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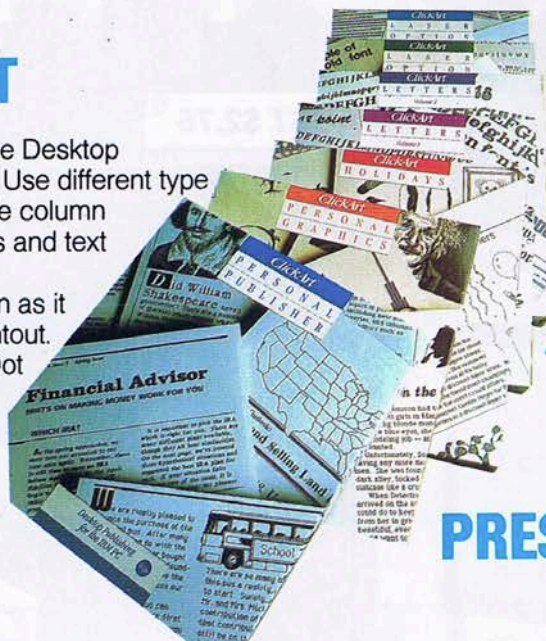
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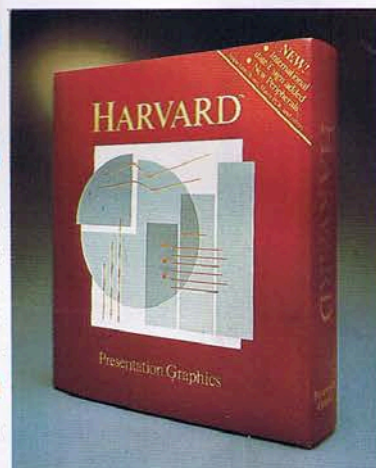
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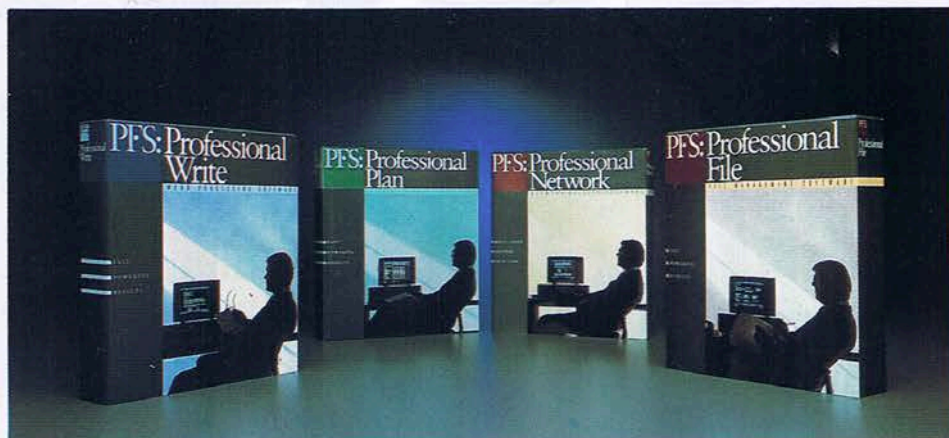
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Donation to IHC

Case Communication Systems recently donated a PC and printer to the Papakura branch of the NZ Society for the Intellectually Handicapped, along with two modems which will allow direct access to the main IHC computer in Wellington.

At the presentation, IHC Papakura administrator Trevor Martin said he was looking forward to the gift cutting down the interminable paper mountain present in any large organisation.

"Entertainer Gray Bartlett's long association with IHC and other organisations, and his friendship with Case Communications' managing director Tony Hough resulted in some gentle persuasion to provide the PC and modems," he said. "We are delighted that Case's forward thinking has provided us with the technology to make life a lot easier."



At the presentation, from left: Gray Bartlett, Tony Hough, Trevor Martin and IHC fundraiser Rex Thurgood.

Industrial and computing seminar

Massey University's Department of Production Technology is running a seminar and hands-on workshop later this month, entitled Integrated Manufacturing - management systems and computer tools.

A keynote speaker will be Sir Earl Richardson, the noted New Zealand industrialist and a member of the recent Ministerial Working Party on Science and Technology, while other speakers include academics, both New Zealand and overseas, accountants and managers. The seminar will concentrate on manufacturing control policies, not only looking at modern computer tools for supporting integrated effort but also considering the more significant managerial concepts underlying the new approaches.

The seminar will be held at Massey University from 25-27 May, with the workshop the following day.

Hurt by dumping?

Motorola has announced its first-quarter profit of \$US56 million, up 24.4 per cent from last year, on sales of \$US1.55 billion. The company is one of the US chip manufacturers claiming to have been hurt by Japanese dumping. Its chip sales rose by 22 per cent, and new orders by 32 per cent, during the quarter.

Unix conference

NZUSUGI, the Unix Systems Users' Group Inc, is holding its 1987 conference at the Auckland Airport Travelodge from 12-14 May. As well as many New Zealand speakers, overseas people who will address the conference include Michael Dubrall of NCR Pacific Group; Mike Florio, the California-based Unix consultant; Pamela Gray of Sphinx; and MIPS Computer Systems' John Mashey.

The theme will be "Unix as you like it", and the group points out that it is entirely independent of any individual vendor or brand. Anybody who wants to learn or contribute is welcome to attend.

Shopping centre goes EFT-POS

A complete 48-terminal EFT-POS network for retailers has been installed in the Northlands Shopping Centre in Papanui, Christchurch, in what Group Rentals' manager of business systems, Grant Burtenshaw, calls "the first major multiple installation into a centre in New Zealand."

He adds, "There are currently in excess of 1500 terminals on the EFT-POS network nationwide, and this number is increasing by more than 200 a month. The decision by retailers at Northlands Shopping Centre represents an investment by Group Rentals of \$400,000 in terminal and communication equipment."

OS/2 applications years away

It will be years before developers have produced much software based on Microsoft's coming Operating System 2 (OS/2), said Bill Gates, Microsoft chairman, at a San Francisco press conference. Since the operating system itself won't be delivered until the first quarter of 1988, a respectable number of applications won't appear for "a couple of years" later, he said.

Gates predicted that the IBM and compatible world will split into two camps - the MS-DOS diehards and the new OS/2 enthusiasts, who will "capture the office market in about three years". (One commentator called it the "Old Coke and New Coke" syndrome.)

OS/2 will be available to clone makers and end users alike, providing them with the basic operating system to run new IBM software. However, unlike IBM's first generation of computers, this generation's new operating system is not tossed in free with the merchandise. OS/2 will cost \$US325 and the technical manual reference manual \$US200, according to Microsoft. But, adds the firm's Steve Ballmer, "You get a lot more for your money." Microsoft Windows will be bundled with the operating system.

EXZEL *Newsline*

IBM or EXZEL Compatible?

1986 saw EXZEL computers outsell IBM and all other IBM compatible PC vendor machines by at least a factor of 2:1. In most cases the success of EXZEL computers was even more marked.

This certainly raises the question of whether the marketplace would be better off looking at the question of EXZEL compatibility (as the standard) rather than IBM. This question gains even more credibility when you look at the product strengths that EXZEL brings to the marketplace. For example, the ability to start



with a basic PC and upgrade it to an XT (hard disk added), an AT (faster Intel 80286 processor), or even the new AT-386 (an even faster Intel 80386 - 32 bit processor) utilizing only a simple board swap routine. The customer benefits from maintaining their original investment and upgrading at a fraction of the cost of starting again simply to obtain more powerful technology.

Just as importantly, this unique upgrade ability is not limited to just standard desktop models, it is also available on the full range of EXZEL Portables and Executive Slimline models.

EXZEL computers are marketed by Computer Imports Limited in conjunction with their existing dealer network.

New Product Release - Retailers Cash And Stock Control System

Computer Imports will soon be releasing a 'Retailers - Cash and Stock Control' system, designed to operate like an existing Cash Register yet it addresses the main areas of need within a Retailing environment:

- ★ **Ease of use**
 - designed to take account of even the most inexperienced shop assistant.
- ★ **Automatic cash reconciliation and banking**
 - improves accuracy in charging and providing change to customers in a prompt, efficient manner.

★ Sales figures per product without counting shelves

- allows accurate planning and ordering of stock without the need to engage in time consuming physical stock counts.

★ Full sales analysis history

- assists in shelf allocation and return on investment equations.

In providing these benefits along with the cost-effectiveness of EXZEL equipment, Computer Imports is confident that this solution is tailored to the needs of Retailers.

Computer Imports Will Be At The Southern Business Expo '87

The South Island EXPO is to be held in the Christchurch Townhall during May 19-21st.

Computer Imports Limited will be taking the opportunity to display a complete range of EXZEL computers and associated products.

It has been rumoured that Computer Imports Limited will be taking the opportunity to make some major product releases. The Computer Imports display will not be hard to find - it occupies the full stage area of the Christchurch Town Hall!

Any enquiries from the South Island should be directed to our Christchurch office (03) 64-145 or to an EXZEL dealer.

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EXZEL Rental Option Now Available

Whilst appreciating the value of EXZEL PC's, in certain situations it has been impossible for companies and corporations to obtain 'Capital Expenditure' authority regardless of the inherent benefits.

Computer Imports has responded by providing a rental option for its EXZEL computers. Apart from the realisation of being able to obtain an EXZEL computer system, a number of other advantages are obtained by renting.

1. Economy

Often, equipment is only used part of the time. For example, it may be employed in short-term projects, or as a back-up to committed equipment, or in applications which may be cancelled or suspended. If you own the equipment, it can spend an appreciable part of its life on the shelf where there is no return on your investment. If you rent, you only pay when the equipment is actually needed.

2. Capital is conserved

Rentals let you acquire the use of equipment without capital outlay. You pay for its use while it is working for you and not before. The capital dollar you save through rental can be invested elsewhere in your project or business to facilitate your job and generate additional profits.

3. Try before you buy

It is not always clear from the equipment specifications that a given model will do the job you have in mind and the requirements of the job itself may change with time. If you buy, you are committed, if you rent, you are not. A short-term rental can also let you get hands-on experience to guide a subsequent purchase decision.

4. Rental permits fast cost recovery

Rental payments are fully tax deductible. Purchased equipment can be depreciated, yielding tax savings, but only at a much lower rate.

5. Maintenance/calibration expenses eliminated

As you know, the cost of maintaining calibrating and warehousing equipment can be high. When you rent, you avoid these costs and the attendant headaches, whilst retaining the benefits of professional equipment support.

6. Cost allocation is simplified

Proper allocation of the cost of equipment ownership and support is often a difficult and complicated process. Rental payments on the other hand can be charged directly and fairly to the projects or locations where the equipment is actually used.

7. Unforeseen needs can be satisfied

At peak periods or when essential equipment breaks down, rental can put the necessary equipment in your hands right away.

8. Obsolescence is eliminated

By renting, you avoid this obvious pitfall completely. You can return rental equipment any time that a new improved model comes along - which is frequent in the area of high technology.

9. Credit is preserved

Capital purchases may use up large amounts of operating funds which must be replenished often through borrowing capacity or utilising available lines of credit.

10. Tight budgets can be stretched

Today, capital constraints and budget limitations are a familiar problem. When efficient performance of your task requires more equipment than your budget will allow you to buy, renting is often the most practical and economical solution.

For further information contact Computer Imports Limited on (09) 395-344.

Computer Imports Ltd



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Atari going PC compatible

Atari Corporation, which went public in November last year, will soon be introducing a series of PC compatible machines. No details are yet available, but the New Zealand introduction is expected to take place at **Computing 87** later this month and sources indicate that prices will be "cheaper than Amstrad".

"However, the 68000 will remain the flagship of the company," according to Max Bambridge, Atari's director of international sales and marketing. The 68000 family includes the familiar 520ST and 1040ST, and now the Mega series, aimed at the business market with 1, 2 or 4Mb, detachable keyboard, mouse, and a second disk drive in a companion box.

Atari is bringing out desktop publishing as corporate philosophy, based on the Mega 2 with 1Mb for CPU and 1Mb dedicated to the laser printer, and expected to sell in the US for less than \$US3000, with the printer for another \$US1500. No firm prices are yet available for the Mega series in New Zealand.

Two-chip 2400 bps modem

Intel has introduced its 89024 modem which uses VLSI (very large scale integration) devices to support full-duplex operation at all data speeds up to 2400 bps. It comprises two chips - 89026 application specific processor and 89027 analog front end interface - while most others on the market use three or more components.

The 89024 conforms to CCITT V21, V22 A and B, and V22 bis standards, and includes in its firmware the complete Hayes command set, segmented to allow customised commands and modem features for a differentiated end product.

High-capacity drive

From a California company known in the past for its hard drives fitted as standard to mainframes and minis comes a new line of full-height 5.25 inch 85Mb drives for micros. The Micropolis 1330 series has 30 msec access time and a guaranteed MTBF of 25,000 hours, with a reduced price since Micropolis opened a manufacturing facility in Singapore.

The 1330 (slightly derated from the 28 msec, 30,000 hour MTBF 1320) comes complete with Speedstore software which overcomes the 32Mb DOS access limitation. Also available is the 1350 series, with 170.6Mb (unformatted) and 23msec access.

Mac office products

Apple's new peripherals and software for the Macintosh office environment are, according to CED Distributors general manager Mal Thompson, "of special interest to systems houses and solutions developers working in major corporate environments."

They include AppleShare, a

software-based fileserver running a dedicated Macintosh Plus with hard disk to support up to 25 users; LaserShare print spooler to allow documents to be queued on a dedicated Macintosh print server; and the AppleTalk PC Card, which enables MS-DOS PCs to be integrated into an AppleTalk environment.

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USENET project donation

The NZ Unix Systems User Group has donated \$5,000 to Victoria University's USENET Project. NZUSUGI president Ian Howard says the donation has been made because the project brings access to the worldwide Unix based USENET network for the New Zealand Unix user community.

Professor John Hine of Victoria's Computer Science Department, the driving force behind the project, says his group has established all the overseas connections to pick up the news, and has completed development of the software to allow New Zealand users to contact the Unix based computer system from Pacnet or by dial-up. So far, the Fisheries Research Department at Greta Point and ICL are working at connecting to the network.

Professor Hine says the \$5,000 donation will enable his department to meet the costs of bringing news from overseas while the network is expanding throughout New Zealand. Connection to the network will provide organisations with access to USENET news free of charge while the grant lasts.

Scholarship winners

In conjunction with the University Grants Committee, IBM recently selected the winners of its three scholarships, annually awarded to one postgraduate and two undergraduates.

The postgraduate winner is David Andrae of Canterbury University, now studying for a PhD at Victoria University in the specialist field of

artificial intelligence and more particularly in the area of machine learning. Andrew Mitchell, in his first year of study for a BE at Auckland University, was awarded the IBM scholarship for undergraduate students, while Kelly Tonkin of Canterbury University was presented with the scholarship which is open to students of Maori or Pacific Island descent.

Technology agreement signed

AWA Computers last month signed a technology agreement with General Automation Inc (GA) to provide for distribution and eventual local manufacture of the American products.

"Our intention is to have full manufacturing facilities here, with the ability to tap into the most sophisticated of GA's research and technology," said Martyn Coe, AWA Computers general manager. "This will offer real benefits for our customers

as well as encouraging other businesspeople to recognise New Zealand's potential as a first-class customer."

Rene Caron, GA's marketing and sales group vice-president, replied, "New Zealand may be a small country, but you Kiwis have a reputation for precision manufacturing and innovation. Coming from California, where the computer industry is based, we can't help but feel we have a lot in common with New Zealand."

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ROM	128K	128K
RAM	128K	128K
I/O	built in	built in
FLOPPY DISK DRIVE	built in	built in
SERIAL PRINTER INTERFACE	built in	built in
PARALLEL PRINTER INTERFACE	built in	No
MOUSE INTERFACE	built in	built in
SERIAL INTERFACE TO MODEM	built in	built in
RGB COLUMN TEXT	built in	built in
EXPANSION SLOT	One expandable to two optional built in	No
PRO-CO-PROCESSOR	built in	No
KEYBOARD	built in	built in
VIDEO DISPLAY	built in	built in
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BACKGROUND COLOR	PROGRAMMABLE 16 COLOR	No
BACKGROUND COLOR	PROGRAMMABLE 16 COLOR	No
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The critics rave

So it's not surprising that FORTUNE magazine named the COMPAQ DESKPRO 386 one of the most significant products of 1986.

As did Business Week.

Australian Personal Computer said "it is beautifully engineered and professionally supported. It's the most powerful PC - compatible currently available."

They also added it's "simply the micro to be seen with."

Australian PC World praised the COMPAQ DESKPRO 386 as "an excellent, well engineered PC with power and speed aplenty. COMPAQ can truly say this is the fastest PC available."

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New Zenith product range

Zenith Data Systems in the USA has released a completely new PC range, starting with the 8088-2 processor Z-148, with 640kb RAM, zero wait state 4.77/8MHz, with a choice of dual floppies or single floppy and 20Mb hard disk drive. The Z-159 series has similar features but with 768kb expandable to 1.2Mb on the motherboard, video options of Hercules/Colourgraphic combination or EGA system, and floppy controller support for 360kb, 720kb or 1.2Mb drives.

AT compatibles are the Z-248 range with 8MHz 80286 processor, 768kb expandable to 2Mb on the motherboard and choice of CGA/Hercules or EGA, while top of the line is the Z-386, with full 16MHz 80386, 1Mb RAM and up to 80Mb of Winchester drive. Two laptop portables complete the lineup, with 80C88 processors, up to 640kb RAM and either 5.25 or 3.5 inch dual floppy drives.

Publicity laser

Interactive laser disk technology is being explored by NZTP's Media and Publicity Studios as a means of increasing the country's reach into overseas markets. Its advantages are seen as combining the information retrieval characteristics of videotex, the text and illustrative attributes of print, and the visual impact of television in a compact portable package at relatively low cost.

With the North American tourist market in mind, the Studios have been investigating the potential of the video disk system as a merchandising and training tool with travel groups. "We're very excited about the possibilities it offers for promoting New Zealand and for presenting our own extensive image resource," says marketing manager Nigel Swinn.

New 32-bit family

Fitting into the low- to mid-range of Honeywell's product line is a new generation of DP 6 PLUS (productivity linked user system) family of 32-bit interdepartmental computers with a virtual memory operating system.

According to Chris Angove, manager of Honeywell Bull (NZ) Ltd, the new line offers improved system price/performance, modularity in the form of both performance/system upgrades and software offerings, and increased system security features.

Real estate package

Now operating at 11 sites around the country and considered by its originator to be "bulletproof" and ready to be marketed is Realty Data Systems' Real Estate Sales Management System. Written in Dataflex by Alison Hamilton for the Wang PC (and also available for the LapTop), it is said to do everything a real estate office needs, including word processing, in addition to its major functions of sales and listings.

Real 1 comprises four main modules: residential, commercial, trust, and property management, and has been developed over two years, with graphics still to come. At present such packages are rare in the industry, and Hamilton says, "I do not at this stage think I've any competition."

80386 workstation

Unisys has announced its B 38 workstation, based on the 80386 microprocessor, as a new member of the B 25 series and able to support up to 11 cluster workstations.

In addition, the new product ClusterShare allows IBM PCs and compatibles to coexist in the B38 cluster network. Shared resources include disks, printers and communications facilities using the Cluster Share RS-422 interface board and the software which contains both MS-DOS 3.1 and level MS-NET and NET BIOS.

Upgrade your 286

Starting operation in New Zealand is the Australian company Tech Pacific, which was recently appointed distributor in the region for Intel's PC Enhancement Operation (PCEO). The product range includes Above Board, up to 8Mb of expanded memory, and Inboard 386/AT, an add-on for ATs which features Intel's 32-bit 80386 microprocessor and high-speed math coprocessor support.

Also available from Tech Pacific is Plus Development's Hardcard series, a hard disk subsystem mounted on a PC-compatible plug-in board, the 20Mb version having a 49msec seek time.

Hard-driving laptop

Released on the New Zealand market is Datamini's Lap Top, another entry in the competitive field of portable IBM compatibles which are capable of all the usual desktop functions.

Weighing 7.5kg, the Datamini has 640kb RAM and a 16-bit 80186 microprocessor running MS-DOS at 4.915MHz. The full-size keyboard is the standard IBM layout and the screen is a backlit supertwist 80x25 flat panel display. Standard mains-powered drive configuration is one 5.25 inch internal floppy and one 20Mb hard drive, although an option is a battery-powered model with two 5.25 inch floppies.

Too cheap?

Roland DG is worried that the newly-launched DPX-3300 might be considered so cheap (at \$12,500 including GST) that prospective buyers will be put off. However, the company points out that it is a precision draughting plotter with more features than any currently available A1 model.

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34. Motherboards — 256K onboard, standard speed 8088 CPU	\$550
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52. As above, but with 360K FDD etc	\$4,500	\$8,250	
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55. If Portable, Add	\$500	—	—

HARD DISKS	
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57. 20MB with Controller Card	\$1,850*
58. 30MB with Controller Card	\$2,300
59. 45MB with Controller Card	\$2,700
60. 45MB with Controller Card (40ms av. access)	\$3,000
61. 75MB with Controller Card (28ms av. access)	\$9,500
62. 126MB with Controller Card (28ms av. access)	\$15,500
63. HDD + FDD Controller Card Only	\$625

PC/AT OPTIONS	
64. Standard RAM Card, 0 RAM	\$300
65. 'Above 640K' Expanded Memory Card, 0 RAM	\$425
66. 256Kb RAM chips for above, per 256KBytes	\$100
67. For 2MB Card fully populated	\$1,150
68. Co-processors — 80287-6	\$825
— 80287-8	\$1,150
— 80287-10	\$1,375
71. Serial Card — with one port	\$375
— with two ports	\$425
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77. Power Supplies — AT size, 200w/230v	\$400
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79. Keyboard, standard layout	\$265
80. Keyboard, with separate Numeric & Cursor Pads	\$300*
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92. Corvus OmniDrive — 21MB	\$4,500
93. Corvus OmniDrive — 45MB	\$6,500
94. Corvus OmniDrive — 75MB	\$9,900
95. Corvus OmniDrive — 126MB	\$16,000
96. Novell Network — 8 User	\$2,300
97. Novell Network — 50 User	\$3,500
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WORM arrives

A WORM (write once, read many times) optical disk drive is now available in New Zealand. The Tallgrass Technologies unit can store up to 200Mb of data on each side of the removable optical disks, giving the advantages of huge capacity and security (the disk can be written only once) for such applications as very large databases, especially those requiring permanent storage of information.

To overcome the slow 220 msec access time of the optical drive, the unit comes with a normal 28 msec access 50Mb hard disk, 25Mb of which is used as cache memory to handle read/write activity. The optical drive comes into use only when the cache is full or when the operation is complete. Also included is Laser-track, the operating software to manage the optical disk, minimum RAM being 384kb.

The optical drive will be on display at **Computing 87**.

IBM, take note

"Over the past year IBM NZ has taken out an injunction against one NZ computer supplier, and threatened action on no fewer than four other occasions. They had prepared papers. We as a company have sought from IBM on two separate occasions guidance on the technical details that underlie their continuing concerns. IBM responses have been decidedly unhelpful.

"Now, considering that their latest 'PC' product releases will do very little to assist their marketing ills, IBM should in the interests of the market start a proper dialogue with others in the industry. There is nothing to be gained from continual attempts to elbow one another. Otherwise, I also intend commencing to use the press to report the interactions of the past year, that so far have not been reported. Understand?"

(From *Computer Broking Services* April newsletter)

Top software slot

Microsoft's surge in revenue – a 95 per cent increase over last year – has catapulted it to the point of having the distinction of being the king of software in the US, overtaking Lotus which has held the title of number one for years in terms of largest earnings.

Flawed chips

Intel has announced that some 80386 chips have been malfunctioning, and tests are continuing to determine the extent of the problem. According to Intel officials, some of the microprocessors are making mistakes in multiplication of very large numbers when operating in 32-bit mode.

Some 100,000 80386 microprocessors have been delivered, and analysts estimate up to half of them may be affected. The problem may require replacement of the motherboard, but while it sounds serious, it may not be, according to Compaq. A spokesman has been quoted as saying most users would never notice the problem since the complex calculations are not generally performed.

Up-to-date Parliament

Data General has been awarded, for an undisclosed sum, a contract to supply Parliament with an office automation system, so that by this time next year all MPs will have personal computers in their Wellington offices, linked with several information databases.

The distributed processing system will be based on 33 minicomputers,

New power, old price

In announcing a new version of the Compaq Deskpro 286 with the 12MHz 80286 microprocessor replacing the 8MHz model, the company states it offers "significantly enhanced performance at the same suggested retail prices."

