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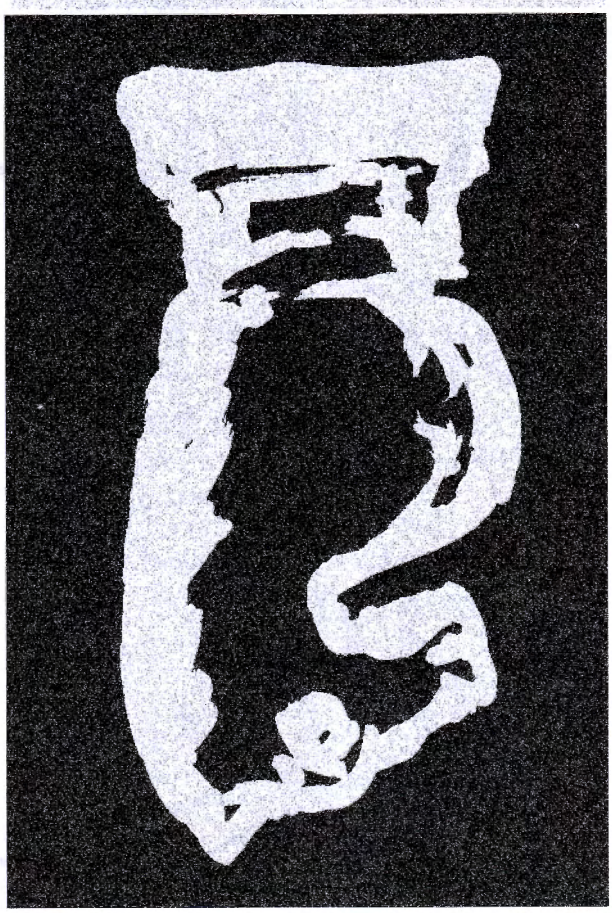
WORLD

Volume 3 Issue 4 Price £2.50



Adventure '93
SQLUG wave adventure pack

QL Calender
Zeller's Congruence

Black Knight
Pointer Chess from Jochern Merz

DIY Toolkit
"Packbits"

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DIGITAL PRECISION

THE POWER BEHIND THE BUTTON

1984-1994

THE BEST SOFTWARE FOR THE BEST COMPUTER

A PRIDE IN ITS LOGIC

NO IDEALISTIC PRIG

SPIRITED LOGICIAN

DIGITAL PRECISION

A LOGIC IN ITS PRIDE

PERFECTION SPECIAL EDITION

POWER

PERFECTION SPECIAL EDITION has 253 (two hundred and fifty three) direct/menu commands (not counting options in sub-menus), plus 32 special characters (like Bold on) that can be inserted 'directly' plus intelligent (and now excellently documented) macros. Comparisons with other word processors on the subject of power are hence quite unnecessary.

EASE OF USE

Professional Publisher is the best! No other desktop publisher for the QL even comes close.

Independent reports, customer feedback and published reviews (of its less able but still excellent predecessor, PERFECTION) leave one in no doubt as to which word processor is friendliest – PERFECTION SPECIAL EDITION, with its intuitive, silky handling. Uniquely, it has two operating modes, with both menus (visible or invisible – they even look like Quill's) and direct commands (for when you familiarise yourself with the system). Uniquely, both modes are 're-entrant' (so you can use any menu option or direct command while you are in the middle of performing another option or command – block handling, etc, becomes a dream). Uniquely, PERFECTION SE has fully automatic memory management, grabbing and releasing RAM instantly as your document grows or shrinks – programs without this don't take full advantage of the multi-tasking abilities of the QL! Uniquely, PERFECTION SE leaves you in the driving seat, not juggling things around 'underfoot' while you are typing. Uniquely, PERFECTION SE allows up to nine different documents to be handled simultaneously from one copy of the program – each with totally independent margin, tab, justification, control panel, etc, settings. Uniquely, each document can itself have up to six environment settings, each settable or recallable instantly with a single keypress combination. Each document can have any number (up to 500,000 on GOLD CARD) of candidate blocks! Each document can have two independent windows (of any depth, of any (but same) width across) 'on to' it, even with overlapping text – that allows you to edit in one place while viewing another, to compare 'before editing' with 'after editing' (you can arrange to have one window remain 'frozen' in time), etc. Uniquely, we realise how much faster it is to type in something like CTRL/SHIFT/F5 than (say) F3 F3 R – both involve three keys, but as the former doesn't require the keys to be pressed in just one specific order, or to be released in any order at all (together will do), it is in practice twice as fast as the latter, where no key may be pressed until its predecessor is released. PERFECTION SE takes advantage of all this – it is the little things that count! Uniquely, by providing eight user-definable strips, PERFECTION SE allows you to cope with printers of the future, not just the printers that now exist – you can attach the strips to any printer features. Uniquely, PERFECTION SE's status lines give full information on all relevant global settings. And the manual has an index. Also, it has all the important bits at the front.

WYSIWYG?

By the latest definition of this term, neither is PERFECTION SE fully WYSIWYG, nor are other QL word processors. WYSIWYG means what you see on screen is exactly what you get on paper. Exactly – down to every wiggle in every character in every font.

To get true WYSIWYG, use PERFECTION SE's fully automatic link (supplied as part of PERFECTION SE) to PROFESSIONAL PUBLISHER, where you will get 100% WYSIWYG. 100%? Yes, 100%. With this combination, adjust the horizontal and vertical magnification on your monitor (ie calibrate it once and for all so screen circles correspond to same-diameter printed circles – poor monitors may distort a little bit at the edges). Now you can place your printed output from PERFECTION via PUBLISHER over your monitor screen, and get a match that is more perfect than is your eyesight. Now that is WYSIWYG.

SUPERB PRINT QUALITY & FLEXIBILITY

Uniquely, using the aforementioned automatic link, you can output PERFECTION SE documents using over a thousand fonts (a huge variety of styles and sizes, supplied on the PUBLISHER and TOOLBOX disks) on virtually any printer – from the humblest Epson RX80, Brother M1009 or Star LC10 (which are all single font machines when used with most word processors) to top-end lasers. ***You are not limited to the fonts built into the printer!!*** All PERFECTION SE **bold**/underlined/ *italics*/^{super}/$_{sub}$, etc, settings are preserved. Proportional spacing and micro-justification are automatic, even when you mix fonts of differing widths ***and heights*** (even on the same line), vary line spacings, etc. Uniquely, you are not trapped with one type of micro-justification (ie adding all the space between words, and using the predefined widths of characters as their separation) – with our system, you can vary (in 5% steps) the proportion of micro-spaces added between words to that added between characters (the latter in proportion to their *individual* widths). Settings around 65%-35% – not the 100%-0% forced upon you by some other word processors – seem to give the most pleasing results. Uniquely, you are not limited to mere rectangular columns plus headers/footers – that's all the rest can do – you can output in any sequence to any number of frames (text flowing from one to the next), each of any shape – irregular polygons of up to 66 sides, circles, multi-column or part-column boxes (hundreds of types of borders, thousands of textures), doughnuts, wrap-around shapes, even re-entrant ones ('join-the-dots' type borders, even with intersecting edges) – all with micro-justification and proportional spacing! Look at the example on this page. Of course, if super fancy output or special effects are not of the essence, PERFECTION SE's direct printer output is more than capable of meeting your needs.

THE FASTEST

For benchmarking, we've used an unimpeachable file – not one created specially – a public domain version of the first book of The King James Bible, all fifty chapters of the book of Genesis. This came to **one hundred and forty pages**, well over **forty two thousand words** excluding headers and footers, well over **two hundred and twelve thousand characters** excluding justification ones and **one thousand five hundred and thirty three indexed verses**!! We didn't use a smaller file (as used to benchmark other programs) as PERFECTION SE's timings for most operations then become impossible to stopwatch (too fast!). The hardware used for all timings was GOLD CARD: speeds would be **further improved by over three times** using the SUPER GC. Of course, LIGHTNING SE was used. File operations were to ramdisk: normal slave blocks would give identical times. All settings on **everything** were for maximum speed, except where indicated to the contrary – we have the sense **not** to force full speed upon you in operations like scrolling and global Search & Replace. PERFECTION SE's speed for these is switchable (at run-time and when configuring), as too great a speed may cause overshoot (with scrolling) or fatal alteration (if there is human error inputting the target or replace strings). Here are the benchmarks for this huge file:

Load 140 pages: 0.6 seconds (yes 0.6, not 6!) ☆ Import 140 pages: 0.6 seconds (yes 0.6, not 6!) ☆ Save 140 pages: 0.5 seconds (yes 0.5, not 5!) ☆ Export 140 pages: 0.5 seconds (yes 0.5, not 5!) ☆ Case-sensitive search from top for word at bottom: 0.4 seconds (yes 0.4, not 4!) ☆ The same, but case case-insensitive: 0.5 seconds (yes 0.5, not 5!) ☆ Case-sensitive search backwards from bottom for word at top: 0.4 seconds (yes 0.4, not 4!) ☆ The same, but case-insensitive: 0.5 seconds (yes 0.5, not 5!) ☆ Automatic Search & Replace, in Fast (No Query) mode, of last 600 occurrences: 7.4 seconds (same length replace string); 7.7 seconds (shorter replace string); 10.5 seconds (longer replace string – longer time as we deliberately chose a high *density* of replaces to handicap PERFECTION SE into auto-managing memory – without causing any heap fragmentation, but still with only a 0.005 second overhead per replace!) ☆ Automatic Search & Replace in Slow ('Querying') mode: arbitrarily slow, typically 30 times slower – because we deliberately allow for human response time (in case you want to abort) before proceeding from one replace to the next – booby prize to anyone for benchmarking us on this setting!! ☆ Scrolling 100 lines of text, up or down, by full-width screen page: 1.5 seconds ☆ Scrolling 100 lines of text on full-width screen, line by line, in slow (full) mode: 5.7 seconds (down)/5.8 seconds (up) ☆ As above, but in medium speed mode: 4 seconds ☆ The same, but in fast mode and default settings: 13.5 seconds to scroll through the whole massive document, averaging 0.23 seconds per 100 pages (!) – and this could be made up to ten times faster by reconfiguring PERFECTION SE ☆ Reformatting paragraphs, changing margins, justification, etc, of existing text: c5 times faster than predecessor ☆ Inserting (or undoing) emphasised, underlined, italics, superscript, subscript, 8 strips, 6 environment settings: Instant (i.e. immeasurable) ☆ Navigation to line or page or to top or bottom or to 8 markers or to highlights/blocks: Instant ☆ Setting new margins, justification, etc: Instant ☆ Deleting block of 100 pages: 0.3 (yes, 0.3 not 3!) seconds ☆ Copying/moving block of 100 pages (not just 10!), downwards or upwards: 3.4 seconds (yes, including all the time for automatic memory management and anti-fragmentation – other programs are light-years behind) ☆ Spellcheck as you type: Ten times faster than anyone can possibly type ☆ Spellcheck all 140 pages in the document using the 350,000 word Mega Dictionary: 3.9 seconds (20 'errors' – like 'pluckt'!) ☆ And using our tiny dictionary (well, tiny by our standards – large by comparison with most others): 5.1 seconds (566 'errors') ☆ Time taken to create user dictionary from the results of the second spellcheck (566 errors): 0.8 seconds to extract all 'errors' from document and clean document; 1.9 seconds to create a full user dictionary therefrom and also a sorted, duplicate-free wordlist file (for browsing) ☆ Spellcheck file (ASCII or native): Even faster. ☆ Print first 10 pages to file: 3.5 seconds. ☆ Change every occurrence of God to ***God*** in bold underlined italics, strip 2 – 9.5 seconds!

TECHNICAL NOTES Reformatting is the amendment of a section of previously-entered text to conform to margin, indentation, justification and pagination settings after the user returns to it and makes alterations, either by hand (by over-typing, deleting, adding or otherwise changing) or using search and replace, merge etc. PERFECTION SE lets the user pre-configure, or tune at run-time, the desired reformatting behaviour. The options are to either select Never (most suitable for technical users, and what all previous PERFECTIONs did: you had to initiate the reformat of the re-edited para), Instant (= 0.1 seconds, giving in-situ real-time automatic reformatting as-you-type: common in word processors, and irritating to the eye) or User-delay, the most flexible setting (giving slightly delayed auto-updating of lower text). On User-delay the user is free to set any delay from 0.2 seconds to 99.9 seconds in 0.1 second steps. About 1.5 seconds is best for sedate typists and 0.3 seconds for speed demons. This means that you are not hassled by continuing screen changes on lines below the one you are editing and concentrating upon, or shufflings around on the current line caused by right or centre justification. When you pause in your typing for longer than the set delay, PERFECTION SE automatically tidies up, without you having to do anything. On User-delay, if you navigate or progress off the line, or invoke any menu or command (including Save, Print etc.), an auto-reformat occurs instantly. This means that you are never left with the document in the wrong state. With these options, you have the best of all possible worlds.

Also, SHIFT/CAPS now obeys the indent margin (which matters if the cursor is on the first line of a para) and leaves the cursor position unaltered within the text. Other reformatting commands are unaltered, so you can still step through paras reformatting manually as you go, if you wish. The maximum number of lines, characters, words, lines, pages etc have all been increased (effectively to infinity: e.g., the new limit on characters is 30 million-million, this up from 2 million, restrictive in Super Gold Card / QXL days!). Also, the new version (starting with v5.13) is even faster, and its handling of complex search/replaces (say, involving end of line codes) has been optimised. PERFECTION SE really is superb!

