thought before embarking on what could be a waste of time. You may have taken a calculator through Customs without questions but that does not mean you will not be stopped and asked to produce the appropriate documentation when carrying a computer.

What mains power is there in the country to which you are going? Knowing that the QL power supply does not have much in the way of reserve power for unusual usage, anticipate trouble if the voltage or its frequency are not 240V/50Hz. In fact, despite misgiving, a friend has recently been using one of his QLs on the 220V/60Hz supply in Brazil, apparently without serious difficulty.

The power supply runs hot, as might be expected with the different frequency; extended running cannot be recommended. The slightly lower voltage should present no problem but remember that a few areas still have much lower voltages, such as 110-115V, and that is no use for the QL unless there is an auto-transformer available to step up the level to 220V-240V. The display may present a bigger problem. What are the pin connections for the signal lead? Do you know what your QL pin connections are? Note that early QL User Guides gave incorrect pin designations.

An unbuffered connection between QL and display is a good way of blowing the 8301 chip in the QL.

Then there is the matter of the picture structure; you cannot plug into any TV or monitor and expect a stable picture. It may be necessary to have a TV or computer repairman handy to make adjustments to the display. If a TV is used, the characters may be an odd size; the U.S. QLs use a

### Information

*Disc cleaning kit.* Inmac (U.K.) Ltd, 16 Silver Road, London W12 7SF. Tel: 01-740 9540.

*Q—Switch.* Transform Ltd, 24 West Oak, Beckenham, Kent BR3 2EZ. Tel: 01-658 6350.

*Archrtm/Archdev 2.38.* Psion Ltd, Psion House, Harcourt Street, London W1H 1DT. Tel: 01-723 9408.

*Archrtm/Archdev 2.38. Filebound.* PDQL, Unit 1, Heaton House, Camden Street, Birmingham B1 3BZ. Tel: 01-233 3042.

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

TK Computerware, Stone Street, North Stanford, Ashford, Kent TN25 6DF. Tel: 030281 2801.

different number of pixels to represent characters, because the TV system used there is different from that used in the U.K. The configuration routine for the Editor program allows you to make this change but for that program only. Carry a conversion program if you wish to exchange files with another system type such as a PC-compatible. It might be better to buy a Z-88.



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- o Automated printer driver selection (useful for program swapping and also for selecting different typesizes from your printer)
- o Automated set up of the QL clock minimises typing by remembering the year/month/day.
- o Multi-tasking clock program.
- o Compatible with the QL front end program QATS.

All these features, and Task Swapper still only uses 10K of RAM, and is compatible with floppy discs, ROM toolkits, RAM discs and useful utilities such as QL Keydefine.

**Mega Toolbox NEW 29.95**  
 (Demonstration cartridge - redeemable against purchase: 10.00)

This is not just another run-of-the-mill QL toolkit. It adds over 168 new commands to QL basic, and truly breaks new ground. Extensive and original use is made of the QL's multi-tasking ability, enabling the basic programmer to perform wonders, even if he wants to compile his programs.

**Main Features:**

- o Designed for use by serious programmers and software houses.
- o Improved control of QDOS resources (including memory, keyboard, pipes, files, jobs, alarm clocks and time playing jobs.)
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- o Dual screen handling (copying, 3-wrapping, automated screen mode control.)

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**Main Features:**

- o Tokenised rules save memory (about 100 rules in a 128K QL).
- o Precompiled expressions for fast rule evaluation.
- o Intelligent searching and pre-announcing of rule base.
- o Boolean and fuzzy logic plus user definable probability relationships.
- o Formatting of input and output and ability to construct menus for the user.
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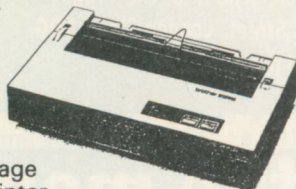


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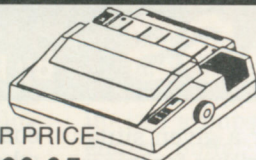


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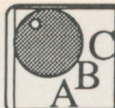
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F8	SHIFT F3	SCROLL LOCK	CTRL F5
F9	SHIFT F4		

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This controls the function of the numerical pad. Is NUMLOCK on; then a keypress on it generates the numbers and characters shown at the keys, otherwise

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HOME  
END  
PAGE  
PAGE  
DEL  
INS  
CTRL -  
CTRL +  
SYSREQ  
CTRL PRN  
ALT SHIFT SYSREQ  
PRN  
ALT SHIFT PRN

#### CURSOR CONTROL

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Cursor to end of line (in editors only)  
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Delete character under cursor  
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program slow down  
program speed up  
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toggles MODE 4 and MODE 8  
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s.u.  
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THE

# P + R : O = G < S

If you have a program worthy of consideration, send it to 'The Progs',  
Sinclair QL World, Greencoat House, Francis Street, London SW1P 1DG.  
We pay for everything published at the usual page rates.

## Program of the month

### CRITICAL MASS by Patrick Carter

**C**ritical Mass is a game based on nuclear fission chain reactions. The idea is to blow all your opponent's pieces off the board before your opponent can do the same to you.

The game is played on a 6x6 square matrix. Players take turns to place counters on the board. Each square has a maximum number of counters which can be placed on it before it explodes, dispersing its counters to the adjacent squares vertically and horizontally. The critical mass of a square is equal to the number of squares adjacent horizontally and vertically to it, i.e. Corners - 2, Sides - 3, Centre - 4.

Any of these dispersed counters landing on an opponent's piece changes it to your own. If any of these pieces has also reached its critical mass it will also explode; hence by careful planning you can wipe out all your opponent's piece changes to your own. If any of the pieces has also reached its critical mass it will also explode; hence by careful planning you can wipe out all your opponent's pieces with a single chain reaction of explosions.

The problem with implementing a game like this on the computer is that it is possible to set off a chain reaction of 25 explosions by one fatal move and lose. This means a look-ahead algorithm would be difficult to implement with the number of possible moves from a given position, leading to a waste of both valuable memory and time.

The next best solution is to use a static algorithm which tries to pick

out the best move for a given situation. A simplified algorithm for this is shown and was developed mainly by trial and error by playing the game.

computer will not move into a square where it can be blown up by adjacent opponent's piece, i.e. attacked directly or indirectly.