The increased processor speed is combined with faster random access memory (100 nanosecond DRAMs), up to 80Mb of fixed disk with under 30msec average access time, the option of an internal 40Mb fixed disk tape backup, and a total memory expansion capability of 8.1Mb. Up to four half-height internal storage devices can be supported.

linked by 8.5km of fibre-optic and coaxial cable. The first stage will equip the Beehive, while the remainder of the project will follow the general elections later this year, completing installation work in Parliament Buildings. All MPs, including backbenchers, will have workstations, laser printers and PCs linked to internal and external networks.

UK purchase

Paxus Professional Office Systems has announced its acquisition of the business of MGE Systems, a UK supplier of integrated systems to accountants and financial institutions. MGE's two major product ranges are the Trust Administration and Banking System (TABS) and the PARTNER family which includes packages for accounts preparation, time recording, taxation, portfolio management, sales and purchase ledgers and office automation.

Australia-based Paxus set up a UK subsidiary last August and the recent acquisition, effective from 1 April, gives it expertise in the taxation field of that country as well as an additional base of some 200 clients.

Microsoft earned \$US19.1 million in its third fiscal quarter, compared with Lotus' \$13.7 million. The company's success, described as "outrageous" by one commentator, is attributed to booming sales of Microsoft Word 3.0 for the Macintosh, and of Microsoft Mouse.

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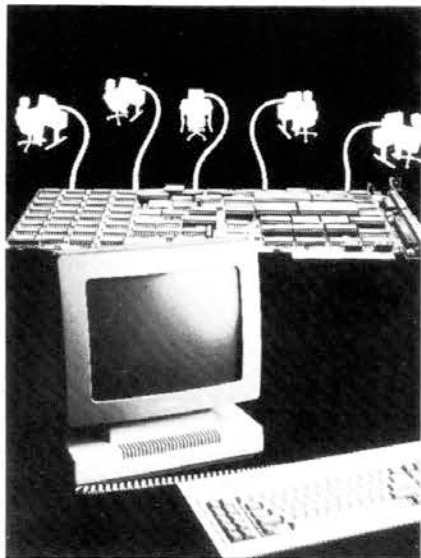
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Q11

Green light for DBXL

Just announced is an agreement between WordTech Systems and Ashton-Tate that protects DBXL, a dBase III plus equivalent, from copyright infringement litigation. The agreement provides for the transfer of WordTech-developed SQL technology to Ashton-Tate, the company having also acquired the services of SQL expert Harry Wong, in exchange for the protection.

WordTech's David Miller states that the action is "tantamount to an endorsement of DBXL by Ashton-Tate. We've been concerned that some purchasers may defer buying decisions in the face of recent lawsuits against clones of Lotus 1-2-3, and now Lotus 1-2-3 itself. People are hesitant to buy a product that may be declared illegal, because they fear they won't be able to get support for it in the future. This is especially true in the corporate environment."

New name in business electronics

The Dimock Group, active in office and retail machines for more than 50 years, has formed Data Systems (NZ) Ltd as a wholly-owned subsidiary to specialise in EFT-POS, credit authorisation and magnetic card based technology, communications equipment and software development.

Based in Auckland, Data Systems is also represented in Dimock's 12 regional and provincial branches around New Zealand. General manager is Ian Bailey, previously manager of Dimock's electronics cash register division, while managing director is Vern Tait, also with a similar role in the parent company.

Priority investment

Wang New Zealand has undertaken a significant investment in a leading supplier of merchant banking computer systems, Priority Computing Ltd, as part of a major restructure in the ownership and management of the Sydney-based company. The remaining shareholding has been taken up by the two principals of the Australian Wang software house VTEC and the staff of Priority.

Large market foreseen

Frank Sheu, marketing manager for the Asian-Pacific area for Mitac, one of Taiwan's largest computer manufacturers, recently visited New Zealand for talks with Pacific Computers' Peter Parsonage about this country's personal computer market. Mitac International and Pacific Computers signed a contract last December for the exclusive NZ distribution rights for the Taiwanese XT and AT compatibles, as well as its backup tape system and EGA card.

In stating that the partnership expects to capture 10 per cent of the New Zealand market by the end of the first year of operation, Mr Sheu pointed out that Mitac products were designed to avoid any possible infringement of IBM copyrights. Also, he said, "Mitac's products run faster, have more features and cost less than IBM machines or any other MS-DOS machines with a similar level of quality."

Spiking drawings

Voltage fluctuations can create havoc in computer systems, and in promoting its line of Mini UPS (uninterruptible power supply) which can protect smaller installations against power surges and provide battery backup for two hours, ASTEC Industrial Products' Kim Naylor points out the horrors of corrupted CAD systems.

"Voltage spikes and dips cause unwanted changes to drawings or total loss of hours of patient work," he says. "Often the ensuing shambles is not evident until the data has been output to the plotter. In addition, the problem of being faced with a completely blank screen at a crucial time for the drawing office can be infuriating."

Richard Franklin, director and former chief executive of VTEC, has been appointed managing director of Priority Computing, while Richard Bone remains New Zealand managing director. Priority was established in February 1981 to provide software services to the banking and finance industry and selected Wang as its hardware supplier.

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Q10

Redesigned and streamlined

It looks a bit different, comes in a new colour, makes a noise, and has a name that even Apple admits doesn't mean anything. Could SE stand for Slightly Enhanced? Grant Cowie runs the new Macintosh through its paces.

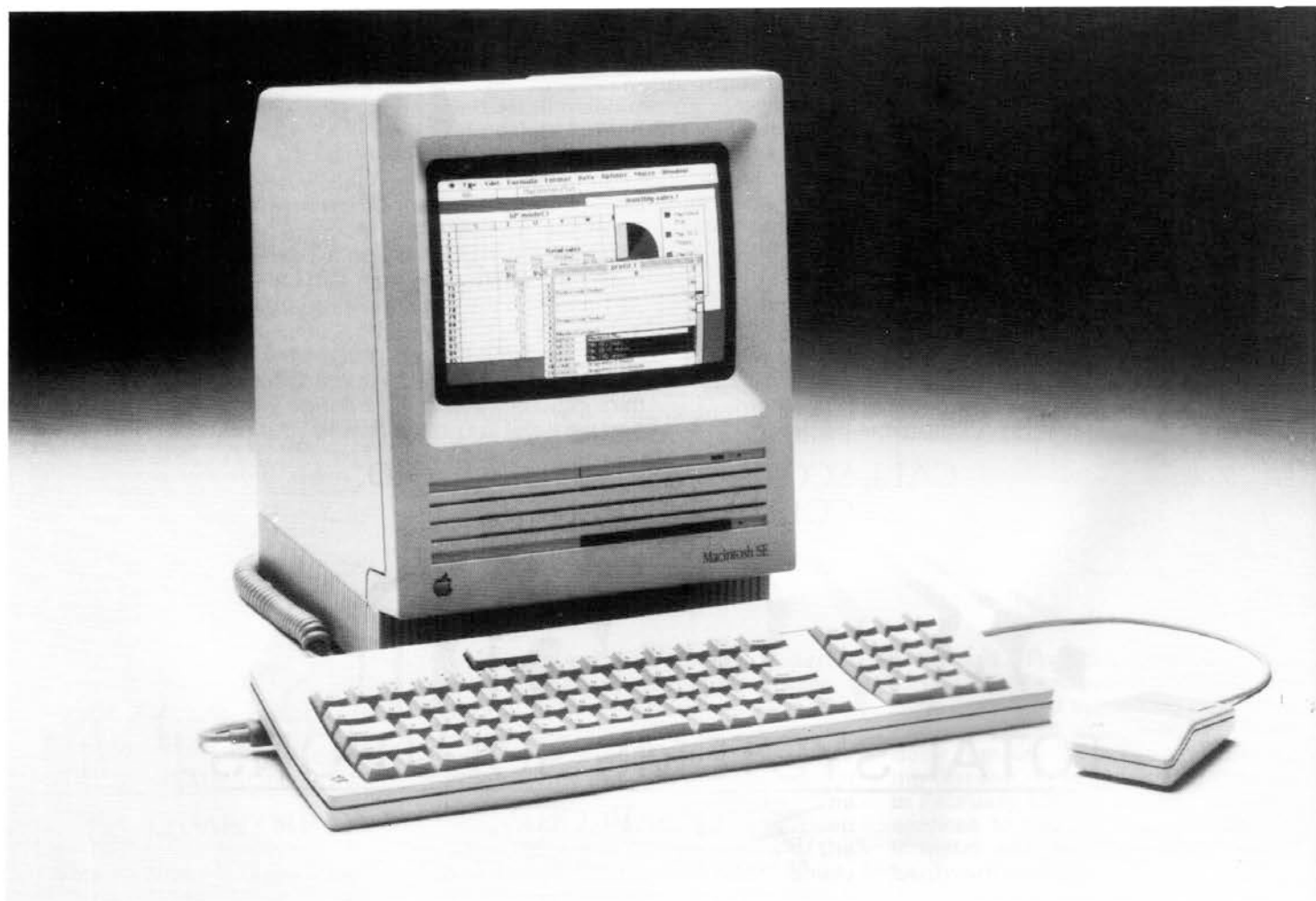
Last month I mentioned that Apple had just announced two new Macintosh computers, Macintosh SE and the Macintosh II. Courtesy of CED, the local Apple distributors, I have had the use of one of the new SEs for the last few weeks, so I thought I would share some of my thoughts on it with you.

The first thing you notice about the SE is its colour. Gone is the friendly familiar beige of the Mac Plus, replaced by "platinum", a steely-grey colour. The initial reaction to this was an unqualified "Ugh" as the Mac came out of its box, but over a period of time I've got used to the colour and I think I now prefer it to the original beige (my wife certainly does).

The next most obvious change is in the keyboard. Many people did not like the old keyboard, describing it as tinny. The new keyboard is lower slung with a much firmer touch. Initially I did not like the feel of it, but I suspect that was only because I had become used to that aspect of the original keyboard. However, having used it for quite some time I now find

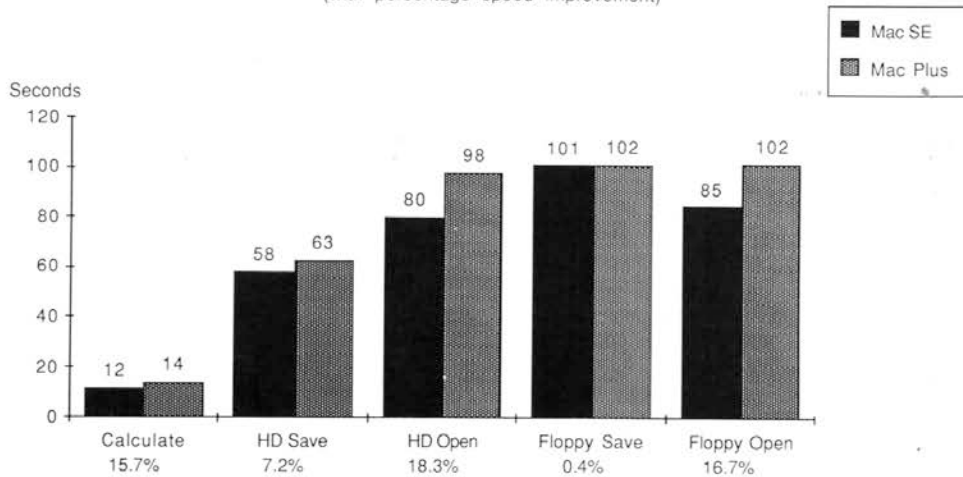
that I prefer it to the old one.

Apple now uses the same keyboard for both the Macintosh and the IIGS. This means that there are unMacintosh-type keys on it such as Esc and Control. Sadly the Option key has been cut in half to accommodate the Caps Lock, the space bar has shrunk dramatically, and in the interests of computerese the Backspace key has been renamed Delete. There is also an extraordinary key marked with a triangle at the top of the keyboard. The manual says this is a Reset key,



Excel Spreadsheet Comparative Performance

(with percentage speed improvement)



the effect of which depends on the application being run. It had no effect at all whenever I tried it.

The new keyboard layout does not solve one of the Macintosh's problems. According to the Macintosh interface guidelines, the Tab key is used to skip from field to field in dialogue boxes. The Return and Enter keys generally act as equivalents to clicking the OK button to accept the data. Now the numeric keypad is on the right of the keyboard, and the Tab key is on the far left. This means that two hands have to be used for entering sets of numeric data into a dialogue box. For any major data entry job this is unacceptable.

The new keyboard has the ability to daisy-chain devices. There is a socket on each side of it, either one of which can be used for the cable. The other can be used for some other device, such as the mouse, a joystick, a graphics tablet or even another keyboard. This means that the mouse can be plugged into either side of the keyboard, which is good news for left-handed people. Unfortunately this

new daisy-chaining ability means that the keyboards have new connectors, so you can't use a Mac Plus keyboard or mouse on the SE.

Incidentally there are two keyboards now available for the Macintosh from Apple, and presumably third parties will develop more (the keyboard is not included in the basic SE package – it is an extra). The other keyboard has a set of function keys to give it compatibility with MS-DOS applications running on the (appropriately enhanced) SE.

Apple has also redesigned and streamlined the mouse. The two silly lugs that used to wear out underneath have been replaced by a teflon bar. The net result is a mouse that is easier to hold and move than the old one.

In designing the SE, Apple has completely redesigned the internals of the Macintosh. This is reflected in the case which no longer vents at the top. Instead there is now a (reasonably quiet) fan with vents at the back and near the bottom on either side. It's a pity that the fan is required, but

with a bigger power supply and an internal 20Mb SCSI drive there would have been little option. One of the joys of using the basic Mac Plus is that it is totally silent.

On the back of the computer is what appears to be a push-out panel. Presumably this is where the connectors go for any expansion cards. This is the only sign of the new "open" architecture.

Performance

Of course, having a pretty new case is of little use if the computer itself doesn't actually perform well. The press releases said that for certain operations the SE is up to 20 per cent faster than the Mac Plus. It is also said to be totally compatible for all applications that have been built following the Macintosh guidelines.

Previously I had been using a Mac Plus with an Apple SCSI hard drive. The SE certainly felt slightly faster in that windows seemed to open more quickly and applications seemed to start faster. However, to test the system out properly we ran several benchmarks. These included databases, spreadsheets and Pascal compilations, and show that the SE is on average about 15 per cent faster than the Mac Plus.

The speed increase is perhaps best illustrated by the Excel benchmark

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that we used. We set up a 100 x 100 spreadsheet which had 100 simple assignments, 5,000 multiplications, and 4,900 divisions. This spreadsheet was run several times on the SE and the Plus under as nearly the same conditions as we could achieve (although there was a new System folder on the SE). The results are shown in the bar chart.

These indicate that there is a significant speed improvement in the SE. However, there is a surprising anomaly with the internal floppy drive on the SE, and we ran the tests several times to confirm this. For opening the spreadsheet (i.e. reading it off the disk) the internal floppy was only marginally slower than the internal hard disk, and was considerably faster than the external hard disk on the Mac Plus. But in saving the spreadsheet, there was no appreciable difference with the Mac Plus floppy. Whether this is due to the hardware or some quirk in Excel we cannot say.

The SE also has a new 256kb ROM. Encoded in this are many of the most commonly used fonts, so that changing fonts in applications such as MacWrite is now extremely fast. However, one particular aspect I did not like was the jerkiness in the cursor. When the machine is busy the cursor changes to a wrist watch (with the hands turning!). Any tiny movements of the mouse at this point can send the cursor leaping right across the screen.

To test the claims for compatibility we ran virtually every package and system that we have (and there are quite a few of these!). Without exception all the packages ran, so I can say that Apple's claim of compatibility has been verified.

New System and Finder

A new version of the system and the finder have been released with the SE. Quite how these differ from previous releases is not clear. There are of course some cosmetic differences. For example the "Get Info" windows have been revamped, there is a new multi-level control panel, and the trash can now bulges when it has something in it. There is also a new menu option for turning the system off which presumably parks the hard disk head. However, although there do not appear to be any substantial changes on the surface, there are probably major changes inside which are transparent to the user.

MS-DOS

The major new feature on the SE is its "open architecture". The machine has one slot for adding an option card which must (according to Apple) be

installed by an authorised Apple technician. The option card that everyone is talking about is the Mac86, an 8086 card that will enable MS-DOS applications to be run in a window on the SE. This will be supplied not by Apple but by a third party. Apple has also announced a 5.25 inch disk drive for reading and writing MS-DOS files.

Unfortunately I cannot tell you much about the Mac86 as it won't be available until at least June. However, it does appear that there will be some ability to cut and paste between MS-DOS and Mac applications, and that the mouse will support MD-DOS applications that use a mouse (I wonder how Microsoft Windows will go on the Mac?). The screen emulation of the IBM characters will apparently be done by software, so this may be a little slow. Despite this, the Mac86 is supposed to run at about the same speed as an IBM PC/XT.

There will also be a Mac286 for the MacII, which will provide complete compatibility and about the same performance as an IBM AT. Apparently this will have one megabyte of memory on board and a socket for an 80287 maths coprocessor. Both the Mac86 and the Mac286 will be able to read and write MS-DOS files on the Macintosh hard disk.

In the final analysis it does seem ironic that Apple has at last provided IBM compatibility on the eve of IBM's announcement of its next generation computers, which may or may not be MS-DOS compatible. It is also a bit sad to see what is obviously a technically superior piece of equipment having to be "downgraded" to an obsolete technology to gain market acceptance.

Who should have one?

The trouble with having the use of a new computer for a period of time is

that you become rather attached to it. Despite my initial reservations about the keyboard, I now find I prefer it and the SE in general to my trusty Mac Plus. The new mouse in particular is definitely superior to the old one. In addition everything is in one easy-to-carry bundle, so there are no external disk drives to lug around the place. I think that within the next few months I will be selling my Mac Plus and getting an SE (incidentally there is no upgrade path from the Mac Plus to SE - you have to buy a new one).

There is no upgrade path from the Mac Plus to SE - you have to buy a new one.

With its (as yet unseen) ability to run MS-DOS applications, the SE should definitely appeal to the corporate user. The advantage for them is the MS-DOS parachute (after all, no one ever got fired for buying IBM). This means they can get the benefits of the Macintosh user friendliness and still have the option of running their favourite Lotus 1-2-3 spreadsheets. However, it is my bet that once they have had a taste of Excel they will happily forget about the "need" for MS-DOS and will instead utilise the full power of the Macintosh.

How the SE will succeed in the marketplace will to some extent be determined by the new generation of IBM PCs which is due to be announced soon, what features these offer and at what price. The SE is not a cheap computer, being priced at just under \$11,000 (plus GST) for the 20Mb version. But neither is it expensive when viewed as a highly productive management tool.

Microcomputer Summary

Name:	Apple Macintosh SE
Manufacturer:	Apple Computer Inc, USA
Processor:	MC68000, 32-bit internal architecture, 7.8336MHz
Memory:	1Mb RAM expandable to 4Mb, 256kb ROM, 256 bytes of user-settable parameter memory
Storage:	either two 800kb double-sided 3 1/2-inch disks or one 3 1/2-inch and internal 20Mb SCSI hard disk
Screen:	9-inch diagonal, 512 x 342 pixels
Interfaces:	two Apple Desktop bus connectors two RS232/RS422 serial ports, external disk interface, expansion connector SCSI interface
Sound:	4-voice sound with 8-bit digital-analog conversion using 22kHz sample rate
Fan:	10cfm crossflow
Weight:	7.7kg (two 3 1/2-inch disk drives) 9.5kg (one 3 1/2-inch, one hard disk)
Price:	Macintosh SE \$5,959
(\$NZ + GST)	Macintosh SE Hard Disk 20 \$10,795 Apple keyboard \$395 extended keyboard \$535

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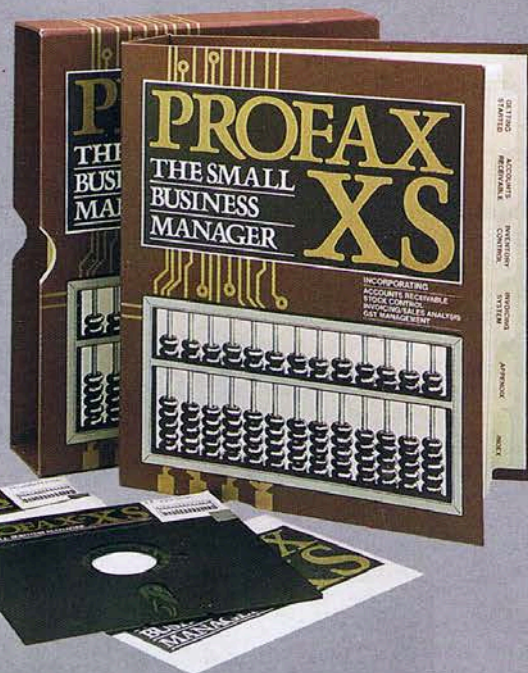
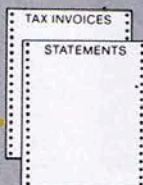
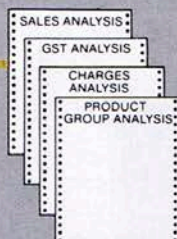
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Power in a plain box

— the Compaq Deskpro 386

For all the ballyhoo surrounding the latest in micros using the new 80386 32-bit chip, they have been slow to arrive in any numbers. Mark James asks a few questions about the first on the scene and wonders about its position in the microcomputer field.

The introduction last year of a number of microcomputers based on the Intel 80386 microprocessor raised a number of issues as to the future of personal computing. Is it appropriate to expect these superfast machines to perform the same kinds of functions as lesser IBM-compatible computers? Can software be developed that will take true advantage of their power?

Are they really personal computers at all, or should they be regarded as network nodes or multi-user systems? Now that the 80386 machines are entering New Zealand in some numbers, I was pleased to have the opportunity to see for myself.

The Compaq Deskpro 386 was first off the mark with the new chip, and has outsold its competitors by a wide margin. This is the machine provided for review by Datatronic Systems, New Zealand Compaq distributors.

Physical description

With all of the marketing hoopla surrounding the 80386 machines, I was expecting some radically new packaging: sharp angles, polished chrome, perhaps racing stripes. Compaq missed a cue here. At first glance, the Deskpro 386 looks nearly identical to the Deskpro 286, Compaq's IBM PC/AT-compatible computer.

The main unit measures 50.3 cm by 41.9 cm and stands 16.2 cm high. The keyboard is similar to the IBM enhanced AT keyboard (101 keys, 12 function keys, separate numeric and cursor control pads), and the monitor on the review machine was Compaq's standard monochrome display unit. The rear of the main unit contains outlets for the display unit's power and signal, along with one nine-pin serial port and one 25-pin parallel connector. Except for the number 386 on the badge, you would think that you were dealing with an ordinary clone.

Inside the main box, however, the sense of *deja vu* disappears. Sitting near the left edge of the motherboard, as if designed to be seen, is the large square 80386 chip. Seven card slots lie to the rear: three short (8-bit) and four long (16-bit) slots. An additional

32-bit slot, designed solely for Compaq expansion memory, runs off to one side. On the review machine, one long slot was used by a controller board for the floppy disk, serial and parallel ports while the 130Mb hard disk controller took another and the video controller used a short slot. This left two short and two long slots for expansion.

The front of the main unit contains room for four half-height devices. The 1.2 Mb floppy disk drive took up one of these, and the full-height 130 Mb Control Data hard disk needed two more. (A half-height 40Mb disk is also available.) The 200-watt power supply is more than adequate for any normal configuration.

The salient feature of 80386 machines is speed, and the Compaq leaves no doubts on this score.

Since the review machine came fresh from the factory, I had the opportunity of going through the setup procedure. The documentation was written for MS-DOS version 3.1, and the machine came with version 3.2 plus some extra setup utilities. This resulted in some initial confusion, but it soon became clear that the setup utilities had their own on-line instructions, and that the manuals were unnecessary. There were no options as to how the hard disk was to be formatted — I got four 32Mb logical drives (C:, D:, E: and F:), with no choice of physical disk organisation. This contrasts sharply with the procedure for setting up disks of similar capacity on minicomputers and mainframes.



Performance and compatibility

The salient feature of 80386 machines is speed, and the Compaq leaves no doubts on this score. The processor runs at 16MHz with one wait state, precisely double the speed of IBM's fastest PC/AT. The SI performance index of Norton utilities, which yields 7.7 for the IBM, varies between 14.9 and 15.8 for the Compaq 386.

This variation is itself interesting. The SI index is calculated by dividing a constant by the number of clock ticks elapsed during the execution of a test. In the case of the 386, the number of clock ticks is so low that a random variation of one or two ticks can cause nearly a 10 per cent error in the index. In other words, the granularity of the clock ticks is too large to measure the speed of this fire-breather.