DIGITAL PRECISION PRICES

	£
3-D PRECISION CAD SYSTEM	49.95 d
ADVENTURE CREATION TOOL SPECIAL EDITION	49.95 r
ARCADIA GAME	9.95 s
ARCHIVE DEVELOPMENT SYS + RUN-TIME MODULE	29.95 a
ARCHIVE TUTORIAL	19.95 a
BETTER BASIC EXPERT SYSTEM	24.95 a
BLOCKLANDS GAME	9.95 s
CASH TRADER v3.3 + ANALYSER	99.95 c
COMPARE FILE UTILITY	19.95 a
COPY UTILITY FOR BACKING UP	9.95 a
CPORT BASIC TO C AUTO-TRANSLATOR WITH C68 COMPILER	99.95 c
CPORT BASIC TO C AUTO-TRANSLATOR	89.95 c
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DAT-APPOINT APPOINTMENT DATABASE SYSTEM	19.95 d
DESKJET/LASERJET DRIVER FOR PRO PUBLISHER	19.95 c
DESKTOP PUBLISHER SPECIAL EDITION	39.95 c
DESKTOP PUBLISHER	24.95 d
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DIGITAL C SPECIAL EDITION	49.95 a
DISKTOOL WITH QUICKDISK	19.95 b
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EDITOR	29.95 a
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FONT ENLARGER	19.95 r
GAMES COMPENDIUM (ALL FIVE GAMES)	29.95 a
GRAFIX 24-PIN UNIVERSAL PRINTER DRIVER	14.95 r
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IDIS SPECIAL EDITION	39.95 d
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LIGHTNING SPECIAL EDITION ACCELERATOR	49.95 h
LIGHTNING GOLD SPECIAL EDITION	39.95 a
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MEDIA MANAGER SPECIAL EDITION	49.95 d
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MEGA DICTIONARY	29.95 g
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NAMES AND ADDRESSES DATABASE SYSTEM	19.95 d
PAYROLL SYSTEM	49.95 c
PC CONQUEROR GOLD SPECIAL EDITION WITH DR-DOS v7	179.95 g
PC CONQUEROR GOLD SPECIAL EDITION	99.95 g
PC CONQUEROR WITH DR-DOS v7	139.95 r
PC CONQUEROR	59.95 r
PEDIT PRINTER DRIVER FOR XCHANGE	19.95 a
PERFECTION PLUS SPECIAL EDITION WITH SPELLCHECKER	139.95 c
PERFECTION PLUS WITH SPELLCHECKER	99.95 r
PERFECTION SPECIAL EDITION WORD PROCESSOR v5	99.95 c
PERFECTION SPECIAL EDITION DEMO VERSION + SAMPLE DATA	19.95 c
PERFECTION WORD PROCESSOR v3	59.95 d
PERFECT POINTER TOOLS	29.95 a
PROFESSIONAL ASTROLOGER WITH ASTRONOMER	69.95 a
PROFESSIONAL ASTROLOGER	59.95 a
PROFESSIONAL ASTRONOMER	29.95 s
PROFESSIONAL PUBLISHER TOOLBOXES (BOTH PARTS)	49.95 r
PROFESSIONAL PUBLISHER TOOLBOX PART ONE	29.95 r
PROFESSIONAL PUBLISHER TOOLBOX PART TWO	29.95 r
PROFESSIONAL PUBLISHER	89.95 c
QFLICK CARD INDEX SYSTEM	29.95 a
QKICK FRONT END SYSTEM	24.95 a
QMATHS MATHEMATICAL SYSTEM PART ONE	69.95 c
QMATHS MATHEMATICAL SYSTEM PART TWO	59.95 c
QMATHS MATHEMATICAL SYSTEM (BOTH PARTS)	99.95 c
QMON MACHINE CODE MONITOR	39.95 a
QUICKLASER PUBLISHER DRIVER FOR LASERJET/DESKJET PRINTERS	19.95 c
RECOVER ARCHIVE UTILITY	19.95 a
REVERSI GAME	9.95 s
SEDIT + SCREENPRINT ARCHIVE UTILITIES	19.95 a
SOLUTION PC EMULATOR WITH DR-DOS v7	109.95 r
SOLUTION PC EMULATOR	29.95 r
SPELLCHECKER WITH DICTIONARIES	49.95 d
SUCCESS CP/M EMULATOR	49.95 b
SUPERBASIC MONITOR	24.95 a
SUPERFORTH COMPILER WITH REVERSI	39.95 a
SUPER ASTROLOGER	24.95 s
SUPER BACKGAMMON GAME	9.95 s
SUPER SPRITE GENERATOR	29.95 a
TOOLKIT III WITH ROM	49.95 h
TOOLKIT III	29.95 a
TRANSFER UTILITY SPECIAL EDITION	29.95 b
XREF SUPERBASIC PROGRAM ANALYSER	29.95 a
TRANSFER UTILITY	9.95 b
TURBO BASIC COMPILER + TOOLKIT	79.95 a
ULTRAPRINT SCREEN DUMP UTILITY	19.95 a
XREF SUPERBASIC PROGRAM ANALYSER	29.95 a

KEY a=Available either on cartridge or disk; b=Disk only; c=Minimum 512K exp: disk only; d=Minimum 256K exp: either cartridge or disk; r=Minimum 256K exp: disk only; s=Cartridge only; g=Minimum 1.5Mb RAM: disk only disk; h=ROM + (cartridge or disk)

AND NOW - BEST-EVER SPECIAL DEALS...

5% off 2 programs
10% off 3 programs
20% off 4 programs
30% off 5 programs
40% off 6+ programs!

SUPER GOLD CARD

This amazing product is the way forward for the QL. Like Gold Card before it, the brand-new **Super Gold Card** is a plug-in disk interface and RAM expansion that works on all QL versions. Incredibly, it is *over three times* speedier than Gold Card, with *over twice* the RAM and with many enhancements. It complements LIGHTNING SPECIAL EDITION like nothing else, squeezes the best out of TURBO (which was designed with 32-bit CPUs in mind) and really accelerates PC CONQUEROR. **Super Gold Card** is actually as fast, or slightly faster, than the much vaunted QXL: also, it is **100%** QL-compatible **now**, and no PC is needed. The table below really says it all:

System → / *↓ Features*	*Bare QL*	*TRUMP CARD I*	*GOLD CARD*	**SUPER GOLD CARD**
Relative Speed	1x	1.8x	7x	**25x !**
Motorola CPU	68008	68008	68000	**M68020**
Clock Frequency	7.5MHz	7.5MHz	16MHz	**24MHz**
Bus width	8 bit	8 bit	16 bit	**32 bit**
RAM fitted	128Kb	896Kb	1,920Kb	**3,968Kb**
RAM access speed	Slow	OK	Fast	**Twice as fast**
PCB population	V.high	High	V.low	**V.low**
Physical dimensions	Monolith	Full-size	Half-size	**Half-size**
Lock-up frequency	Ouch!	Occasional	V.rare	**Won't**
Battery Backup Clock	No	No	Yes	**Yes**
Clock Protection level	N/A	N/A	Modest	**High**
Toolkit II + Manual	No	Yes (early vns)	Yes	**Enlarged**
Sub-directory support	No	No	Yes	**Yes**
Parallel/Centronics port	No	No	No	**Yes**
Spooler/Screendump/Ramdisks	No	Yes	Yes	**Yes**
Speedup switch (Screen#2)	No	No	No	**Yes**
Future hi-res graphics	No	No	No	**Planned**
Disk drives supported	N/A	SD/DD	SD/DD/HD/ED	**SD/DD/HD/ED**
Max no: of disk drives	0	2	3	**4**
Max sectors/disk	N/A	1,440	6,400	**6,400**
Max disk transfer rate	N/A	30Kb/sec	120Kb/sec	**>120Kb/sec**
Peripheral card tolerance	OK	No	No	**OK**
SCSI-2 compatibility to-be	No	?	No	**Yes**
Miracle/DP Warranty	No	No	2 years	**2 years**
DIY/Kit incorporability	Yes	No	No	**Yes**
Overall Rating by DP	2%	10%	30%	**110%**

And to the Very Best news: from DP, SUPER GOLD comes SUPER CHEAP!
SUPER GOLD CARD, plus a no-limit extra 20% SOFTWARE DP DISCOUNT VOUCHER, plus a FREE mystery DP program, plus a FREE Dust Cover, will cost you a mere £375 ✓✓✓✓
Less £125 if part-exchanging your standard 2Mb Gold Card
Add £125 for ED 6400-sector Disk Drive (PSU, cased, cables).

OTHER HARDWARE EXCHANGED AND SOLD BY ARRANGEMENT. PLEASE ORDER NOW: WE EXPECT VERY HIGH DEMAND FOR SUPER GOLD CARDS, AND WE DON'T WISH TO DISAPPOINT. INTERNATIONAL RAM PRICES ARE UNSTABLE AND PRICE HIKES MAY BE INEVITABLE. CONSEQUENTLY, THE ABOVE COMBINATION OFFER COULD BE WITHDRAWN WITHOUT NOTICE...

The software discount must be taken at the same time as the main order, and CAN be combined with the SPECIAL DEALS discounts. For example, if you chose six DP programs of total list price £100, you would only have to pay £100 -40% -20% = £48 for them! And, of course, you would also get the two gifts absolutely free, and a 4Mb SUPER GOLD CARD too!

*TERMS & CONDITIONS * We accept payment by VISA, Mastercard, Access, Eurocard, Eurocheque, £ cheque drawn on a UK branch of any bank or building society, postal order, cash, travellers cheques or direct funds transfer to our bank account #60327808 at Barclays Bank plc, South Chingford Branch (sort code 20-53-00), NE London Business Centre, PO Box 2403, London N18 2BY. If you must use another currency, add 7.5%. If you must use another form of cheque, add £15. * Upgrades cost only the difference in current price plus £10; return the original disk and manual. But do NOT return the manual if the upgrade is to a "SPECIAL EDITION" of your original program: you will be sent useful supplementary documentation. Upgrades from LIGHTNING are the exceptions to the last rule! * Only DP programs and upgrades (i.e. not DR-DOS) count towards discounts. * Prices are all-inclusive for UK mail-order. Rest of Europe, add 5%. Elsewhere, add 10% (Air Mail). * We aim for 24 hour turnaround. * DP & Digital Precision are trading names of Digital Precision Ltd, Company No.1833989, registered in England & Wales. * Orders using your own paper are also welcome!*

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Sinclair QL World,
Published by Arcwind Ltd.
The Blue Barn,
Tew Lane, Wootton,
Woodstock,
Oxon. OX7 1HA
Tel: 0993 811181
Fax: 0993 811481
ISSN 026806X

If you have any comments or difficulties please write to the editor and we will do our best to deal with your problem in the magazine, though we cannot guarantee individual replies. Back issues are available from the publisher price £2.50 UK, £2.99 Europe. Overseas rates on request.

Subscriptions from: Arcwind
The Blue Barn, Tew Lane,
Wootton, Woodstock, Oxon. OX7 1HA
UK: £23.40
Europe: £32.90
Rest of World: £40.90

Reprographic Services: Eclipse, Brook Street, Watlington, Oxon. OX9 5JH.
Distributed by: Seymour Press Ltd., Windsor House, 1270 London Road, Norbury, London, SW16 4DH

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QL Scene

BRISTOL RADIO RALLY

On Sunday 26th June 1994 the **Bristol Radio Group** (members of the Radio Society of Great Britain) are holding the 37th Longleat Amateur Radio Rally from 10am at Longleat Park (go to **Longleat House, not the Safari Park**), near Warminster in Wiltshire. Last year over 5,000 people attended the rally, which, as well as radio and electronics equipment and spares, is now featuring more and more computer-related suppliers, including a large Bring and Buy section.

For non-radio, non-computerised members of the family, there is a large Craft Fair, refreshments, and the Safari Park and House nearby, as well as extensive parkland. Camping is available through the *Longleat Caravan Club on 0985 844663.*

Admission to the grounds and rally are £2.50 for adults, £1.50 for pensioners and 50p for children, the same as last year.

For further information, including table bookings for traders, contact **Shaun O'Sullivan, 15 Witney Close, Saltford, Bristol BS18 3DX. Tel. 0272 860422, Fax 0272 869387.**

OYEZ! ALL-TRADERS FAIR IN LONDON!

UK traders will be banding together to hold a TRADERS' QL FAIR on **Saturday 25th June at St. Helena's Church Hall, St. Quintin Avenue, London W10** from 10am to 4pm. It is hoped that all the UK QL traders will be there, and possibly visitors from overseas as well.

There will be a separate room for lectures and demonstrations.

QL owners can come along and set up their own systems on a first-come, first-served basis. Entrance is free, parking is free, and Ladbroke Grove tube is about 10 minutes away. And if you get into the area really early, it's a good time to walk round the Portobello Road market before all the good stuff goes.

This is a first-class idea, now that the All Formats Fairs have less and less to offer to QL users, especially in the London area, and we hope as many people as possible will have a chance to go along.

More information from **Tony Firshman at TF Services, Holly Corner, Priory Road, Chavey Down, Ascot, Berks SL5 8RL. Tel. 0344 890986. Fax 0344 890987.**

BILL CHANGES HIS OFFICE

Stalwart Bill Richardson of WN Richardson & Co. (EEC) has **moved** his business to a new address. Find him in future at:

6 Ravensmead
Chalfont-St-Peter
Buckinghamshire SL9 0NB

Tel. 0494 871319
Fax 0753 892235

The old phone number will continue in use for the time being, but will only be manned by the answering machine.

Miracle In Newport

*It's never too late! If you've just won the pools or had your pocket money upped (and our mailers haven't gone completely berserk) then there's still time to get to Miracle In Newport, **Rhode Island, USA**, Saturday 14th May, $7US on the door. Call Bob Dyl on +1 401 849 3805 for information. Coffee and donuts Sunday morning (Americans take the ugh out of doughnuts).*

"ADDRESS BOOK" FULLY REVISED

DJC's **Address Book and Label** utility has been upgraded to version 13. It now includes a Birthdays facility to allow you to add birthday dates to names and addresses, and select entries on the basis of month or between given dates in a month - handy if you want to avoid a ding-dong over a forgotten date.

You can now also insert blank lines between full-page-width entries.

Address Book is an easy-to-use program **based on Archive** for recording names, addresses and a few notes. It allows printing-out on various sizes of labels, and among other things avoids "empty lines" when printing out short addresses.

The picture here shows all the commands and facilities on the menu from which the whole program is operated. There are also some sub-menus with further choices.

Address Book and Label Printer costs £15 (plus £1 for overseas airmail postage). Upgrades from earlier versions cost just £2 - send back your master disk and you will receive the upgrade and a new manual.

Dilwyn Jones Computing, 41 Bro Emrys, Tal-y-Bont, Bangor, Gwynedd, LL57 3YT, UK. Tel 0248 354023.

NEW SUPERBASIC DEVELOPMENT TOOL

Once more, from the man in Im Stillen Winkel - **QBasic,** a brand new product. QBasic is a Thing for QD - a connection between QD and QLiberator, an interface and parser in one. Having typed or loaded your SuperBasic program into **QD**, you can use QD's facilities for editing. To compile and run, you can use F10. with a choice of Compile options. The parser will check the syntax of the program, and identify the location of any errors it finds. Otherwise, it generates a **QLiberator**-compatible work file, and calls QLib to compile and execute.

The basic requirements to use QBasic are QD 5 or 6 and QLiberator 3.30 or higher. QBasic costs DM49.90, with bundling options if you want QD and/or QLib.

One minor snag which Jochen draws attention to is that WHEN constructs are not parsed correctly. This will not, he feels, incommode very many users. Contact Jochen for answers and more information.

Further to this, Merz's **QMON** and **JMON** now work on all 680x0 processors, from the 68000 up to the 68030 and 68040. They handle all stack frame formats, so that debugging, tracing etc. can be done in Supervisor mode on higher processors. JMON now has all the facilities of QMON, but does not rely on SuperBasic windows, having its own, movable, windows, which can be put in a button frame for easy breaking and re-awaking. Permanent breakpoints and trap levels can be specified. Merz recommend the system for development under the **Pointer Environment**, with an many independent debuggers as you need in their own windows. The only caveat is that the debugger does not handle the extended instruction set of the 68020/030/040.

The English version of QMON and JMON are handled by **Digital Precision, 222 The Avenue, London E4 9SE, tel. 081 527 5493**, and the German version by Merz. A special upgrade price is available for users of the original **QJump QMON** (2.00 to 2.03): German or English versions can be upgraded for DM32.90 via Jochen Merz's address. Return the master disk for upgrade to **Jochen Merz Software, Im Stillen Winkel 12, D-47169 Duisberg, Germany. Tel. 010 49 203 50 12 74.**

ERGON NOW ON FAX

Ergon Development can now take **fax calls**, thanks to QFAX, on their regular number (+39 522 70409). Best times are between 1800 to 2000 GMT Monday to Friday, 0900 to 1300 Saturday and 0900 to 1900 Sunday (the latter time has lower phone charges from many countries).

All Ergon's programs have been modified to run on any QL-compatible with any resolution. (At present only the QXL and QVME allow extra resoultion, but they will also be fully compatible with the Miracle graphic card). They are already fully compatible with the 68020 of the Super Gold Card, the Atari QVME (68000 on STE or 68030 on TT) and the QXL 68040.