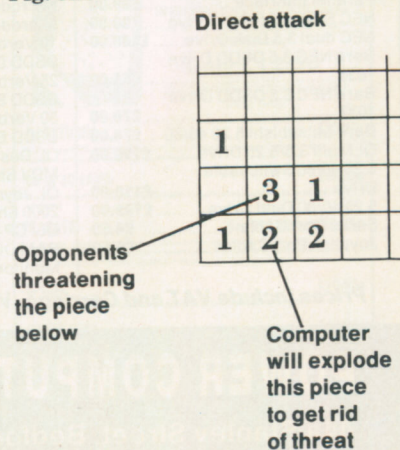
#### ALGORITHM

- 1 Is any piece in danger of being destroyed by the enemy — direct or indirect attacks?  
Yes — Can we destroy the offending enemy piece by exploding an adjacent square?  
Yes — Solve problem and make move.  
No — Struggle on with algorithm.
- 2 Can the computer move into a vacant safe corner?
- 3 Can the computer go in the sides between corners it holds?
- 4 Build out from a held corner towards an opponent's corner?
- 5 Go in the middle nearest two corners it holds?
- 6 Go in the middle and build out from a corner owned towards the opponent?
- 7 Go in the centre?
- 8 Go in any safe move on the board?
- 9 Go anywhere which you hope will not trigger a chain reaction if blown up when an adjacent enemy piece explodes?
- 10 Go anywhere?

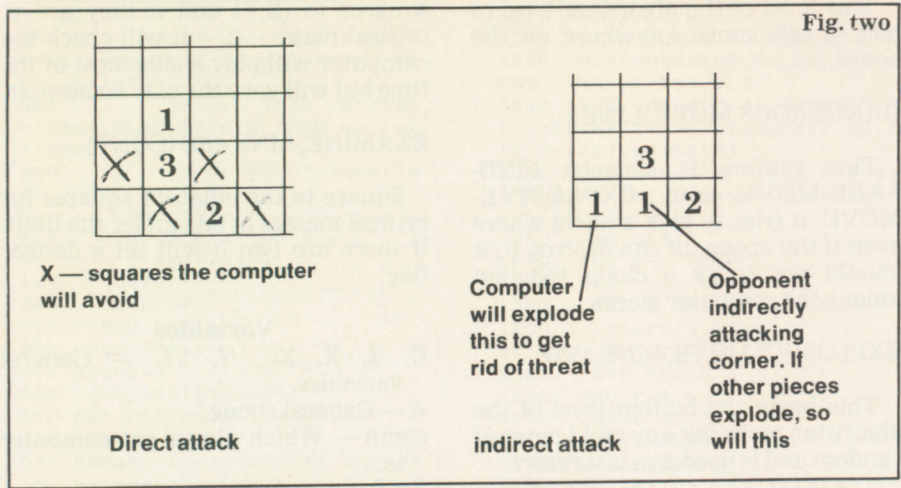
The program will start at the top level and work its way down the bottom level until it finds a valid move. Obviously the lower level the more risky the moves produced will be. The program has its disadvantages as it will play similar moves to given situations but several RND functions in the program should vary the play somewhat.

As a rule, the computer will try to play the following moves: 1, It will never explode any pieces unless they are threatened by the opponent — see point No. 2 — or it has no other choices left — i.e., has reached level 10. 2, It will always explode any piece if it can when that piece is threatened by direct or indirect attacks. 3, The

Fig. one







You will undoubtedly develop your own methods of playing the game and improving the algorithm I would like to hear from anyone who has any ideas for ways the program can be improved and perhaps even made unbeatable.

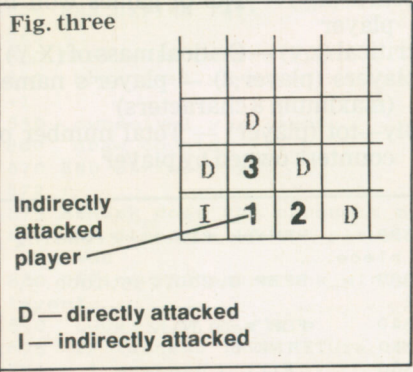
As a rule the corners and sides are better to play into than the centre because they are much easier to defend; apply this rule loosely, as in some cases it might be of more value to play to the centre.

It is possible to attack the opponent in two main ways, by direct and indirect attacks. Indirect attacks are

attacking pieces can be directly exploded. i.e., they are at one under critical mass.

It may be a good idea to link 'chains' or squares which are at one under critical mass so the whole can be exploded if one is set off. Be careful with this strategy because if the opponent can attack one end of your chain, your counters will be wiped out, so it might be a better idea to set up two groups of pieces and use an empty buffer square between the chains.

It is important to remember that even if you own more than 90 percent of the counters it is still possible for the opponent to reverse the situation with one well-timed chain reaction!



when an attacking piece is two under its critical mass, but two adjacent pieces, if exploded, will cause the attacking piece to explode. Direct attacks, on the other hand, are where

**Game procedures**

CHK-XPLOD(PPLAYER, LINE 270  
SUBS: CHK-WIN, LEFT, RIGHT, UP, DOWN

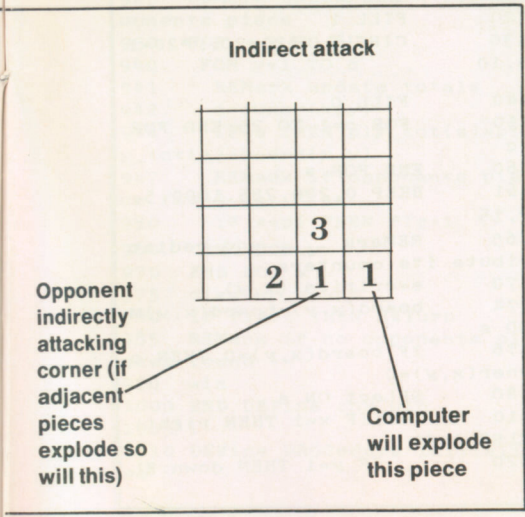
This routine scans the board to see if any piece has reached its critical mass. If it finds an offending piece it will disperse its counters using the subroutines UP, DOWN, LEFT and RIGHT, finishing by checking if any has via CHK-WIN.

UP, LINE 680  
LEFT, LINE 780  
DOWN, LINE 730  
RIGHT, LINE 830

These routines will distribute the counters at location (X,Y) in the required direction and re-draw the counters there.

CHK-WIN(PPLAYER), LINE 880  
SUBS: DISPLAY-COUNT, WIN

This routine scans the board and counts the number of counters each player owns. The totals will be displayed via DISPLAY-COUNT. If a player has no counters, WIN is called to increment the number of games won.