In fact, the true speed potential of the 80386 chip has not yet been fully realised. The SI index, along with nearly all programs that people will run on this machine, runs the chip in its 16-bit mode, which is required for compatibility with older IBM PC-type programs. In this mode, processor instructions and memory accesses

can take advantage of the 16MHz processor speed, but they cannot benefit from the ability of the chip to handle data in 32-bit chunks instead of 16-bit ones. Since MS-DOS itself requires the machine to run in 16-bit mode, users of 80386 machines are forced to choose between speed and compatibility. We shall return to this subject later.

In its 16-bit mode, there is very little problem with IBM compatibility. With the exception of an early version of Microsoft Flight Simulator, I could find no MS-DOS programs that would not run on the Deskpro 386. Some copy-protection schemes use disk or processor timing tricks to detect illegal copies but even these ran without trouble. In its default setup, the Deskpro 386 adjusts its clock speed to what it thinks the current program wants. In the event that this is wrong (as happens with the latest version of Flight Simulator), the MODE SPEED command of MS-DOS will set it to a constant 6, 8 or 16MHz.

Enhanced keyboards, in which the cursor keys are separate from the numeric keypad, often present compatibility problems, and the Compaq is no exception here. When Numlock is on, pressing one of the arrow keys followed very quickly by, say, the 4 key on the main board will produce a dollar sign instead of a 4. This is

because the cursor key actually sends three key codes to the computer when Numlock is on: shift depress, arrow key, and shift release. If you hit the 4 key before the keyboard sends the shift release, the computer thinks you were pressing shift/4, for a dollar sign. Problems with Numlock are very frequent among IBM-compatible keyboards, and the Compaq's problems are less serious than some.

Multi-user capabilities

One could reasonably argue that the speed of the 80386 machines is too fast to be really useful. Since 80286 machines are available at less than half the price of the Deskpro 386, there would have to be a strong need for the extra speed in order to justify the extra cost. Those who toy with megacell spreadsheets all day, or who perform extensive mathematical calculations would be possible candidates for the 386's speed; software development and computer-aided design might also qualify. However, the most likely use of this power is for multi-user systems of network servers.

To gain some perspective on this, I installed a ConnectCom eight-port serial controller board, an Overland TC/PC controller for a mainframe-

standard, nine-track reel-to-reel tape drive, and the AMPS multi-user operating system. Nine Wyse-50 terminals were attached to the Deskpro 386 (eight on the ConnectCom board and one on the standard serial port), all configured to run at 38,400 baud. Including the monitor, we now had a ten-user AMPS system, and we decided to give it a thrashing.

In program execution, calculations, database queries, screen manipulation and most other operations, it was evident that we were not remotely approaching the full multi-user capacity of this machine. The one problem that we encountered was with the terminal attached to the standard serial port. (Although that port can be set to 38,400 baud, it is not really rated for that speed. When reduced to 19,200 baud, the problems went away.) The general impression that we gained was one of surreal power: a microcomputer doing all this, and so fast! We felt that we understood why the 80386 chip is rated as having the power of a VAX 11/780.

Then, when we began to access the entire disk through the MS-DOS file structure, the euphoria went away. Although response times remained quite tolerable, they were no longer instantaneous, and it was clear that the bottleneck lay in the disk accesses. This surprised us, since the man-

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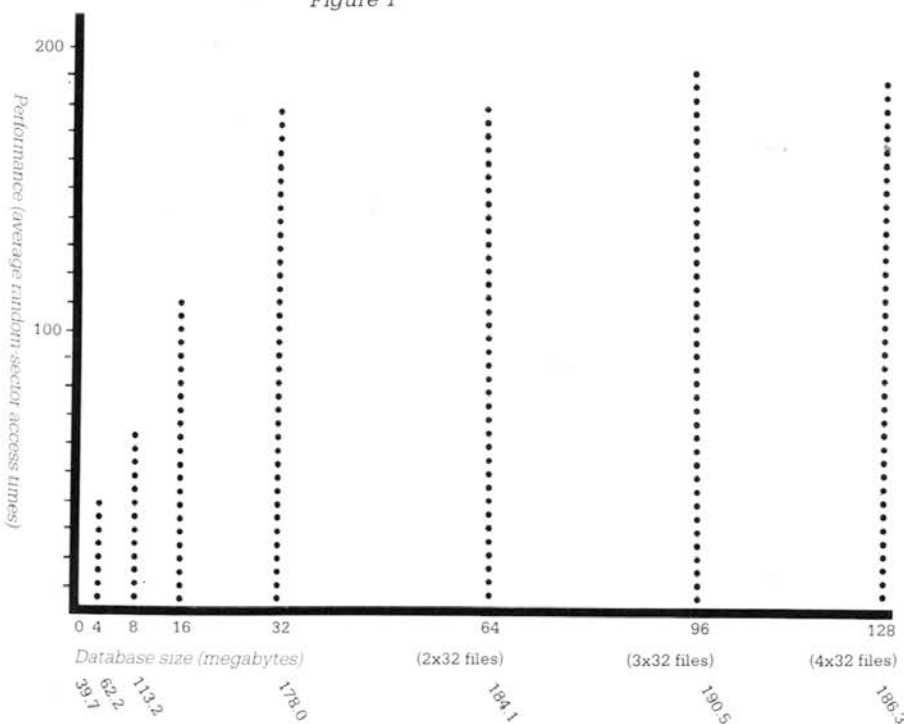
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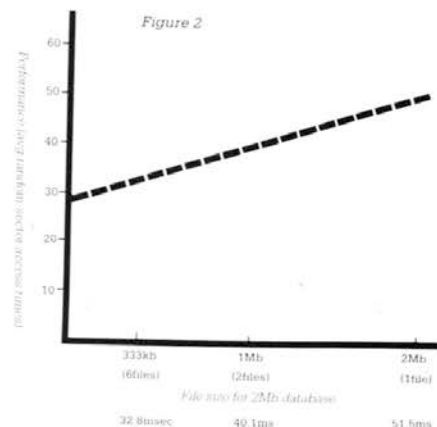


ufacturer's ratings gave the worst-case access time as 50 milliseconds – a respectable figure even by the standards of larger computers. The AMPS system statistics, however, showed average access times of 190 milliseconds. What could be slowing

things down?

Some quick tests (see figure 1) showed that the average access times for random sectors from one MS-DOS file worsened as the size of that file increased. However, accessing random sectors from two or more

Figure 2



different files was no worse than from one, even if the files were widely separated on the disk. This proved that the physical operations of the disk were not at fault.

We then ran the same test on the same data in the same physical locations on the disk, once as a single MS-DOS file and once as six separate files (see figure 2). Average access times were 57 per cent worse for one large file than for six smaller ones. This indicated that the source of the problem lay with large MS-DOS files, and not with the Deskpro 386 itself.

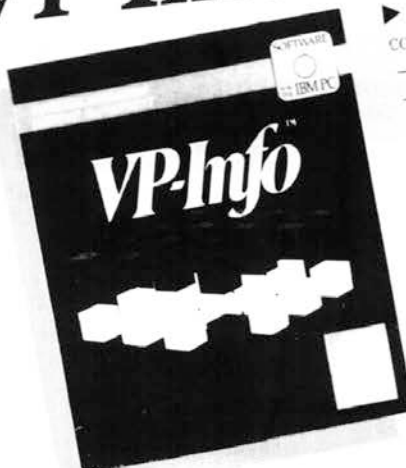
MS-DOS maintains a file allocation table indicating where, physically,

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Phone (071) 82363.

each sector of a file is located. The indicator for one sector points to the indicator for the next. To find a random sector in a file, MS-DOS must chase down this file allocation chain until it finds the indicator for the desired sector. For short files this does not present much of an overhead, but on a 32Mb disk (or larger), files can have as many as 65,535 sectors. If you want, say, the 63,711th one, MS-DOS must follow the allocation chain for that file until it comes to the 63,711th entry.

This presents a major overhead, and was in fact the bottleneck for our multi-user system. When AMPS (or any other operating system) accesses the disk directly, rather than going through this MS-DOS overhead, this problem doesn't occur.

What all this shows is that much of the speed of a large hard disk is wasted when used under MS-DOS. As mentioned above, MS-DOS also requires that the 80386 chip operates in 16-bit mode, which is not only slower than 32-bit mode, but also precludes the use of special 80386 task-switching and memory-protection functions which would greatly facilitate the operation of multi-user and network systems. In addition, MS-DOS limits user-addressable memory to 640kb, while the Compaq Deskpro 386 supports up to 14Mb.

Microsoft has been promising for some time a new version 5 of MS-DOS which, according to reports, will

address some of these problems. Originally rumoured for 1986, it has apparently been delayed until at least 1988. When it does arrive, it will make use of some of the advanced features, not of the 80386 chip, but of the 80286. We are still a very long way from software that can combine the power of the 80386 chip with the large base of MS-DOS software to which people are accustomed.

In the meantime, there are the multi-user operating systems. Both PICK and AMPS have announced versions of their systems for the 80386 machines, while Xenix V/286 will run on the Deskpro 386 and the Xenix V/386 is said to be on the way. Microport V (another Unix flavour), Concurrent DOS and Novell systems should be available for the 80386 this year, and each of these operating systems takes advantage of at least some of the new chip's special power.

Documentation and ease of use

Although relatively new to New Zealand, Compaq is known overseas for quality in hardware and documentation, and the Deskpro 386 is a case in point. The computer, although unexciting in design, is functional and solidly built. I had two complaints: the keyboard had a somewhat spongy feel, and the line definition on the monochrome screen was

not good. Those who like silence in the office might also wish for a quieter fan.

The machine comes with three large manuals: MS-DOS, BASIC, and a user's guide. All are well-organised, well-presented and, with the exception of the wrong version of the installation utilities mentioned earlier, easy to use and follow. Compaq provides several "supplemental user programs" that cover such utilities as cassette tape backup and RAM disk (which can be up to eight megabytes in size).

All considerations of ease of use pale, however, before the blinding speed of the computer. This is the most important ease-of-use feature, and the most lasting impression of the machine. You can argue that you don't need the speed, but there is no denying that it is nice to have.

Conclusion

Compaq has taken a risk in coming out with a machine before IBM, having never tried this before. It is clear that IBM did not wish to embrace the 80386 chip too quickly; when this horse is finally harnessed, its power will threaten the sales of some of IBM's larger machines. Therefore Compaq must be given full credit for leading the pack and forcing Big Blue's hand.

...but when employed as a single-user machine, running MS-DOS and most traditional micro-computer programs, its speed must be recognised as an expensive gimmick.

The Desktop 386 is a delight to use, essentially because of its 16MHz processor speed, but when employed as a single-user machine, running MS-DOS and most traditional microcomputer programs, its speed must be recognised as an expensive gimmick. The computer would be faster still – much faster – except for a number of constraints related to compatibility with MS-DOS and with older machines.

With non-MS-DOS operating systems, many of the constraints fall away. However, only when operating systems and programs are written which take full advantage of the 32-bit nature of the chip, when a standard emerges for a 32-bit bus, and 32-bit disk, tape and communications controllers are built for it, shall we begin to see the true potential of the 80386.

Microcomputer Summary

Name	Compaq Deskpro 386
Manufacturer	Compaq Computer Corporation, Houston, Texas
Microprocessor	Intel 80386
Clock Speed	16MHz, one wait state
ROM	128kb; IBM PC/AT-compatible BIOS
RAM	1Mb standard, expandable to 14Mb
Disk Drives	One 1.2Mb floppy Choice of 40, 70 or 130Mb hard disk
Video	None standard; choice of monochrome or colour monitor
Keyboard	101 full-travel keys; separate numeric, cursor and editing keypads; 12 programmable function keys
Sound	Single-voice speaker (IBM-compatible)
Communications	RS-232C serial port (9-pin male connector) parallel port (25-pin female connector)
Operating System	None bundled; choice of MS-DOS or Xenix
Languages	All MS-DOS languages
Bundled Software	None
Base Price (\$NZ plus GST)	40Mb model, \$15,724 70Mb model, \$18,910 130Mb model, \$21,001
Options (\$NZ plus GST)	Monochrome monitor and card, \$1052 Colour monitor and card, \$3238 80287 math coprocessor, \$1038 4/8Mb memory board, \$8042 40Mb tape backup, \$1969 MS-DOS V3.2, \$225 Xenix base system, \$1710 Xenix development utilities, \$1360
Ratings (5 highest)	Documentation 5; ease of use 4; expansion 3; compatibility 5; connectability 3; support 4; value for money 4.

Document processing for the technical professional

When a technical writer wants to produce a document with equations and graphs and things, the average word processor can't cope. John Highland describes a package which just might do the trick.

February 1987 saw the New Zealand premier of a brand-new word and document manipulation package produced by one of the giants of American software. Lotus Development Corporation, who gave us 1-2-3, Symphony, Hal, Jazz, Graphwriter and Freelance Plus among others, has released Lotus Manuscript, a specialised word processor bristling with features for the more serious wordsmith.

This package would be wasted on the receptionist/typist who types the three-quarter page letter on fancy letterhead. Instead, it is designed for the professional technocrat who needs hundreds of pages, graphs, charts, equations, Greek symbols, multiples of sections, clauses, sub-clauses, and sub-sub-clauses to communicate in an exacting manner—legal, technical and scientific concepts that only other technocrats dare to decipher.

It excels in the extremely structured document and offers the capability to alter, amend and restructure the file with relative ease. Manuscript is best utilised by the regular and serious operator who doesn't mind the trade-off of a little complexity in operation to provide amazing power of manipulation.

Target market

Manuscript has been designed for the law, contract, specification, report, or technical paper writers of the professional world. These writers require a higher level of sophistication and functionality than general

word processors provide. Over 200 word processors are currently on the market worldwide. Many of these systems are adequate for general correspondence but are unable to integrate text and graphics, support very long documents or handle complex equations.

Lotus purports Manuscript to be the first word and document processor designed specifically to meet the needs of technical professionals. They say it offers all the features to produce high-quality technical documents without sacrificing everyday

word processing capabilities, and say it eliminates the need to use more than one package to produce a single document that includes equations or combines text and graphics. Manuscript is well-suited to those who produce documents that are continually being revised and distributed. It can support documents of up to 800 pages, and organizes footnotes, an index, and cross-references. Its built-in outliner makes creating a document intuitive and straightforward, as well as making it easy to move sections with just a few keystrokes and to automatically generate a table of contents.

Manuscript combines basic word processing functions with the ability to create a sophisticated structure for a document. It copes easily with a

$$\delta S = \frac{e_1 - e_2}{1 + e_1} \delta h$$

The zoom and magnification modes of the Preview function of Manuscript show how the printout will be formatted.

1. SUMMARY OVERVIEW

Introduction to the Temperature Calculator

The object of this exercise is to find a mathematical relation that relates the new data values from the 10th GCA channel and relates the temperature corresponding to the heat. The problem is not simple as the response of the temperature sensor is not completely linear. It is for the same change in A/D data values, the corresponding change in actual temperature varies with the value of the A/D data.

Creating the Conversion Relation

Step One: Creating the Data Table

To use actual values of response, create the data values and the actual temperature values. A graph of temperature versus data values using the 1-2-3-5-7-9-11-13-15-17-19-21-23-25-27-29-31-33-35-37-39-41-43-45-47-49-51-53-55-57-59-61-63-65-67-69-71-73-75-77-79-81-83-85-87-89-91-93-95-97-99-101-103-105-107-109-111-113-115-117-119-121-123-125-127-129-131-133-135-137-139-141-143-145-147-149-151-153-155-157-159-161-163-165-167-169-171-173-175-177-179-181-183-185-187-189-191-193-195-197-199-201-203-205-207-209-211-213-215-217-219-221-223-225-227-229-231-233-235-237-239-241-243-245-247-249-251-253-255-257-259-261-263-265-267-269-271-273-275-277-279-281-283-285-287-289-291-293-295-297-299-301-303-305-307-309-311-313-315-317-319-321-323-325-327-329-331-333-335-337-339-341-343-345-347-349-351-353-355-357-359-361-363-365-367-369-371-373-375-377-379-381-383-385-387-389-391-393-395-397-399-401-403-405-407-409-411-413-415-417-419-421-423-425-427-429-431-433-435-437-439-441-443-445-447-449-451-453-455-457-459-461-463-465-467-469-471-473-475-477-479-481-483-485-487-489-491-493-495-497-499-501-503-505-507-509-511-513-515-517-519-521-523-525-527-529-531-533-535-537-539-541-543-545-547-549-551-553-555-557-559-561-563-565-567-569-571-573-575-577-579-581-583-585-587-589-591-593-595-597-599-601-603-605-607-609-611-613-615-617-619-621-623-625-627-629-631-633-635-637-639-641-643-645-647-649-651-653-655-657-659-661-663-665-667-669-671-673-675-677-679-681-683-685-687-689-691-693-695-697-699-701-703-705-707-709-711-713-715-717-719-721-723-725-727-729-731-733-735-737-739-741-743-745-747-749-751-753-755-757-759-761-763-765-767-769-771-773-775-777-779-781-783-785-787-789-791-793-795-797-799-801-803-805-807-809-811-813-815-817-819-821-823-825-827-829-831-833-835-837-839-841-843-845-847-849-851-853-855-857-859-861-863-865-867-869-871-873-875-877-879-881-883-885-887-889-891-893-895-897-899-901-903-905-907-909-911-913-915-917-919-921-923-925-927-929-931-933-935-937-939-941-943-945-947-949-951-953-955-957-959-961-963-965-967-969-971-973-975-977-979-981-983-985-987-989-991-993-995-997-999-1001-1003-1005-1007-1009-1011-1013-1015-1017-1019-1021-1023-1025-1027-1029-1031-1033-1035-1037-1039-1041-1043-1045-1047-1049-1051-1053-1055-1057-1059-1061-1063-1065-1067-1069-1071-1073-1075-1077-1079-1081-1083-1085-1087-1089-1091-1093-1095-1097-1099-1101-1103-1105-1107-1109-1111-1113-1115-1117-1119-1121-1123-1125-1127-1129-1131-1133-1135-1137-1139-1141-1143-1145-1147-1149-1151-1153-1155-1157-1159-1161-1163-1165-1167-1169-1171-1173-1175-1177-1179-1181-1183-1185-1187-1189-1191-1193-1195-1197-1199-1201-1203-1205-1207-1209-1211-1213-1215-1217-1219-1221-1223-1225-1227-1229-1231-1233-1235-1237-1239-1241-1243-1245-1247-1249-1251-1253-1255-1257-1259-1261-1263-1265-1267-1269-1271-1273-1275-1277-1279-1281-1283-1285-1287-1289-1291-1293-1295-1297-1299-1301-1303-1305-1307-1309-1311-1313-1315-1317-1319-1321-1323-1325-1327-1329-1331-1333-1335-1337-1339-1341-1343-1345-1347-1349-1351-1353-1355-1357-1359-1361-1363-1365-1367-1369-1371-1373-1375-1377-1379-1381-1383-1385-1387-1389-1391-1393-1395-1397-1399-1401-1403-1405-1407-1409-1411-1413-1415-1417-1419-1421-1423-1425-1427-1429-1431-1433-1435-1437-1439-1441-1443-1445-1447-1449-1451-1453-1455-1457-1459-1461-1463-1465-1467-1469-1471-1473-1475-1477-1479-1481-1483-1485-1487-1489-1491-1493-1495-1497-1499-1501-1503-1505-1507-1509-1511-1513-1515-1517-1519-1521-1523-1525-1527-1529-1531-1533-1535-1537-1539-1541-1543-1545-1547-1549-1551-1553-1555-1557-1559-1561-1563-1565-1567-1569-1571-1573-1575-1577-1579-1581-1583-1585-1587-1589-1591-1593-1595-1597-1599-1601-1603-1605-1607-1609-1611-1613-1615-1617-1619-1621-1623-1625-1627-1629-1631-1633-1635-1637-1639-1641-1643-1645-1647-1649-1651-1653-1655-1657-1659-1661-1663-1665-1667-1669-1671-1673-1675-1677-1679-1681-1683-1685-1687-1689-1691-1693-1695-1697-1699-1701-1703-1705-1707-1709-1711-1713-1715-1717-1719-1721-1723-1725-1727-1729-1731-1733-1735-1737-1739-1741-1743-1745-1747-1749-1751-1753-1755-1757-1759-1761-1763-1765-1767-1769-1771-1773-1775-1777-1779-1781-1783-1785-1787-1789-1791-1793-1795-1797-1799-1801-1803-1805-1807-1809-1811-1813-1815-1817-1819-1821-1823-1825-1827-1829-1831-1833-1835-1837-1839-1841-1843-1845-1847-1849-1851-1853-1855-1857-1859-1861-1863-1865-1867-1869-1871-1873-1875-1877-1879-1881-1883-1885-1887-1889-1891-1893-1895-1897-1899-1901-1903-1905-1907-1909-1911-1913-1915-1917-1919-1921-1923-1925-1927-1929-1931-1933-1935-1937-1939-1941-1943-1945-1947-1949-1951-1953-1955-1957-1959-1961-1963-1965-1967-1969-1971-1973-1975-1977-1979-1981-1983-1985-1987-1989-1991-1993-1995-1997-1999-2001-2003-2005-2007-2009-2011-2013-2015-2017-2019-2021-2023-2025-2027-2029-2031-2033-2035-2037-2039-2041-2043-2045-2047-2049-2051-2053-2055-2057-2059-2061-2063-2065-2067-2069-2071-2073-2075-2077-2079-2081-2083-2085-2087-2089-2091-2093-2095-2097-2099-2101-2103-2105-2107-2109-2111-2113-2115-2117-2119-2121-2123-2125-2127-2129-2131-2133-2135-2137-2139-2141-2143-2145-2147-2149-2151-2153-2155-2157-2159-2161-2163-2165-2167-2169-2171-2173-2175-2177-2179-2181-2183-2185-2187-2189-2191-2193-2195-2197-2199-2201-2203-2205-2207-2209-2211-2213-2215-2217-2219-222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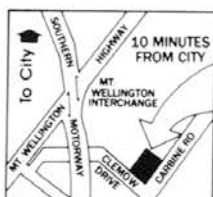
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Jonathan Sachs, codeveloper of 1-2-3, was the principal designer of Manuscript.

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1.2.3 Parking and Traffic

Parking requirements will depend on the events, peak user type, and the amount of transportation that will be used. A thorough study involving communication with city and neighborhood groups will be completed before final determination of the amount of parking is made.

Access to the park should be designed to minimize impact on the neighborhood. The reconstruction of Oak Drive will address this goal while at the same time improving acceptable traffic conditions. Current traffic patterns at the intersection of Oak Drive and Elm Street are presented in Table 3.

Hours	05-08	08-09	09-12	12-14	14-20	20-24
Cars	123	214	410	470	472	274
Small Trucks	17	40	81	60	74	18
Trucks	2	6	12	1	3	3
Farm Machines	0	2	1	1	1	0
Totals	142	262	504	532	550	295

As can be seen from a graphing of the traffic survey information, there are peak hours of activity that must be accommodated with the reconstruction of Oak Drive. Furthermore, all the changes in the traffic pattern that will be caused by the park will be considered.

Table 4: Estimated Costs

Category	Estimated Costs	
Design	\$101,000	
Engineering		
Geotechnical Consulting	\$40,000	
Total Survey and Plan	21,000	
Land Treating	9,700	
Traffic Signs	12,200	
Total Engineering	106,900	
Permits and Approvals	12,500	
Construction Materials	15,000	
Earth Moving	\$113,000	
Park Facilities	271,500	
Grass and Drainage	19,500	
Floods	16,000	
Fencing	70,000	
Lighting	112,800	
Landscaping	98,000	
Total Construction Services	942,800	
Construction Management	10%	94,280
Contingencies	5%	47,140
Total Estimated Cost	\$1,119,670	

Known Funding Sources

Source	Amount
Central City Park Reserve	\$450,000
State Funds (Title 242)	180,000
Recreation and David Sisson Trust	250,000
Total Local Funds	\$880,000
Matching Federal Funds	420,000
Total Funds Available	\$1,300,000
Shortfall	(\$180,330)

Project Issues and Approach

The development of Central City Park offers the citizens of Central City a valuable opportunity to see an improved and upgraded city space and a new open space with both passive and active recreational facilities. The 15-acre site presents numerous possibilities, but it also offers serious challenges that must be addressed to ensure the park is properly developed.

Site Use and Development Issues

Settlement

An extensive monitoring program will be initiated to establish and continuously update settlement data. This information, in turn, will be used to determine the location of park facilities which are settlement sensitive. Current settlement data information is shown in Table 5.

The graph shows the settlement rate information. The settlement rate is not in constant rate any day, which treatment and plan will provide a storage retention of its use. Information about the rate of settlement and the rate of settlement is shown in the graph.

The portion of the site used by the city for dumping rubble presents the possibility of differential settlement. In addition, piping settlement on the playing field area is of special concern. Piping settlement tends to subside to some extent as a finished playing field and other large graded areas. Special attention to the subgrading of these areas is important.