Ergon's ZX **Spectrum emulator range** has been rationalised to the ZM/128 and the ZM/hT systems. The first is now the ZM/128, a 102-page manual and accessories/conversion programs. The second is also the superfast ZM/hT compiler (full ZX supped on Gold Cards). Ergon recommends users to get the upgrade which also has a laser-printed manual with step by step examples. See Dilwyn Jones for range and prices.

The **Ergon demo disk** is now a fully revised V5.1, and includes demo versions of MasterBasic, QLM, DEA, Open World and Floppy Disk Utilities. The Zx eMulator demo disk has also been brought up to date, and also contains some utilities and games. Send six IRCs to Ergon for the demo disks.

Just to remind everyone: Dilwyn Jones is now Ergon's dealer in the UK, apart from upgrades for existing users, which MUST go through Ergon themselves. Contact at **Davide Santachiara, Via Emilio De Marchi 2, 42100 Reggio Emilia, Italy.**

QL Scene

ARCHIVE UPGRADE FOR PC

Transform Ltd. of 7c Station Approach, Hayes, Kent BR2 7EQ are promoting Arcplus, a "considerably enhanced" version of Archive for use on the PC.

Arcplus was developed several years ago and has been quietly updated since. The most recent improvements have been substantial and include On-Line Help, context-sensitive within the editor, and access to more memory. If not enough Extended and Expanded memory is available, Arcplus gives the Virtual Memory code back to DOS to maximise the DOS memory.

Interested users should contact **Transform on 081 462 4666 (fax 081 462 3971)** for current prices and a list of functions, etc. The current upgrade price for existing users with versions dating up to 1 January 1993 is £75 plus VAT, £10 plus VAT after 1 January 1993. Manuals cost £25.

OPEN CHANNEL

Scrabble

I wonder if any of your readers could help me find a **copy of the Scrabble program** for the QL? My wife is a keen player, has seen the PC version, and would like something similar! If possible I would like it on disk - I was lent a copy once, but had problems because it needed MDV2. Since I bought a 3.5in disk drive I haven't used the microdrives and MDV2 doesn't work.

I have had my QL (JS rom) since 1985, with a Microvitec colour monitor, and have now added the disk drive, Gold Card, and an Epson Stylus 800 inkjet printer, mainly used with Perfection as a club secretary. I can recommend it all, particularly **the Gold Card.** Before I fitted it in 1992, I used to get crashes every time I used the QL, none at all since, touch wood!

Robin M Milford
Hedge End
Southampton

Even though somebody asks us quite regularly about Scrabble for the QL, no-one seems to be publishing it. Maybe someone can help Robin with Scrabble, but how about one of our software publishers putting it back on the market again?

Psion Chess

On Saturday 12 February I spent an enjoyable and enlightening day at the **Quanta Scottish Workshop** in Edinburgh. What struck me most was just how friendly and helpful were members of the QL fraternity. Dilwyn Jones remembered my name from telephone orders of QL programs, and it was good to meet him face to face. Bill Richardson was more than helpful.

I was very pleased to be able to buy a second-user copy of Psion Chess. Sadly, when I got it home and tried to run it, the dreaded **"bad or changed medium"** came up on screen. Nothing I tried would recover the file which was corrupt - 'chessc'. Even Cartridge Doctor did not succeed.

Then I tried copying files to disk simply by using **Ice**, and Lo and behold, it worked! Psion Chess is terrific as far as I am concerned, and it's a great pity it is no longer available commercially. So old ways are not so bad, as Miracle indicate by incorporating a parallel interface in their Super Gold Card, which was released at the Workshop. (The Super Qboard also had one.)

For those who might come across a second-user copy of Psion Chess, it is as well to know that it won't run on an expanded QL, so you need to use a utility to make the QL 'think' it only has 128K of memory. Gold Card has such a utility in RES_128.

All in all an excellent day. The QL is far from dead!

James C McGreehin
Alva
Scotland

The residents of much of Scotland may be spread thinly compared to, say, Birmingham or London, but when they have a day out, they do it properly. Ice may be old-fashioned now, but it was an extremely useful utility which always worked well. For those who are tempted to fret at compatibility problems, I know several commercial PC users who have to use stratagems to "convince" one program that it is working with an earlier version of another program, because the programmers have not allowed for the one to recognise updated version numbers for the other!

Taskmaster

I am a new subscriber to QL World. To give you some background, my father purchased the QL **back in 1984** and, in turn, it has been passed to me. I regard myself as QL enthusiast and have back copies of QL World/QL User from 1985 to 1987 inclusive.

However, my main objective is to be in contact with other QL users and identify the route in which I can obtain further and replacement software.

I have had the recent misfortune of **"trashing"** my **Taskmaster**, and am unable to obtain a copy from my "master", as that seems to have been corrupted. Additionally, I am on the lookout for another copy of **Archive**, as, again, I am having difficulty in copying my microdrive master to obtain a working copy I keep getting "bad line or changed medium." As well as having microdrives, I also have a "double/twin" 3.5in Cumana disk drive facility.

I look forward to receiving the March issue of **QL World** and would be grateful if you could give me details of how to obtain back issues.

Alan Knell
Allesley
Coventry

So many corrupted files and changed mediums this month! Is it the weather? If you are looking for software, you should get catalogues from Dilwyn Jones (back cover), Qubbesoft and SJPD (see Instant Access). The latter two are public domain dealers and also stock some backissues of QL World. Digital Precision also have a long list of software but put most of the details in their advertisement in QL World. Jochen Merz advertises every couple of months, and you will find information on smaller publishers in QL Scene whenever they issue something new, or an upgrade. Archive is now available in the Xchange version from PD dealers. A reader may be able to help you with reconstituting your trashed programs, otherwise. You should also contact the QL User Group (West Midlands) via Mike Bedford-White, 16 Westfield Road, Acocks Green, Birmingham B27 7TL, who meet regularly in Birmingham,which is not far from you.

Arcwind has back issues back to May 1991, but unfortunately all the copies belonging to the previous publisher were removed and trashed (unreconstitutably) when they moved offices - a great pity, it happened one day when we weren't looking. Copies do crop up at fairs, through.

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 an answer, or just sound off about something which bothers you, write to: Open Channel, QL World, The Blue Barn, Tew Lane, Wootton, Woodstock OX7 1HA.

PC/QL/Thor

One of the projects that I have been attempting, between my existing projects on the PC, is **to use the PC to control the QL/Thor**. It has occurred to me that it should be possible via a serial link that the PC could in effect become a remote terminal for the QL. It would save considerable space on the desktop, allowing a keyboard and a monitor to be removed. With large amounts of people now being forced onto PCs due to the unstoppable rise of the PC both at work and home, this sort of system may allow the use of both side by side in the same way as the QXL, thus helping to keep the QL in action. I wonder whether this project might be worth consideration by Simon for a future article.

Bob Gillett
Torquay
Devon

*Getting the QL to colonise or run alongside the PC has already occupied a fair amount of thought among dual users. If you haven't done so already, you should investigate **QL File Server,** by Di_ren, sold by Dilwyn Jones Software (details on back cover). I've forwarded your Simon-specific queries for Simon's attention.*

Star Printer

In May 1993 I bought from Watford Electronics a **S tar LC24-200** colour printer for £214 (including the colour ribbon). The monochrome version was about £50 cheaper. It works via Ser1 with the old Taxan/Kaga interface.

This has proved very recommendable. The 24-pin head produces LQ characters to a standard I think exceptional for a dot matrix printer, close to commercial printing. There are two modes, Standard and IBM. IBM modes have 7 character sets, of which 6 are accessible from my QL.

The **Standard mode** is factory-selected Epson-type, with the variations for 16 International Character sets. The DIP switches are on the top of the machine in front, but the works are so attuned to software commands that I rarely find it necessary to touch them.

My wordprocessor is **The Editor**, into which I can insert the commands and see exactlly what I have done. Then all I have to do is enter "w.ser1" and the printer starts to rol. I do not have to Save, if that is not required, so control is entirely from the keyboard without need of a driver.

If your wordprocessor accepts print codes direclty into the text, then there are many fancy things this printer can produce in the expanded print range. In Quill, one is limited by the number of translate options, but everything which Quill commands, the LC24-200 will do.

So this is the printer for both the beginner and the doyen who wants a professional-looking document.

A printer driver is required, of course, in **Professional Publisher**, and it is necessary to amend ProPub's driver, referring to the printer manual and the ProPub manual for things like line feeds. There is no problem here at all. The Star LC24-200 has a complete range of **graphics commands**. There is one thing it does with ProPub, however, and that is to verticallly stretch the page somewhat. One has to remember this when drawing circles.

Another useful facility is paper parking. One keeps fanfold paper permanently threaded in the machine while one can use cut sheets. Switching to each type of paper is controlled by the paper release lever.

The manual has complete instructions and software codes, well laid out and easy to understand.

The machine has four different font sets built in, and four extra cartridges are available for another 11 fonts at a price of £25 per cartr idge (1993).

The built-in fonts are Roman, Sanserif, Script and Courier. Characters per inch are a choice of 20, 17, 15, 12 and 10, plus double and quadruple size characters. As well as normal printing, outline and shadow characters are also obtainable. Italics are available for all characters.

Peter Tomlin
Hatherley Grove
London W2

Thank you for the recommendation, Peter. Any others will be gratefully received by QL World and any bewildered would-be printer buyers.

Editor's notebook

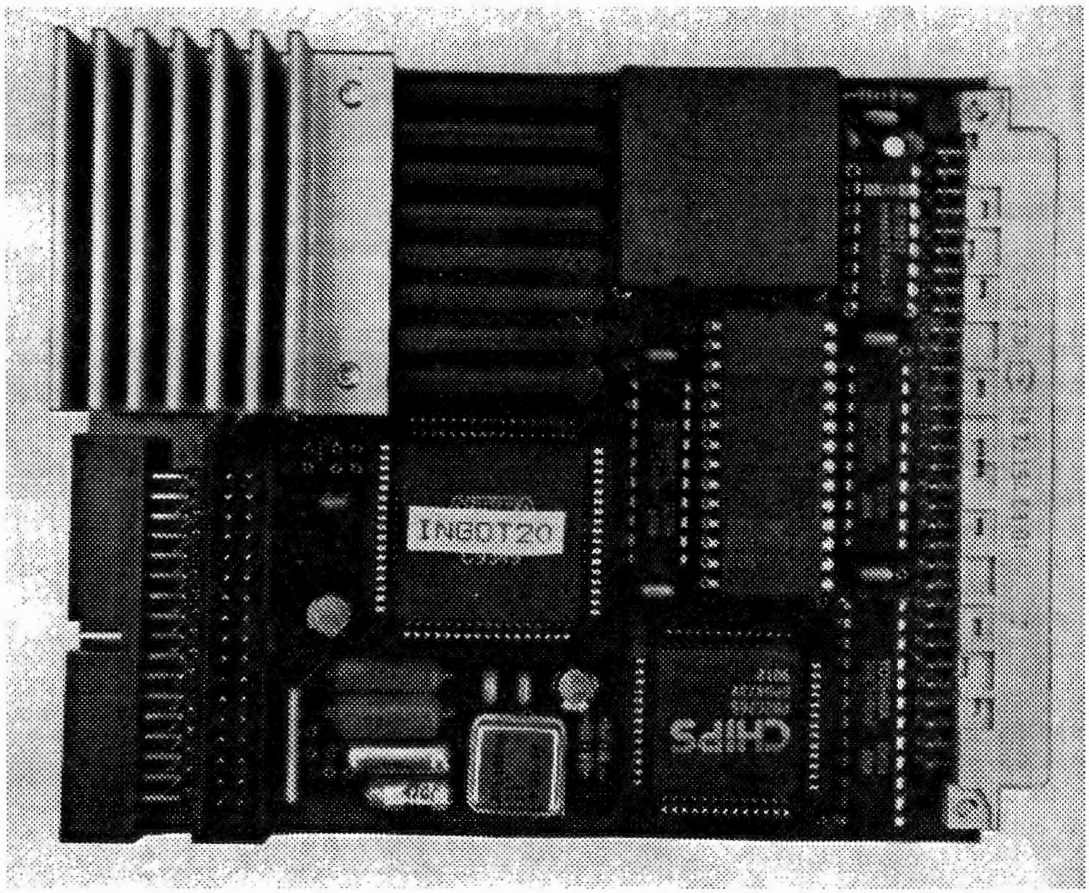
Summer is finally here, and for the third time since QL World moved to Arcwind, the oilseed flowers are out in the fields of Oxfordshire, smacking passers-by in the eye with yellow and playing havoc with people's hayfever. I like oilseed flowers and don't get hayfever!

In the festive spirit, we have an accumulation of games this month. Very serious games, of course. Tower of Valagon is worth playing for its conversational value alone. See page 21.

Time to bag up a gross of goldfish for people who spotted our deliberate mistake. The good news is that it doesn't mess with anyone's listings (we have another department to do that).

Talking of goldfish - "Why join us for a QL good time?" ask IQLR about the Miracle show next month. There are lots of positive answers to that, but the real answer may be one of those three-letter words that's never there when you want it!

MIRACLE SYSTEMS



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Troubleshooter

Bryan Davies speculates on the benefits of the new Super Gold Card and wonders about graphics cards.

It really is remarkable how much good stuff has been introduced during what might be called the twilight of the QL. Inevitably, we think "how different things would have been if that had been available from the start", but ten years have gone by and any new product has to be considered in the light of how many currently active QL users will buy it. The thought is prompted by the surprising new piece of hardware announced in QL World Volume 3.1 - the **Super Gold Card.**

Now we have another significant addition to the hardware. The Super Gold Card is a product of **Miracle Systems**, as would be expected, although the arrival of DP's advertising last-thing before the printing of QL World meant that Miracle were the last people to announce their own new product!

Digital Precision have also remained very true to the QL for a long time, and could be excused for not devoting much effort to developing new products now, but there continues to be a steady stream of new and re-vamped software from that direction too.

Two Options

For the benefit of anyone who has not read the adverts, the Super Gold Card is much faster and has more memory than the GC, and has a parallel (printer) port too. It fits into the QL just as neatly, though. Visually, they are hard to tell apart!

Clearly, the Super Gold Card and the **QXL** card are competitive with each other, to some extent. The user who has hesitated to get involved with PCs now has the means to get an even-faster QL, without having to clear space for another large box.

Miracle make it clear that the QXL, not the Super Gold Card, represents their future path, but it is admitted that there are is still basic development going on with the QXL. The SGC, on the other hand, can be expected to be a fully-working product.

At the time of writing (late April), the QXL still lacks a **Basic interpreter** and has some trouble writing to disk drives. Late delivery of software to Miracle has convinced them that they should write their own in future (they have, in fact, done some software modifications for the SGC themselves).

On the subject of the small display size, it is hoped that programmers will modify their programs to make use of the full screen; Miracle do not see it as their task to do this. **Text87 Plus 4** and programs running under QPac2 can make use of the larger screen.

In answer to a question from **David Owen**, there has so far been no review of the QXL in QL World because Miracle don't want to release review hardware until they feel it is nearer its final state. This is a "philosophical" matter, my own feeling being that it is better to have some review in the early stages of a product's development, while it is still fresh in potential buyers' minds, and indeed the editor tells me that she has a user report in mind.

Multitasking

A couple of points in a previous Troubleshooter article brought comment from Miracle. Reference to OS/2 as a pre-emptive multi-tasking operating system was not intended to suggest that Qdos too does not allow the priority of running jobs to be set. The multi-tasking function existed in Qdos from the start, long before OS/2 was developed.