INITIALISE, LINE 1010  
SUBS: GET-PLAYERS

This routine will initialise all the variables and arrays, then go on to get the player's names via GET-PLAYERS.

MOVES(PPLAYER), LINE 1160  
SUBS: COMPUTERS-MOVE, CHK-XPLOD, DRAW-COUNTER

This routine gets a move from the specified player or computer, verifies it, plays it on the board and checks if it will cause an explosion via CHK-XPLOD, finally making sure there are no chain reactions.

DRAW COUNTER(X, Y), LINE 1710

This routine will draw a counter at location (X,Y)

WIN, LINE 1850  
SUBS: UPDATE-SCORES

This will print a win for the given player and update the scores. The player is then asked if he wants another attempt; if so, who goes first will be swapped and the program re-started.

UPDATE-SCORES, LINE 1960

This will display the number of games won by each player in the bottom right corner of the screen.

DISPLAY-COUNTS, LINE 2100

This will display the percentage of total number of counters owned by each player in the top right-hand corner of the screen.

GET-PLAYERS, LINE 2200

This asks if there are one of two players, then asks for their names; if it is a one-player game it will ask whether the player wishes to go first.

COMPUTERS-MOVE, LINE 3000  
SUBS: CHK-PLAYER-THREAT, CORNERS, SIDE, MIDDLE, FIND-SAFE-MOVE, DANGEROUS MOVE, EXPLOSIVE-MOVE.

This is the routine which links the various parts of the algorithm,

CHK-PLAYER-THREAT, LINE 3150  
SUBS: HELP, EXAMINE

This routine scans the board to see if any opponent's piece is alone under critical mass. If so, the computer will try to destroy it via HELP and EXAMINE.

HELP(X, Y), LINE 3300

This will check all the adjacent squares to location (X,Y) to see if the computer has a piece of one under critical mass which it can explode to destroy square (X,Y) (Stops direct attacks).

CORNERS, LINE: 3400  
SUBS: CHECK

CHECK(X,Y), LINE: 3550

The routine is really the opposite of HELP. It will check to see that the square (X,Y) is not surrounded by any opponent's pieces of one under critical mass.

SIDES, LINE: 3650  
SUBS: CORNER-FLAG, POSSIBLE-MOVE

This routine will fill in sides between computer-owned corners and, using PT1, PT2 and PT3, it will build out from an owned corner towards an opponent's corner.

The RND function will try to make sure that the computer will play a side most of the time but will vary the play somewhat.

POSSIBLE-MOVE(X,Y) LINE 3950  
SUBS: CHECK

This routine makes sure that given move (X,Y) is both valid and safe.

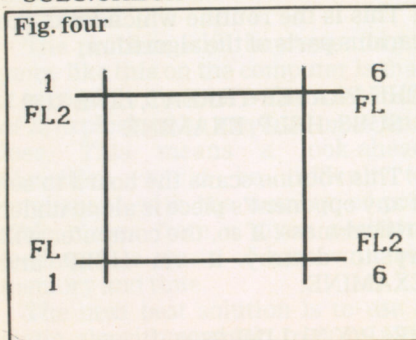
CORNER-FLAG, LINE 4000

This sets the flags FL and FL2 as shown, depending on which corners the computer holds.

MIDDLE, LINE 4070  
SUBS: CORNER-FLAG, POSSIBLE-MOVE

This routine works similarly to SIDES and will fill in middle between computer-held corners and, using PT1, PT2, PT3, build middle from a computer-owned corner towards an opponent's corner. Again the RND function should bring some variation into the play. It will also move into the centre.

FIND-SAFE-MOVE, LINE: 4400  
SUBS: CHECK



This level of the algorithm tries to pick a safe move anywhere on the board.

DANGEROUS-MOVE, LINE:

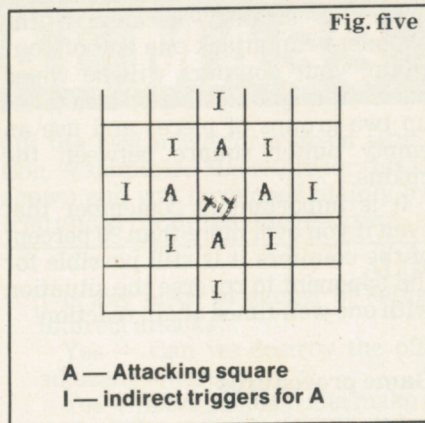
This routine is between FIND-SAFE-MOVE and EXPLOSIVE-MOVE. It tries to pick a move where even if the opponent can destroy it, it should not spark a chain reaction among the computer pieces.

EXPLOSIVE-MOVE, LINE 4550

This being the bottom level of the algorithm picks out any valid move at random and is used as a last resort.

EXAMINE, LINE 4700

This routine checks for indirect and (i) avoids them or (ii) destroys the opponent's threatening piece. It works by checking the adjacent



squares to (X,Y) and if they are at critical mass - 2 - it will check the computer will play a side most of the time but will vary the play somewhat.

EXAMINE, LINE 4700 (CONT)

Square to the adjacent squares for critical masses of one under the limit. If there are two it will set a danger flag.

#### Variables

C, S, X, XC, Y, YC — General variables.

A — General string.

comp — Which player the computer is.

flag, flag — General flags.

fl, fl2 — Flags marking which corners the computer holds.

loop, loop2 — General loops.

movx, movy — Computer move.

pt1, pt2, pt3 — Loops used with SIDES and MIDDLE in the format: FOR X=pt1 to pt2 STEP pt3

pl — Which player to check for losing.

player — The player whose turn it is.

tot — The total counters on the board.

turns — Flag to signal first turn has been taken.