Layer	Depth	Settlement Rate	Settlement Rate	Settlement Rate
1	8-15	0.208	0.126	0.176
2	15-18	0.197	0.127	0.157
3	18-22	0.123	0.189	0.104
4	22-28	0.064	0.078	0.055

Settlement rates were calculated using the formula: $S = \frac{A \cdot \Delta \sigma}{E \cdot \Delta \sigma}$

Soil Conditions

On-site investigation reveals that the presence of clays, including silty clays, and the lack of growing medium is needed for some use to be addressed. Soil chemistry evaluation and testing of the soil will also be done.

Figure 6: Forces Resulting from a Line Connecting a Plane

Figure 6: Forces Resulting from a Line Connecting a Plane

1.2.1 Community Issues

1.2.1.1 Neighborhood Support

The development of the park must be responsive to the needs of the neighbors as well as the city at large. Meetings will be held to ascertain the feelings of the community and to respond to their needs. Safety and security on the site as well as traffic, noise, lighting, and visual impact will all need to be addressed in public meetings.

Neighborhood residents have already received their own survey of preferred use and needs for the area. Table 2 shows the results of this informal survey as summarized in the Open Space Preservation Committee. A more detailed and thorough survey should be done. The results will be combined with city-wide results to achieve optimum consensus as to the facilities Central City Park should include.

Activity/Facility	Percentage of Respondents		
	Necessary	Desirable	Unnecessary
Playing Fields	76%	19%	5%
Recreational Courts	79%	16%	5%
Tennis Courts	61%	17%	12%
Exercise and Jogging Paths	51%	15%	14%
Picnicking	96%	5%	1%
Swimming Pool	45%	47%	8%
Picnicking Area	86%	8%	6%

1.2.2 Park Security

Police and fire department access to the site, fencing, and area lighting will all be investigated in the provision of park security. Both the city and the neighbors will have input in this important topic so that all parties feel their concerns have been considered. Any park will accommodate police and maintenance vehicles. Special fencing to protect private property may be required in places.

Figure 7: Forces Resulting from a Line Connecting a Plane

Figure 7: Forces Resulting from a Line Connecting a Plane

The hardware options supported are: IBM Graphics Card, Hercules, Hercules Plus, Hercules Graphics Cards Plus, IBM Colour Card, IBM Enhanced Graphics Adaptor, and memory boards compatible with the Lotus/Intel/Microsoft memory specification.

The package comes complete with: eight system disks, hardware chart,

Features

- File conversion

Manuscript can import or export ASCII files or files supporting the IBM DCA (Document Content Architecture) revisable text format. This allows the user to transmit files to or from other word processors and sys-

- Structured Outliner

Manuscript's structured outliner provides the organisation needed for long, structured documents such as manuals, proposals, and specifications.

The outliner helps the writer during both the initial creative phase and the later editing and reorganizing of a document. It enables users to start writing a document in the form of a simple outline that can then be easily expanded and changed at will. The outline can be in decimal number, Roman numeral, or alphabetic form. Sections are automatically renumbered when moved. Later the document, regardless of size, can be collapsed to its outline (to any predetermined level of headings), providing the writer with a global view of the entire document.

Navigating through the document is simple and fast. Moving complete sections of text requires only a few keystrokes, and generating a table of contents is automatic.

- Column handling

Manuscript creates, manipulates, and formats columns through a table editing device. The table layout editor creates and edits multicolumn textural formats and simple or complex tables – inserting, deleting, moving and sizing columns. Columns can be manipulated and formatted separately through the menu command structure.

Borders around columns and tables and rules within them can be added quickly and easily with the border layout editor so that a series of blocks of data can stand together as a table of data.

- Combined text and graphics

With Manuscript, graphics can be sized and positioned alongside text anywhere on the page. Currently, most documents that combine text and graphics are created using a combination of software packages and manual cutting and pasting.

Initially, Manuscript will import graphics from Lotus products such as 1-2-3, Symphony, and Freelance Plus. In the future, leading graphics packages from other companies will also be supported. Manuscript also supports bit-mapped images produced by several leading scanners. With this capability a free-hand drawing, a photograph, or graphics produced by a software product not directly supported by Manuscript can be integrated in the document.

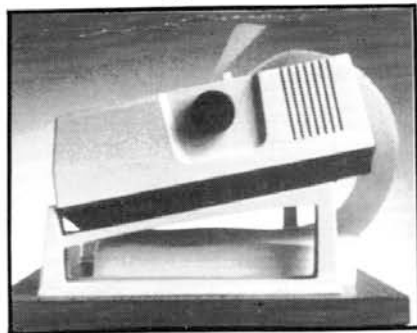
- Equations and Greek symbols

Manuscript allows the user to include matrices and vertically stacked equations as well as mathematical symbols. Upper and lower case Greek characters, diacriti-

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cal marks, binary operators, and eight types of brackets are available. An equation can be placed and sized anywhere on the page, including within a line of text.

To simplify the writing process, the user enters equations and formulas in text form. Manuscript then automatically sizes and generates the elements. Equation review before printing is possible through use of Document Preview. For example, $\sum_{n=1}^{\infty} \left(\frac{\pi}{2}\right)^n = \frac{(\Phi_x - 1)^3}{\beta + 1}$ super n = [(Phi sub x-1) super 3] over [beta +1] "Agnerates:

$$\sum_{n=1}^{\infty} \left(\frac{\pi}{2}\right)^n = \frac{(\Phi_x - 1)^3}{\beta + 1}$$

• Document Compare

This feature notes the differences between two similar versions of a document. It compares each word in a first document against a word located at the same place in a second document, and highlights text that has been inserted, deleted, or moved. It then prints a marked-up copy. A change will be marked if text has been deleted, inserted, or moved. The attribute markers are: strikethrough for deletions, under score for insertions and underscore, italic for moves. The user can select whether to ignore changes in punctuation.

Document Compare is very useful for pinpointing changes on review copies or when creating several different documents from the same base document. For example: if Manuscript is used to create several contracts which are basically similar but have some different clauses, Document Compare is an easy way to highlight those differences quickly in printed form.

• Document Preview

An entire document can be previewed on the screen before printing to check line and page breaks and the display of tables, graphics, and equations. Document Preview displays a full page at a time. Areas of text can be magnified to check hyphenation, line endings, and page breaks. The preview displays typefaces and sizes chosen by the user in the editor from a list available to the particular printer configuration. A zoom option enables equations and graphics to be enlarged.

This utility takes the document created in the editor and converts it from a character based format into a graphics format. It is then possible to see the graphics and equations that are included in the document. Document Preview works by running the edited file through the print formatter and sending the file to the screen

APPENDIX "A" AMENDED AND RESTATED LIMITED PARTNERSHIP AGREEMENT OF INVESTMENT SERVICES COMPANY PROPERTIES

This agreement is as of December 20 was made as of December 12, 1985 and is amended and restated as of April 10, 1986, by and among Investment Services Company, an Ohio corporation, and Investment Services Company Advisors, Inc. a Maine corporation. William J. Hardy (the "Individual General Partner"), Investment Services Company Equities Corporation (the "Initial Limited Partner") and the persons signing this Agreement as Limited Partners on the signature pages hereto (collectively the "Limited Partners").

Article I Formation of Existing Limited Partnership Formation and Agreement of Limited Partnership Limited Partnership

Example of Document Compare

TRADER SERIES DEBTORS/INVOICING/SALES ANALYSIS

Accounting Functions:

- Statement print on standard statement paper.
- Printing of aged trial balance at any time during the month.
- GST content is kept for each transaction and totals.
- Automatic calculation and printing of Invoices, Credit Notes, Invoice/Statements and Quotes.
- Detailed sales analysis showing sales and turnover per item.
- Facilities for the control of a large turnover of casual debtors.
- Ability to use stationary pre printed with your name and logo.
- Ability to rebuild transactions and index.
- Prints Sticky labels for envelopes.
- GST calculation can be on tax inclusive or tax exclusive prices.

Special Features:

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- Reports to Screen or printer.
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 - Quick inquiry on sales analysis.
 - Add a new debtor or item.
 - List all or selected transactions.
 - List the last ten transactions.
 - Summarise balances, sales and transactions.
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 - Change screen colours.
 - Change length and tone of the beep.
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 - Change tone of the key click.
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MS-DOS

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M1021+: EAMON ADVENTURES - A two disk sophisticated adventure with a menu driven facility to design your own games. Requires Basic. \$36.

M1022: SUPER COMPILED GAMES (2) Good arcade-type games, including Kong, Striker, Spacevade, Life2 and Frog.

M1023: GREAT BASIC GAMES More than a dozen, including Wizard, Xwing, Combos, Mars, Racecar, CIA.

M1024: PHRASE CRAZE - An entertaining quiz-type game. Asks you part of a phrase and requires you to complete it.

M1025: AMULET OF YENDOR - Adventure with graphics. 20 levels of play against many monsters and powerful magic.

M1026: 5 TEXT ADVENTURE GAMES - of different types, including a murder mystery, horror, pirate, etc.

M1027: SUPER HANGMAN - Highly acclaimed. Large vocabulary and includes quotations, riddles and music.

M1028: SUPER COMPILED GAMES (3) - Another excellent selection. Includes Flightmare, Solitaire, Jumpjoe and more.

M1030: PROVOCATIVE PICTURES (1) - A collection of naughty pin-ups.

M1031: WILLY THE WORM A high quality game which allows you to build your own game board.

M1036: MAHJONG An outstanding Australian programme of the Chinese card game with good graphics.

UTILITIES

M2016: MENU SYSTEMS - Some of the best menu generating programmes we could find. Run programmes from YOUR menus.

M2017: DVORAK KEYBOARD - The DVORAK layout offers greater efficiency in place of the standard keyboard.

M2018: MEMORY PROMPT A memory-resident utility that prompts you with the correct syntax for DOS commands, BASIC A, Turbo Pascal, Debug and Edlin.

M2019: EXTENDED DOS UTILITIES Substitute utilities with more features.

M2020: PC-TOOLS Utilities to browse, darken, dump, compare, merge, page, print, delete, format text, with C source.

M2021: UNIX COMMAND SHELL - Control your programmes with commands similar to those available in Unix.

M2022: DOS MANAGEMENT - An efficient environment for managing your operating system, with help screens.

M2023: BATCH LANGUAGE ENHANCEMENT More features and control when creating bat files and modifying them.

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M2027+: EXCEPTIONAL FILE & DOS UTILITIES A two disk collection of many powerful tools - such as fast format, alarm clock, disk wipe, display colour as shades of grey, file sorter, text reader, line counter, read squeezed library files, create files from memory, digital clock display, dos syntax reference, cursor speed-up, create secret directories, etc. \$36.

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M4011: GRAPHICS-ICON CREATOR Especially suits creation of symbols and logo-type characters.

M4012: TALK ILLUSTRATOR An easy-to-use programme providing bold lettering and other features for slide presentation.

M4013: PAINT-TYPE GRAPHICS Uses slabs of colour, shading etc. for its effects. Requires coloured monitor.

LANGUAGES

(For tutorials, see Education Section)

M84: PROLOG NEW VERSION 1.8 is now available.

M5017: SPRITES AND ANIMATION FOR TURBO PASCAL Source code and instruction for programming with animation sprites.

M5018: BASIC AIDS (3) Has special programmes to remove numbers from your Basic programmes and to restore them.

M5019: TURBO TOOLS Numerous small Turbo Pascal programmes that illustrated the book "Complete Turbo Pascal".

M5021: SCREEN GENERATOR A new aid for designing screens in Basic.

M5022: WINDOWS FOR BASIC AND 'C' - A collection of functions that give windowing capability to your programmes.

M5023: CROSS ASSEMBLER - Xasm lets you use your computer to develop programmes for other computers, especially the Z80.

M5024: TOOLS FOR TURBO PASCAL - convert and manipulate dates, display, edit and validate data entry fields.

M5025: TURBO PASCAL DEBUGGER - An interactive debugger with pop-up help, formatters etc. Invaluable.

M5026: MACRO-ASSEMBLER - Many have been waiting for this. A fine choice.

M5028+: ASSEMBLER ROUTINES/UTILITIES 3 disks with dozens of time-saving routines, teaching examples and aids. \$39.

M5029: BASIC SUBROUTINES LIBRARY.

COMMUNICATION

M108: QMODEM 2.2 latest update is now available.

M6010: PROCOMM ver.2.3. A many-featured Modem Comms programme that is receiving wide critical acclaim overseas.

M6011: COMMUNICATION UTILITIES - Supplementary tools useful for Qmodem Procomm, Kermit and PCTalk.

BUSINESS/CALCULATION

M122: SPREADSHEET - Up-graded version (2) of FreeCalc. Suitable for home and business. Needs enhanced graphics such as Hercules, or colour monitor.

M126: STATISTICAL ANALYSIS A very good Multiple Correlation programme (compiled) has been added to the disk. Many other tests and analyses included.

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M7025+: LOTUS UTILITIES/WORKSHEETS - Front end for easier access and worksheets - cheques, loans, mailing list, time control, printer utilities, finances, etc. Two disks \$36.

M7026+: SYMPHONY TIPS AND WORKSHEETS - tips on using word processor, importing multiplan data, using sidekick: applications for banking, insurance and medical; also 5 year business plans; disk labels, and lots more. 6 disks for \$78 instead of \$108.

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M8014: INSTANT RECALL Memory-resident database to record and access information without leaving programmes.

M8015: INVENTORY/STOCK CONTROL A menu-driven system for keeping inventories.

M8016: MAIL MANAGER FOR MULTIMATE Menu-driven label producer. Lists created can be accessed by Multimate, merged with forms, etc.

EDUCATION

M9007: SECONDARY MATHEMATICS A collection of Basic programmes that instruct in equations, areas, logarithms, determinants, etc.

M9008+: 'C' TUTOR - Comprehensive and easily followed course in the 'C' programming language. 2 disks. \$36.

M9009+: PASCAL TUTOR - A two disk set that suits both the novice and experienced programmer, with references to Generic and Turbo Pascal. \$36.

M9010: INTRODUCTION TO BASIC PROGRAMMING with Games - a well written tutorial on Basic, plus illustrative games.

M9011: TEACHER'S GRADEBOOK - Keeping track of test marks and providing comparisons and reports.

M9012: ANSWER CHECKER Compares words, sentences, terms, questions, answers.

M9013: STRUCTURED PROGRAMMING TUTORIAL & AID Design and document structure of programmes. Especially suits Turbo Pascal.

GENERAL

M9501: DIETERS FRIEND Provides details of 27 nutrients in different foods, etc. and compares with standards. Needs Basic.

M9502: SPORTING ADMINISTRATION - helps those running sporting events to keep track of scores/results, match opponents, print reports, etc.

M9503+: BIBLICAL QUOTES - A two disk set of 14800 cross-references to 7956 verses of the new Testament. \$36.

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We include source coding where possible. The programmes are documented, where required. Disks are formatted for MS-DOS 2.0 or greater. 360 k. Programmes are intended for the IBM-PC or close compatibles.

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- U7. DIRECTORY PATHS.** Lets programmes write to other directories.
- U8. KEYBOARD DEFINER.** Redefines keyboard to suit own needs.
- U9. SPACE.** Shows the amount of free space on disk in thermometer style.
- U10. SUPERIOR DIRECTORY.** Shows disk directory with file attributes which are active. Also sorts by name, date, size, extension. Accurate for hard disk.
- U11. BACKED UP.** Indicates which hard disk files have not been backed-up.
- U12. NEW FILES.** Lists files that you created today.
- U13. SPEEDKEY.** Increase speed of cursor.

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- U101. PRINTER SWAP.** Swaps line printer assignments for easier printing.
- U102. WORDSTAR CONVERTER.** Superior converter of wordstar to ASCII and reverse from document file.
- U103. DISK COVER DIRECTORY.** Prints directory in size suitable for pasting on disk jacket.
- U104. COMMAND EDITOR.** Very good editor of operating system commands.
- U105. BANNER.** Prints wide banners on your printer.
- U106. LISTER.** Prints documentation, adding page numbers.

U107. PRINT CONTROLLER. Gives extensive control of printer settings – bold, italics, compressed, etc. Epson compatible.

U108. NOT PRINT. Redirects computer output to the screen.

U109. DARKEN. Overstrikes a text file to obtain darker print.

U110. MERGE. Merge sorted files into one sorted file.

U111. TEXT FORMATTER. Processes text files for printing with special features imbedded in output – bold, italics, etc.

U112. SEARCH/REPLACE. Search for and replace characters.

U113. CUT & PASTE. Allows movement of parts of documents between files.

U113. NOTEPAD. Ready at hand notepad. Memory resident.

U114. TEXT INDEX. Indexing for text files. Mark words for listing.

U115. WORDSTAR INDEX. Indexing system for Wordstar.

U116. UNDERLINE STRIPPER. Strip underline from Wordstar files.

U117. KEYBOARD DEFINER. Keyboard redefiner for Wordstar.

U118. WORDSTAR COLOUR. Adds colour to Wordstar.

U119. WORDSTAR NUMBERS. Add and remove numbers to paragraphs in Wordstar files.

U120. WORDSTAR CHARACTERS. Character look-up programme.

U121. EXECUTABLE PATCHES. Standalone Wordstar patches.

U122. WORDSTAR GREEK. Obtain Greek characters in Wordstar documents.

U123. PROGRAMME EDITOR. Editor for programmers, with multiple windows.

U124. TEXT EDITOR. Editor with major commands, without frills.

U125. LAST LINES. Types the last specified number of lines in a file.

U126. FAST LISTING. Fast listing of files by extension.

U127. SQUEEZE LIST. Lists squeezed library files.

U128. COUNT. Counts characters, words, lines, pages in a textfile.

U129. PRINTER PATCHES. Extensive collection of printer patches for wordstar.

FILE LOCATING

U201. SMALL FILE FINDER. Locates files in subdirectories. Small tightly coded.

U203. FILE SEARCH. Memory-resident. Locates files in subdirectories.

U204. CHARACTER SEARCH. Searches disk for character or string.

U205. FILE FINDER. Locates and lists files, allows deletion of unwanted files. Act from within programme.

U206. NEW GREP. Matches file patterns. Has 'C' source.

FILE READING/DISPLAY

U301. TEXT READER. Excellent text display utility with many features. Scrolls, reads one page at time, goes to end, beginning, etc.

U302. READ SQUEEZE. Read squeezed files without physically unsqueezing.

U303. READ BACKUPS. Read backup disks of your hard disk. Needs Basic.

U304. TREE DIRECTORY. Displays a tree directory of files, including sub-directories.

U305. TRACK READER. Reads sectors and tracks in hex and ASCII.

U306. BROWSE. Examine files with 4 way scrolling.

U307. DUMP. Gives an ASCII/HEX display of any file.

U308. DIRECTORY READER. Read a directory from or to a certain point.

U309. KEYBOARD BUFFER. Keyboard buffer of 160 characters.

U310. SYSTEM SHELL. Operating system shell that interfaces with Crosstalk, 1-2-3, and Multimate.

EQUIPMENT HANDLING

U401. DRIVE CLEANER. Runs the drive for head cleaning disk.

U402. CORELOOK. Gives memory content in HEX and ASCII.

U403. SCREEN SAVE. Blanks screen if not used for several minutes. Saves screen wear.

U404. DISKPARK. Positions the hard disk head key for safety when travelling or moving computer.

U405. COLOUR CONVERTER. Displays colours as shades of grey.

FILE MOVING

U501. SWEEP. Famous file-handler. Reads, mass copies, deletes, etc.

U502. REDIRECTS output to a disk file.

U503. NIMBLE DISK. Helps you move more easily around a hard disk.

U504. SECTOR RETURN. Recovers deleted first sectors.

U505. SELECTIVE COPYING. Copy programme using menu system.

U506. SELECTIVE DELETION. Programme delete using menu system.

U507. ENHANCED COPYING. Copy several unrelated programmes with the same command.

U508. NEW MOVE. Rename and move programme to another directory without copying.

U509. TOTAL ERASURE. Totally erases disk, including format.

U510. NEW DISKCOPY. Good diskcopy with extra features. Copies whole disk. Sidesteps and signals faulty sectors.

FILE ORGANISATION AND CHECKING

U601. ARCHIVER. Superior file compressor and library creator.

U602. FILE CORRUPTION. Fast checker for detecting corrupted files.

U603. DISK SQUEEZE/UNSQUEEZE. Squeezes and unsqueezes all files on a disk.

U604. PROTECT/UNPROTECT. Avoids accidental erasure of important files.

U605. SECRET FILES. Make, go to, or remove a secret directory.

U606. SQUEEZE/UNSQUEEZE. Compresses files to save space. Also uncompresses.

U607. LIBRARY CREATOR. Combines files into libraries. Adds to, deletes, extracts files.

U608. LIBRARY DISPLAY. Displays the directory of a library. Related to above programme.

U609. NEW NAME. Changes volume name of a disk.

U610. FILE COMPARISON. Intelligent file comparison programme which detects differences between files.

SPECIAL FEATURES

U701. CALENDAR. Display of any month or year.

U702. NEW DATE. Changes date of file entry in disk directory.

U703. BYTE CONVERTER. Converts all bytes to 2 byte (7 bit) for serial transfer.

U704. COMPILING AID. Simplifies, automates compiling and linking.

U705. ALARM. Sets time for alarm to sound.

U706. NEW TIME. Sets system time and clock.

U707. DOS HELP. Assistance with dos commands displayed on screen.

U708. GET TIME. Simplifies getting time and date.

U709. CLOCK. Shows time on screen while you work.

U710. CALCULATOR. Memory-resident for convenient access.

FILE ALTERATION/RECOVERY/REPAIR

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CIRCLE NUMBERS BELOW AND SEND TO US WITH PAYMENT AND YOUR NAME AND ADDRESS. OR TELEPHONE US WITH THE PARTICULARS. SEE ABOVE.

1	2	3	4	5	6	7	8	9
10	11	12	13	101	102	103	104	105
106	107	108	109	110	111	112	113	114
115	116	117	118	119	120	121	122	123
124	125	126	127	128	129	201	202	203
204	205	206	301	302	303	304	305	306
307	308	309	310	401	402	403	404	405
501	502	503	504	505	506	507	508	509
510	601	602	603	604	605	606	607	608
609	610	701	702	703	704	705	706	707
708	709	710	801	802	803	804		

rather than the printer. The facility is non-interactive, so to change a document the user must return to the editor.

● Print formatter

The print formatter lays out the pages, justifies the copy using microjustification, and has sophisticated widow and orphan control. It places and sizes any graphics called for and makes all the font and line space changes specified. It ensures that tables do not break across pages and offers a variety of page break options on the design of the document. This automatic formatting spares the user the need to manually adjust the layout of each page of a document.

● Printer support

The program supports a wide range of printers from dot matrix and letter quality to laser. The PostScript page-description language, found in many laser printers such as the Apple LaserWriter Plus, is supported. Manuscript currently supports over 40 of the popular printers on the market today.

Screen environment

To provide speed of use Lotus made the conscious decision not to provide a WYSIWYG screen appearance. Instead a word picked out to print in *italics* appears as blue on a colour screen and by positioning the cursor under any letter of the word the description of the printer attribute in force is displayed at the top of the screen.

A good context-sensitive help facility is provided. Pressing the F1 key calls up a help screen appropriate to the current operation.

With regard to document formatting, it is possible to have global settings for character attributes and fonts, margins, paragraph indentation, line justification, headers footers and footnotes for the title page, first page, odd and even pages, index and contents pages.

In addition to these, Manuscript allows local formatting at the level of

its basic document 'unit' which it calls a block. The size of a block can vary between a single line and the entire document. A block can also contain a number of columns.

Within a block, text attributes (bold, italic, superscript etc); the justification (left, right, centre); paragraph indentation; between line and between block spacing; as well as character font and right and left margin indentation can all be given values which are different from the global values set for the document as a whole.

Changes to format characteristics are made in a consistent way: a window showing settings for the current section, block or column is displayed on-screen. While tabbing through each value, depression of the space bar produces a list of possible alternatives. Any particular format value is then highlighted using arrow keys and selected with the 'Ins' key. Manuscript uses this method for item selection consistently throughout its many functions, providing an easy to learn environment.

Manuscript uses accelerator keys to speed up operations; for example 'CTRL' and 'S' allows you to instantly save the file under its present file name. An 80,000-word spelling checker is included from Proximity Software, the same package which is integrated into Lotus Symphony. The spelling checker lets you create and maintain your own auxiliary dictionary.