From the user's point of view, the control over Qdos priority is rather limited, however. You cannot easily preset priority for all the programs you want to run regularly.

In the early days, multi-tasking with the QL was very interesting, but not so useful when using substantial programs. The processing capacity and memory simply were not there.

The Super Gold Card now gives us both processing power and plenty of ram, and will make multitasking - as opposed to simply switching programs - a more usable function.

The other point made by Miracle has had plenty of airings, without (so far as I am aware) producing a clear picture. The subject is **"disk caching"**. This expression has been common for at least six years.

The appropriate Qdos function is **"slave blocks"**. Both of them improve the effective read and write speed of disk drives. Blocks of information are stored in memory after use, and, if anything more is required from the same block, it is available at the speed of memory, rather than disk, access. It is a common feature of software operation that successive accesses to program files on disk frequently look

in much the same place, making it worthwhile to hang on to a block of data which has just been read from disk into memory. The next piece of data requested may well be within the same block.

Disk Caching

The relative speed of access of disk and memory is a large ratio. A fast hard disk drive has a nominal access time of the order of 5-10 milliseconds, whereas ram memory has a nominal access time of 60-70 nanoseconds.

There is much to be gained in performance by an effective disk caching function. The point I have made is that the average QL user has no control over the slave block function. If some other internal operation decides it wants to use the memory where the last disk data has been stored, that is that - the stored disk data is lost.

Presumably, the more memory there is the less chance there is of losing the slave block function this way. The 4 MB of the SGC may prove to increase the effectiveness of the caching function.

The size of the slave blocks is not under user control. The difference with a proper disk cache is that it is something the user can specify, and it will not be disrupted by other processes.

A good caching function allows the memory space reserved for disk data to be specified - 2 MB is a sensible figure to use in many environments - and the drives to be affected by caching can be identified. The form of caching can be set - for example, read-only or read and write.

Floppy drives can perform much faster with caching but errors are common if they are both write- and read- cached. It is also possible to perform a "look ahead", giving a predictive aspect to cache operation.

The SGC opens up several possibilities, because of its speed and its ram. It seems a pity that programmers have - over the years - shown relatively little interest in providing user-friendly utilities for the QL.

A disk cache would be useful, especially if it had a reporting function, to tell the user how effective it was (recording the "cache hit and miss rate"). So would a housekeeping program, of the nature of Files 2 (from TaskMaster) but with a much better, graphical display, able to show many more files and the directories. A simple-to-use "disk doctor" program would be welcomed by many users.

By simple is meant something which does not require the user to understand anything of the internal structure of files, but merely presents him/her with as few as possible questions (and ones that can be easily answered). For example, "error found in sector containing file xxxxx - move data to good area on disk (Y/N)?".

Digital Precision has introduced version 5.14 of Perfection. The handling of large files - especially those with lots of short lines - has been improved, and (all, hopefully) end-of-file anomalies have been removed.

Other detail improvements have been made. DP has also taken on some more of the older QL software, from back in the **Eldersoft** days, and this should be appearing in their adverts. **Software87** has made further detail improvements to Text87 Plus 4, in connection with its use with LineDesign.

What You See

Good though it is to have another go-faster card, many users must be wishing that the development of improved graphics for the QL had higher priority. What would you say is the major factor in the success of certain other computers and categories of software? Surely, a **display** with higher resolution and more colours attracts the attention of users of all ages. It is not just the kids who go crazy over fancy decoration!

How else do you explain the success of Windows software on the PC? Anything written to run under it is - by definition almost - slow. Text display is decidedly poor, unless you invest in an expensive display and driver card.

There is an endless list of drawbacks, but the claimed sales of Windows reached 40 million some time ago. A high proportion of the people who call me for help mention Windows. Many of them have only the foggiest notion of what "it" is, but they are convinced they have to have it.

Assuming you are not too bothered about getting any work done, there is a lot to be said for the Graphical User Interfaces. Maybe it is an extension of the "a picture is worth a thousand words" concept. Whatever the reason, many people seem to love icons, buttons, tool boxes, ribbons, bars, scroll bars and all the other paraphernalia that goes with a windowing environment.

Of course, we have that on the QL too, notably in the form of **QPac**, but the limited resolution and colours of the screen prevent anything very adventurous being done.

For example, you cannot get very many file names on the QL screen, but there is no problem getting 150-200 names on a 1024 x 768 pixels screen, all quite readable, and with room left for program information.

But... the cost is high. You need a 17-inch screen to make the text readable, and even then it is unlikely to be as easy on the eye as non-GUI text on a 14-inch screen. There is vastly more information to be changed each time a new picture is required, and that means that the processing power has to be much higher to deliver the same speed.

The 14-inch screen will handle quite a bit more than the 512 x 256 pixels of the standard QL, though. You can get very good text and colour at 640 x 350 (EGA) and 640 x 480 (VGA); even 800 x 768 (SVGA) is good, with some displays and cards.

The next step, 1024 x 768, is simply too much for normal 14-inch displays to cope with. Can anyone give a categorical answer, on whether or not standard QL displays are actually capable of handling greater resolution and more colours? If the answer is no, a worthwhile new graphics card is going to entail a new display too, and that means serious money.

Odds and Ends

Reader **David Owen**, in Dubai, has a QXL card installed in a 33/66 MHz PC, with access to a 512 MB hard disk. He is using it in a network, with a standard JS QL that is fitted with a Gold Card and ED drives. For printing, he has an Epson EPL 7100 laser. The printout is fine unless he uses the FSERVE command in part of the boot routine.

With that command activated, there is intermittent corruption of the print; some characters are incorrect, line feeds and general formatting go wrong, and so on. This happens even if no attempt is made to use the network - the mere presence of FSERVE appears to cause the trouble.

Years ago, my experiments with networking (using TK2) showed that

the placement of FSERVE within a boot file was important, but why that was so I cannot recollect. Has any other reader had similar experience with corrupted printing?

A quick tip from **Roy Barber**, ex-editor of the Quanta newsletter: removing labels from 3.5-inch disks can be made easier by heating the labels with a fan heater. But disks are mainly plastic, so don't overdo the heating!

Mouse Matters

Do abbreviations drive you up the wall? Here is another you might have wondered about:

MFLOPS - Millions of Floating-point Operations Per Second. This is a measure of performance doing calculations, and is very relevant with cad/cam software.

You cannot get far without a mouse these days, but the QL variety tend to be a bit pricey. For a cheap one, call Adman Services, who are offering mouse, cable and software for a very reasonable price (see below).

Having despaired of ever coming across a good mouse, a recent encounter with a state-of-the-art laptop computer cheered me up no end. The computer is the Thinkpad, from IBM. That company has taken a lot of criticism in recent years, not least because its offerings in the way of portable computers were seen to be poor.

This new one has the best mouse I have used, and also the best colour LCD screen. As far as the user is concerned, the mouse looks remarkably like the orange eraser that comes on the end of a pencil. It looks the same, is about the same size, and has a similar feel to it. It is located in the middle of the keyboard, and is called a "stick", but it protrudes only a small amount above the surrounding keys.

You push on it, but do not move it, since it is sensitive to pressure rather than displacement. At first sight, one thinks it will not work, but it does, and very well too. There is no apparent problem from interference with the keyboard.

Some months ago, I made a few comments on the coming of miniature hard disk drives. The size was to be about that of a standard credit card. Well, they are here. The same laptop mentioned above had a 105 MB hard drive on a plug-in card that has roughly the same area as a credit card, but is about 1 centimetre thick.

Unfortunately, I could not get it recognised by the computer! Almost certainly a software problem, not hardware.

INFORMATION

QL mouse, software and cable, £16:
Dennis Briggs
Adman Services
53 Gilpin Road
Admaston
Telford
Shropshire TF5 0BG.
Tel. 0952 255895

JOCHEN MERZ SOFTWARE

Im stillen Winkel 12 . 47169 Duisburg . Germany . Tel and Fax: 0203501274 . Mailbox: 0203-591706

NEWS - NEWS - NEWS - NEW

QD Version 6! Brandnew features. Selective automatic tab compression/expansion! You can, for example, make QD compress allspaces which fit to tabs into a tab on giver file extensions,say _ASM, and get them automatically expanded when the file is loaded again! This saves, even on well-documen-ted source files, between 30 and 40% disk space!!! It also speeds up assembly, as the file gets shorter! Another VERY useful feature is the permenentline/column display- which does not slow QD down! Editor handling and line-handling speeded up. Bracket match - position cursor over a bracket () [] {} "" etc. and press a key-combination, and QD finds the matching bracket! Some minor improvements, keyclick within QD acdec and more.
QD Version 6 DM 125-
Upgrade from Vers. 5 with new manual **DM 26,90**
Upgrade from Vers. 4 with new manual **DM 49,90**

QMON/JMON - Brandnew version of the well-known monitor. Debugger, Disassembler. Adopted for the pointer Environment. QMON now recognises the various stack-frames and cache handling of the different processors (6800x to 68040). A Trap level can be set, and a permanent Breakpoint has been introduced. JMON is a job-monitor with all the features of QMON, but it has got its own, moveable windows, which may be put to sleep etc. -really embeeded in the Extended Environment.
New Version (German only) **DM 67, -**
Upgrace to V2.08 (German or English) **DM 32,90**

DoubleBlock - Tetris-like game for the QL! Many features, high-score-table, various levels of difficulty, differently shaped items and two-player option! Can be played with keyboard or joystick(s). **DM 42,90**
typeset93-ESC/P2 - Dedicated text87 printer drivers for all EPSO printers with ESC/P2 including the new Stylus 800. Supports the scalable fonts, special chars and block graphics for drawing borders etc. **DM 69,90**

QMenu - the Menu Extension. QMenu is an interface with pre-defined menus (e.g. multi-column file-select, simple-choice boxes, select from lists). The menus can be used from SuperBASIC, machine code and other languages. New character-select menu and info call. [V5.14] **DM 39,90**
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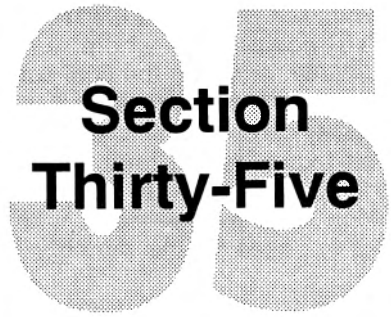
The NEW USER GUIDE

Concepts Section



This month the Concepts Guide continues with Arrays, Basic and the QL Clock.

ARRAYS

If a single variable was a bicycle, capable of transporting only a single piece of information, an **array** would be the equivalent of a double-decker bus, able to arrange masses of information in rows and columns. Arrays are incredibly important because they are the only mass data storage concept available to SuperBasic programmers without recourse to writing their own data structures.

An array is a **set of variables** that share a common name and are distinguished by one or more subscripts. An array designed to hold names of football team members (including substitutes and so on) might have the following structure:

```
Player$(1)
Player$(2)
Player$(3)
....
Player$(22)
```

Whereas ordinary variables can be used without any preparations, the first step towards using an array is to **declare its dimensions using a DIM statement** such as DIM Player$(22, 20). It saves time to dimension many arrays using one DIM statement, such as:

```
DIM Player$(22, 20), Matches(22, 26), Goals(22, 26)
```

In procedures and functions, **local arrays** can be declared using the LOCal statement at the beginning of the code, such as LOCal Temp$(12, 14), Tval(6). Arrays can be passed to procedures and functions as arguments, but only by reference and never by value. Once declared, the dimensions of an array can be discovered using the DIMN function.

A strange result of including a DIM statement in a program is that until the program is run and the line is interpreted, any reference to the array name in a direct command will cause an error. This seems to be because Qdos becomes aware of the variable name and so includes it in the appropriate lookup table as soon as the DIM line is entered, but it does not allocate memory space until the SuperBasic interpreter reaches the DIM command and carries it out.

Array names obey all the rules associated with ordinary variables, including the use of a trailing dollar sign or percentage sign to indicate their type. The dimensions of the array appear in brackets immediately after the variable name. In the example above, the array contains eleven rows each of twenty columns. Each column in a two-dimensional string array can hold one character: in numeric arrays each column can hold a complete value. DIM Manager$(20) is little different from a normal string variable, except that its absolute length has been made explicit.

Sinclair Basic **string array conventions** are unique among Basic dialects in that you must explicitly declare a maximum length for strings when the array is first declared. The convention has both strengths and drawbacks, and having been an ardent supporter of the Sinclair way of handling string arrays in the past I must say that I am now less inclined to argue strongly for it, although it still has some useful strengths.

The main irritation of Sinclair arrays is the need to **rope off memory space** that might never be used. To accommodate a set of strings, the longest of which is 100 bytes, but the average length is nearer 30 bytes, every string in the array must be 100 bytes long. The same goes for rows: unless you have memory to spare it would be foolish to declare an array with 600 rows just on the off-chance that they might all be used.

On the other hand, it is wonderful to be able to extract the fourth character of the ninth string array element with the statement X$ = ELEM$(9, 4) rather than the depressingly clumsy X$ = MID$(ELEM$(9), 4, 1) syntax found in other Basics. Indeed, this simplicity is extended to ordinary string variables not dimensioned as part of an array, which is unique amongst Basic implementations but can be found on more powerful languages such as C. Fortunately, the disadvantages of the Sinclair system can by and large be corrected with a bit of programming, but the syntactical muddles of other Basics are only overcome by adopting another language.

Arrays can have **a large number of dimensions**, but the most common are single dimension arrays, or lists, and two-dimensioned arrays, or tables. Continuing the football team scenario introduced earlier, let us assume that a season comprises 26 games and that a code of 2 indicates that a player was on the pitch for the whole match, 1 indicates a substitution and 0 means he or she did not play that week. The best way of holding this information might be a two-dimensioned numeric

array declared with the command DIM MATCH(22, 26). This creates a table of 22 rows, one for each member of the full team, and 26 columns, one for each game of the season. Of course, if the team is also part of a knockout series and plays in Europe, two other arrays are required or a third dimension could be added to the MATCH array.

Array **subscripts** are whole numbers within the range 0 to 32,767, although the final subscript to a string array (ie the length of each string) must not exceed 32,766. No array can contain more than 65,535 elements, a figure that excludes the final dimension of a string array. As the space required to hold an array is allocated in full as soon as it is declared, a further restriction on array size is imposed by the memory available in your QL.

Apart from the unusual declaration rules, string arrays on the QL exhibit one or two **further oddities**. The first is that even when the maximum length of strings within a string array is declared with an odd number the true length of the strings will be increased by one to make the total length an even number. The second oddity is that the **zero element** in the final dimension of a string array is inaccessible. Numeric arrays include the zero element, so that MATCH(0, 0) is a valid array reference. PLAYER$(4, 0), however, is not, because this is where SuperBasic stores the true length of the string. You can read from this location (it returns a numeric value), but you cannot write to it.

A significant **advantage** of arrays is the ability to scan through them using variables as subscripts. For example, the names of the members of the football team can be entered with the following code snippet:

```
FOR X = 1 TO 22
INPUT "Enter a player's name", Player$(X)
ENDFOR
```

Other ways of getting information into arrays are from hard-coded expressions, from DATA statements, and from data files with each line holding a single value. Example snippets for all three follow:

```
FOR x = 1 TO 12: Random(x) = RND(20)
FOR x = 1 TO 12: READ DataLine(x)
REPeat loop
INPUT #5, BigList(x)
x = x + 1
IF EOF(#5): EXIT loop
END REPeat loop
```

All of the Sinclair Basic dialects are good at handling array slicing, in other words extracting small parts of a larger array structure. PRINT Player$(1 TO 22, 1), for instance, prints the initial letter of each footballer in the array.