#### Arrays

owner(x,y) — Owner of piece (x,y)

board(x,y) — No. of games won by player

critical(x,y) — Critical mass of (X,Y)

players(player,8) — player's names (maximum 8 characters)

ply—tot(player) — Total number of counters owned by player

```

mdv1_CRITICAL_MASS 1988 Jul 18 335 REMark flash offending
19:15:27 Mon piece...
337 BEEP 0,200,255,1000.5,
2
100 REMark Critical mass Jan 340 FOR s=1 TO 2
1985 350 INK 6
105 REMark Thinking processes 360 FILL 1
added Jan 1987 370 CIRCLE x*20+20,y*20+1
110 REMark (c) Patrick Carter 0,10
130 REMark Yelverton. Devon 390 FILL 0
170 initialise 400 FOR c=1 TO 25:END FOR
175 REPEAT game c
180 draw_board:turns=0 410 INK 0
190 update_scores 420 FILL 1
210 REPEAT loops 430 CIRCLE x*20+20,y*20+1
220 FOR player=1 TO 2 0,10
230 moves(player)
240 END FOR player
250 turns=1
260 END REPEAT loops
262 :
265 REMark has any piece reach 460 END FOR s
ed its critical mass 461 BEEP 0,200,255,1000.5,
270 DEFINE PROCEDURE chk_xplod 2,15
(player) 465 REMark ... and redist
280 LOCAL x,y,s,c ribute its counters
285 REMark zero variables 470 s=critical(x,y)
290 flag=0:sound=1 474 board(x,y)=board(x,y)M
300 FOR x=1 TO 6 OD s
310 FOR y=1 TO 6 476 IF board(x,y)=0 THEN o
315 REMark piece found over wner(x,y)=0
crit mass? 480 SFlect ON s
320 IF board(x,y)>=critical 510 =2:IF x=1 THEN right:
(x,y) THEN ELSE left
330 flag=1 520 IF y=1 THEN down:EL
  
```

```

SE up
550 =3:IF y=1 THEN right:
down:left:ELSE IF y=6 THEN rig
ht:up:left
560 IF x=1 THEN up:right
t:down:ELSE IF x=6 THEN up:left:
down
590 =4:up:right:down:left
ft
600 END SElect
610 draw_counter x,y
630 flag=flag+1
635 BEEP
640 END IF
650 END FOR y
660 END FOR x
662 sound=0
665 chk_win(player)
670 END DEFine chk_explod
672 :
675 REMark redistribute pieces
to adjacent squares routines
680 DEFine PROCedure up
690 board(x,y-1)=board(x,y-1)
+1
700 owner(x,y-1)=player
710 draw_counter x,y-1
720 END DEFine up
725 :
730 DEFine PROCedure down
740 board(x,y+1)=board(x,y+1)
+1
750 owner(x,y+1)=player
760 draw_counter x,y+1
770 END DEFine down
775 :
780 DEFine PROCedure left
790 board(x-1,y)=board(x-1,y)
+1
800 owner(x-1,y)=player
810 draw_counter x-1,y
820 END DEFine left
825 :
830 DEFine PROCedure right
840 board(x+1,y)=board(x+1,y)
+1
850 owner(x+1,y)=player
860 draw_counter x+1,y
870 END DEFine right
872 :
875 REMark does the opponent h
ave any pieces - if not player
has won
880 DEFine PROCedure chk_win(p
layer)
890 LOCAL x,y,pl,flg,s
895 IF turns=0 THEN RETURN :R
EMark 1 st turn
900 REMark set pl to opponent
910 IF player=1 THEN pl=2:ELS
E pl=1
920 flg=0:ply_tot(1)=0:ply_to
t(2)=0
925 REMark check board for op
ponents piece
930 FOR x=1 TO 6
940 FOR y=1 TO 6
941 REMark update totals
942 s=owner(x,y)
944 IF s THEN ply_tot(s)=ply
y_tot(s)+board(x,y)
947 REMark if opponents pie
ce found set flag
950 IF s=pl THEN flg=1
960 END FOR y
970 END FOR x
975 display_count
980 IF flg=1 THEN RETURN
985 REMark if no opponents pi
eces found :-
990 win
1000 END DEFine chk_win
1005 :
1010 DEFine PROCedure initiali
se
1020 LOCAL x,y
1025 WINDOW 448,200,32,16
1026 WINDOW£0,448,40,32,216
1030 SCALE 150,0,0
1040 DIM board(7,7),owner(7,7
),critical(7,7),player$(2,8),p