Constructive criticism

There is always room for improvement and some of the aspects that hassled me were:

- There are areas where the word processing interface is not entirely consistent throughout Manuscript.
- The pop-up windows often block the portion of the text you are working on, making it difficult to complete the dialogue required by the pop-up menu. For instance,

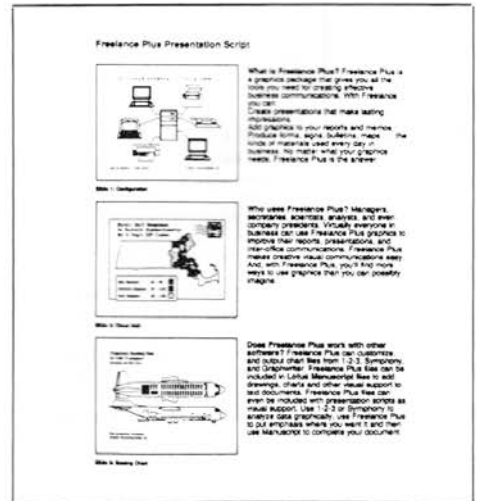
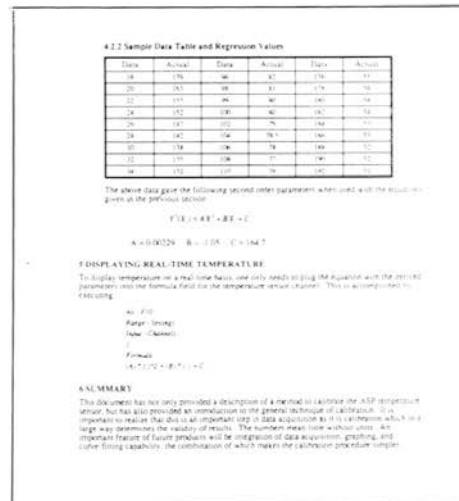
when you want to make a global replacement you might need to glance back at the text to see how a word is spelled or what its attributes are. You can't see the word because the menu is covering it up.

- The pop-up menu should be a different colour from the base document, so as to be obviously present on the screen.
- On the top of the screen is always displayed information regarding the current cursor position, including its position on a line. I would like to know the line number as well. There were times that I mistook the top of a screen for the top of a page.
- Manuscript should have more flexibility in the area of global searches. It would be handy if you could search for all carriage returns and insert a block or section divider wherever one was found. This would simplify the process of converting an unstructured document to a structured one. Manuscript should be improved to allow for wild-card searches.
- On my colour VDC all sorts of static came over the screen every time I hit a key during document editing. Manuscript should be modified to suppress 'snow' on IBM compatible equipment.
- Although Manuscript had print drivers for various Okidata printers, it didn't have one for my particular model. Neither did it provide for me to form my own. The upshot was that I was not able to produce a hard copy of my files.

Conclusion

I believe Manuscript to be well suited for its intended market, and at \$1110 including GST feel it is well worth checking out for your own requirements.

Review copy supplied by Imagineering Micro Distributors Ltd, Auckland, NZ distributors of Lotus products.



Bits & Pieces

(A sometime column on industry tips, comment, rumour and hearsay. Contributions of tittle-tattle will be welcome.)

PC prices fall

IBM announced a 15-20 per cent price reduction on existing personal computers, depending on the models and configurations. This will mean that, for example, the XT with 20Mb drive will be \$4936, and the mono display and mono printer adapter will be about \$760. An AT with 30Mb drive is now \$9203.

★★★★★

Might be time for some in-house training at Telecoms. A colleague in our office rang an Auckland Telecoms salesperson for information and was, of course, referred to another Telecoms person.

Caller: "Can you put me through to him then, please?"

Telecoms man: "Sorry, I don't know how the phones here work. Can you ring back?"

★★★★★

A Word to the Wise... the writer spent some time watching visitors at the recent PC Show in Sydney and talking with some about why they were at the show and whether they had found what they were looking for. Also spent time observing the way exhibitors related to various visitors.

It was interesting to note that women, particularly if they had young children with them and were casually dressed, were generally overlooked in terms of assistance while mature men in suits and ties were eagerly sought out.

It pays not to be too judgemental about appearances though: speaking with one woman who was from the group above, i.e. casually (maybe practically) dressed and with a young child. She was at the show to seek out information on a network for the manufacturing business she and her husband own. He was away at the time of the show and she would be managing the project of computerising their business, initially with about eight workstations, she hoped.

Needless to say, she found little assistance at the show from exhibitors but managed to glean enough information and take enough brochures to begin calling up some suppliers.

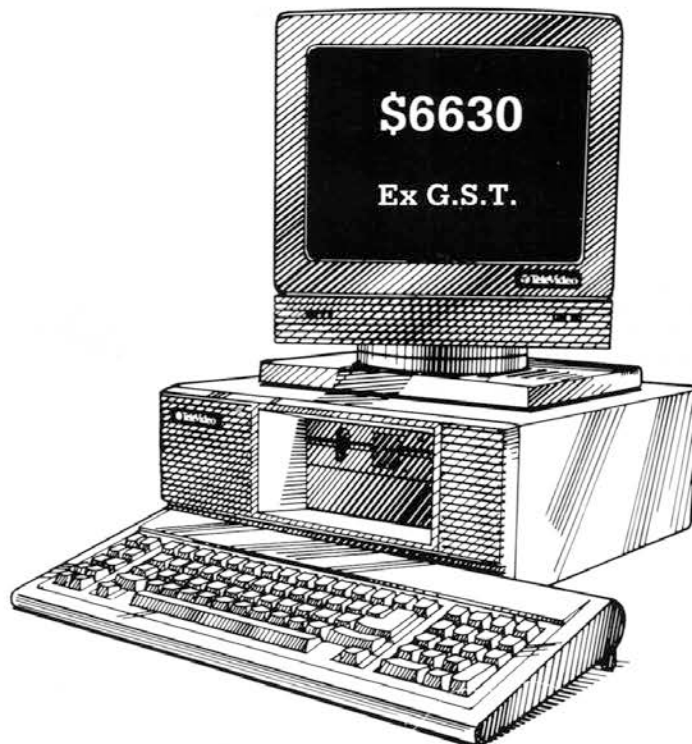
★★★★★

Saw another woman at the PC show walk off a stand in quite a huff: she had had a fairly full discussion about some options for her company's office automation requirements. The salesperson on the stand brought the whole issue to a grinding halt when he suggested to her that she had better go and check it out with the boss before they went much further. Didn't occur to him, I guess, that she was the boss!

★★★★★

★★★★★

THE CAT IS BACK



There are plenty of low cost AT compatible machines from companies that you've never heard of, but wouldn't it be nice to find a low cost, high quality AT from a reputable manufacturer that you have heard of. Now you can.

TeleVideo are a leading U.S. supplier of quality computer equipment and offer you the high performance TeleCAT-286 with all the usual AT features and a whole lot more; 80286 processor with 6 or 8 mhz clock, 640 x 400 high

resolution monitor with CGA graphics, 20mb hard disk and a 1.2mb floppy.

You even get more desk space for your dollar, the TeleCAT-286 is almost 30% smaller than the IBM AT which, apart from the price, is the only thing the TeleCAT-286 gives you less of.

It's one high performance computer that lets you settle for more, for a great deal less.

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Sophisticated and very portable

by Wayne Silver

The Psion Organiser is an interesting machine recently launched on to the New Zealand market. The initial problem in reviewing it is one of definition. It looks like, and performs many of the expected functions of, a programmable calculator, but has the memory and data manipulatory capabilities of a computer. Obviously the manufacturer, facing the same problem, came up with the title of "Organiser".

The name does give a definite clue as to the major function of this machine – that is, as a sophisticated, portable data storage unit, but which also has a number of inbuilt other functions.

The Organiser is extremely attractive to look at, coloured primarily in gunmetal grey with alternative options of pastel blue and yellow. The screen is dot matrix with two lines of 16 characters visible. Overall size is a comfortable 142 x 78 mm, and the 36 keys have an audible click (a nice touch). I did find the keys too close to be ideal, and two fingers side-by-side were too wide to depress two keys next to each other.

Be warned – the unit is not designed for the average computer or WP user, but rather for someone with little or no computer input knowledge who would not miss a typewriter style keyboard.

Operating the Organiser is very easy for the first-time user.

Operating the Organiser is very easy for the first-time user. Without looking at the manual (not a recommended practice, I know), I was able to master the basic operating functions in a couple of minutes. It is menu driven, and different options can be selected either by using the cursor keys to move to the desired selection and executing or, as you become more confident, typing the first letter of the desired option for immediate access.

The functions built into the unit include a time function and a basic calculator with 10 memories. The calculator can be enhanced by using formulae written in OPL (Organiser



The Organiser II with some of the packs which slot into locations on the back. Overall length is actually to the bottom of the keyboard, the remainder being a sliding protective cover which can be removed entirely.

Programming Language), but it is to its detriment that it doesn't have such common functions as NPV and per centage markup programmed. Writing these yourself would, I think, be time-consuming and irritating to the average executive.

A diary function allows entries at 30-minute intervals with integrated alarms and entries of up to 64 characters. I can see the use of a portable diary in the case of a very mobile user such as a travelling salesman or a long-distance truck driver, but again with regard to its function as a desktop executive tool I feel the time taken to punch in the information would not be reflected in greater time efficiencies later. Personally, I don't think you can beat the flexibility of a day planner open on the desk.

Other functions include those specifically related to data storage capabilities such as Save, Erase and Copy. The standard unit has available to it 32kb ROM and 16kb RAM.

Essentially the organiser is aimed at two different markets. To the general retail market it offers a personal work tool, but at close to \$600 its

appeal there would be limited. However, as a specialised data storer in conjunction with sophisticated add-on or peripheral options it should be favourably received.

It will be best utilised in out-of-office locations where non-computer users must collect and manipulate information.

I believe the real power of the Organiser is in taking advantage of the optional peripherals such as the bar-code and magnetic card readers, and memory expansion data packs which are available in 8, 16, 32 and 64kb, with read/write access. Function packs are also available for finance, maths and spelling. The Organiser has a standard 16-pin slot which allows it to connect to a printer or microcomputer to download data for further manipulation.

It's that ability to link to peripherals, along with its ease of use and portability that makes the Psion Organiser a valuable addition to the electronic market. It will be best utilised in out-of-office locations where non-computer users must collect and manipulate information.

Note: The XP model Psion Organiser II was reviewed. The cheaper, less powerful and expandable model will also be released, aimed more at the retail sector and priced closer to \$300.

PRICES: (subject to freight and GST)

Psion Organiser II	\$570.50
16kb data pack	81.62
32kb data pack	142.80
64kb data pack	326.90
Maths pack	122.50
Finance pack	122.50
Mains adaptor	53.06
RS232 interface	228.85
D pack eraser	229.88
Bar code reader	940.80
Holster	48.00

Review unit supplied by Machine Ware, Takapuna.

A tertiary reply

by Ross Clark,
Co-ordinator of computing,
Carrington Technical Institute

The secondary viewpoint on the present status of computing in education has been put in the December 1986 issue in an informative article by Pip Foyer. This was followed by "A Primary Perspective" in February by John Buchanan.

I should like to present another angle, from the technical institute point of view. This is a very personal view, however, and does not necessarily reflect the official thinking.

What we are

Technical Institutes are very different from our other tertiary family, universities and teachers' colleges:

- Our main emphasis is on facilitating the learning of practical skills.
- We have no research grants.
- Our teachers are all called tutors, perhaps to reflect the more personal teaching approach than the university lecturing.
- Teaching conditions are similar to our secondary cousins.
- We are employed by the Education Department.
- Most of our full-time tutors were recruited from industry and commerce where they had already gained experience in their chosen fields.
- Much of technical institute training is performed by part-time tutors. In fact we have more part-time tutors than full-time. These part-time tutors, who would all be sufficiently expert in their own fields, bring valuable current experience into the class-room. At our institute they account for at least a quarter of all teaching hours.

Although technical institutes had their origins in the trades departments of secondary schools, they are a long way from that now. At one extreme we have the Central Institute of Technology, where there is a definite academic flavour. Most institutes now offer diverse courses including accountancy, secretarial, architecture, engineering, computer programming and analysis.

Computer facilities

We had expected a major government initiative in 1981, and when this was delayed some of us went ahead on our own initiative to set up a teaching computer facility. The government-supplied computers finally arrived late in 1982.

We have now arrived at the stage where the Education Department

knows that there are staff in the institutes capable of selecting computer equipment, and the principals have more autonomy in how their money is spent. Subsequently the tutors in charge of computing at most of the institutes have clubbed together, with Education Department assistance, and achieved major cost savings in both hardware and software. The benefit to the New Zealand education scene from the negotiating power of this autonomous but co-operating group is tremendous.

Computer teaching

Let's look at the types of computing teaching we have:

- Computer appreciation for all full-time students.
- NZ Certificate in Data Processing course, full-time and part-time.
- Computer assisted draughting and design.
- Word processing for commerce students.
- Many part-time courses, including all of the above and others such as spreadsheets, database, computer introduction and general business packages, to name a few.

In our initial stages of computing we had groups of teachers coming to us for lessons, and we still get teachers attending overnight classes in computer introduction. After reading John Buchanan's article I now understand where all the others have been disappearing to!

Our role is to equip our clients with the ability to perform a role in society. In the computing area we believe we do this best by setting up computer learning experiences which simulate as much as possible the real working environment. Thus we have of late been purchasing many IBM-type computers, and have been using them to run standard application packages, because that is where the running has been.

A summary of Carrington's computing facilities may be eye-opening to some of you:

Computer systems for teaching:

There are seven laboratories:

- 10-station Mnet (Micromation) (CP/M) for word processing (WORDSTAR)
- 16-station TurboDOS (BMC with RGB) for computer introduction
- 12-station AOS (Data General C150) for programmers
- 14-station MS-DOS (IBM clones with RGB) for Labour Department

- transition courses
- 12-station MS-DOS (IBM clones hires) for CAD
- 15-station MS-DOS (IBM clones) for management and accountancy
- 25-station MS-DOS (IBM clones) for word processing (WORD) and spreadsheets
- Simulated business centre:* Microcomputers and printers for accounting applications and word processing.
- Guided learning centre:* Microcomputers and printers for accounting applications and word processing.
- Horticulture:* Microcomputer for landscape design and control of horticulture systems
- Labour Dept. transition course outpost:* Microcomputers for teaching of word processing and accounts processing.
- Computer Resource Centre:* Terminals where possible to all computer laboratories
- Microcomputer and printer
- Plotter
- Manuals
- Teaching materials
- Various microcomputers at strategic locations for tutor use.

Computer systems for administration:

- Datapoint 7-station system, supplied by Dept. of Education, for financial systems.
- MS-DOS IBM-clone 42-station network about to be commissioned, for office automation.
- Library system to be commissioned.

On reflection

Something old, something new. The Data General computers were the original computers supplied by the Department of Education and still perform their trusty role of training programmers in COBOL and PASCAL. However, BASIC has moved off them onto MS-DOS machines.

We decided at an early stage that networking was an efficient method of installing computer teaching facilities. I've seen too many teachers trying to copy yet another floppy to inflict that on our people!

The 20-station word processing facility has been an experiment, both to see the ability of tutors to cope with that number of computers at once, and to see if the computers could! With the excellent learning-

(continued on p.86)

Business software monopoly?

Are there any software houses marketing multi-user business software on microcomputers prepared to enter a pitched battle with CBA? It seems not. Our reading of the market would indicate CBA has the lower end of the multi-user segment well tied down.

Certainly CBA has set some trends which are becoming accepted as the basis of good business packages:

- the ability to run both single user and multi-user without re-keying clients' data
- on-screen help facilities
- access to data files and information outside standard reports through enquiring on the database
- transportable across multiple operating systems

It is Dataflex, CBA's development tool, that provides the new dimension and facilities to the software. Naturally one asks why other keen software houses have not developed other Dataflex generated products. In fact they have, but without the advertising and promotion that has lifted the profile of CBA.

Calibre Systems (now operating under the Impact banner) has developed Essence which has been on the market now over 12 months. Unlike CBA which is not tailored to suit individual clients, Essence is frequently modified by Calibre to meet clients' needs. In this way Essence addresses certain vertical markets very well.

The only other packaged Dataflex-based system we are aware of is Archives Solutions. Archives originated in Australia and has been available here for the last nine months, marketed by Archives Computers in Auckland.

Again, its product range is similar to both CBA and Essence in that it offers debtors, inventory, order entry, purchase ordering, creditors, general ledger, job costing and payroll. Archives will modify its software.

At this level – and we are referring to package prices of \$1,250 to \$1,500 – there are not too many players. There is certainly room for other high profile products, particularly those sufficiently sophisticated to address the ever-growing corporate market, a market where decentralisation of computer processing is picking up speed.

Meanwhile, CBA, box on. It seems the market is yours.

Xtree Xplained

It is very easy to become lost on your hard disk while working within directories of directories of direc-

tories or, if you prefer, sub-sub directories.

Xtree is a hard disk organiser available for IBM or compatibles at a price of \$135 + GST. On one screen it clearly sets out your directory tree structure so that the relationship between files and directories can be instantly recognised.

Where Xtree is particularly useful is in:

- Tagging files according to specified attributes
- Calculating file space used by certain directories
- Specifying files as visible/invisible
- Sorting files into varying sequences
- Renaming directories
- Highlighting disk utilisation
- Tracking common files over multiple directories etc.

as well as bringing some of the DOS commands into a logical menu structure.

Xtree is another PC tool that becomes indispensable once it has been used.

Goalfix Planner

MicroLab has news of a home-grown product, developed by Coopers & Lybrand in South Africa.

Goalfix Planner is a software program that has been developed to enable business people and their financial advisers to assess how to improve profitability and cashflow, and determine which key performance factors have the greatest influence on these items. It is particularly useful to managers and decision makers.

In short it is a financial planning and decision making aid; is simple to understand, easy to use and very quick; and requires no previous computer experience. It is not a spreadsheet, financial modelling system or an accounting package.

The Planner has inter alia the following facilities:

- What If calculation: predicts the effect on RONA (return on net assets) and other key result areas of change in any of the key performance areas of the business, or changes in combinations of such areas.
- Goal Seek: identifies the contribution required from any of the key performance areas of the business in order to obtain a desired result. Because it is totally interactive it is possible to find the optimum contributions from a number of different performance areas in order to come up with a practical solution to a problem.

- Sensitivity Analysis: systematically ranks the impact on key result areas of a change in the key performance areas. This facility enables the businessman to focus on the areas of the business which are critical to optimum performance.

- Consolidation of plans: provides the facility to consolidate up to 12 planning cycles and up to 12 companies.

Goalfix works on any IBM or compatible personal computer.

Printer evolution

Gradual change taking place in printer technology is a matter of evolution, not revolution. We are seeing improvement in performance and quality with the introduction of the 24-pin dot matrix printers. The 24-pin head replaces the traditional 9-pin head thus providing greater clarity of presentation with one pass over the paper.

A high-performance 24-pin printer running at 250 cps in draft mode and 140 cps in LQ (letter quality) mode is going to cost \$2,800 to \$3,000. A range of print fonts comes standard with the printer, and others are available in clip-on cartridges.

The additional pin heads in the new printers can achieve LQ results with one or two passes over the document as opposed to the traditional four or five, thereby increasing speed in this mode up to three or five times the norm.

If you are looking to buy, ensure the tractor feed is included in the price (often they are optional extras) and ensure you can add cut sheet feeders for those wanting word processing facility. Buffer sizes will vary. If your PC is often printer bound (always waiting for the printer), a reasonable buffer will allow jobs to be dumped in their entirety to the printer, thus freeing up your terminal.

One added benefit of the new technology we are seeing is a reduced noise factor. Dot matrix printers, due to their design, have tended to be deafening and we will continue to think them so compared to the laser, inkjet, and thermal printer variety.

MicroLab is Coopers & Lybrand's micro computer consulting arm providing independent advice on business systems.

Through this column MicroLab offers a commentary on developments in the computer industry as they affect the business person.

Unleashing the new Amstrad P.C.



The new Amstrad PC1512 has taken a big bite out of computing's Big Cheese. Already it's become Britain's top-selling P.C. And it's done it in the two best possible ways. On performance. And on price.

For performance, the Amstrad PC more than matches up. Because, unlike other lesser-known compatibles, a "Mouse" is standard equipment. When used in conjunction with Amstrad's GEM "Paint" and GEM "Desktop" software, it allows you to draw full-colour diagrams and pictures with fingertip ease.

And organising your files and discs becomes as easy as a click of the finger.

These programmes come as part of your Amstrad PC package.

Along with MS-DOS 3.2 and DOS Plus operating systems, and BASIC 2—an amazingly powerful computer language that now

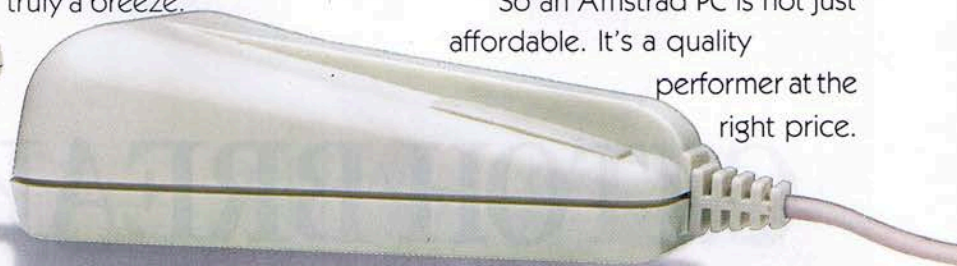
combines windows, colour and sound to make programming truly a breeze.

But the amazing reality is that Amstrad PC's start from only \$2395 plus GST. And the top-of-the-range 20 megabyte systems

Amstrad Computers
You're up and running

start at just \$4135 plus GST.

So an Amstrad PC is not just affordable. It's a quality performer at the right price.



Amstrad give you six new PC models to choose from.

With options such as single or double floppy disc, high-capacity 20 megabyte hard disc, and high-resolution monitor in either monochrome or colour.

After all that, you'd think the price of the new Amstrad PC's is the big catch.

Now see how it runs.

No wonder it's got the others on the run.

To find out more about the new Amstrad PC 1512, clip this coupon now. Or call into your nearest dealer and see how it runs.

The Amstrad P.C.



I'd like to know more about the incredible AMSTRAD.

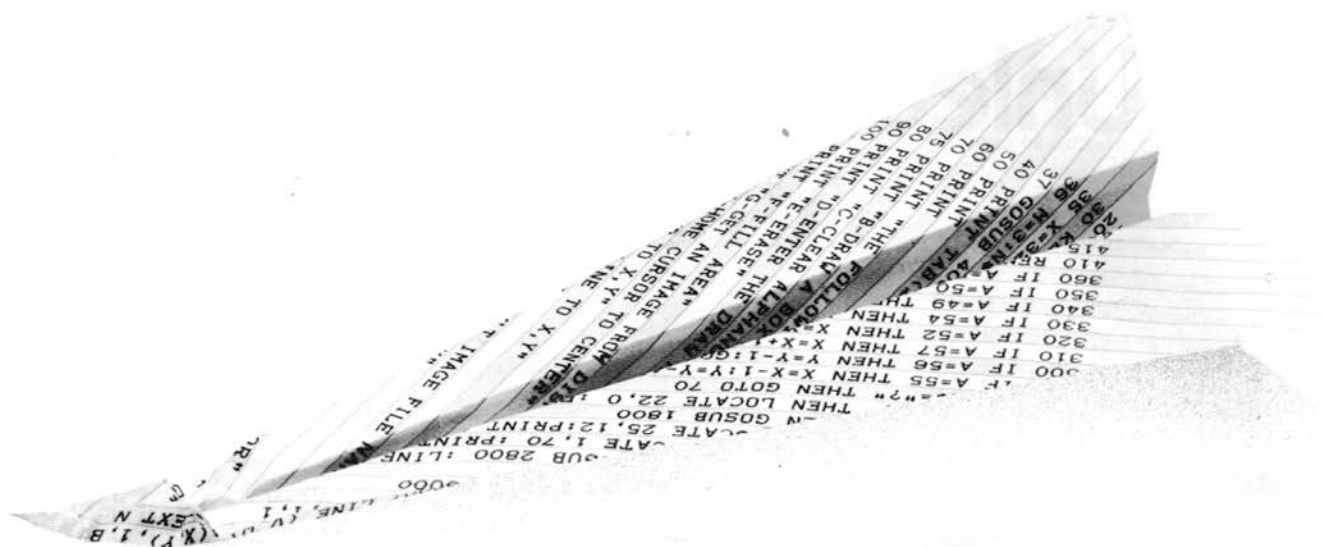
POST TO: Amstrad Computers Ltd., CPO Box 2353, Auckland,
21 Great South Rd, Newmarket, Auckland.
Phone: 504-035 Auckland or Phone 883-121 Christchurch.

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AMSTRAD 3009



C.ITOH BREAKS THE SOUND BARRIER!

At speeds up to an amazing 350 characters per second the new C.Itoh CI-3500 Serial Dot Printer is whisper quiet.

Less than 58 decibels.