SuperBasic is less good at handling array slices to the left of an expression. LET Player$(1 TO 22, 1) = "?" produces a plaintive "not implemented yet" message. The beginning of a slice must be explicitly included, not implied with a PRINT Player$(5, TO 12) syntax. The end of a slice, however, can be left to the computer to gauge, as with PRINT Player$(3, 6 TO).

Should you omit all subscripts from an array reference, SuperBasic attempts to give you the whole array. PRINT Player$ is therefore the easiest way of obtaining a printed list of all the array contents. Unfortunately, this option cannot be used to initialise an entire array to something other than zeroes or null strings.

Arrays can be passed to procedures and functions in order to be operated on, but you cannot take advantage of the optional ability of the SuperBasic interpreter to pass arrays by reference instead of by value. In other words, array names cannot be passed to procedures or functions within brackets.

Redimensioning

When SuperBasic arrays are **re-dimensioned** Qdos blanks out all previous values to start again with a clean sheet. With the Turbo compiler, however, arrays can be re-dimensioned "on the fly" without losing all of their contents. This can be exceptionally useful when adding or deleting a row in a **two-dimensional database array**. The drawbacks are that the stretching and shrinking can only take place on the first dimension of an array (although this is usually what is wanted anyway) and that the program must be compiled in order to work. The adjusted lengths of rubber arrays can be determined using the DIMN function.

Arrays are all very well, but they can waste space and they all their elements must be of the same data type. Some alternatives worth considering are linked lists (with variable length entries, of course), queues and stacks. These can be created out of a single very long string, or from reserved memory areas, or directly accessed from data files, and they can be managed using SuperBasic procedures and functions. If you decide to implement data structures in reserved memory, remember to make use of Turbo Toolkit's memory handling functions such as SEARCH_MEMORY, MOVE_MEMORY, PEEK$ and POKE$. The Turbo Tookit package also contains worked examples of running virtual arrays from datafiles. If your Sinclair QL World library goes back that far, check out the long series of *Super Basic* articles on the subject of data structures published in the Autumn of 1988.

The **memory space** occupied by an array becomes important when it is large enough to take up a significant proportion of the available memory and when the array belongs to a compiled program whose dataspace needs to be calculated. Each floating point value in a numeric array occupies six bytes. Each value in an integer array will need two bytes. Each string in a string array will occupy its true length, rounded up to the next even number, plus two more bytes. Remember that all arrays have zero elements, so an array declared as NUM(5, 9) has 60 elements in it, not 45.

The **Turbo compiler** treats all string variables as one-dimensioned string arrays with a default length of 100 characters. Even if you only plan to hold only a single character in a variable, Turbo will rope off 100 valuable bytes of memory for the task. Conversely, should you plan to extend a string variable to include more than 100 bytes, Turbo will truncate the string to the 100 character maximum, thus losing data and potentially causing problems with slicing beyond the 100 character point. Programmers therefore need to get into the habit of explicitly declaring string variables as if they were single-dimensioned arrays.

BASIC

Basic - the **Beginners' All-purpose Symbolic Instruction Code** - began life as an interpreted language when all about it existed more demanding, compiled languages. It was recognised that it was too difficult to ask beginners to write complete chunks of program code and wait ages for it to be compiled, only to discover that there was a fundamental error in the first line. My very first program was written in **Fortran** and it was supposed to calculate fuel consumption figures from distances travelled and fuel used. Even though it was only about twenty lines long, the program took hours to create on punched cards. These were sent by courier to the University computer centre and two days later the output returned: error in line 3. The next revision produced fifty pages of output instead of one because a loop had no way of terminating. In all, it took over a week to debug a very simple routine.

A Valuable Language

The Basic language performed a very valuable service by allowing programmers to run programs without compiling them first and thus immediately finding out whether they worked or not. It was powerful enough to explore data structures, but never intended for "industrial strength" programming. In general, its error handling was appalling in that it preferred to stop processing with a vague error message rather than handle the crisis without crashing, it was slow in execution and it lacked the more advanced program structures and data types available in other languages. These weaknesses were acceptable when the role of Basic was to train programmers to use other, more capable, languages. Over the years, though, the weaknesses of Basic have been addressed and its strengths enhanced so that now it is possible to use it to write professional quality programs and compile the results into a fast-running and error-proofed application.

Apart from its unprepossessing name, Basic has gained a big hold on the programming community so that it stands among the most-used programming languages in the business computing world (the others being **Cobol**, mainly for mainframes, and **C**, mainly for Unix and MS-DOS). Basic's closest rival, also available for the QL, is C. C is a **compiled language** of enormous flexibility that spans the gap between high-level languages and assembler code. Its chief advantage over Basic is speed of execution, but when Basic is compiled with Turbo this distinction by and large disappears.

Compared with other languages, Basic is also very simple. It does not demand that programmers declare all the variables they plan to use. It does not have complicated data structures. It does not require an intimate knowledge of the workings of the central processing unit. As far as the demands made on the computer are concerned, Basic does not require large overheads of memory, nor does it need large storage areas for source, intermediary and object files.

Basic is an **interpreted language**, meaning that each program line is converted into a machine code subprogram that is passed to the central processor to be carried out. This is a slow process as one Basic keyword might equate to several machine code instructions and the English-like syntax of a Basic command needs to be converted into an entirely different syntax more suited to the logic of the CPU. A further disadvantage of interpreters is that they have no sense of the large structure of a program. If they meet a command inside a loop they painstakingly analyse it, convert it to machine code and execute it in isolation even though it is exactly the same command that they were handling a few microseconds ago. This is the computing equivalent of a goldfish excitedly exploring its small goldfish-bowl: every time it does a circuit it thinks "A plastic shipwreck - never seen one of those before".

Compilers get all of the interpreting into machine code over with in one operation, producing a new file of "object code" that is impossible for humans to make sense of but which the CPU understands perfectly. Compiling also gets around the problem of translating and re-translating identical commands inside loops: the process is optimised just once. Turbo does this for SuperBasic, giving programmers the very best of both worlds.

The essentials of Basic are its **reserved keywords**, its syntax, its program structures and its data types. Reserved words are those that have special meaning to the interpreter and thus cannot be used to represent anything else. The syntax of Basic centres on "expressions". One of the simplest expressions is "Hello" - a string expression. "Hello " and " World" is a slightly more complicated expression that includes an operator, in this case one that joins the two strings together. The other types of expression are numeric, such as 5 * 7, and logical, such as (Name$ = "Jones"). The latter expression returns a value of true or false, on the QL represented by one and zero respectively.

Reserved keywords fall into two main groups: procedures and functions. A **procedure** is a "doing" word, such as PRINT, DIM, GOTO and STOP. A **function** is often described as an expression factory: you pour in raw material expressions, known as arguments, and the function manufactures a new expression from them, called the return value. For instance, LEN("Hello") takes a string expression and returns a numeric expression, 5, representing the number of characters in the string. Function names follow the same rules as variables in that they return a string if they end in a dollar sign, otherwise they return a number.

Symbols play a large part in Basic syntax because they convey so much information in a single character. Some are **operators**, such as +, * and ^, that carry out a mathematical process. Others are **separators**, such as ;|, that help the interpreter to make sense of a command. Some operators are represented by words such as NOT, AND, OR and INSTR, and TO is often an acceptable substitute for the comma as a separator.

SuperBasic has two main data types, **numeric** and **string**, and two minor data types, "**identifiers**" and "**names**" that are hybrids between variables and constants. Numbers can be conjoined using a wide variety of operators, whereas there are far fewer available for strings. Strings are character sequences. Variable names can be used to represent numbers or strings, with string variables being distinguished by trailing dollar signs. Variables must have a value assigned to them before they can be referred to. In other words, a variable must appear in the left-hand-side of an assignment expression before it can appear on the right-hand-side. Names are used for devices and files and can be expressed with or without enclosing quotation marks. Identifiers control and identify REPeat loops.

A **command** is the equivalent of an English sentence and it can contain procedure keywords, functions, constant expressions, variables, operators and separators. It always begins with a reserved procedure keyword, except for assignment expressions where the LET keyword is optional. There are some commands that only have a keyword, such as STOP, whereas others have keywords followed by parameters, which can be expressions or functions. Parameters are separated by separators of which TO and the comma are the most frequently used.

A **program** is a numbered list of Basic commands. Basic is alone in numbering its statements, a habit that modern Basics have now dropped. SuperBasic is very close to not needing line numbers provided that commands like GOTOs and GOSUBs are not used, but the final, radical step was not taken. Mind you, SuperBasic was presented as being an evolution of the language, not a revolution. Visual Basic, SuperBasic's most modern sibling, is hardly recognisable as a Basic dialect.

Program structures allow certain commands to be repeated a number of times (**iteration**) or bypassed under certain circumstances (**conditional branching**) or jumped to regardless (**unconditional branching**). A Basic dialect will usually have more than one example of constructing each type of structure. All programming languages, no matter how complex their vocabulary and syntax, base their structures on iterations and branches. SuperBasic has advanced unconditional branching structures that allow programmers to invent their own procedures and functions, providing they can be defined using the keywords already present in the language. SuperBasic also eases some of the pain of typing by allowing structural keywords to be abbreviated: the lower case parts of keywords like DEFine PROCedure can be omitted. It is a shame, though, that simple words like LOCal have an abbreviation while long words like RANDOMISE do not.

A key feature about Basic, and all other computer languages, is that absolute precision is expected in the construction of commands. **Errors** are likely to be generated by mis-spellings, the unexpected appearance of spaces, the lack of an appropriate symbol or the placing of values in the wrong order. Sometimes the interpreter will signal that a mistake has been made and refuse to carry on. Sometimes the mistake will be syntactically correct but the result will not be what was expected. In an age when standards of English expression are so loose, it is interesting to see the popularity of programming languages that demand such extraordinary attention to detail.

THE CLOCK

The Sinclair QL's **internal clock** maintains reasonably accurate time while the computer is switched on, but loses all knowledge of time when the power is turned off. The clock works by tracking the alternations in the UK mains current and assuming that there are exactly 50 cycles per second. Rather than writing a boot sequence that requests the correct date and time every time the computer is turned on, a more accurate quartz-based, battery-backed clock can be purchased and installed to ensure that the time is kept even when mains power is removed. Miracle Gold Cards also include such a facility.

As far as the QL is concerned, prehistory ended with the last second of 1960. Its internal clock represents all times and dates as the number of seconds that have elapsed since the first second of 1961. The value for the current time is obtained by the command PRINT DATE. More usefully, the DATE$ function returns the date in year, month, date, hour, minute and second order, as in the following output obtained by typing PRINT DATE$ in the command window:

1994 JUN 14 09:50:00

It should have been possible to strip away bits of the date using string slicing, but this is only available on **Minerva**-equipped QLs. The recommended work-around is to assign date output to a string variable and then slice that.

The clock shows more than anything else Sinclair's target market of small businesses, where dates prior to 1961 have little relevance, split-second accuracy is not vital and the need to time routines to the nearest hundredth of a second is limited.

COERCION

Coercion was trumpeted as a key difference between SuperBasic and ordinary Basics, but its advantages have limited appeal and the overheads in terms of error-trapping and conversion coding seem to be wasted. By coercion, Sinclair means that a value of one type can be automatically converted to another type if the circumstances seem to warrant it. Numbers can become strings, integers can become floating point values and names can become strings, all without intervention from the programmer.

The direction in which coercion flows is important. Coercion works **from integer to floating point and from floating point to string**, but it does not necessarily work in the other direction. Floating point values are truncated to the nearest whole number when they are coerced into integers. It would have been nice for SuperBasic to treat strings that do not begin with numerals as if they are zero, but instead it produces an error message. This can be overcome by prefacing strings with a "0" whenever they are to be coerced into a number, such as PRINT 6 + ("0" & Text$).

Coercion is of most value when passing parameters to a function or procedure because one routine might then cope with strings or numeric variables equally well. In practice, this is useful only in trivial cases because different processing might be required for text and numbers, or different error-trapping might be needed. Personally, I would have much preferred to see coercion dropped in favour of a function that identifies whether a parameter is a numeric or string value, the end of the need to follow string variables and functions with a dollar sign, and the ability to assign numeric and string values to the same variable or array element when the need arises, just as the dBase language does.

Coercion has, however, forced the introduction of a genuinely useful new operator, the **ampersand**. The ampersand in SuperBasic is used to join together two strings, whereas it is more common in other dialects to use the + symbol. Through coercion, however, PRINT "2" + "5" results in a figure 7, not the number 25, so another operator needed to be found to ensure that the correct operation was carried out. PRINT "2" & "5" therefore returns the equally-correct "25".

BLACK KNIGHT

A game of Chess, and two other games.

Ian Bruntlett is busy playing his QL, and sometimes winning.

INFORMATION
Program: Black Knight
Publisher: Jochen Merz Software, Im Stillen Winkel 12, D-47169 Duisberg, Germany.
Price: DM 119.90

Black Knight is a new, pointer-driven **Chess** program for the Sinclair QL and compatibles. It has a library of 5,000 opening moves and differing levels of play ranging from a hard "5 seconds response" to an even harder "1 hour response".

As Chess is my Achilles heel, this review will be written from the point of view of a novice. The window used to display the board is a little small and the pieces lack some contrast - it is hard to clearly see a white piece on a green square. Psion chess avoided this problem by putting a contrasting outline around each piece.

Beaten!

Although Black Knight never failed to beat me, the option to "take back last move" helped me learn a little from my mistakes. It is also possible to repeatedly take back the last move, allowing a bad stretch of play to be undone.

Another facility, useful to both novice and normal player, is the facility to set up the board with a hypothetical state of play and to start play from there. This is a useful tool for playing with chess problems or trying to overcome a particular strategy.

The "**change sides**" facility is a useful way to get Black Knight to suggest a move to me or, in dire circumstances, swapping sides permanently can result in Black Knight losing a game and sulking.

Pointer Style

Black Knight also has standard facilities for a pointer environment game - Quit (remove job), move window, toggle sound, go to sleep as well as start a new game. It will Save/Load games, although I would have liked an option to save the state of the board as a text file. It will also act as a normal chess board, allowing two humans to play each other, and it has a demo mode where it will play against itself.

Although Black Knight is a good game to play, I found some technical problems in my version. Ignoring the lack of CONFIG blocks, the serious one is that it is written in C and suffers from the occasional "NULL pointer assignment". In other words it tries to overwrite the operating system rom.

At its best this triggers WatchMem's alarm and at its worst (ie when it loses a game), it crashes my QL so thoroughly the Gold Card clock gets corrupted. So be careful if you run Black Knight on an early Gold Card - make sure any important data that you are working on (such as a review of Black Knight in Text87) is saved before you beat the program, or it may have its revenge. However, it looks as though the newest versions have fixed this bug, and can now be beaten in safety.

There are two limitations listed in the manual - pawn promotion is limited so that it is only possible to promote a pawn to a Queen or a Knight. There can only be three Queens and/or three Knights of the same colour on the board at the same time. I doubt this will be a problem for me.

This game is worth buying if you want a Chess which will run under the pointer environment.