ly_tot(2),games(2)
1050 player$(1)="" :player$(2)
="" :games(1)=0:games(2)=0:soun
d=0:flg=0:flag=0
1060 RESTORE
1070 FOR x=1 TO 6
1080 FOR y=1 TO 6
1090 READ critical(x,y)
1100 board(x,y)=0
1110 owner(x,y)=0
1120 END FOR y
1130 END FOR x
1140 CSIZE £0,3,1
1141 CLS£0:CLS£1
1145 get_players
1150 END DEFine initialise
1155 :
1160 DEFine PROCedure moves(pl
ayer)
1170 LOCAL x,y,loop,loop2,a$
1180 INK £0,player+2
1190 CLS £0
1191 REMark is it computers m
ove ?
1192 IF player=comp THEN comp
uters_move:x=movx:y=movy:GO TO
1340
1195 REMark no - get entry fr
om player
1200 REpeat loop
1210 PRINT£0," Enter your mo
ve ";player$(player);"?"
1220 PRINT£0,FILL$(" ",10);
1225 REMark x coordinate
1230 REpeat loop2
1240 a$=INKEY$(-1)
1250 IF a$>"0" AND a$<"7" T
HEN x=a$:EXIT loop2
1260 END REpeat loop2
1270 PRINT£0,x;" ";
1275 REMark get y coordinate
1280 REpeat loop2
1290 a$=INKEY$(-1)
1300 IF a$=CHR$(192) THEN C
LS£0:NEXT loop
1310 IF a$>"0" AND a$<"7" T
HEN y=a$:EXIT loop2
1320 END REpeat loop2
1330 PRINT£0,y
1335 REMark is this move val
id
1340 IF owner(x,y)<>0 AND ow
ner(x,y)<>player THEN
1350 CLS £0:FLASH £0,1
1360 PRINT£0," You can't
go there!":FLASH£0,0
1370 FOR c=1 TO 500:END FOR
c
1380 CLS £0
1390 END REpeat loop
1400 END IF
1405 REMark yes - put piece o
n board
1410 board(x,y)=board(x,y)+1
1420 owner(x,y)=player
1430 draw_counter x,y
1435 REMark has any piece rea
ched critical mass?
1440 REpeat loop
1450 chk_xplod(player)
1455 REMark check for chain
reaction
1460 IF flag THEN END REpeat
loop
1470 END DEFine moves
1475 :
1480 DEFine PROCedure draw_boa
rd
1490 LOCAL x,y
1500 PAPER 1:BORDER 2,7:CLS
1510 INK 7
1520 CSIZE 3,1
1525 REMark numbering
1530 FOR x=1 TO 6
1540 CURSOR x*20+20,15,-3,0
1550 PRINT x
1580 CURSOR 10,x*20+15,0,-4
1590 PRINT x
1600 END FOR x
1610 INK 0
1620 CSIZE 2,0
1625 REMark squares
1630 FOR x=1 TO 6
1640 FOR y=1 TO 6
1650 FILL 1
1660 CIRCLE x*20+20,y*20+10
,10
1670 FILL 0
1680 END FOR y
1690 END FOR x
1692 REMark divide screen
1695 BLOCK 5,196,280,0,7
1696 BLOCK 160,2,280,108,7
1700 END DEFine draw_board
1705 :
1710 DEFine PROCedure draw_cou
nter(x,y)
1720 LOCAL s
1730 s=owner(x,y)
1740 IF s=0 THEN INK 0:ELSE I
NK s+2
1750 IF s AND NOT(sound) THEN
BEEP 2500,50
1760 FILL 1
1770 CIRCLE x*20+20,y*20+10,1
0
1780 FILL 0
1790 CURSOR x*20+20,y*20+10,-
3,-4
1800 STRIP s+2
1810 INK 0
1820 IF board(x,y)=0 THEN GO
TO 1840
1830 PRINT board(x,y)
1840 END DEFine draw_counter
1845 :
1850 DEFine PROCedure win
1855 LOCAL loop,a$
1860 CLS £0:INK £0,player+2
1870 PRINT£0," ";player$(p
layer);" has won"
1880 games(player)=games(play
er)+1
1890 update_scores
1900 PRINT £0,"Another go (Y/
N)";
1910 REpeat loop
1920 a$=INKEY$(-1)
1930 IF a$=="n" THEN CLEAR:C
LS:CLS£0:STOP
1940 IF a$=="y" THEN
1941 FOR x=1 TO 6
1942 FOR y=1 TO 6
1943 board(x,y)=0:owner(x
,y)=0
1944 END FOR y
1945 END FOR x
1946 x=games(1):games(1)=ga
mes(2):games(2)=x:a$=player$(1
):player$(1)=player$(2):player
$(2)=a$:IF comp=1 THEN opp=1:c
omp=2:ELSE comp=1:opp=2
1947 END REpeat game
1948 END IF
1950 END REpeat loop
1955 END DEFine win
1957 :
1960 DEFine PROCedure update_s
cores
1965 LOCAL x
1970 CSIZE 2,0:INK 7
1980 STRIP 1