So now you can work really fast without driving the rest of the office up the wall. And if you like the sound of that, consider the other great features of this versatile new low-profile compact from CONTROL:

Priced to move quickly! The C.Itoh CI-3500 is cost-competitive with many 200-250 CPS printers, and beats any other unit rated at 350 CPS.

It gives you high throughput: 135 LPM on full lines of 132 characters at 10CPI and even faster on short lines. Performance comparable with line printers but at a fraction of the price.

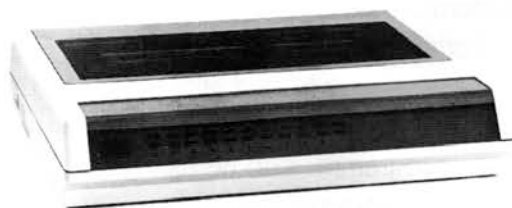
Near letter quality from two-pass printing.

Extra versatility of character printing: Double Height, Double Width, Slanted, Bold, Superscript, Subscript, Underlined and full graphics.

Bi-directional high speed forms tractor and friction feed.

Full diagnostic feature with three digit display.

The super-fast, super-value C.Itoh CI-3500. Available from New Zealand's biggest dealer network. To see it (even hear it) simply contact us now for the name of a stockist near you.



CONTROL

45 Normanby Road, Mt Eden, Auckland 3. P.O. Box 68-474, Auckland, N.Z. NZ61102 'DATASYS' Phone (09) 600-687

CLAUDE 14395

A new standard in small business software

Why is this man smiling? Bill Heritage, computer systems consultant with Bowden, Impey & Sage, delves into a locally-developed accounting package.

If there is any justice in the world, and in my more optimistic moments I am convinced that modest quantities may be found, then the Trader Series from The Computer Suite Limited will become the standard against which New Zealand small business software of the 1980s will be measured.

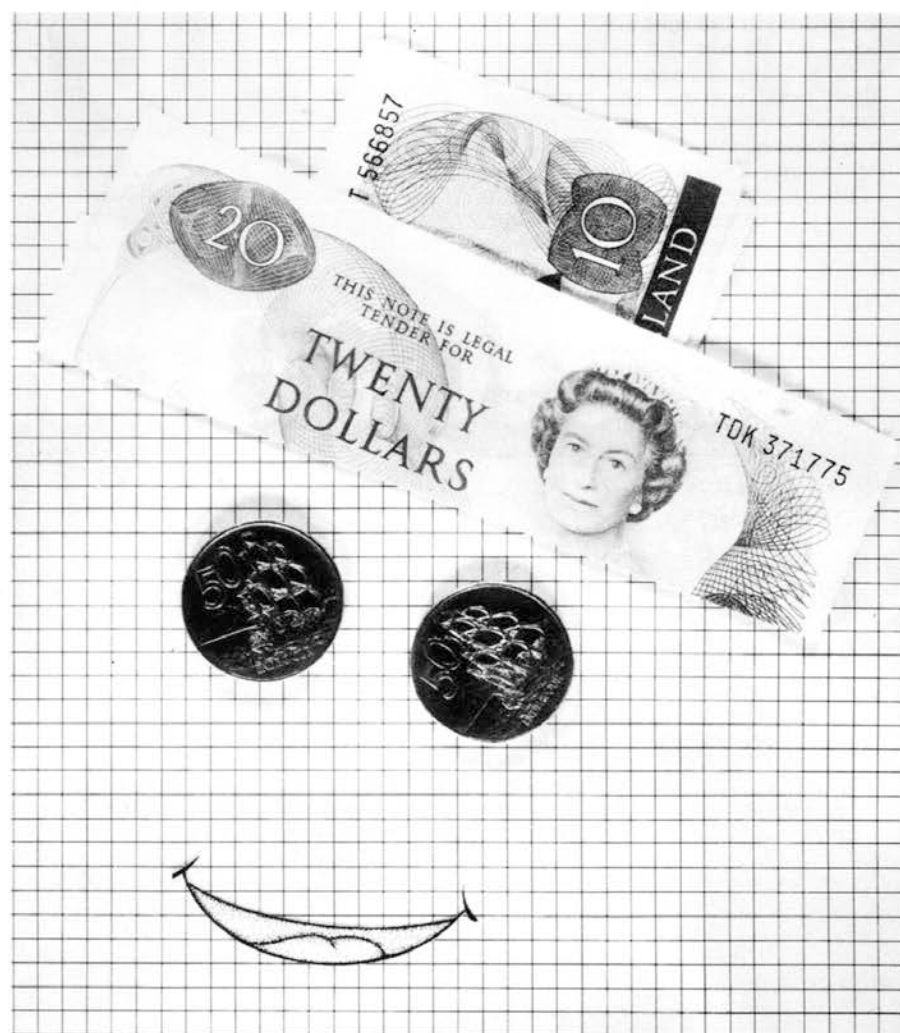
It's not just that it works. Even I can produce clumsy software that will eventually produce the right answer. It's not just that it is fast, though I cannot recall any other MS-DOS accounting software that responds so satisfyingly instantly to the touch of a key. It's not just that it is easy to use, either. Other packages are easy to use, though not always as lavishly supplied with Help screens.

I cannot recall any other MS-DOS accounting software that responds so satisfyingly instantly to the touch of a key.

What makes Trader stand right out, head, shoulders and rib cage above the rest as far as I am concerned is that it is FUN to use.

I am a sucker for pop-ups and pull-downs. I admit it freely. I delight in piling window on top of window, filling the screen with instant access to whatever it is that I want RIGHT NOW. One of the frustrations of computing is the operator waiting those unendurable 20 or 30 idle seconds for a program to load. Trader comes with delightful shortcuts from one part of the application to another.

Imagine you are keying in invoice data to your PC. A customer phones with a query about her account. In the bad old days you would either have to take a name and phone number and call back, or scrap what you were doing and bustle through the menus to reach the Customer Enquiry option, hoping to get there before the customer hangs up, bored with waiting.



With Trader you stop keying (you've got one hand on the phone by now anyway) and press F9. A Lotus-style menu appears across the top of the screen. A few keystrokes and the customer's current data is displayed. Need details of the transactions? One more keystroke and another window opens on top of the summary data with a neat listing of recent transactions. A bit of haggling over terms? Press F3 and an on-screen calculator is there to help you. (It is there at any time, not just when the pull-downs are in use.)

I even used the pull-down enquiry in the middle of a debtor update. Would the program stumble over re-accessing the currently open file? Not a bit.

Now that you know Trader is wonderful, what does it actually do?

It is an Invoicing and Debtors package for the small business. It is designed specifically for tradesmen, but is equally useful for a wide range of small businesses. Order entry is not included.

Specific features are:

- "Casual" debtors. One-off customers who will be deleted semi-automatically once their account has been paid.
- Invoice/statements for those who are not accustomed to sending monthly statements. I tried mixing regular invoices with invoice/statements for the same debtor. Not a problem to Trader.
- Quotes are produced by entering an invoice and not "processing" it. It is the only feature that is anything less than wholly professional and elegant. I would prefer to see it as a separate item on the Transaction Entry Menu. However, it is an easily learned fudge and clearly explained in the manual.
- GST details are not zeroed every month. They are sensibly accumulated until you tell the computer that you have reached the end of your GST accounting period.
- All reports and enquiries are independent of period and procedures and give information right up to the last transaction. There is even a pull-down screen that will tell you instantly the total of outstanding debts or total sales so far this month - data of enormous fascination to anyone in business.
- Sales analysis is by quantity and value.

Trader comes with delightful shortcuts from one part of the application to another.

The manual is clearly written and well presented. A typed sheet is enclosed to describe the updates between the printed manual version (1.1) and the current version (1.32). Mind you, it is virtually redundant. I referred to the manual for initial loading instructions and only picked it up again so that I could truthfully say I had reviewed it.

It is clear that the software has been developed with the user's wishes as the driving force. The attention to little features, too many

TRADER SERIES Debtors / Invoicing

<F9> Pulldown Options <F10> Help

9 Debtors on File

Debtor Code : _____
Debtor Name : _____
Address : _____
Town : _____

3 Months + :
2 Months :
1 Month :
This Month :

Casual

HELP # 3

TRADER is waiting for you to enter a debtor code. If you enter a debtor code that does not yet exist, TRADER will allow you to add it. If you enter a code that is in use TRADER will allow you to view or edit it. If you don't know the correct code enter a partial code for searching. Press <Esc> to return to the MAIN MENU

Press any key to continue

Press <Esc> to Exit

Options Debtors Items Transactions Summaries

Options <F10> Help

He 0 = Black 8 = Dark Grey
Di 1 = Blue 9 = Light Blue
Fi 2 = Green 10 = Light Green
Ne 3 = Cyan 11 = Light Cyan
Be 4 = Red 12 = Light Red
Ke 5 = Magenta 13 = Light Magenta
Cl 6 = Brown 14 = Yellow
7 = Light Grey 15 = White

Debtors

Items

Enter Colours For; Text BackGr
(0..15) (0..7)
Normal Text 7 0
Messages and Headings 15 0
Input Fields 15
Help Windows
Other Windows
Calculator

11/01/86

to describe in this article, argue a responsiveness to user comments that would shame many better known software houses.

Previously Trader was available only in a CP/M version. This new DOS version requires 128kb (but prefers 256kb), and I ran it on the office 640kb NCS XT-10 under PC-DOS 2.1. In turbo mode it showed no problems, just running faster.

Three more modules are on the way in MS-DOS format - Inventory Con-

trol, Creditors and General Ledger. Look out for them.

At present Trader retails for a giveaway \$395 plus GST. It would still be good value at twice the price and Computer Suite confesses that the price is expected to rise later in the year.

Marks out of 10: Functionality 10, reports 9, ease of use 10, manual 8, value for money 10+++.

Demonstration system supplied by The Computer Suite Limited, Auckland.

Options Debtors Items Transactions Summaries Options <F10> Help

He 0 = Black 8 = Dark Grey
Di 1 = Blue 9 = Light Blue
Fi 2 = Green 10 = Light Green
Ne 3 = Cyan 11 = Light Cyan
Be 4 = Red 12 = Light Red
Ke 5 = Magenta 13 = Light Magenta
Cl 6 = Brown 14 = Yellow
7 = Light Grey 15 = White
Enter Colours For; Text BackGr
(0..15) (0..7)
Normal Text 7 0
Messages and Headings 15 0
Input Fields 15
Help Windows
Other Windows
Calculator

11/01/86

TRADER SERIES Debtors / Invoicing <F9> Pulldown Options <F10> Help

MAIN MENU :-

11/01/86

1 Maintain/Enquir
2 Maintain/Enquir
3 Transactions
4 Reports
5 Ageing
0 End Program

Enter Selection (0 .. 5)

0.000
+ - * / % C
7 8 9 -
4 5 6
(=) 1 2 3 +
0 .



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- | | | |
|--|--|---|
| <input type="checkbox"/> Document processing | <input type="checkbox"/> Business graphics | <input type="checkbox"/> Project management |
| <input type="checkbox"/> Data base | <input type="checkbox"/> Spreadsheet | <input type="checkbox"/> Other (specify) |

Name _____ Position _____

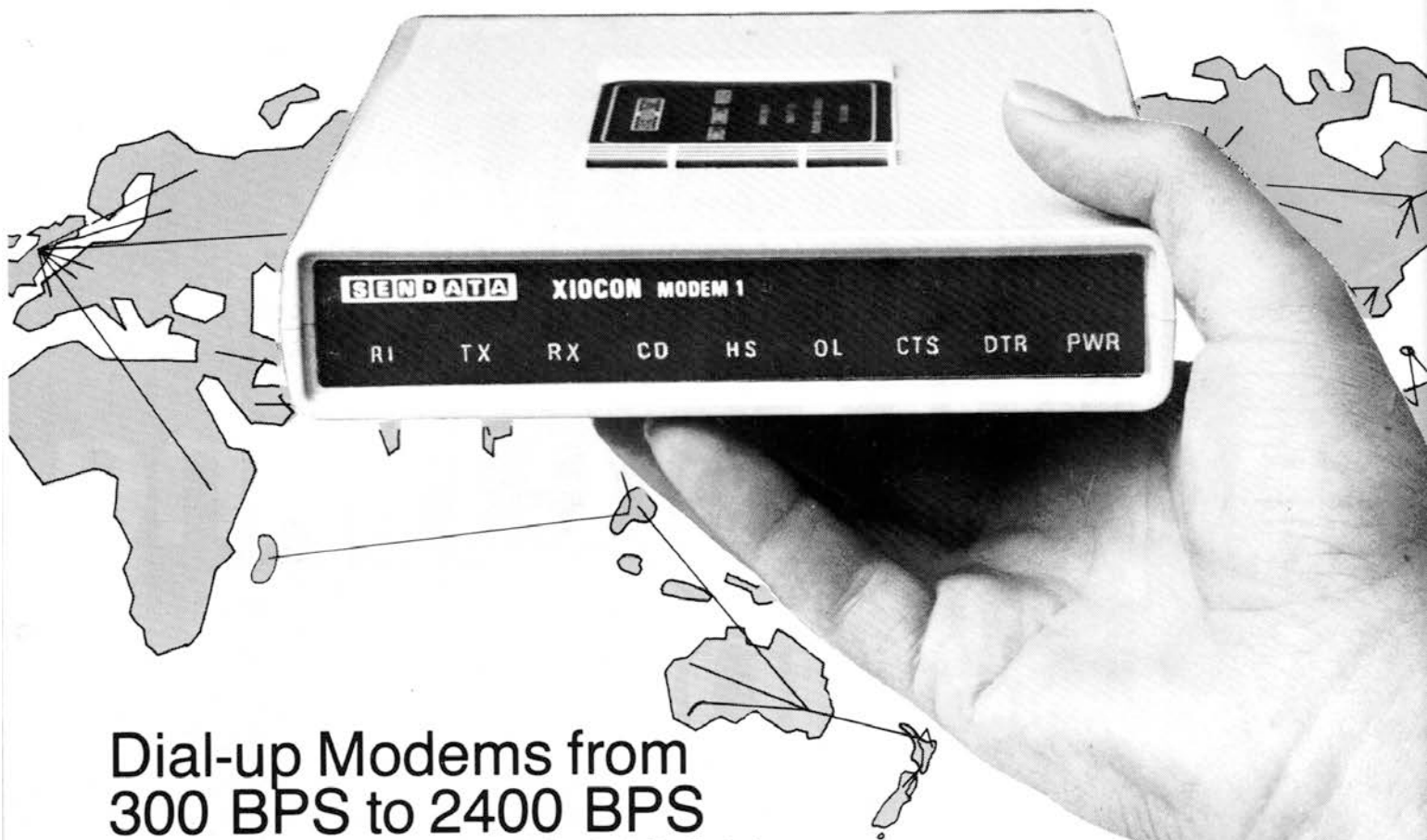
Company _____

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Profax has pruned its major product to XS. Does it work without all the fancy bits expected from more recently-developed packages? Phil Ashton, MicroLab manager of Coopers & Lybrand, takes a look at some...

Traditional small business software

In producing Profax XS, Logical Methods has trimmed its flagship product, Profax, to three integrated packages: Debtors, Invoicing, and Stock Control. We weren't able to relate the 'XS' name variation to the fact that you get less than the original five modules!

Profax has developed a reputation for reliability and ease of use which XS will continue to promote. XS is a traditional, menu-driven software product built around structured data files and fixed report formats. It is strictly single-user and has been designed to run on IBM or close compatibles. (Logical Methods has indi-

cated that the least compatible of the compatibles compatible with XS is the Sanyo 555. Phew!)

In the software industry it is very comforting to have a product that is rugged without necessarily being ostentatious. XS is not a product that offers all the flash extras. It is fundamentally sound, offers the features most smaller businesses would be looking for, and includes reporting on GST.

Logical Methods has built into XS a simple self-install system so that the software can be loaded easily onto hard disk units as well as floppy drive systems. XS also includes a file exten-



sion utility so that the user is able to increase the size of data files (when the system requests it) without the need to contact the specialists.

Perhaps the most appealing feature of XS is its presentation, both on screen and as a product packaged within the user manual. Screens are clear and uncluttered. The software looks organised and efficient.

PROFAX XS — Reference Manual

Inventory Control

6. SALES REPORT — YEARLY

ABC HOLDINGS LIMITED — DEMONSTRATION

PAGE 1

Sales report - yearly

31OCT86

PRODUCT CODE	DESCRIPTION	QTY SOLD	VALUE SOLD	COST OF SALES	MGN (%)	LAST SALE
cr5	5 inch Crescent	145.000	505.40	215.84	57.3	30OCT86
ctl	Copier toner - black 500ml	38.000	313.50	215.90	31.1	26OCT86
desk1.8	Executive desk - 1.8m	7.000	2289.00	1785.00	22.0	28OCT86
lab1	Labour	4.250	114.75	76.50	33.3	23OCT86
mpc1	MX70 Photocopier	3.000	5885.25	4300.00	26.9	28OCT86
pro2	Professional service fee	2.000	100.00	100.00	100.0	30OCT86
			9207.90	6593.24	28.4	

END OF REPORT

9. STOCK SALES AND VALUATION REPORT

ABC HOLDINGS LIMITED — DEMONSTRATION

PAGE 1

Stock sales and valuation report

31OCT86

GP NO	PRODUCT GROUP	SALES M.T.D.	SALES Y.T.D.	STOCK LATEST COST	VALUE AVERAGE COST
1	Furniture	654.00	2289.00	1020.00	1020.00
2	Office Supplies	82.50	313.50	860.70	850.13
3	Equipment	1938.65	6390.65	22342.50	21959.60
4	Services	160.75	214.75	0.00	0.00
		2835.90	9207.90	24223.20	23829.73

END OF REPORT

Orthodox

I mentioned earlier that XS comprises structured data files. XS is a very orthodox product and can therefore become a frustration for those users wanting some room to move, some flexibility. It is not a database file storage system, and therefore you cannot haul out of the system any information you want based on your selection criteria. However, the suppliers have built into XS the option to export selected information from the Debtors and Inventory master Files and Debtors Transaction File into any of the popular productivity tools, thus adding at least an extra dimension to the reporting options.

Report content in XS is quite adequate. All reports optionally print to the screen as well as printer and in fact reports have been designed to print to screen as they are all a maximum of 80 characters wide. This does present some limitation in reporting where 132 characters would allow more detail. For example the sales reports are either month or year to date rather than the more common month and year to date. Other reports, rather than being a convenient one line per record, can stretch into two or three lines.

Although XS is being marketed as a small business manager there is no practical limit to the size of your data files. For example you could run 2,000 debtors and 5,000 stock items comfortably on a hard disk machine with the only limitation being the size of the hard disk. (Your real limitation is 30,000 debtors, 30,000 stock items!)

Documentation of the system takes the form of a well structured manual. Not only does it describe the applications in depth but it also offers help to the user outside XS, namely suggested end of period routines, back up procedures, recovery after

power failure and so forth. The user manual is a useful assistant, well designed, professional and visually appealing.

Menus

Software is accessed by logical step-through menus designed on the standard tree structure. The main menu will give the user access to the following systems:

- **Debtors:** A package allowing processing of invoices, credits, cash and journal entries where cash credits

and journals can be posted to chosen months for ageing purposes. A range of reports offers all the control one would require in a credit control system.

XS permits brought-forward type accounts only, where all prior months' transactions are compressed into one figure as the "brought forward from last month" balance.

- **Stock:** Monitors both average and latest cost prices as well as carrying one selling price per product. Ten-digit stock number and 27-character description are maximum field sizes of interest to prospective users.

Reporting is more than adequate, covering stock valuation, recommended re-order, price lists, sales reports, stocktake lists. Useful features include the ability to alter selling prices at the time of entering stock receipts and to select the number of decimals displayed in quantities.

- **Invoicing:** Although only one selling price is held per stock product, XS does contain a discount matrix whereby discount percentages can be varied for a customer/customer group dependent upon the product group they are purchasing.

XS does not allow order entry as such. It assumes manual packing slips have been completed or that a three-part invoice is to be printed (one copy of which is the packing slip).

Invoice printing is one of the few areas of weakness. All invoices must be printed as data is entered, as opposed to a mass print once a day or week. A simple option to print in a batch at some later stage would add considerable flexibility and speed entry of packing slips.

XS caters for non-stocked items, allows the user to vary unit selling price and discounts at entry stage, and accepts narrative lines as well as product lines. GST reporting is basic and does not allow the accumulation of data to match the client's GST accounting period. Otherwise, it provides all necessary information.

Invoicing naturally is fully integrated to Debtor and Stock, thereby updating the customer and stock quantities (and sales analysis) as invoices are produced. It is a tidy functional system and tolerant of data entry errors.

Profax XS is an excellent product to introduce the business person to computers as it has set a high standard in presentation and simplicity of use. It is rugged, easy to comprehend and consistent in its approach, and it is difficult to level any criticism at XS other than perhaps its lack of innovation.

At \$995 XS is a steal, although from this month it will be less of a steal as we understand a price rise is on its way.

THIS MONTH'S HOT LIST

BUSINESS SOFTWARE		SYSTEMS & UTILITIES		LATEST RELEASES	
	\$		\$		\$
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2. WordPerfect: WordPerfect Corp.	675.00	2. Crosstalk XVI: Crosstalk Communications	295.00	Explore strange new worlds and new civilizations. Boldly go where no game has gone before! This first of its kind spaceship simulation takes you on a space odyssey unlike any you've ever encountered before.	
3. dBase III Plus: Ashton-Tate	1095.00	3. Norton Utilities: Norton Computing	249.00	Ability	\$295.00
4. Microsoft Word: Microsoft	990.00	4. Sideways: Funk Software	144.00	Includes 6 full-featured applications: Wordprocessing, Spreadsheet, Database, Graphics, Telecommunications, Presentation. Fully-integrated, no complicated commands. What-you-see-is-what-you-get printouts. Imports Lotus 1-2-3 files, not copy protected.	
5. Multimate Advantage: Ashton-Tate	995.00	5. Norton Utilities Advanced: Norton	345.00	Norton Advanced	\$345.00
6. Sidekick: Borland Int'l	210.00	6. Carbon Copy: Meridian Technology	540.00	All the features of the "indispensable" Norton Utilities - the world's best-selling disk management package. Loaded with significant new technical enhancements.	
7. PFS: First Choice: Software Publishing	375.00	7. Disk Optimizer: SoftLogic Solutions	99.00	Includes a powerful new version of the remarkable UnErase data recovery feature. A must for everyone who demands the most from their PC's.	
8. VP Planner: Paperback Software	189.00	8. XTREE: Executive Systems	89.00	dBXL	\$395.00
9. DAC Easy Accounting: DAC	CALL	9. Dan Bricklin's Demo Program: Software Garden	250.00	dBXL is powerful enough for the most sophisticated data management applications, yet offers ease of use for the inexperienced computer user. It completely replaces dBASE III Plus, offering these advantages: Economical Power. dBXL is less than one fourth the cost of dBASE III Plus; full dBASE III Plus compatibility. Unique On-Line "Help" System: Windows, open up to 99; Ease of use. dBXL's INTRO command does what the dBASE III Plus Assistant fails to do. Helps the user get started. Other enhanced features: a HELP keyboard, faster indexing and smarter error messages.	
10. Q & A: Symantec	595.00	10. Double DOS: SoftLogic Solutions	150.00	Generic Cadd 2.0	\$299.00
11. Wordstar Professional: Micropro Int'l	695.00			Introducing Generic CADD Version 2.0, the program that brings you the features of sophisticated Computer-Aided Design and Drafting Packages. No matter what kind of design or drafting work you do, Generic CADD will help you do it better, faster, and more accurately.	
12. PFS: Professional Write: Software Publishing	425.00	HOME AND EDUCATION		Ega Wonder	\$1125.00
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14. Paradox: Ansa Software	CALL	2. Print Shop: Broderbund	169.00	No mode commands, no special software and no pre-boot drivers are required.	
15. Microsoft Windows: Microsoft	295.00	3. Typing Tutor III: Simon & Schuster	129.00		
16. Quicken: Intuit	165.00	4. Math Blaster: Davidson & Assoc	164.00		
17. SQZ: Turner Hall	179.00	5. Certificate Maker: Springboard	195.00		
18. Reflex: Borland Int'l	220.00	6. Dollars & Cents: Monogram	450.00		
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28. PopDrop: InfoStructures	83.00	5. Lode Runner: Broderbund	99.95		
29. Diagram-Master: Decision Resources	690.00	6. Summer Games II: Epyx	99.00		
30. Smart System 3.1: Innovative Software	1975.00	7. Champion Football: Activision	110.00		
		8. Scenary Disks: Sublogic	70.00		
		9. StarFlight: Binary Systems	135.00		

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Colourful capabilities

— the NEC Pinwriter P5XL

Shayne Doyle looks at a printer that's a step up from the average dot-matrix machine, giving not only LQ with only one pass but also more colours than Henry Ford ever offered.