The Oracle

INFORMATION
Program: The Oracle
Publisher: Jochen Merz Software, Im Stillen Winkel 12, D-47169 Duisberg, Germany.
Price: DM 49.90

The Oracle is a **puzzle/strategy game** for the QL. It is a pointer driven program and multi-tasks with other programmes. This is just as well as I seem to be more interested in playing the game than writing about it.

Oracle is less frantic than other "shapes and colours" games such as **Tetris** or **Brain Smasher** - this allows more thought to be put into the game by a player. The manual states that the player should "meditate carefully over each move and you may find the secret four ways which will unlock the Oracle". This would be easier if there was a Save Game option.

Oracle has a playing board of twelve squares by eight. The computer gives the player one decorated tile at a time from a pouch filled with 72, introducing randomness and uncertainty to the game. Each tile has one of six colours and one of six shapes.

The tiles are placed on the board adjacent to other tiles and the result is either a "one way match", "two way match", "three way match" or a "four way match" yielding 1,2,4 or 8 points. A "one way match" is easy, as your tile just has to touch one side of another tile and match either its colour and/or its shape. If the tile touches two tiles, the new tile must match at least the colour of one neighbouring tile and at least the shape of the other neighbouring tile.

Hard Match

Placing a tile ranges from easily placing one related tile next to another for a "one way match" to the hard task of placing a tile in the middle of four adjacent tiles. So far I have only placed one "four way match" and that was in a game with Help switched on, showing me all the legal moves. Placing a tile

on the outer edges of the board (called the "beyond") is easy and scores no points.

There is a deeper game within Oracle that I have barely reached. When a "four way match" is first made, the message "This is the first step to solving the puzzle" appears. I would like a facility to print the board as a text file to make it easier to trade strategies and solutions.

Oracle as a program has some odd technical quirks that could be tidied up.

The least endearing feature is the way it won't save the high score table when the game is ended but that may be an incompatibility problem - Jochen Merz probably runs Oracle on an Atari, I run it on a Gold Card QL with Minerva.

Oracle as a game is recommended for anyone who likes Brain Smasher and related puzzle games.

Hints

Hints: To improve play, practise with the "always show moves" options active - novices tend to miss quite a few opportunities and this will point them out.

So far the only way I can get on the high score table is to empty the pouch. I do this by building lines of similar colours in one direction, lines of shapes in another direction.

Also, I build other lines to parallel those lines, resulting in more "two way matches".

This gets me into the high 60s, which doesn't put me into the high score table) but helps to empty the pouch which gives me 1,000 bonus points, putting me in the middle of the table.

Minefield

INFORMATION
Program: MineField by B. Scheffold
Publisher: Jochen Merz Software, Im Stillen Winkel 12, D-47169 Duisberg, Germany.
Price: DM 39.90

Minefield is an addictive game of chance and skill that has swept the desk tops of computers all over the world. I learned to sweep mines on an Amiga but the latest (slowest?) version of Microsoft Windows has Mine Sweeper built in. Now I can play it on my QL. This version of MineField uses the pointer environment and will multi-task with other programs.

The player is presented with a rectangular field that is broken up into smaller squares by a grid. There is a set number of mines to be cleared and no immediate indication as to where the mines are located.

Another obstacle is the presence of a clock, behaving like a time bomb - clear the field too slowly, the time-bomb goes off and the game is over.

At the start of the game, the player has to pick an arbitrary point to start from and MineField either blows the player up, reveals a number in the square or handles a "0/blank" square. This is an inherent strength/weakness of any MineField-type game.

Blown Up

The weakness is that a player can be blown up within the first few moves without making a single mistake. The strength is that after the first few moves of a game, you may have picked a "0/blank" spot and had a large portion of the field revealed to you.

An empty square is marked by moving the pointer over the square and either pressing the left mouse button or Space. If the player makes a mistake and declares a mined area to be free, there is an explosion and the game is over - in this game the player only has one "life".

If the empty square really is empty then MineField displays a number in that square which shows how many mines are next to that square.

A square is marked as mined by moving the pointer over the square and either pressing the right mouse button or Enter. After plenty of accidents - pressing the wrong mouse button, I remember the correct button with the phrase "A mine has been LEFT here".

No Mines

If you uncover a square that has no mines touching it - horizontally, vertically or diagonally, then its number would be 0. However MineField treats such squares differently. It displays a blank square rather than a 0 square. It then uncovers any neighbouring "0"/blank squares, and any similar neighbours of those neighbours.

The result is that stumbling onto a blank patch starts the QL clicking away, clearing a chunk of the mine field automatically. I can never get used to this, it always fools me into thinking I've stepped on a mine accidentally - then I see a portion of the field being cleared automatically and I realise what is going on.

Once a couple of squares have been cleared, it is usually possible to deduce those neighbouring squares are empty and those which have mines in. The player keeps on marking squares as clear or mined until the whole field is clear.

Real Guess!

Occasionally, an "impossible to deduce" situation arises where the player just has to make an educated guess as to where the next clear square is.

Although the game is sound there are some technical quibbles. The command to Execute is unnecessarily intricate, preventing it from being a simple program to pop-up. Also, on my system it refuses to save the high score table, yet no error message is displayed.

However, to conclude, this is a competent implementation of MineField.

All three games reviewed had rough edges when it came to integrating them into an existing set-up.

The games were on disks ready to be booted from but that does not help the experienced user with hard disk - or, as in my case, ED drives.

Each game should have been configurable with CONFIG as well so that a hard disk user could be working deep in a project and still be able to execute the game without having to change data defaults.

Adventure '93

Adventure '93

Bruce Nicholls re-enters the world of QL adventure in the form of SQLUGware.

Have you ever wanted to visit the New World aboard a galleon, find the ten hidden treasures of the fabled caves and challenge the mighty dragon baud, meet a fluffy bunny rabbit from Disneyland, teleport to strange worlds and visit alien races? Now's your chance with the release of the Adventure93 package from SQLUG (the Scottish QL Users Group).

Adventure93 is a set of five QL adventures written by Alan Pemberton, probably the most prolific adventure writer for the QL. The five games, written between 1986 and 1990, constitute the majority of his QL adventures and have been released previously as either public domain or commercial programs. The adventures are all here re-issued as SQLUGware.

SQLUGware is a species of public domain software designed to increase the awareness of the Scottish QL User Group. The packages may be freely copied and passed on without any restrictions other than that the packages must be intact and contain the documentation explaining SQLUG- ware. If you make only light use of the program you do not have to register. If you do register, for a modest fee of £7, £9 for overseas, (cheques made payable to Scottish QL Users Group) you receive certain benefits.

The first is a Helpline service, a must if you get stuck on an adventure and you feel like throwing your QL out of the window. The second is printed manuals for the ex-commercial adventures. The last is that if substantial improvements are made to any of the adventures you will be sent the upgrades free of charge. The adventures are on two 3.5-in 720K disks, so a disk drive is necessary, and an expanded memory QL is required if you wish to run all the adventures.

The first, **Adventure Playtime**, was originally on QL World's Microdrive Exchange in 1987. The SuperBasic listing has now been compiled with Q_Liberator and made into a fully multitasking adventure (all the adventures are capable of multitasking). It is text-only.

Strange Lands

The setting is a strange land. Most of the inhabitants have problems, so you as the adventurer are given the task of solving them and bringing peace to the land. In your travels you will meet a librarian who is looking for that elusive last book, a prisoner who wants to escape and a foreign tourist who is having some difficulty finding the route.

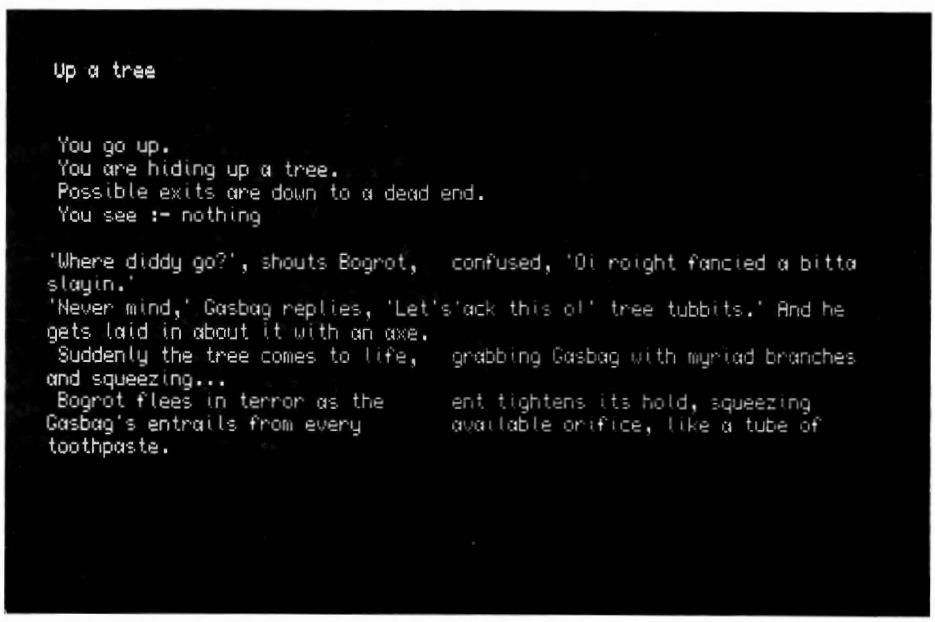
The problems usually involves finding or using an object which can be located somewhere in the adventure, although you may not find the objects in the same sequence as the problems. As an example the foreign tourist could obviously do with a foreign map, but where do you find the map? Instructions are given to the adventure in the form of brief phrases describing what actions you would like to perform such as "GO THROUGH PINK DOOR". The adventure can also handle multiple actions such as "EAT PIZZA AND OPEN PINK DOOR AND GO THROUGH PINK DOOR", which is an action you can perform in the first location. An option to SAVE and LOAD your current position to a device, or ram disk, is provided. This also prevents any unforseen problems cropping up which then place you back at the beginning of the adventure, providing you save regularly. If you find yourself completely stuck on one of the problems a DECODE command is available to translate one of the many hints such as "ivsgly g'mlw", in the Quill instruction doc file.

Introduction

Adventure Playtime is an ideal introductory adventure for anyone who has never become ensorbed in adventuring before. The problems encountered can easily be overcome, the adventure is very user-friendly and is often very amusing.

From the Tower of Valagon was the next text adventure to be released. This adventure takes place in a fantasy land full of Orcs, Giants and Dwarfs. Your quest is to rid the land of an ex-court Mystic named Valagon who was angry at the King not wanting his services any more. Valagon, in his tower on Mount Perethil, conjured up a vast army of Orcs to take the city of Hirin, where the King resides, to extract revenge. The Oracles foresaw the arrival of a handsome prince to restore peace, but unfortunately he

A cultural screen from the Adventure of the Tower of Valagon.



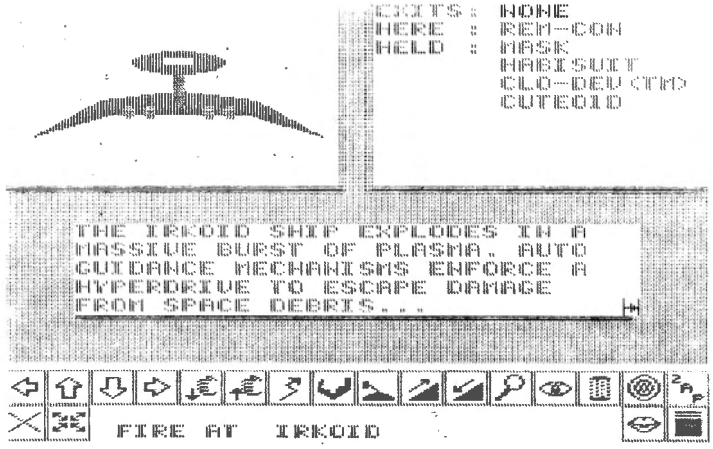
was scared and ran away, leaving you instead.

This adventure works in the same way as in Adventure Playtime. The interaction between the characters you meet in the adventure has been increased and you need to ask them to perform some actions on your behalf. This is done by simply typing the correct verb such as "ASK ORACLE TO READ ORB" or "TELL EDMUND TO KILL DWARF". The adventure descriptions are vivid and convey an atmospheric setting throughout the adventure. From the Tower of Valagon is moderately difficult, and copious use of the SAVE option is a must, as it is easy to be killed off.

Starplod is altogether different. The setting is deep in space where you are in charge of a Gal-Fed Exploratory Space-Craft in orbit around an immense Space-Base. The Space-Base is running out of Moronium and it is up to you to find the next shipment. This adventure works differently. Instead of typing commands, you use a row of graphical icons. The range of icons includes take, movement commands, zap (fire), examine, utilise, and so on. Once you have selected an icon you can then select any option at that icon, like choosing an object.

The screen is split into four areas. The top left shows a small diagram of your current position - the adventure runs in Mode8 and uses the QL's limited colours to great effect. The top right text box shows your possible exits, your position and items that you are currently carrying. The middle of the screen is a description box detailing your actions and the location text and the bottom of the screen is the icons.

The adventure is ideally for a beginner as the icon-controlled adventure



Explosion time in Starplod.

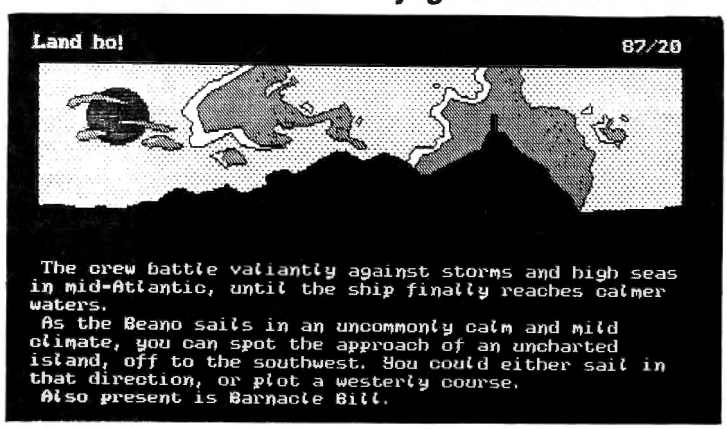
is less complex than a text adventure. The puzzles throughout the adventure are not very complex and the graphical interface is certainly a welcome change from text adventures normal on the QL.

The last adventure on disk 1 is **Ye Classical-Type Adventure**. This was written using Gilsoft's Quill Adventure Writer, originally released on the Spectrum computer. The adventure is pure text and can only accept two-word commands, a limitation with the Quill Adventure Writer. It is called Ye Classical-Type Adventure as it tries, and succeeds, to re-create the original atmosphere the first adventure, *Colossal Cave*, or Adventures created in the mid-70s. This is not a copy of the the original adventure but a light hearted homage. The setting is a fantasy land where you have to challenge the mighty dragon Baud. Before this can be done you must find and bring back the ten hidden treasures of the Fabled Caves to a dwarf named Sporrin. The adventure takes place mostly in a large labyrinth of tunnels know as the Fabled Caves and includes many features found in the original Colossal Cave, such as secret words which teleport you from room to room.

The adventure is moderately difficult and the Caves themselves are very large, so you will have to spend some time preparing your next move. There are hidden jokes within the adventure relating to the original Colossal Cave, although the adventure can certainly be enjoyed without them.

The second disk contains the last and most ambitious adventure by Alan Pemberton. The adventure combines text and graphics, with most of the graphics produced by Francis O'Brien. The adventure has about 22 half-screen graphics showing some of the scenes in the adventure. The graphics are superb and show what can be achieved on the limited QL screen display.