```

```

1990 AT 12,25:PRINT"GAMES WON
:"
2000 FOR x=1 TO 2
2020 AT x*2+12,24
2030 PRINT player$(x);" - ";
games(x)
2035 END FOR x
2040 CSIZE 0,0:INK 0
2050 END DEFINE update_scores
2060 :
2100 DEFINE PROCEDURE display_
count
2105 REMark display % of coun
ters owned
2110 LOCAL tot,x
2112 INK 7:STRIP 1
2115 AT 1,26:PRINT"COUNTERS"
2120 tot=ply_tot(1)+ply_tot(2
)
2130 FOR x=1 TO 2
2140 AT x*3,26:PRINT player$
(x):AT x*3+1,28:PRINT INT((ply
_tot(x)/tot)*100);"% "
2150 END FOR x
2160 END DEFINE display_count
2180 :
2200 DEFINE PROCEDURE get_play
ers
2210 LOCAL x,y,a$
2215 INK 0,7
2230 PRINT 0,"1 or 2 players
?"
2240 REPEAT loop
2250 a$=INKEY$(-1)
2260 IF a$="1" THEN
2270 PRINT 0,"Do you want t
o go first?"
2280 a$=INKEY$(-1)
2290 IF a$="y" THEN
2300 comp=2:EXIT loop
2310 ELSE
2320 comp=1:EXIT loop
2330 END IF
2335 ELSE
2340 IF a$="2" THEN comp=3:
EXIT loop
2350 END IF
2360 END REPEAT loop
2380 FOR x=1 TO 2
2385 CLS 0:INK 0,x+2
2390 IF x=comp THEN
2400 player$(x)="COMPUTER"
2410 ELSE
2420 PRINT 0,"Enter name?"
2430 REMark max 8 chars
2440 FOR y=1 TO 8
2450 REPEAT loop
2460 a$=INKEY$(-1)
2470 IF a$=CHR$(10) THEN
EXIT loop:REMARK return
2480 IF a$>="A" AND a$<="
z" THEN EXIT loop
2490 END REPEAT loop:REMAR
k char invalid
2500 IF a$=CHR$(10) THEN y
=8:GO TO 2530
2502 IF CODE(a$)>96 THEN a
$=CHR$(CODE(a$)-32):REMARK con
vert to upper case
2505 PRINT 0,a$;
2510 player$(x)=player$(x)
&a$
2520 END FOR y
2525 PRINT
2530 END IF
2535 player$(x)=player$(x)&F
ILL$(" ",8-LEN(player$(x)))
2540 END FOR x
2550 END DEFINE get_players
2560 :
2800 REMark **** THINKING PROC
ESS STARTS HERE ****
2810 :
3000 DEFINE PROCEDURE comput
er_s_move
3002 REMark zero moves & deci
de who the opponet is
3005 movx=0:movy=0:IF comp=1
THEN opp=2:ELSE opp=1
3010 INK 0,7:FLASH 0,1:PRINT 0,
"THINKING ....":FLASH 0,0:IN
K 0,5
3025 REMark see if player thr
eatens any of computers' count
ers
3027 AT 0,1,0:PRINT 0,"Threat
"
3030 chk_player_threat
3031 IF movx THEN RETURN
3032 AT 0,1,0:PRINT 0,"corner
"
3035 corners
3040 IF movx THEN RETURN
3045 AT 0,1,0:PRINT 0,"side
"
3050 sides
3060 IF movx THEN RETURN
3065 AT 0,1,0:PRINT 0,"Middle
"
3070 middle
3080 IF movx THEN RETURN
3082 REMark try any safe move
3083 AT 0,1,0:PRINT 0,"safe m
ove
"
3084 find_safe_move
3085 IF movx THEN RETURN
3086 AT 0,1,0:PRINT 0,"dang
erous move":dangerous_move
3087 IF movx THEN RETURN
3088 AT 0,1,0:PRINT 0,"expl
osive move"
3089 REMark if no safe move t
hen make a random one
3090 explosive_move
3100 END DEFINE computers_move
3105 :
3150 DEFINE PROCEDURE chk_play
er_threat
3160 LOCAL x,y
3165 REMark scan through boar
d
3170 FOR x=1 TO 6
3180 FOR y=1 TO 6
3185 REMark is there an opp
onents piece ready to explode
3190 IF owner(x,y)=opp AND
board(x,y)=critical(x,y)-1 THE
N
3200 REMark yes - seek to
destroy it before it destroys
us
3210 help x,y
3215 IF movx THEN x=6:y=6
:REMARK bypass loops if move f
ound
3217 ELSE
3219 IF owner(x,y)=comp T
HEN examine:REMARK find indire
ct attacks
3220 IF (movx AND flag=1 A
ND RND>.75) THEN x=6:y=6:ELSE m
ovx=0:movy=0:REMARK bypass loo
ps
3230 END IF
3240 END FOR y
3250 END FOR x
3260 END DEFINE chk_player_thr
eat
3270 :
3300 DEFINE PROCEDURE help(x,y
)
3305 REMark check adjacent sq
uares to opponents piece for p
iece to blow up
3310 IF owner(x-1,y)=comp AND
board(x-1,y)=critical(x-1,y)-
1 THEN movx=x-1:movy=y:RETURN
3320 IF owner(x+1,y)=comp AND
board(x+1,y)=critical(x+1,y)-
1 THEN movx=x+1:movy=y:RETURN
3330 IF owner(x,y-1)=comp AND
board(x,y-1)=critical(x,y-1)-
1 THEN movx=x:movy=y-1:RETURN
3340 IF owner(x,y+1)=comp AND
board(x,y+1)=critical(x,y+1)-
1 THEN movx=x:movy=y+1
3350 END DEFINE help
3360 :
3400 DEFINE PROCEDURE corners
3410 LOCAL x,y
3415 REMark scan corners
3420 FOR x=1 TO 6 STEP 5
3430 FOR y=1 TO 6 STEP 5
3435 REMark are they empty
3440 IF owner(x,y)=0 THEN
3445 REMark are they safe
check x,y
3460 IF movx THEN x=6:y=6
3470 END IF
3480 END FOR y
3490 END FOR x
3500 END DEFINE corners
3510 :
3550 DEFINE PROCEDURE check(x,
y)
3555 REMark is there an adjac
ent opponents piece which can
be blown up
3556 REMark yes - move propos
ed is unsafe
3560 IF owner(x+1,y)=opp AND
board(x+1,y)=critical(x+1,y)-1
THEN RETURN
3570 IF owner(x,y-1)=opp AND
board(x,y-1)=critical(x,y-1)-1
THEN RETURN
3580 IF owner(x,y+1)=opp AND
board(x,y+1)=critical(x,y+1)-1
THEN RETURN
3590 IF owner(x-1,y)=opp AND
board(x-1,y)=critical(x-1,y)-1
THEN RETURN
3595 REMark no - check for in
direct explosions
3600 examine
3610 END DEFINE check
3615 :
3650 DEFINE PROCEDURE sides
3660 LOCAL x,y,pt1,pt2,pt3,lo
op
3670 fl=0:fl2=0:flg=0:pt1=2:p
t2=5:pt3=1
3680 corner_flag
3700 REPEAT loop
3710 REMark do we own corne
rs along horiz.
3720 IF NOT((fl=1 AND fl2=6
) OR (fl=6 AND fl2=1)) THEN GO
TO 3800
3722 REMark yes - scan side
3725 FOR x=pt1 TO pt2 STEP
pt3
3730 REMark can we go ther
e?