NEC has had available for some time now a range of very high quality printers designated the P series. The model under evaluation here is the latest top of the line P5XL model, with colour printing capability. Quite a large unit, the P5XL is also **HEAVY!** If one equates weight with built-to-last engineering, then this printer is going to stand up to a lot of heavy-duty use. Any mechanical components visible give the impression of being oversized, compared with a lot of other printers I have seen.

The P5XL is of fairly standard appearance, in "PC beige" colouring, and has a large contrasting section on the right front face. This is where the function and control switches are located, and below those, two slots for font cartridges. The lift-off acoustic cover is well-designed and affords a high degree of acoustic isolation, the P5XL being one of the quietest printers I have used. The front top surface opens towards the operator to access the ribbon, a microswitch preventing printer operation while it is open.

My only criticism of the external design is of the legends illustrating the three settings of the paper release lever. These are the same colour as their background, and not easy to make out at a glance, but obviously this may inconvenience only the casual user.

Control panel

On the control panel are five pressure switches each with appropriate indicators: — Select, Feed, Mode, Font, and Quiet.

Select places the printer online/offline to the computer. Feed operates as a line feed if pressed repeatedly, but if held in it performs a form feed. Mode toggles between Draft and Letter Quality mode, although LQ mode is available only with certain fonts. The Font switch sets the available characters per inch options, high speed mode, proportional spacing mode, and exactly what options are available depends on the setting of the Mode switch. The Quiet switch puts the printer into a mode whereby it prints each line with two passes, the pin impact noise being considerably reduced.

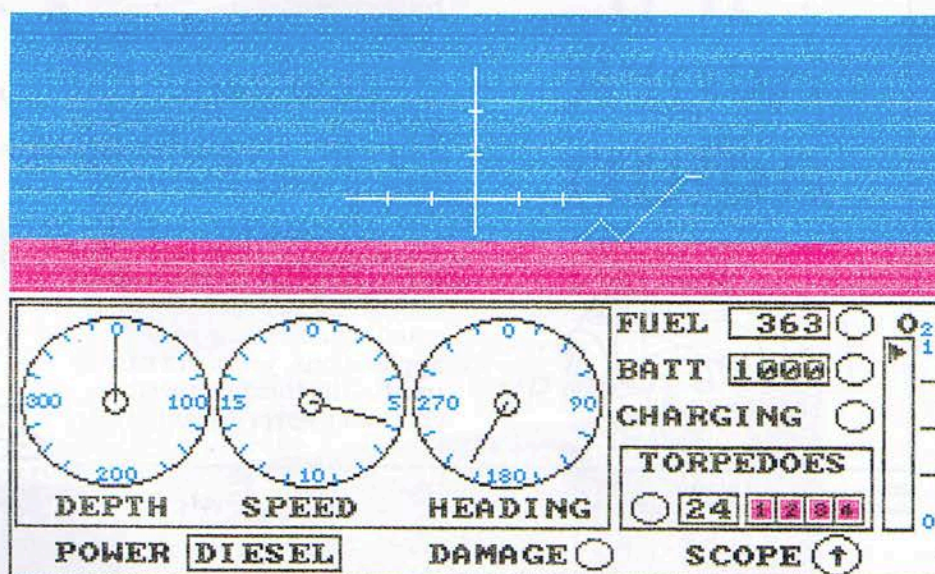
with the P5XL's 24-pin head.

I have three minor complaints regarding the control panel: there is no capability to finely adjust the paper position with fine forward and

NEC PINWRITER P5XL PRINT MODES

NEC P5XL draft mode NEC P5XL draft mode
NEC P5XL 12 cpi draft mode NEC P5XL 12 cpi draft mode
NEC P5XL high speed mode NEC P5XL high speed mode
NEC P5XL 15 cpi draft mode NEC P5XL 15 cpi draft mode
NEC P5XL 17 cpi draft mode NEC P5XL 17 cpi draft mode
NEC P5XL 20 cpi draft mode NEC P5XL 20 cpi draft mode
NEC P5XL 10 cpi letter quality NEC P5XL 10
NEC P5XL 12 cpi letter quality NEC P5XL 12 cpi letter
NEC P5XL 15 cpi letter quality NEC P5XL 15 cpi letter quality
NEC P5XL 17 cpi letter quality NEC P5XL 17 cpi letter quality
NEC P5XL 20 cpi letter quality NEC P5XL 20 cpi letter quality
NEC P5XL proportional spaced letter quality mode

AND NOW A LINE PRINTED IN THE COLOUR MAGENTA
AND NOW A LINE PRINTED IN THE COLOUR CYAN
AND NOW A LINE PRINTED IN THE COLOUR VIOLET
AND NOW A LINE PRINTED IN THE COLOUR YELLOW
AND NOW A LINE PRINTED IN THE COLOUR ORANGE
AND NOW A LINE PRINTED IN THE COLOUR GREEN
AND NOW A LINE PRINTED IN THE COLOUR BROWN



reverse line feeding; it was a nuisance to have to repeatedly press the Feed switch to perform multiple linefeeds; and I feel control pads are best located on the top surface as front mounted switches can be difficult to access when a printer is in some types of acoustic hoods.

The rear panel offers access to the configuration DIP switches, and the parallel interface socket was clear of the paper path. Is your printer one of those infernal units with the printer cable emerging right in the centre of the paper feed path? There's one or two around!

For the adventurous printer user the P5XL has, in common with most printers these days, an enormous number of programmable functions and special printing effects. I will not go through the many functions we now expect as standard, but there are some additional ones that you may wish you had on your own printer.

There are functions to perform left/right/centre/full justification of printed text, set the inter-character spacing to a specified number of dots, and enlarge characters vertically. Character font selection may be from the internal fonts or from one of two optional font cartridges. There is a facility to re-print the data in the buffer up to 255 times, but the usefulness of this feature obviously depends on your buffer size. The most important

function of this printer is the colour printing capability, and the following colours may be selected: - black, magenta, cyan, violet, yellow, orange, green and brown.

Colour printing uses a four-band black/magenta/cyan/yellow ribbon, the other four colours being derived from multi-pass colour mixing.

As mentioned earlier, there are two font cartridge slots, but I was unfortunately not able to try these out. Currently available font types are: - Prestige Elite 12 or Pica 10, Letter Gothic 12 or 15, Courier 15, Courier Light 10 or 12, Bold Italic Proportional, Super Focus 10 and OCRA.

Colour ribbon

Colour printing uses a four-band black/magenta/cyan/yellow ribbon, the other four colours being derived from multi-pass colour mixing. When printing in colour, the ribbon moves up and down to select the various bands, and I found that occasionally when the ribbon lifted up, it jammed

against the rollers on the bail bar. A phone call established that it is necessary to remove the bail bar when using the colour ribbon. I had suspected this as the bar looked removable, but could not find any recommendation in the manual to this effect.

Unfortunately, one of the problems with practical use of colour printers is driving them from your applications software. Unless the version of the program you are using is fairly recent, the chances are you will not be able to use the printer's colour capability, as you have no suitable printer driver and little chance of getting updates. I use the Leading Edge word processor, and this company offers the best printer driver upgrade I know of - just dial up its Bulletin Board in the US and download the driver you want. They try to keep up with the expanding printer market.

Supplied with the evaluation printer were screen dump utilities and printer drivers for Lotus 1-2-3 and Symphony. I did some screen dumps from colour games programs, and these came out perfectly. I also installed the 1-2-3 driver and printed a few colour graphs, and it is in this area that colour makes the big difference.

But software I really wanted to try it on was Timeline 2 (Project Planning) Gantt charts. I ran into the problem of not having a suitable

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once,
it'll
work
again.



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dBXL

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* Price subject to GST.

Printer Summary

Model	Pinwriter P5XL	
Manufacturer	NEC Corporation	
Print method	impact dot matrix	
Print head	24 pin - 2 x 12 staggered pin structure.	
Print speeds	264 cps in high speed draft, 220 cps in normal draft, 88 cps in letter quality mode	
Print width	15" paper - number of columns ranges from 40 in 10 cpi expanded mode to 272 at 20 cpi	
Print buffer	8kb	
Character sets	italic and IBM graphic character set 12 international character sets	
Character matrix	17 x 9 dots, draft & condensed, 15 x 26 dots, LQ 12, 17 x 32 dots, LQ 10, 17 x 37 dots, proportional LQ mode	
Graphics matrix	60/180/360 dpi vertically 60/80/90/120/180/240/360 dpi horizontally	
Paper handling	friction	
Interface	Centronics parallel	
Options	8 colour printing plug-in font cartridges (2) plug-in buffer expansion cartridge bidirectional forms tractor single and dual bin cut sheet feeders	
Prices (excl. GST)	P560XL (parallel) P565XL (parallel & serial) bidirectional forms tractor single bin sheet feeder dual bin sheet feeder 16kb buffer expansion cartridge font cartridges 4-colour fabric ribbon cassette black fabric ribbon cassette black multistrike ribbon cassette	\$3450 \$3727 \$331 \$685 \$1232 \$92 \$92 \$28 \$24 \$25

printer driver available and by the time I got around to downloading new driver files from the Timeline RBBS, I had returned the printer.

Even if your software does not have a specific printer driver, it is always worth trying another. Chartmaster (graphing program) made no mention of the P5XL, as expected, but it does have an Epson JX-80 (colour) in the printer list. I selected this printer, and the output came out perfectly in colour.

In action, the P5XL is superb! Fast, quiet, excellent character formation and flexibility. When printing in letter quality mode, it is extremely difficult to identify the type as being from a dot matrix printer, particularly at 10 and 12 cpi. As it zips along at a nominal 88 cps in LQ mode, the P5XL is a much better investment for your money than a daisywheel printer. When printing in colour, even though the multi-pass colour mixing process is time consuming, the P5XL's basic speed is high enough to make this acceptable.

The NEC P5XL is a superb printer offering exceptional capabilities and options. Both the printer itself and the full range of add-ons are reasonably priced in light of those capabilities. This printer had to be prised away from me!

Review printer courtesy of Protech Business Systems Ltd, Wellington.

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Send to:— Framework II "Doing More for You", P.O. BOX 852, HAMILTON
Entries close on August 31, 1987 and judging will be done by a panel of industry experts.

-
1. How long have you been using personal or microcomputers? _____
 2. Including Ashton Tate Products, what other P.C. software do you currently use? _____
 3. Approximately how many employees are in your company? _____
 4. What is your occupation? _____

Rules & Conditions

1. Instructions on how to enter and prizes form part of these conditions of entry. 2. Entries close last mail 31 August, 1987. Winners will be notified by mail and their names published in 'Bits & Bytes' magazine October issue, 1987. 3. This is a game of skill and chance plays no part in determining the winner. Each entry in categories A, B and C will be individually judged in accordance with the stipulated criteria and instructions. The judging will be done by a panel of industry experts selected by the promoter. The judges' decision will be final and no correspondence will be entered into. 4. The promoter is Ashton Tate (NZ) 5. Categories A and B can only be entered by owners of Framework II. Category C may only be entered by non-owners.

PS: this way please

by Gaie Ellis

There's been a lot of speculation about what IBM would introduce next into the PC market and whether it would lock out the competition by using proprietary components and hidden architecture. There was also conjecture that PC-DOS would be edged aside for a new operating system.

What has been introduced is the new Personal System/2 series of personal computers with a better upgrade path, new operating system at the AT and multi-user level, more functionality and speed, more memory at the bottom end entry level, and incorporating as standard a number of the features that are currently offered as options and add-ons in the current range.

The new Models 30, 50 and 60 are available now in New Zealand; the other models should be available in the last quarter of this year, while the new operating system won't be ready until at least the first quarter of next year, according to IBM in the States.

In many respects it seems premature to announce a complete range when only part of it is available – that part to a large extent only keeping pace with other current offerings. One can only speculate that IBM has announced the range now in an effort to encourage those consumers pursuing the new work-alike offerings to hold off making a decision while it brings its new range to the market.

Dealers in New Zealand all have demonstration models available, but at the time of going to print, none of

those contacted indicated they had stocks on hand.

Talking prices, the new Model 30 with two 720kb 3½-inch diskette drives and mono display will be selling here at \$4,301 – excluding GST. Model 50, with 20Mb disk storage, mono display and 80286 processor, is \$8,305 and the Model 60 with 44Mb disk storage and 14-inch colour display, \$12,917. In the US, the 386 box, which is expected next year, will be launched at \$US11,000. It's anybody's guess as to what it will retail at when it arrives here some time early next year.

With the introduction of the new operating system and the promise of the new DOS being developed with Microsoft, it will be interesting to see who follows who in terms of standards and whether IBM compatibility will continue to be the issue it has been since it released its first PC family in 1981. Many of the work-alikes which have been released since then have offered considerable enhancements and benefits, utilising the advances of technology as they came to hand. It's possible the entrepreneurs who have survived the initial forays into this volatile market, and competed successfully with the likes of IBM, will establish standards and options that become the new industry standards.

After all, options incorporated in the new IBM family have already been released in a number of products currently available. The 386 machines are already being marketed

here, and while vendors agree there is still some distance to go in utilising all the capability and functionality the new chip offers, they will obviously be no slower than IBM in achieving those dimensions – and in all probability cost less or at the very most, no more.

IBM is not likely to lead the world toward faster, cheaper, better computers while it is distracted by those who have copied and built on its developments. While IBM's frustration and anger at having others imitate its developments is understandable, consumers are more concerned with the best products – at the best price. They want the latest advantages of technology available to them today, and when they know a technology is available they are hardly likely to entertain old standards out of loyalty.

This announcement by IBM will cause confusion in the market place, and likely slow down hardware and software development. It will also impact those companies whose add-on products have helped IBM users to upgrade and develop their hardware capability in the past.

On the other hand, those committed to IBM products – and that's still a lot of people and companies – are being offered a new range of products that presents options and capabilities in a comprehensive package, with upgrades and design features that look to be lasting.



What is the Personal System/2 range?

Central focus of the newly announced range of personal computer products from IBM are two systems based on the Intel 8086 micro-processor, three based on the 80286 and three on the 80386.

Designed to take advantage of emerging technology and provide for future development, it is likely that the full import of the new operating system and Micro Channel architecture will not become apparent until users and boffins alike get to explore the advantages we are told the systems offer.

One thing is certain: IBM has taken good care to ensure that compatibility is maintained for PC users upgrading to the new hardware. Applications compatible with IBM PCs and PC-DOS will run on the new hardware and they tell us that most of today's applications will run on the new Operating System/2. This system will also run on their PC-XT and PC-AT machines.

The new operating system has been designed to provide expanded memory support and multi-tasking capabilities. The system's been designed to provide data communications, database management and applications across the IBM product line and to maintain a workable relationship between the PS/2 family, the System 370 and the System 3X families.

Open architecture has been maintained with the use of Intel's micro-processors – "surrounded by IBM logic". They say they will continue to provide interface information for third party development of software, applications and I/O devices.

The new range has more IBM developed technology than the PC range and they claim significantly

higher reliability as a result! The desktop system units have a smaller footprint and the larger system units are designed to sit by the desk on the floor. The 3½-inch diskette is standard, offering higher storage density. Conversion kits will be available for dealers and customers to port data between the new drives and the 5¼-inch ones.

The Nitty Gritty

The Model 30: based on the 8086 processor. Two versions – one with, one without hard disk. Both PC-DOS offering up to 2.5 times PC-XT, claims IBM. 640kb memory, hard disk 20Mb.

Models 50/60: based on 80286 processor and new Micro Channel architecture. Architecture features new bus structure. Aids system resources management.

Bus on PC-AT processes transactions singly. New bus allows concurrent task handling and is built into hardware. The M50 is a desktop with 2.5 times PC-AT performance, 1Mb ram, 1.44Mb disk drives, 20Mb hard disk. Screen with high resolution and shading capability.

Model 60: two versions, floor standing, 80286 based, one disk drive. 44Mb or one or two 70Mb drives, built-in adapter, 7 expansion slots.

Model 80: based on 80386. Three versions based on Micro Channel architecture. VGA standard, also integrated adapters, 3½ drive, 7 user expansions slots, 3x32-bit, 4x16-bit. One version with 1 or 2 44Mb drives, other version with 1 or 2 70Mb drives. Options can build to 16Mb. Third version has 20MHz processor, 1 or 2 drives – up to 230Mb of DASD, 2Mb memory standard. Optional 387 math co-processor, as for all Personal System/2 models.

Operating System/2: designed for 80286 and 80386 systems. Compatible with most PC-DOS applications. 640kb memory minimum. Supports multitasking. Being jointly developed with Microsoft. Will be offered in 2 packages: standard with right-to-copy for volume purchasers which includes Presentation Manager and Extended Edition which comprises Standard Edition with database management and communications. Migration assistance and upgrade credit to assist current users into the new system.

Enhanced version of 3270 Workstation Program for those wanting more than 640kb and multitasking options now, before the new Operating System/2 is available (early next year). New system is AIX/386 (that's IBM UNIX). Will provide AIX operating system for Model 80 as with current RT/PC AIX option.



Model 60

Computer financier

The first specialised computer financier of its kind in this country started operations in mid-April. IBM New Zealand Credit Limited will, according to IBM managing director and director of the new company, Basil Logan, fulfil a need for tailored financing solutions that accommodate the growth of companies' computing requirements.

The new venture offers, at competitive costs, financing of IBM hardware, including importing costs; IBM software one-time charges; programming services; machine room alterations; and even computer buildings to house IBM equipment.



Model 30



Model 50

Studying the past with computers

Microcomputers have many uses. Brian Sheppard, survey archaeologist with the New Zealand Historic Places Trust, describes some techniques he has developed to help map out historic sites on a slim budget.

Archaeology may not be a subject expected to be described in these pages but, for many archaeologists, a computer has become as indispensable as a trowel. The New Zealand Historic Places Trust began to use computers in its operations in 1976 when the Historic Places Act first gave it responsibility for the protection, management and investigation of the country's archaeological sites.

At that time, the Trust's main uses for a computer revolved around the need to draw on information contained in thousands of archaeological site records. Some of the tasks use commercial file handling and reporting utilities, but others are based on a series of programs that have been written to meet particular needs. The reasons for describing them here are that some of the applications are a bit out of the ordinary, while some of the programs show how much can be achieved with little other than a great deal of determination. Most were in fact produced with no more programming knowledge than was gleaned from the pages of *Bits & Bytes*.

To understand something of what the system represents, it may be helpful to have described a little of its background. When the Trust was given its statutory responsibilities, we needed to know where archaeological sites were to be found and what they represented. The task is gigantic, ultimately requiring an intimate knowledge of every part of New Zealand.

Fortunately we have been helped in this task by the New Zealand Archaeological Association (NZAA), through the operation of its national site recording scheme. This scheme, which was started in 1958, encourages amateur and professional archaeologists throughout New Zealand to contribute their knowledge of where archaeological sites have been found, and some basic information about them.

The computer retrieval of this information was first designed, with help from the NZAA and from the Victoria University of Wellington, to run on the university's Burroughs B6700

mainframe computer. At that time, records and program modifications were laboriously entered from punched cards that had to be carried across Wellington and up the hill to the university's Computing Services Centre.

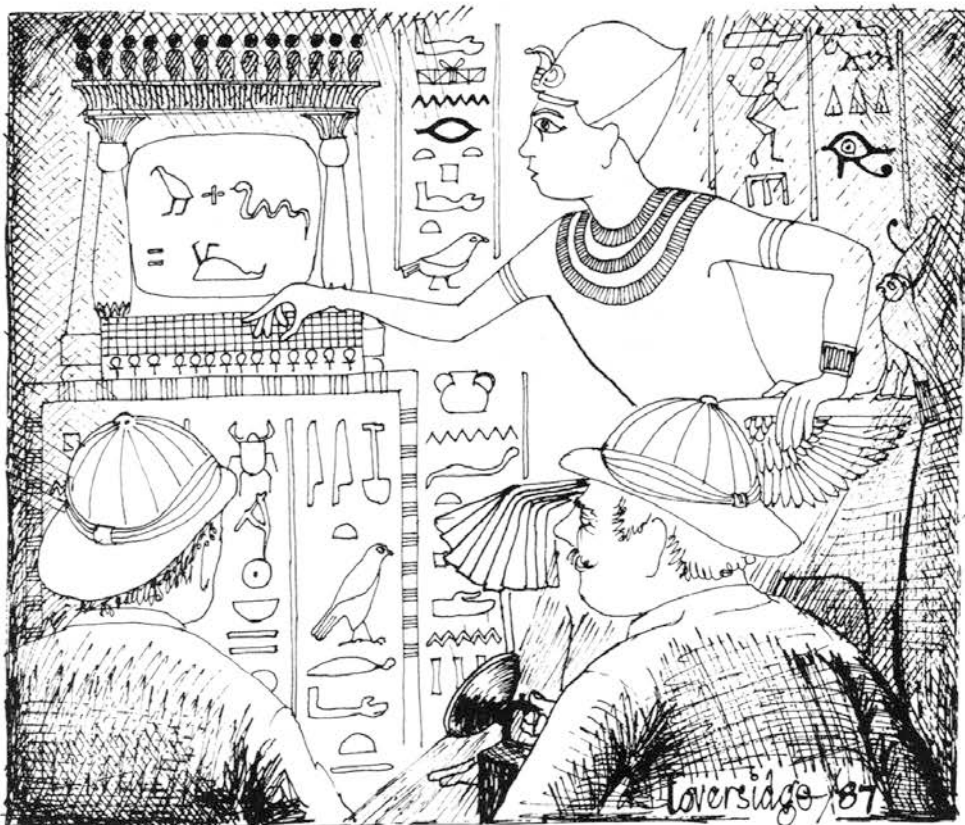
By 1978, when the initial development was complete, there were 17,000 records to be entered, but others were arriving regularly as successive site recording exercises revealed more unrecorded sites. By 1982, the files were up-to-date and could be kept in that state as new batches of records were received. The files currently describe some 40,000 sites, many however destroyed since they were recorded.

The requirements of a computer system were twofold. There was the

normal need to be able to search for records that fitted a specific description, such as all pa sites (Maori fortifications) recorded in Tauranga County. But there was also a need to be able to accession and reference site records from their positions on a standard series of maps.

Here was the first problem. The most suitable map base available for the whole country was, and still is, in the process of change. The former map series, known as NZMS1, is produced at a scale of one inch to the mile (1:63,360) and is calibrated in yards. It is based on two map grids: one for the North Island and the other for the South, angled to accommodate the shape of New Zealand.

The replacement maps, known as NZMS260, are produced at the



I don't think we should tell anyone of this.

slightly larger scale of 1:50,000 and drawn on a different projection that places a single grid over the whole country. This, the New Zealand Map Grid, is calibrated in metres.

Transferred

The referencing system had to be able to work from an NZMS1 map and be easily transferred to the NZMS260 replacement when it was published. This called for a simple method of identifying the NZMS260 map sheet on which a site would later be located, and of calculating its equivalent

grid reference. The mathematical relationship between the map grids was well known and readily available from the Department of Lands and Survey.

While using a mainframe computer, the calculation was relatively straightforward, but it posed problems for many smaller systems because of its use of 'complex numbers', one component of which is the square root of minus one. We had to face this problem in 1983 when installing our own office computer, an IBM System/34. Fortunately there were staff at IBM who knew sufficient

mathematics to be able to write a program that could carry out the calculations by other means.

Having the computer on site, we were able to improve the usefulness of the system. Input errors that had escaped earlier notice were easily corrected, being mostly found by running reports that arranged the records in different but meaningful sequences. Greater ease of access also led to new applications, such as sorting the records by grid reference to ease the laborious job of hand-plotting the sites on to maps.

Further developments were made possible by adding an IBM PC which, when connected by cable and IBM's File Support Utility, allowed files to be transferred from one system to the other. This was the opportunity needed to allow access to a wider range of communications possibilities and to new applications. It also eased the load on the main system and provided the computer on which most of the 'do-it-yourself' programs were developed.

Because the grid reference is the heart of the recording and retrieval system, the grid reference conversion program was rewritten to run on the PC. But by this time a need had grown to be able to backtrack from a metric to NZMS1 grid reference. This needed the mathematics and programming steps to be examined again from first principles, a task which was carried out at incredible speed and accuracy by the Applied Maths Division of the DSIR.

Menus

Given a series of program routines that would carry out the calculations, there were immediate everyday requirements for use by people who have neither the need nor desire to know any more than how to be able to answer some questions that appear on the computer screen. This was done by setting up a series of menus to lead the user through the available options.

I can only endorse what so many people have written in these pages before. Don't be mean with the screen prompts and explanations. They may even help you when you come back later to add further developments.