A dramatic screen from Voyage of the Beano.



To communicate adventure, you enter short phrases in English. For example, "GIVE RUM TO THE CREW" will keep them happy for the long voyage ahead of them. An option to send all the text output to a printer is also included together with the usual SAVE and RESTORE commands.

You take on the role of JD Hogwash, a lowly deckhand who by a stroke of luck, and a lot of bragging, has been made Captain of **HMS Beano** by the Queen. Your orders as Captain is to "give the Spaniards what-for, and come back with the gold". The first task is to muster a crew, and as is common in these times working on a ship is not very popular, so a little pressganging is required before you can set sail for the New World. Your voyages take you to the Sargasso sea, a local settlement, a disco-bar called Sordido and finally to a volcano named Mount Poppakettleon in South America.

This adventure is one of the best for the QL. The graphics and text are of the very best quality and compliment one another. There are a large number of locations, and the puzzles are moderately difficult. As with all Alan Pemberton's adventures there is humour, sometimes subtle,sometimes blatant, which adds to the fun.

For more information on SQLUG write to **Alan Pemberton, SQLUG Secretary, 65 Lingerwood Road, Newtongrange, Dalkeith, Midlothian EH22 4QQ**. The Adventure93 disks can be obtained from Quanta and any PD supplier such as Qubbesoft or SJPD.

DIY Toolkit

Simon Goodwin adds fast PACKBITS compression to the DIY Toolkit repertoire.

This DIY Toolkit project implements one of the most common schemes used to compress repeated bytes in a data stream. The COMPRESS function generates a packed copy of an area of memory, non-destructively. Its counterpart is EXPAND, which incorporates error-checking for corrupt or incomplete data. Both are encoded in less than 400 bytes of SuperBasic extension routines.

Data Packing

PACKBITS is not the most efficient way to pack all data - the optimal choice invariably depends on the exact data being processed - but it is probably the most ubiquitous, used in MacPaint and Apple PICT graphics files, Amiga IFF ILBMs (Interchange File Format Interleaved Bit Map), Aldus/Microsoft TIFF (Tag Image File Format), Adobe Postscript and Hewlett Packard's PCL (Printer Control Language).

The term **"Packbits"** is just as widely used, but it is a misnomer, because the scheme packs groups of bytes, not individual bits. Packbits is one of a class of compression systems known as 'Run Length Encoding'. It works by encoding the length of groups or 'runs' of matching bytes.

Run Length Encoding schemes are so common that it's worth knowing about them, even if your drives are never more than half full and you never use a printer, modem, or data from another system. Compression is paradoxically an enormous topic; Packbits is a perfect introduction to its potential, and its pitfalls.

Byte Stream

Packbits compression generates a stream of bytes, with control bytes interspersed between literal data values. The compression comes because groups of from two to 128 identical bytes are encoded as a count, in the control byte, followed by a single byte of data.

At best, this gives a 64:1 compression ratio; at worst, on a reasonably sized file, it expands the data by a small factor, 129:128. If you encode less than 128 bytes, the result can be much bigger than the original, if added control bytes outweigh the literal data. In such cases it is best to mark the file as unpacked and skip the compression or expansion process.

If consecutive bytes do not match, Packbits collects them into a

```
* QL World DIY Toolkit 'PACKBITS' data compression extensions
* Copyright 1994 Simon N Goodwin, version 1.4, 15th April 1994
*
start   lea.l   define,a1       Point at extension table
        movea.w $110.w,a2       Read BP.INIT vector
        jmp     (a2)            Link extensions to SuperBASIC
*
* new_bytes = COMPRESS(old_bytes,source TO target)
*
squash  moveq   #1,d7           Flag for COMPRESS
        bra.s   getints
*
bad_par moveq   #-15,d0         Bad parameter error code
give_up rts                     Return error code in D0
*
* new_bytes = EXPAND(old_bytes,source TO target)
*
* SOURCE & TARGET are full 32 bit byte addresses, unchecked.
* BYTES is treated as a 32 bit unsigned value (i.e. 4 Gb+).
* Reports END OF FILE unless BYTES matches the end of a pack.
*
expand  moveq   #0,d7           Flag for EXPAND
getints movea.w $118.w,a2       Vector to get long integers
        jsr     (a2)
        bne.s   give_up
        subq.w  #3,d3           Check number of parameters
        bne.s   bad_par
        move.l  0(a1,a6.l),d2   Byte count
        movea.l 8(a1,a6.l),a2   Target Address, anywhere
        move.l  a2,d6           Save it for later
        movea.l 4(a1,a6.l),a4   Source address, unchecked
        tst.l   d7
        beq     inflate
*
* PACKBITS compression routine
*
squeeze move.l  d2,d3           Copy length
        beq     result          Do nothing, quickly
        add.l   a4,d3           D3 points past last byte
        move.l  a4,d5           Remember where we've got to
        move.b  (a4)+,d2        Pick up first data byte
        cmp.b   (a4),d2         Do we start with a group?
        beq.s   next1
        clr.b   (a2)+           Start with an lone byte
        move.b  d2,(a2)+        Bodge to include first byte
*
next1   cmp.l   a4,d3           Have we finished yet?
        beq.s   group_n         Output the last group
        move.b  (a4)+,d1        Check in the next byte
        cmp.b   d1,d2           A match, perchance?
        beq.s   next1           Keep looking good
*
* Bytes from (D5) to -2(A4) match, all D2; -1(A4) is D1
*
        lea.l   -2(a4),a0       Point at last match
        exg     a0,d5           Get biggest into D5
        sub.l   a0,d5           D5 := number of matches-1
        beq.s   group0
*
```

```
* Compress the run of matching bytes into packed groups
*
do_lots cmp.l   #128,d5         Can we do it in one?
        bcs.s   in_one          D5 is 1..127 for 2..128 bytes
        move.b  #-127,(a2)+     Full group size
        move.b  d2,(a2)+        Pattern
        subi.l  #128,d5
        bne.s   do_lots
*
* One byte is left over, treat it specially as a literal
*
odd_one subq.l  #1,a4           Move back over the odd one
        bra.s   group1
*
* Pack the last group of D5+1 bytes into one byte pair
*
in_one  neg.l   d5
        move.b  d5,(a2)+
        move.b  d2,(a2)+
*
* D1 is first mismatch and D3 points past the last byte encoded
*
group0  cmp.l   a4,d3           Have we finished yet?
        beq.s   last1
group1  move.l  a4,d5
        subq.l  #1,d5
        move.b  (a4)+,d2        Is this a new run of D1 bytes?
        cmp.b   d1,d2
        beq.s   next1           Yes, there's no literal group
*
* D1 (D5) & D2 1(D5) differ from the previous run, up to -1(D5)
*
scan    cmp.l   a4,d3           Have we reached the end?
        beq.s   last_n
        move.b  d2,d1           Slide patterns along one byte
        move.b  (a4)+,d2
        cmp.b   d1,d2           Is this still a literal group?
        bne.s   scan
*
* D1 & D2, last two bytes scanned, match; (D5)..-2(A4) don't
*
        lea.l   -2(a4),a0       The literals stopped here
        suba.l  d5,a0
        exg     d5,a0           A0 -> First, D5 is >0 count
        bsr.s   litpack
        move.l  a0,d5           Remember where we got to
        bra.s   next1
*
* Process any last group left at the end of the input data
*
group_n exg     a4,d5           D5 -> Last, A4 -> First
        sub.l   a4,d5           D5 := run length, >0
lastset cmp.l   #128,d5
        bls.s   nearly          D5 <= 128 if C or Z flagged
        move.b  #-127,(a2)+
        move.b  d2,(a2)+        128 of these, please
        subi.l  #128,d5
        bra.s   lastset
*
```

group of up to 128 'literal' bytes, prefixing the group accordingly with another control code.

Convention dictates that the control byte is -127 to -1 if 128 to two literal bytes follow, and 0 to 127 for between 1 and 128 copies of a repeated byte. Notice that the count used is one more than the absolute value of the control byte. The only way to encode a single literal byte is as itself with zero copies, coded as a zero followed by the literal byte value.

The remaining byte value (-)128 is a special case. This control byte is skipped and the following byte is taken as a new control byte. These can be useful as padding while shuffling data around, although it rather defies the principle of compression to write them to a file!

Signed Bytes

You may be more familiar with byte values from 0 to 255, rather than 128 to 127. The values 0 to 127 are stored the same, either way; the rest depend on your interpretation of the most significant or 'sign' bit. SuperBasic treats bytes as unsigned, so PEEK returns -127 to -1 for signed bytes -127 to 1. POKE accepts both signed or unsigned values -128 to 255, and stores them correctly. To prove it, enter this line:

```
CLS : FOR I=-128 TO 0 : POKE 2^17,I : PRINT !!!PEEK(2^17)!
```

It's simple to express the PACKBITS scheme in words, once you've got to grips with the difference between signed and unsigned bytes. Its almost as easy to write an expansion routine, but the code to compress data is surprisingly subtle.

Development

Listing One is my fourth attempt at a Packbits compression routine. I started in SuperBasic, struggling with strings starting at one and PEEK offsets at zero, then got hopelessly confused between bytes and long words in Pascal.

The third try ended up as a complete 68000 program, but after three evenings adding SUBQs here and there it still didn't always give the right answers, so I scrapped it, and wrote the version presented here, from scratch. Version 4 is a bit longer, at almost 400 bytes, but it works.

The main change was that I started by trying to keep the positive or negative control count in a register as I went along, copying bytes across as I scanned them. This is complicated by loads of special cases; you have to look one byte ahead to know if you're in a group yet, so you can't transfer bytes until some time after they've been scanned.

Control counts may be positive or negative, and are one less than the bytes spanned. Individual literal bytes between patterns need special treatment, and groups must be closed off at their 128 byte limit. And what about a pattern of 129 repeated bytes? The odd one should be in the next literal group, not in a two-byte group of its own.

Revisionism

The version listed here is longer and simpler because it uses the program counter to keep track of the type of group being processed. This results in

some duplication but keeps the complexity down. For instance the loop NEXT1 corresponds to the SCAN loop later, except that one hopes for matches and the other expects mis-matches.

They do not explicitly count the bytes as they go along, but later this can be computed from the distance the source pointer A4 has moved in the loop, then adjusted to suit the entry conditions.

At the start of each new scan D5 points at the next data byte, addressed by A4, and at the end it is converted into a simple positive count of the number of bytes in the group, before the control byte is generated.

The D5 count is not limited to 128; in fact it works for up to four gigabytes, a full 32 bit range. The loops DO_LOTS and LITPACK spit out records of 128 incoming bytes until there's a smaller record left over, for IN_ONE or OUT_ONE to deal with.

If a long literal block is found, MOVE128 moves four bytes at a time to minimise the overhead of the DBRA; it's not worth using MOVE.L unless you have a 68020 or above, because on earlier processors long words must be at even addresses, and about three quarters of the time this would not be the case.

Addresses

My revised compressor does not count down the number of bytes remaining, but compares the address of the next, in A4, with the address of the byte after the end of the data, in D3. This is less elegant than a DBRA loop but easier to follow, and it even works with fancy lengths like 0, 1 and 2.

The last group from the input is a special case, so it is handled by complementary routines for matching and non-matching data, labelled GROUP_N and LAST_N respectively. Again the program counter keeps the group and literal routines distinct.

Both return via COUNT; notice how LAST_N rather unconventionally pushes the address of COUNT, then 'falls into' the following LITPACK subroutine. Some programmers and compilers love this sort of deferred branch, and it has its uses, but this is the first time I've done it in DIY Toolkit.

```
nearly  subq.l  #1,d5           Adjust copy count to 0..127
        neg.l   d5              Make negative control code
        move.b  d5,(a2)+
        move.b  d2,(a2)+
        bra.s   count
*
* Process one or more literal bytes at the end of the input
*
last1   clr.b   (a2)+           One lonely literal left over
        move.b  d1,(a2)+
        bra.s   count
*
last_n  movea.l d5,a0           Where did we reach, earlier?
        suba.l  a0,a4           Where are we now?
        move.l  a4,d5           Work out count of bytes left
        pea.l   count           Return to COUNT from LITPACK
*
* Subroutine to copy any number of literals to output buffer
*
litpack cmp.l   #128,d5         Will it fit in one group?
        bls.s   out_one
*
* Copy a 128 byte group of literals, relatively quickly
*
        move.b  #127,(a2)+
        moveq   #31,d1          DBRA count, (128 DIV 4) - 1
move128 move.b  (a0)+,(a2)+
        move.b  (a0)+,(a2)+     Move several bytes each time
        move.b  (a0)+,(a2)+
        move.b  (a0)+,(a2)+
        dbra    d1,move128      Keep on moving
        sub.l   #128,d5
        bra.s   litpack
*
out_one subq.l  #1,d5           D5 := 0 to 127
        move.b  d5,(a2)+
move_n  move.b  (a0)+,(a2)+     Copy the remaining literals
        dbra    d5,move_n
        rts
*
* PACKBITS expansion; literal sequence copier
*
literal move.b  (a4)+,(a2)+     Copy a literal byte
        subq.l  #1,d2           One less to do
        beq.s   run_out
        subq.b  #1,d0           Count down literals
        bpl.s   literal         Self-limiting at 128
*
* PACKBITS expansion routine; D2 is 32 bit length, >1
*
inflate subq.l  #1,d2           We need >1 byte left
        beq.s   abrupt
*
bloater move.b  (a4)+,d0        Get a control byte
        bpl.s   literal
        neg.b   d0              Convert negative count
        bmi.s   bloater         Skip a 'filler' 128 byte
        ext.w   d0
        move.b  (a4)+,d1        Get the byte to repeat
```

The EXPAND routine is much simpler. It starts at INFLATE, which expects at least two bytes - you must have some data as well as the control, or you get an 'End of file' report. The same is true if the data does not run out at the end of a group, where a new control would otherwise come. This usually indicates an incomplete file, or corruption in the data.

The line labelled BLOATER gets a new control byte, ignoring 128s, which stay negative after NEG.B, and sifting the rest to the unpacking and transfer loops, COPIER and LITERAL.

RESULT converts the distance traversed by the data pointer into a floating point value in the usual way - only Minerva boasts a vector to do this and returns it to SuperBASIC.

The Functions

You are expected to find it interesting, but you don't need to know how Packbits works to use it. It's not that bad.

The SuperBasic extensions

```
repeat  move.b  d1,(a2)+        Store one copy
        dbra    d0,repeat       Tight loop suits 68010+
        subq.l  #1,d2           Any more?
        bne.s   inflate
        bra.s   count
*
abrupt  moveq   #-10,d0         Unexpected END OF FILE
        rts
*
run_out tst.b   d0              Check the control count
        bne.s   abrupt          There should be none left
count   move.l  a2,d3           Point at the end
*
* Return (D3 - D6.L) to SuperBASIC as a floating-point value
*
result  sub.l   d6,d3           Where did we start?
        move.w  d3,d4           D4 will be the exponent
        move.l  d3,d5           D5 will be the mantissa
        beq.s   normal          Zero is a trivial case
        move.w  #2079,d4        First guess at the exponent
        add.l   d3,d3           Already normalised?
        bvs.s   normal          If so, no need for shift work
        subq.w  #1,d4           Otherwise halve exponent weight
        move.l  d3,d5           Double mantissa to match
        moveq   #16,d0          Try a 16 bit shift first
*
shifter 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   shifter         Try shifts of 8, 4, 2 and 1
*
normal  addq.l  #6,a1           Free 6 of the 12 stack bytes
        move.l  a1,$58(a6)      Set BV.RIP for 6 byte result
        move.l  d5,2(a1,a6.l)   Stack mantissa
        move.w  d4,0(a1,a6.l)   Stack exponent
        moveq   #2,d4           Floating point result code
        moveq   #0,d0
        rts
*
define  dc.w    0               No procedures
        dc.w    0
        dc.w    2               Two functions
        dc.w    squash-*
        dc.b    8,'COMPRESS'
        even
        dc.w    expand-*
        dc.b    6,'EXPAND'
        even
        dc.w    0
*
        end
```

EXPAND and COMPRESS take identical parameters: the current number of bytes, the place in memory where the data is stored, and the place you want the results, packed or unpacked. The result is the number of new bytes.