```

```

3740 possible_move x,f1
3750 IF movx THEN EXIT loop
3770 END FOR x
3780 REMark do we own corners
along vert.
3800 IF NOT((f1=1 AND f12=1)
) OR (f1=6 AND f12=6)) THEN GO
TO 3860
3805 REMark yes - scan side
3810 FOR y=pt1 TO pt2 STEP
pt3
3820 possible_move f12,y
3830 IF movx THEN EXIT loop
3850 END FOR y
3870 IF RND>.75 THEN EXIT loop
3875 REMark if side is full
or two corners not held or two
opposite corners held
3876 REMark then fill out from
corner held towards opponent
3880 IF f1 THEN
3882 f12=RND(1 TO 2):IF f1
2=2 THEN f12=6
3885 IF f1=1 THEN pt1=2:pt
2=5:pt3=1:ELSE IF f1=6 THEN pt
1=5:pt2=2:pt3=-1
3886 NEXT loop
3887 END IF
3890 f1=RND(1 TO 2):IF f1=2
THEN f1=6
3895 IF f1=1:pt1=5:pt2=2:pt3
=-1:ELSE IF f1=6 THEN pt1=2:pt
2=5:pt3=1
3910 END REPEAT loop
3920 END DEFINE sides
3930 :
3950 DEFINE PROCEDURE possible
_move(xc,yc)
3952 LOCAL x,y:REmark for che
ck routine
3955 REMark is it a valid move?
3960 IF (owner(xc,yc)=comp AND
board(xc,yc)<critical(xc,yc)
-1 AND RND<.6) OR owner(xc,yc)
=0 THEN
3965 REMark is it safe?
3970 check xc,yc
3975 END IF
3980 END DEFINE possible_move
3990 :
4000 DEFINE PROCEDURE corner_f
lag
4005 REMark find out which co
rners we hold
4010 IF owner(1,1)=comp THEN
f1=1
4020 IF owner(6,6)=comp AND (
f1=0 OR RND<.5) THEN f1=6
4030 IF owner(1,6)=comp THEN
f12=1
4040 IF owner(6,1)=comp AND (
f12=0 OR RND<.5) THEN f12=6
4050 END DEFINE corner_flag
4060 :
4070 DEFINE PROCEDURE middle
4080 LOCAL x,y,loop,pt1,pt2,p
t3
4090 f1=0:f12=0:pt1=2:pt2=5:p
t3=1
4100 corner_flag
4110 REPEAT loop
4115 REMark do we own a hori
z side
4120 IF NOT((f1=1 AND f12=6)
OR (f1=6 AND f12=1)) THEN GO
TO 4180
4130 IF f1=1 THEN y=2:ELSE y
=5
4140 FOR x=pt1 TO pt2 STEP p
t3
4150 possible_move x,y
4160 IF movx THEN RETURN
4170 END FOR x
4175 REMark do we own a vert
. side
4180 IF NOT((f1=1 AND f12=1)
OR (f1=6 AND f12=6)) THEN GO
TO 4240
4190 IF f12=1 THEN x=2:ELSE
x=5
4200 FOR y=pt1 TO pt2 STEP p
t3
4210 possible_move x,y
4220 IF movx THEN RETURN
4230 END FOR y
4240 IF RND<.5 THEN GO TO 42
70
4241 REMark build out from h
eld corners towards opponent
4243 IF f1 THEN
4245 f12=RND(1 TO 2):IF f12
=2 THEN f12=6
4247 IF f1=1 THEN pt1=2:pt2
=5:pt3=1:ELSE IF f1=6 THEN pt1
=5:pt2=2:pt3=-1
4248 NEXT loop
4249 END IF
4250 f12=RND(1 TO 2):IF f12=
2 THEN f12=6
4260 IF f1=1 THEN pt1=2:pt2=
5:pt3=1:ELSE IF f1=6 THEN pt1=
5:pt2=2:pt3=-1
4265 END REPEAT loop
4268 REMark very centre piece
s
4270 FOR x=3 TO 4
4280 FOR y=3 TO 4
4290 possible_move x,y
4300 IF movx THEN RETURN
4310 END FOR y
4320 END FOR x
4330 END DEFINE middle
4340 :
4400 DEFINE PROCEDURE find_saf
e_move
4405 LOCAL x,y
4406 REMark scan board
4410 FOR x=1 TO 6
4420 FOR y=1 TO 6
4425 REMark is there a squa
re not owned
4430 IF owner(x,y)=0 THEN
4435 REMark yes - is it sa
fe
4440 check x,y
4445 END IF
4450 IF movx THEN RETURN
4460 END FOR y
4470 END FOR x
4480 END DEFINE find_safe_move
4490 :
4500 DEFINE PROCEDURE explosiv
e_move
4505 LOCAL x,y
4508 REMark scan board for an
y valid move
4510 REPEAT loop
4520 x=RND(1 TO 6)
4530 y=RND(1 TO 6)
4550 IF (RND>.9 AND owner(x,
y)=comp OR owner(x,y)=0) THEN
EXIT loop
4560 END REPEAT loop
4570 movx=x:movy=y
4580 END DEFINE explosive_move
4590 :
4600 DEFINE PROCEDURE dangerou
s_move
4605 LOCAL x,y
4607 REMark scan board
4610 FOR x=1 TO 6
4620 FOR y=1 TO 6
4625 REMark is there an opp
onents piece nearby which isn'
t ready to explode?
4630 IF owner(x,y)=0 OR (ow
ner(x,y)=comp AND board(x,y)<c
ritical(x,y)-3 AND RND>.7) THE
N movx=x:movy=y:x-6:y=6
4640 END FOR y
4650 END FOR x
4660 END DEFINE dangerous_move
4670 :
4700 DEFINE PROCEDURE examine
4710 LOCAL s,c,flg
4715 flg=0:flg=0
4720 REMark check for indirec
t explosions
4730 FOR s=-1 TO 1 STEP 2
4740 REMark horizontals
4750 IF owner(x+s,y)=opp AND
board(x+s,y)=critical(x+s,y)-
2 THEN
4760 flg=0
4770 FOR c=-1 TO 1 STEP 2
4780 IF owner(x+s,y+c)=opp
AND board(x+s,y+c)=critical(x
+s,y+c)-1 THEN flg=flg+1
4790 END FOR c
4800 IF owner(x+s*2,y)=opp
AND board(x+s*2,y)=critical(x+
s*2,y)-1 THEN flg=flg+1
4810 IF flg>1 THEN IF board
(x,y)=critical(x,y)-1 THEN EXI
T s:ELSE RETURN :REmark 2
adjacents can be exploded
4820 END IF
4825 REMark verticals
4830 IF owner(x,y+s)=opp AND
board(x,y+s)=critical(x,y+s)-
2 THEN
4840 flg=0
4850 FOR c=-1 TO 1 STEP 2
4860 IF owner(x+c,y+s)=opp
AND board(x+c,y+s)=critical(x
+c,y+s)-1 THEN flg=flg+1
4870 END FOR c
4880 IF owner(x,y+s*2)=opp
AND board(x,y+s*2)=critical(x,
y+s*2)-1 THEN flg=flg+1
4890 IF flg>1 THEN IF board
(x,y)=critical(x,y)-1 THEN EXI
T s:ELSE RETURN
4900 END IF
4910 END FOR s
4920 movx=x:movy=y:IF flg>1 T
HEN flg=1
4930 END DEFINE examine
4940 :
4999 REMark critical mass data
5000 DATA 2,3,3,3,3,2
5010 DATA 3,4,4,4,4,3
5020 DATA 3,4,4,4,4,3
5030 DATA 3,4,4,4,4,3
5040 DATA 3,4,4,4,4,3
5050 DATA 2,3,3,3,3,2