Take care to allocate plenty of room in case the 'packing' makes the data longer. At worst, a 32K screen could expand to 33024 bytes. This example stores a screen as a compressed file, unless there's no point compressing it.

Compressed files are saved as tasks with a nonsensical one-byte dataspace. Don't try to EXEC these! You could alternatively distinguish compressed files by a data prefix or file name suffix.

```
MAX= 128*256 :REMark 256 lines
VDU= 2^17 :REMark Qdos Screen 0
RAM= RESERVE( MAX*129/128)
IF RAM<=0: PRINT "No RAM!":
STOP
SIZE= COMPRESS (MAX,VDU TO
RAM)
IF SIZE>MAX
SBYTES FILE$,VDU,MAX
ELSE
SEXEC FILE$,RAM,SIZE,1
END IF
DISCARD RAM
```

RESERVE and DISCARD are from DIY Toolkit Volume H, and correspond to ALCHP and RECHP in other toolkits. This is the corresponding program to put FILE$ back on the screen:

```
VDU= 2^17 :REMark Qdos
Screen 0
FLAG= FDAT(\FILE$)
IF FLAG<>1
LBYTES FILE$,VDU
ELSE
SIZE= FLEN(\FILE$)
RAM= RESERVE(SIZE)
IF RAM<SIZE:PRINT "No
RAM!":STOP
SIZE2= EXPAND (SIZE,RAM
TO VDU)
DISCARD RAM
END IF
```

The FDAT and FTYP functions are in **Toolkit 2** and Mark Swift's PD Toolkit. SIZE2 should be the original size of the image, 32K for 256 lines, 8K for a quarter-screen, and so on. Don't put more than 32K into screen memory, or Qdos will crash!

You can compress or expand any type of data once you've loaded it into memory with LBYTES, which is usually much faster than INPUT. Use SBYTES to save the results, if they merit saving.

Packbits is usually pretty good on printer files with lots of spaces or blank lines, like columnar text or spreadsheets, Psion data blocks like paragraph tables and Archive indices, black and white Mode4 images, W_SAVE windows, and (only) black and yellow in Mode8.

Escher Tests!

I tried it on some big files of mono graphics by MC Escher which I have recently converted to the Qdos Public Domain. The 50K 'Fishballs' file came down to 19,743 bytes, while the 32K 'Horsemen' screen weighed in at a disappointing 27,030. Birds2 has large white areas, which brought it down from 32K to 10,106 bytes.

Turning to programs, Packbits was unable to make the C68 compiled Multi-DiscOver utility smaller, but did manage to shave Turbo's QLIPBOARD_

TASK from 30,206 bytes to 27,759. The indentation in BASIC_PAS, source for a little Basic interpreter I wrote in Pascal a decade ago, helped it shrink from 19,330 bytes to 10,650.

The biggest 'files' I have are over 500K, Public Domain disk images used by the Success CP/M emulator. My Gold Card packed the 'Files2' utilities compiled by Michael L Jackson from 532,992 bytes to 252,638 in about two seconds.

Colour screens do not suit Packbits at all well, because most QL colours spread their values between adjacent bytes in display memory. These need special treatment with other DIY extensions.

Horrible

Two horrible cases are all-red and all-green screens, which alternate bytes 0 and 255 in memory. The pattern is obvious to us, but not to Packbits, which only looks one byte ahead and 'compresses' this screen to a bulging 33024 bytes.

You're best advised to sift the red and green bytes with W_CRUNCH, from **DIY Toolkit Volume W** (QLW July 1992) and pack them separately. Thus split, Packbits can cope, and block colour and stippled screens pack down to 1K bytes or less.

These extensions are non-destructive, in that you keep the original data and get a new copy after conversion. This takes more memory than conversion in place, but it is safer and generally faster. These days most people have much more memory than the biggest files that they would be likely to compress.

The Listings

Listing Two is the usual SuperBasic loader with DATA corresponding to the Packbits code. Enter and run the program, which will generate a code file; you choose the name; something like FLP1_PACKBITS_CODE.

Before you can use COMPRESS and EXPAND, you need to link that code to SuperBasic. The easiest way is with toolkit commands LRESPR or LINKUP, but if these are lacking you can do it in three steps, like so:

```
K=RESPR(396)
LBYTES FLP1_PACKBITS_CODE,K
CALL K
```

Save Nails

The source, object code and documentation for this DIY Toolkit project has been added **to DIY Toolkit Volume K,** along with the Hewlett Packard PCL printer drivers. This makes sense because HPDUMP is much enhanced if you use PACKBITS compression before squirting bytes through the slow QL serial ports. PCL printers like my DeskJet can print much faster than the QL can despatch un-packed serial data, and have Packbits expansion built-in.

Volume Y is one of 24 volumes of DIY Toolkit available on disks or microdrive cartridges from Dr. Bill Fuggle. These cost £3 Sterling each, payable to DIY Toolkit, delivered anywhere in the world. You get full documentation and examples on the disk or cartridge, and honarary DIY librarian Bill adds neat laser-printed documentation for each Volume if you order more than one at a time.

This is the way I keep DIY Toolkit projects up to date, so they do not become frozen after each article is printed. I frequently add files as new hardware and software is released, such as

```
100 REMark Sinclair QL World HEX LOADER v 3c
110 REMark by Marcus Jeffery & Simon N Goodwin
120 :
130 CLS: RESTORE : READ space: start=RESPR(space)
140 PRINT "Loading Hex..." : HEX_LOAD start
150 INPUT "Save to file...";f$
160 SBYTES f$,start,byte : STOP
170 :
180 DEFine FuNction DECIMAL(x)
190 RETurn CODE(h$(x))-48-7*(h$(x)>"9")
200 END DEFine DECIMAL
210 :
220 DEFine PROCedure HEX_LOAD(start)
230 byte = 0 : checksum = 0
240 REPeat load_hex_digits
250    READ h$
260    IF h$="*" : EXIT load_hex_digits
270    IF LEN(h$) MOD 2
280       PRINT"Odd hex digit count in: ";h$ : STOP
300    END IF
310    FOR b = 1 TO LEN(h$) STEP 2
320       hb = DECIMAL(b) : lb = DECIMAL(b+1)
330       IF hb<0 OR hb>15 OR lb<0 OR lb>15
340          PRINT "Bad hex digit in: ";h$ : STOP
350       END IF
360       POKE start+byte,16*hb+lb
370       checksum = checksum + 16*hb + lb
380       byte = byte + 1
390    END FOR b
400 END REPeat load_hex_digits
420 READ check : IF check <> checksum
430   PRINT "Checksum incorrect. Recheck data.":STOP
440 END IF
450 PRINT "Checksum correct, data entered at: ";start
460 END DEFine HEX_LOAD
470 :
580 REMark Space requirements for the machine code
590 DATA 396
600 :
610 DATA "43FA016C34780110","4ED27E01600670F1"
620 DATA "4E757E0034780118","4E9266F4574366EE"
630 DATA "2431E8002471E808","2C0A2871E8044A87"
640 DATA "670000DE26026700","00FED68C2A0C141C"
650 DATA "B4146704421A14C2","B68C6758121CB401"
660 DATA "67F641ECFFFECB88","9A886720BABC0000"
670 DATA "0080651214FC0081","14C2048500000080"
680 DATA "66EA538C600A4485","14C514C2B68C6748"
690 DATA "2A0C5385141CB401","67BEB68C67401202"
700 DATA "141CB40166F441EC","FFFE91C5CB886138"
710 DATA "2A0860A4CB8C9A8C","BABC00000080630E"
720 DATA "14FC008114C20485","0000008060EA5385"
730 DATA "448514C514C2606C","421A14C160662045"
740 DATA "99C82A0C487A005E","BABC00000080631A"
750 DATA "14FC007F721F14D8","14D814D814D851C9"
760 DATA "FFF6048500000080","60DE538514C514D8"
770 DATA "51CDFFFC4E7514DC","5382672453006AF6"
780 DATA "53826718101C6AEE","44006BF84880121C"
790 DATA "14C151C8FFFC5382","66E6600870F64E75"
800 DATA "4A0066F8260A9686","38032A03671C383C"
810 DATA "081FD68369145344","2A0370102205E1A1"
820 DATA "690498402A01E240","66F25C892D490058"
830 DATA "2385E8023384E800","780270004E750000"
840 DATA "00000002FE960843","4F4D505245535300"
850 DATA "FE9206455850414E","44000000","*",37518
```

HD and ED drives, Minerva and QL emulators.

If interest and space permit, I'll explain how to patch PACKBITS routines into other machine-code programs. If you can't see how to do it yourself, and want to get cracking straight away, you can use COMPRESS and EXPAND to convert data in SuperBasic, with LBYTES and SBYTES for fast loading. MOVE_MEMORY, PEEK$ and POKE$ will come in handy if you want to use serial devices or mix program-generated data like escape sequences into the packed stuff.

The Pipeline

These days I only get room for one slim article each month, and this project has consumed a few evenings more than expected, so the promised installment of SuperBasic Browser has been held over.

I don't get as many letters about DIY Toolkit as I used to, and I'm not sure whether this indicates satisfaction or exhaustion. Meanwhile I'm squirming along in my own Byzantine way, finding it harder to squeeze simple examples into SuperBasic and Toolkit tutorials.

The Browser will return, and I can feel another bout of mouse-trapping coming on, mainly for the benefit of users with Qpac, unreliable serial ports or wonky Microsoft mice. Please write to me, care of QL World, if you wish to guide the course of future SuperBasic in Action and DIY Toolkit columns.

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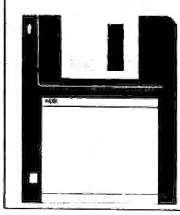

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Dilwyn's Calendar

Jones and Zellar combine to create a congruent calendar

After seeing the date routines in Hardy Hints in a recent issue of QL World, I wrote this program which uses a formula called Zeller's Congruence to calculate the day of the week on which January 1st falls. It then prints a calendar showing each month to the screen.

The names of the months and number of days per month are held in data statements at the end of the program and read into arrays for ease of use. February has to be a special case, because it can have 29 days in each leap year.

Lines 250 to 360 work out if the year specified is a leap year or not, taking centuries into account as well as the normal four year periods - the year 2000 will be a leap year, for example, but 1900 was not.

The loop called "month_no" runs through all twelve months of the year. Lines 400 to 430 add the extra day in February of each leap year. The loop called "line_no" starting in line 440 prints each line of the calendar, maximum of 6 lines.

The loop called "column_no" in line 450 prints the seven days of the week across. The variable "day_no" starts from a negative number and once it becomes 1 or higher, it is printed as a date, with a leading space (line 520) if only one digit long (that is, less than 10), to make it look tidier.

The program remembers where each day ended (in which column number) and uses this to work out where to start the next month.

Months are printed consecutively to the screen - all twelve months scroll up the screen. Press Ctrl-F5 to pause the printing to view a given month.

To make the program print a calendar to a printer, open a channel to the printer port you use, eg 365 OPEN #3,SER1

Then duplicate the PRINT statements in the "month_no" loop, so that they also go this channel, eg 535 PRINT #3,day_no;

Remember to close this channel afterwards, eg 625 CLOSE #3

A form of Zeller's congruence formula is used in lines 210 to 240 to start the date calculations. For more information on Zeller's Congruence, see page 91 of the book Mathematics On The Sinclair QL by C Kosniowski, published by Sunshine Publications. I believe the book is now out of print, but you may be able to buy second-ahnd copies from QL suppliers such as Qubbesoft P/D, SJPD or QBits.

```
                NOVEMBER 1993
SUN   MON   TUE   WED   THU   FRI   SAT
            1     2     3     4     5     6
 7     8     9    10    11    12    13
14    15    16    17    18    19    20
21    22    23    24    25    26    27
28    29    30

                DECEMBER 1993
SUN   MON   TUE   WED   THU   FRI   SAT
                  1     2     3     4
 5     6     7     8     9    10    11
12    13    14    15    16    17    18
19    20    21    22    23    24    25
26    27    28    29    30    31
```

```
100 REMark QL calendar program by Dilwyn Jones
110 WINDOW 448,200,32,16 : CLS : CSIZE 2,0
120 DIM month$(12,10),days_in_month%(12)
130 RESTORE
140 FOR a = 1 TO 12 : READ month$(a),days_in_month%(a)
150 REPeat get_year
160   INPUT'Enter year (e.g. 1993):';year%
170   IF year% >= 1752 AND year% <= 4902 THEN EXIT get_year
180 END REPeat get_year
190 CLS
200 REMark find day of week of January 1st
210 LET century = (year% - 1) DIV 100 : REMark century
220 LET year1 = (year% - 1) MOD 100
230 day_no = 799 + year1 + (year1 DIV 4) + (century DIV 4) - 2*century
240 day_no = -(day_no MOD 7)
250 leap_year = 0 : REMark is this a leap year?
260 IF (year% MOD 4) <> 0 THEN
270   REMark not divisible by 4, not a leap year
280   leap_year = 0
290 ELSE
300   REMark divisible by 4, but what about century?
310   IF (year% MOD 400) = 0 THEN
320     leap_year = 1 : REMark once every 4 century leap year
330   ELSE
340     IF (year% MOD 100) = 0 THEN leap_year = 0 : ELSE leap_year = 1
350   END IF
360 END IF
370 FOR month_no = 1 TO 12
380   PRINT \\ TO 11;month$(month_no);' ';year%
390   PRINT \ TO 4;'SUN MON TUE WED THU FRI SAT'
400   IF month_no = 2 THEN
410     REMark February has 29 days in leap years
420     days_in_month%(month_no) = days_in_month%(month_no) + leap_year
430   END IF
440   FOR line_no = 1 TO 6
450     FOR column_no = 1 TO 7
460       day_no = day_no + 1
470       IF day_no > days_in_month%(month_no) THEN
480         start_next = column_no : EXIT line_no : REMark end of month
490       END IF
500       IF day_no > 0 THEN
510         PRINT TO column_no*4;
520         IF day_no < 10 THEN PRINT' ';
530         PRINT day_no;
540       END IF
550     END FOR column_no
560     start_next = 1 : REMark previous ended on Saturday
570     PRINT : REMark go to start of next line
580     IF day_no = days_in_month%(month_no) THEN EXIT line_no
590   END FOR line_no
600   day_no = 1 - start_next : REMark where does next month start
610   PRINT
620 END FOR month_no
630 REMark data for names of months, and days per month
640 DATA 'JANUARY',31,'FEBRUARY',28,'MARCH',31,'APRIL',30
650 DATA 'MAY',31,'JUNE',30,'JULY',31,'AUGUST',31
660 DATA 'SEPTEMBER',30,'OCTOBER',31, 'NOVEMBER',30, 'DECEMBER', 31
```

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