```

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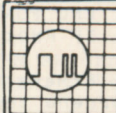


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# MICRODRIVE

## 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 = QLiberated; f1 = monitor mode; f2 = TV mode

- |  |  |
|--|--|
| 1. <b>DIY ASSEMBLER</b> by Giles Todd (B) £5<br>A complete two-pass assembler which assembles all 68008 code and supports the directives DRG, END, EQU, DC and DS.   | 35. <b>QWHIST</b> by John Wakefield (B) £3<br>You play south and the computer plays north against automatic east/west opponents. <i>QL World</i> , August 1987.  |
| 2. <b>MINI MONITOR</b> by Richard Cross (A + O) £3<br>Multi-tasks on the QL using only 3K of RAM. Commands include dumping registers, memory and ASCII m/c trace, register store, memory move and store, and jumps. <i>QL User</i> , October 1985. | 36. <b>MAIL MERGE</b> by Stanley Sykes (B f2) £1<br>Handy utilities providing mail merge and labeller for Quill files, plus a demo.  |
| 4. <b>GOLF</b> by Shergold and Tose (B f2) £2<br>Up to 50 courses of varying difficulty with lakes, rivers, bunkers and trees. You decide power and direction of each stroke. <i>QL User</i> , May 1985.   | 37. <b>THE DOUBLE</b> by P. G. Ives (B f2) £4<br>A large football strategy game. You manage a team through four divisions, buying and selling, boosting morale through the league and F.A. Cup season. |
| 5. <b>PALADIN</b> by Williams and Holliday (A + O) £5<br>All-machine code space-invaders game used as the basis of the games programming series beginning in April 1985.   | 40. <b>ROULETTE</b> by Santiago Rubio (B) £3<br>Spanish/English version of the gambling game, including Leigh Pattern system to break the bank. <i>QL World</i> , September 1987.                      |
| 7. <b>PACMAN</b> by Steve Deary (B) £1<br>Almost 20 screens of varying difficulty including an invisible maze. <i>QL User</i> , March 1985.  | 44. <b>COMPRESS</b> by David Marsh (B) £2<br>Utility to compress SuperBasic files without losing the program structure.  |
| 8. <b>FAMILY TREE</b> by Andy Carmichael (B) £3<br>Archive program and database for assembling and displaying large family trees. <i>Theory of Relativity</i> , <i>QL User</i> , July/August 1985.   | 45. <b>SUPERBREAKOUT</b> by R. Davidson (M + B) £2<br>Fast m/c version of the classic bat, ball and wall game. Optional double bats and/or balls.  |
| 9. <b>COMPOSER</b> by James Lucy (L) £3<br>Completed in <i>QL User</i> , October 1985, this QLiberated program allows you to compose, play and edit music, including tempo, staccato, legato and sharps.   | 46. <b>NAVIGATOR</b> by Norman Marks (B) £2<br>Calculates distance and direction between longitude and latitude points on the Earth. Expandable list of locations.                                     |
| 17. <b>CAD QL</b> by Tony Quinn (S) £4<br>The QL is particularly suited to CAD programs. This version includes rubber banding and user-definable symbols. <i>QL World</i> , September 1988.  | 47. <b>3D MAZE</b> by R. Clements (B) £2<br>Chase round the three dimensional maze against the clock, searching for the key to the next level.   |
| 19. <b>STARPORT 2001</b> by Karl Jeffrey (M + B) £3<br>Galaxian-style arcade game with fast m/c entry. <i>QL World</i> , November 1986.  | 48. <b>YAHTZEE</b> by Jason Price (B) £2<br>The popular dice-game with on-screen graphics. Easy and addictive. <i>QL World</i> , November 1987.  |
| 24. <b>DESIGN 3D</b> by J. F. Tydeman (S) £4<br>3D screen designs with the minimum of fuss. <i>QL World</i> , March/April 1987.  | 50. <b>BANK</b> by Jay Lewington (B) £4<br>Menu-driven program to keep track of several bank accounts, including credits and debits, dated standing orders, statements and more.                       |
| 25. <b>STELLARIS</b> by D. Carmona (B f1) £4<br>Real-time space adventure against the computer, including economic simulations, lunar landing and superb graphics. <i>QL World</i> , June 1987.  | 52. <b>SPACE PODS</b> by Simon Quinn (M + B) £3<br>Your lone ship must protect six energy pods against the aliens. Machine code. <i>QL World</i> , December 1987.                                      |
| 29. <b>BRIDGE</b> by Peter Etheridge (B) £4<br>Excellent version including accurate bidding, automatic or manual card play, replay hands, save and load and more.  | 53. <b>GRAPHIC WRITER</b> by S. M. Walker (B) £2<br>A graphic design program which can save your pictures as SuperBasic commands for use in other programs. <i>QL World</i> , December 1987.           |
| 32. <b>ADVENT2</b> by Phillip Sproston (B) £4<br>Arcade adventure with humour: rooms, robots and problems to keep you on your toes.  | 54. <b>ZAPMAN</b> by L. Miles (M + B) £3<br>Fast-action m/c version of the Pacman genre. Variable skill levels and maze formats.   |
| 33. <b>CLOCK</b> by Leslie Fahidy (B f2) £3<br>On-screen clock to set or read the time. Education, <i>QL World</i> , June and July 1987; complete program.   | 55. <b>ADVENTURE PLAYTIME</b> by A. Pemberton (B) £3<br>An extensive adventure where you must complete tasks for the inhabitants of a strange land. coded messages and hints included.                 |
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<p><b>61. COMPANDER by A. Quigley (M9)</b> £1 Compresses screen designs into the smallest files we have seen from a similar routine. <i>QL World</i>, April 1988.</p>	<p><b>68. TAB—EDITOR by Richard Williams (B, compiled)</b> £3 A flexible text editor for easy entry and manipulation of listings. Includes simple movement through columns, full block copying, special SORT for tabular listings, and very flexible tabbing. "The author has taken a lot of trouble to get it right." Code available from author.</p>
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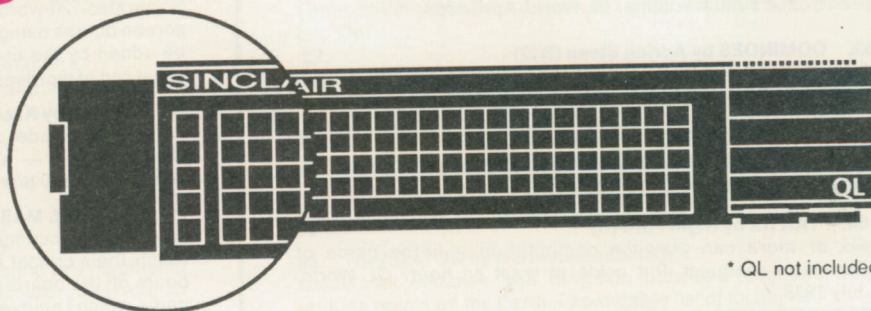


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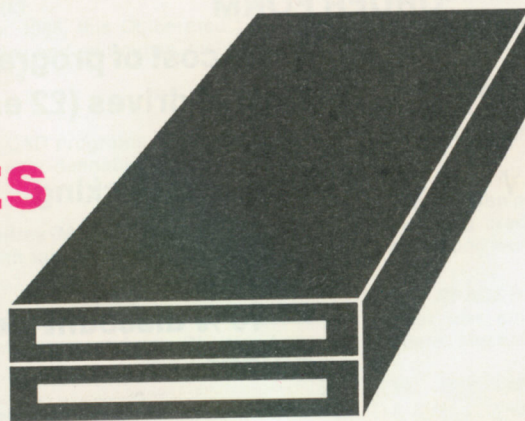
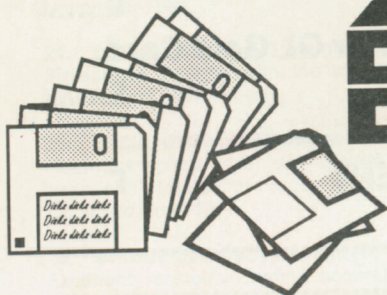
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