I have used menus wherever possible, grouping common applications on a single diskette and ensuring that one program is the master menu. If several diskettes make up a suite of programs, they can be given a common name with the suffix 1, 2, 3 etc. The master menu can then be named by convention MENU1 or whatever other number is given on the diskette. In this way, a user has only to know

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- ★ FILE MANAGEMENT



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the number of the diskette to be led through the collection of programs.

The menu presents a numbered list of options including one to escape from the program. For example:

```
10 REM PROGRAM:- MENU1 FOR DISKETTE ARCHI
20 CLS: PRINT: PRINT: PRINT SPC(16);
  "Map grid conversions": PRINT: PRINT
30 PRINT SPC(10);
  "1: NZMS1 to metric conversion":PRINT
40 PRINT SPC(10);
  "2: Metric to NZMS1 conversion":PRINT
50 PRINT SPC(10);
  "3: Escape": PRINT: PRINT
60 INPUT "Which option?"; CS%
70 ON CS% GOSUB 90,100,110: PRINT
80 PRINT CS% "is not a valid option. ";
  "Please try again.": GOTO 60
90 RUN "N1MET"
100 RUN "METN1"
110 PRINT: PRINT
  "You can now load another diskette"
120 PRINT: PRINT
  "To reload this menu, press F2"
130 END
```

A similar technique can be used with each program called, presenting the introductory menu on the screen as soon as the program runs. One option should be to return to the main menu.

The Trust's PC does not have a graphics board, but there are nevertheless useful schematic representations that can be made within the confines of an 80 character by 24 line screen. One such representation that I have used forms part of a program that identifies which map contains a specified grid reference. Its purpose is to draw the borders of the map being identified and show the approximate position of the grid reference by an asterisk.

The program is particularly useful when buying a map unseen as it indicates clearly if the area of interest is close to an edge or corner, so that an adjoining map can also be ordered. In other forms this technique is also used to check that the correct parameters have been entered before a lengthy program is run.

Before describing the section of the program that draws the map representation, a few points of explanation are needed. A grid reference describes the location of a point on the map grid in terms of its distance from the origin of the grid, at its south-west corner. The distances are expressed as an easting, along the east-west axis, and a northing, along the north-south axis.

The map to be illustrated in this program, a cadastral map of scale 1:10,000, represents an area 5000 metres wide (east-west) and 7500 metres deep (north-south). This is conveniently represented on the screen as a rectangle 20 character spaces wide and 15 line spaces deep. One character space therefore represents 250 metres and one line space represents 500 metres. The program in simplified form, includes the following instructions:

```
100 REM Values calculated earlier:-
110 REM EMAP= easting of w-edge of map
120 REM SMAP= northing of s-edge of map
130 REM Values input by user:-
140 REM E = easting of site
150 REM N = northing of site
160 REM
170 REM If site on west or south edge,
180 REM move asterisk on to map
190 IF E=EMAP THEN EX=E+1 ELSE EX=E
200 IF N=SMAP THEN NX=N+1 ELSE NX=N
210 REM Calculate posn of asterisk
220 COL%=FIX ((EX-EMAP)/250)
230 ROW%=CINT ((NMAP-NX)/500)+.5)
240 REM
250 PRINT " "
260 I%=1: FOR I%=1 TO 15: IF ROW%=I% THEN
  PRINT " ";SPC(COL%);";";SPC(19-COL%);";"
  ELSE PRINT " ";SPC(20);";"
270 NEXT I%
280 PRINT "-----"
```

An obvious extension to a system that uses grid references as the principal means of location is to drive a graph plotter from the PC, to mark the locations of sites on suitable base maps. Our initial development was carried out on a small (A3) Roland DXY-101 plotter, but now also on the larger (A1) Graphtec GP9101. The programs use the same menu approach as before, and include other routines to make the results easier to understand, such as drawing grid calibration marks on the borders and adding suitable captions where required.

This again has not needed access to expensive CAD software as most of the routines are quite elementary. It has, however, opened up all sorts of opportunities for examining patterns of data to get a better understanding of how the landscape was used in earlier times, why sites are where they are, and which areas are most in need of further site recording.

In parallel with this, we are also developing methods of using inexpensive portable computers in the field to enter, reference and update site information as it is recorded, transferring it via the PC to the main system. This project has so far used the small Casio FP-200, with its liquid crystal screen and built-in spreadsheet as a file organising and sorting facility, but trials are now underway on the smaller, hand-held Psion Organiser, making use of its greater portability and its direct compatibility with the IBM PC.

It is in the field situation that the small graph plotter also comes into its own, for drawing up site plans. Site measurements are fed into the portable computer rather than being scaled down on to paper, allowing the plans to be drawn up at appropriate scales in the motel at the end of the working day.

The Trust looks to the effective use of modestly-priced computer technology to assist in the pressing needs of public archaeology. We have very limited resources, but have been particularly fortunate in the help received from so many people. Some have been able to make their contribution on the basis of particular expert knowledge, but one lesson that has come through clearly to me is that there is a lot that you can do for yourself.

Many *Bits & Bytes* readers will be faced with the same option of 'do it yourself or do without', so have a careful look at potential applications, break them down into manageable problems, and have a go.

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MODEM ROUNDUP

Welcome to this first Bits & Bytes roundup of modems currently available in New Zealand. It is the first, simply because a year ago there were no units in any quantity with Post Office type approval, but as with any other aspect of this type of technology, things change very quickly.

The modem is now an accepted computer peripheral with a real role in business and recreation use. In fact, when the computer/modem combination fails to work for some reason, the user is left with the sense of loss that used to be all too familiar in the days before microcomputer reliability reached its present level. The feeling of isolation, once somebody has become used to the facilities offered by modems, is not a pleasant one.

All type approval for modems (along with facsimile machines, EFT terminals and videotex units) has been done since December last year in New Plymouth by what is now Telecom Data. During 1986, 79 units were approved in all those categories, with about 40 being passed in the first three months of this year and more being submitted all the time.

"We haven't broken the back of the backlog yet," reports Robert Heaven of Telecom Data.

A few plug-in boards are going through the system but are not yet in general use, so the modem continues, in this country at least, to be the separate grey box with buttons and lights on the front, sometimes made in New Zealand but more often sourced from overseas. Because there tends to be a certain sameness in appearance of units which perform the same tasks, we have devoted the available space to descriptions and technical data rather than pictures.



SENDATA RANGE

Speed	300 to 2400 bps (V21, V23, V22, V22bis)
Command set	Hayes
Autodial	optional
Autoanswer	optional
Interface	RS-232
Indicator lights	transmit & receive, data, power, data set ready, data terminal ready
Software supported	independent
Size	155 x 23 x 45 cm
Features	auto dial-back, asynch or synch, single or multi-speed capability
Price	from \$380 to \$2300
Agents	Case Communication Systems (NZ) Ltd

MINI MODEM

Speed	300 & 1200/75 bps (V21/V23)
Interface	RS-232
Indicator lights	power, carrier detect, receive data, transmit data
Software supported	standard coms packages
Size	14 x 7.5 x 3 cm
Features	Post Office approval pending
Price	\$195 incl. GST
Agents	Pacific Computers

CASE SHORT HAUL

Speed	50 bps to 256k
Interface	RS-232 or V35
Indicator lights	transmit, receive data, data terminal ready, data set ready, power matchbox size to 20 x 25 x 45 cm
Size	Size
Features	small units for extending RS232 range, for NZPO leased lines, and units for high speed processor to processor linking
Price	\$290 to \$2082
Agents	Case Communication Systems (NZ) Ltd.

DATAPHONE 1200 x 3304

Speed	(1200/75) 1200/600/300 bps (V23)
Autoanswer	Yes
Interface	RS-232C
Indicator lights	transmit/receive, carrier detect, request-to-send, clear-to-send, ring, off-hook
Software supplied	Supercom II, Crosstalk etc.
Size	20.4 x 15.7 x 6.6 cm
Features	Viatel compatible
Price	\$349 (incl. GST)
Agents	Dick Smith Electronics NZ Ltd

Modem Roundup

CTL MD 312

Speed	1200/75, 75/1200, 300/300 bps (V21, V22)
Interface	25 pin, RS-232C, 8 pin DIN TTL
Indicator lights	power, off hook, RX data, TX data, CD, RTS
Software supported	any
Size	16 x 16 x 4.3 cm
Features	simplicity of operation
Price	\$381 plus GST
Distributors	Machine Ware Ltd., Takapuna

CTL MD412

Speed	1200/75, 75/1200, 300/300 bps (V21, V23)
Autoanswer	Yes
Interface	RS-232C & TTL DIN
Indicator lights	power off hook, RX, TX, CD, RTS, AA, ring
Software supported	any
Size	16 x 16 x 4.3 cm
Features	simplicity of operation
Price	\$479 plus GST
Distributors	Machine Ware Ltd., Takapuna

COMPUSPEC M50

Speed	300, 1200/75 bps (V21/V23)
Autoanswer	Yes
Interface	RS-232
Indicator lights	Ph/Data, on-line, 300 ORG, 300 ANZ, 75/1200, 1200/75, CD TXD, RXD
Software supported	transparent to user data
Size	15 x 23 x 3.5 cm
Price	\$495 plus GST
Agents	Datacom Equipment Ltd

NETCOMM SM 850

Speed	300, 1200/75 bps (V21, V23)
Interface	RS-232
Indicator lights	Yes
Software supported	bundled with own comm. package Crosstalk, Symphony, Jazz, Sidekick, Open Access etc.
Features	asynch, speed rate converter for 1200 full duplex, auto speed select, speaker, voice/data line sharing
Price	\$529 (ex-tax)
Agents	Imagineering Micro Distributors

STARTCOM 21/23

Speed	300 and 1200/75 bps (V21/V23)
Command set	Hayes
Autodial	Yes
Autoanswer	Yes
Intelligent	Yes
Interface	RS-232
Indicator lights	power, auto answer, carrier detect, receive data, transmit data, ring indicator, off-hook, terminal ready
Software supported	First Choice, Multi-com, all Hayes compatible
Size	26 x 14 x 4 cm
Features	Post Office approval pending
Price	\$595 incl. GST
Agents	Pacific Computers

COMPUSPEC M100

Speed	300, 1200, 1200/75 bps (V21/V23)
Autoanswer	Yes
Interface	RS-232
Indicator lights	PWR
Software supported	transparent to user data
Size	28 x 6 x 18 cm
Features	internal hardstrap options
Price	\$674 plus GST
Agents	Datacom Equipment Ltd.

CTL MD1200

Speed	1200/1200 bps (V22)
Autodial	available soon
Autoanswer	Yes
Interface	RS-232C or 3 wire
Indicator lights	power, TX, RX, off hook, AA, originate, CD, RTS
Software supported	any
Size	16 x 16 x 4.3 cm
Features	8, 9, 10 & 11 bit-switch selectable
Price	\$814 plus GST
Distributors	MachineWare Ltd., Takapuna

COMPUSPEC M1050

Speed	300/300 75/1200 1200/75 bps (V21, V23)
Command set	menu driven
Autodial	Yes
Autoanswer	Yes or no
Intelligent	Yes
Interface	RS-232 V24
Indicator lights	(9) PH/data, on line, modes, CD, RD, TD
Software supported	Compuspec Insight, Kermitt SS
Size	23 x 15 x 3.5 cm
Features	ext. phone socket, auto or manual disconnect, optional videotex terminal emulation
Price	\$845 plus GST
Manufacturer	CompuSpec Industries Ltd

NETCOMM SM860

Speed	300, 1200/75 bps (V21, 23)
Autodial	Yes
Interface	RS-232
Indicator lights	Yes
Software supported	bundled with own comms. package, Crosstalk, Jazz, Symphony, Sidekick, Open Access, etc
Features	asynch, speed rate converter for 1200 full duplex, auto speed select, speaker, voice/data, line sharing
Price	\$849 (ex. tax)
Agents	Imagineering Micro Distributors

TANDATA

Speed	1200/75, 75/1200, 300/300, 1200/1200 bps (V21, V23)
Command set	Bell, Hayes, Tadata
Autodial	Yes
Autoanswer	Yes
Intelligent	Yes
Interface	RS-232
Indicator lights	PWR, line, TXD, RXD, CDT
Software supported	Tanlink
Size	25 x 16 x 4 cm
Price	\$995 plus GST
Distributors	Microcomputer Electronic Company

RACAL, RACAL VADIC, NETCOM

Speed	1200-18,000 bps
Command set	Hayes, V25bis, Racal-Vadic
Autodial	Yes
Autoanswer	Yes
Intelligent	Yes
Interface	RS-232
Indicator lights	103, 104, 105, 106, 107, 108, 109, 125
Software supported	Crosstalk, Smarterm, Sidetalk, George, MacGeorge
Size	33.6 x 20.3 x 3.8 cm
Features	MNP error correction, speed conversion, PSTN leased line option, synch or asynch
Price	from \$1100
Agents	Racal-Milgo N.Z. Ltd.

PHILIPS LSI 1203

Speed	1200, 600, 300/bps (V23/V21)
Autodial	Optional
Autoanswer	Yes
Interface	V24, V28 (RS232)
Indicator lights	power, RTS, TXD, DCD, C1, RXD, DSR, test, speed
Size	30.4 x 25.6 x 4.8 cm
Features	synch or asynch full duplex over 4 wire leased lines, half duplex over 2 wire leased/dial lines
Price	\$1140 with GST
Agents	Philips New Zealand Limited

COMPUSPEC M1000

Speed	300, 1200/75 bps (V21/V23)
Command set	proprietary autodial
Autodial	Yes
Autoanswer	Yes
Intelligent	Yes
Interface	RS-232
Indicator lights	power
Software supported	custom autodial software
Size	28 x 6 x 18 cm
Features	multispeed, videotex emulation, programmable, auto speed conversion for terminal
Price	\$1190 plus GST
Agents	Datacom Equipment Ltd.

COMPUSPEC M1200

Speed	1200 bps (V22)
Command set	Hayes
Autodial	Yes
Autoanswer	Yes
Intelligent	Yes
Interface	RS-232
Indicator lights	off hook, auto ans, TSC, RXD, CD, AL, DL, RDL, NORM
Software supported	all Hayes compatible autodial packages
Size	15 x 3.5 x 23 cm
Features	autoparity
Price	\$1195 plus GST
Agents	Datacom Equipment Ltd.

NETCOMM SM891 21/23 SA

Speed	300, 1200/75, 1200 HDX bps (V21, 23)
Command set	Hayes compatible
Autodial	Yes
Autoanswer	Yes
Intelligent	Yes
Interface	RS-232
Indicator lights	Yes
Software supported	bundled, Crosstalk, Symphony, Jazz, etc.
Features	auto disconnect, AT command set, synch/asynch. auto ranging, auto speed select, speaker, voice/data, line sharing
Price	retail \$1199 (ex tax)
Agents	Imagineering Micro Distributors

PHILIPS LSI 1021

Speed	1200/19200bps
Interface	V24, V28 (RS-232)
Indicator lights	power, DCD, CTS, test, EQL
Size	30.4 x 25.6 x 4.8
Features	short haul transmission, synch or asynch, baseband up to 19200bps
Price	\$1200 with GST (asynch option for \$200)
Agents	Philips New Zealand Ltd

COMPUSPEC M2000

Speed	300, 1200/75, 1200 DX bps (V21/V23)
Command set	Hayes
Autodial	Yes
Autoanswer	Yes
Intelligent	Yes
Interface	RS-232
Indicator lights	test, mode, status, on-line, DSR, DTR, CD RTS, CTS
Software supported	Hayes autodial compatible PC communications
Size	28 x 6 x 18 cm
Features	autobaud detect, auto speed, Videotex emulation
Price	\$1390 plus GST
Agents	Datacom Equipment Ltd.

COMPUSPEC M2412

Speed	1200/1200 2400/2400 bps (V22, 22bis)
Command set	Hayes
Autodial	Yes
Autoanswer	Yes or no
Intelligent	Yes
Interface	RS-232 V24
Indicator lights	(9) PH/data, on line, diagnostics, modes, CD, TD, RD
Software supported	CompuSpec Insight, Kermitt SS
Size	16.5 x 23 x 4 cm
Features	ext. phone skt, comprehensive diagnostics
Options:	security redial, timekeeping
Price	\$1495 plus GST
Manufacturer	CompuSpec Industries Ltd.

NETCOMM SM 872 1200 SA

Speed	300, 1200 FDX bps (V22)
Command set	Hayes compatible
Autodial	Yes
Autoanswer	Yes
Intelligent	Yes
Interface	RS-232
Indicator lights	Yes
Software supported	bundled, Crosstalk, Symphony, Jazz etc
Features	auto disconnect, synch/asynch, automatic configuration, automatic adaptive & fixed compromise equalisation, local/remote test
Price	\$1600 retail (ex-tax)
Agents	Imagineering Micro Distributors

PHILIPS LSI 2411

Speed	2400/1200/bps (V26 and V26bis)
Autoanswer	Optional
Interface	V24, V28 (RS232)
Indicator lights	power, DCD, RXD, RTS, TXD, DSR, test
Size	21.8 x 44 x 4.2 cm
Features	high throughput efficiency on multipoint polled networks, uses dial line as backup for leased line
Price	\$1735 with GST (PSTN option \$380)
Agents	Philips New Zealand Limited

NETCOMM SM842 123SA

Speed	1200, 1200/75, 300 FDX bps (V22, 23, 21)
Command set	Hayes compatible
Autodial	Yes
Autoanswer	Yes
Intelligent	Yes
Interface	RS-232
Indicator lights	Yes
Software supported	bundled, Crosstalk, Symphony, Jazz etc.
Features	auto disconnect, auto ranging, AT command set, synch/asynch, auto adaptive/fixed compromise equalisation, local/remote test
Price	\$1975
Agents	Imagineering Micro Distributors

NETCOMM SM 882 2400 SA

Speed	300, 1200, 2400 FDX bps (V22, 22bis)
Command set	Hayes compatible
Autodial	Yes
Autoanswer	Yes
Intelligent	Yes
Interface	RS-232
Indicator lights	Yes
Software supported	bundled, Crosstalk, Symphony, Jazz etc
Features	auto disconnect, synch/asynch, auto ranging, auto config., auto adaptive & fixed compromise equalisation, local/remote test
Price	\$2050 (ex tax)
Agents	Imagineering Micro Distributors

PHILIPS DS 3680

Speed	2400/1200/bps (V22bis/AB)
Command set	Hayes and CCITT V25bis
Autodial	Yes — stores up to 51 numbers
Autoanswer	Yes
Interface	V24, V28 (RS232)
Indicator lights	DTR, DSR, DCD, RXD, TXD, SPD, PWR, auto, line and TST
Size	21.2 x 35.6 x 5.4 cm
Features	synch or asynch, full duplex over dial lines, autodial number selection by name or slot number, voice call facility
Price	\$2140 with GST
Agents	Philips New Zealand Limited

NETCOMM SM 847 1234SA

Speed	2400, 1200, 1200/75, 300 FDX bps (V22, 22bis, 23, 21)
Command set	Hayes compatible
Autodial	Yes
Autoanswer	Yes
Intelligent	Yes
Interface	RS-232
Indicator lights	Yes
Software supported	bundled, Crosstalk, Symphony, Jazz etc
Features	autodisconnect, AT command set, auto ranging, synch/asynch, auto adaptive/fixed compromise equalisation,
Price	\$2700
Agents	Imagineering Micro Distributors

CASE QUATTRO

Speed	300, 1200/75, 2400 bps (V21, V22, V22bis)
Command set	Hayes
Autodial	Yes
Autoanswer	Yes
Intelligent	Yes
Interface	RS-232
Indicator lights	transmit & receive data, power, data set ready, carrier detect, data terminal ready
Software supported	independent
Size	20 x 28 x 4.5 cm
Features	error correction, asynch or synch, auto dial back
Price	\$2908
Agents	Case Communication Systems (NZ) Ltd

PHILIPS DS 3648

Speed	4800/2400bps (V27bis/ter)
Interface	V24, V28 (RS-232)
Indicator lights	DTR, DSR, DCD, RXD, RTS, CTS, TXD, TST. 4 x alpha-numeric displays
Size	21.2 x 35.6 x 5.4 cm
Features	synch, full duplex over 4 wire leased lines, half duplex over 2 wire leased and dial lines, special facilities for multipoint polled networks, extensive testing facilities
Price	\$3845 with GST
Agents	Philips New Zealand Ltd

PHILIPS DS 3540

Speed	synchronous 9600/7200/4800bps (V29)
Interface	V24, V28 (RS-232)
Indicator lights	DTR, DSR, DCD, RXD, RTS, CTS, TXD, TST. 3 x 7 segment displays indicate line quality, port number and speed
Size	21 x 40 x 19 cm
Features	end of transmission signal, antistreaming, optional 4 port multiplexer card provides 4 independent data links
Price	\$4460 with GST (\$4880 with mux option)
Agents	Philips New Zealand Limited

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Intelligent	3 levels to analyse modem, circuit performance
Interface	RS-232
Indicator lights	LCD display plus
Software supported	independent
Size	36 x 35 x 8 cm
Features	network management functions, integral multiplexer options, asynch, synch, fast-poll
Price	from \$4500 to \$18,000
Agents	Case Communication Systems (NZ) Ltd

PHILIPS DS 3650

Speed	synchronous 14400/12000bps (V33)
Interface	V24, V28 (RS-232)
Indicator lights	DTR, DSR, DCD, RXD, RTS, CTS, TXD, TST. 3 x 7 segment displays indicate line quality, port number and speed
Size	21 x 40 x 19 cm
Features	remote testing and looping facilities, trellis coded modulation, optional 6 port multiplexer card provides 6 independent data links synch or asynch
Price	\$11200 with GST (\$12600 with mux option)
Agents	Philips New Zealand Ltd

GDC 1222EC

Speed	1200, 600 DX bps (V22)
Autoanswer	Yes
Interface	RS-232
Indicator lights	DTR, DSR, TXD, RXD, data rate, busy, offhook, test, self test
Software supported	transparent
Size	31 x 27 x 10 cm
Features	auto adaptive equalisers, multiprotocol synchronous, asynchronous, port security, high-density rackmounting, N.Z. manufactured
Agents	Datacom Equipment Ltd.

GDC 2422

Speed	2400 1200 DX bps (V22bis)
Command set	V25bis, easy dial
Autodial	Yes, 30 lines each up to 60 digits
Autoanswer	Yes
Intelligent	Yes
Interface	RS-232
Indicator lights	PWR SIG Quality, RXD, TXD, DTR, RTS, CTS, CD, fall back test mode, phone data
Software supported	V25bis, transparent to user data
Size	31 x 27 x 10 cm
Features	NZ manufactured, optional error correctors, V22 fallback auto
Agents	Datacom Equipment Ltd.

GDC 2426S

Speed	2400 half DX bps (V26bis)
Autoanswer	Yes
Interface	RS-232
Indicator lights	PWR, TXD, RXD, DTR, DSR, RTS, CTS, CD, test mode
Software supported	transparent to user data
Size	31 x 27 x 10 cm
Features	half duplex V26bis, compatible with US bell 201C for international use
Agents	Datacom Equipment Ltd.

WORLDLINK 1200

Speed	300/1200 bps (V21/V22)
Command set	Hayes AT
Autodial	Yes
Autoanswer	Yes
Intelligent	Yes
Interface	RS-232C
Indicator lights	call progress, high speed, carrier detect, low battery
Software supported	many popular packages
Size	10.2 x 6.1 x 2.5 cm
Features	battery powered, 1200 bps, automatic power control, portable with full comms. features, P.O. approval pend.
Agents	Southmark Computers Ltd

CODEX 2300 SERIES

Speed	2400 to 14,400 bps (V27bis/V29/V33)
Interface	RS-232C/V24/V28
Indicator lights	TXD, RXD, RTS, CTS, DTR, DCD, ERR, TEST, signal quality, fallback
Size	21 x 40 x 7.6 cm, 43 x 41 x 8.9 cm
Features	testing and monitoring facilities via front panel and controls. Optional in-built multiphasers
Price	P.O.A.
Agents	Datacraft (NZ) Ltd.

CODEX 2600 SERIES

Speed	4800 to 19,200 bps (V29/V33)
Intelligent	test and diagnostic capabilities
Interface	RS-232C/V24
Indicator lights	TXD, RXD, RTS, CTS, DTR, DCD, ERR, TEST, signal quality, fallback
Software supported	on-board network control
Size	43 x 41 x 8.9 cm
Features	error probability readout, self-tests, trellis-coded modulation, centralised network control, soft-touch front panel, in-built multi-phaser options
Price	P.O.A.
Agents	Datacraft (NZ) Ltd

CONCORD, MULTITECH 224E, DC5234

Speed	600/1200/2400/9600/1200-75/300 bps (V22/V22bis/V32/V21)
Command set	CDS autodial command set/RS-366/V25/Hayes
Autodial	Yes
Autoanswer	Yes
Interface	RS-232C/V24
Indicator lights	up to 23, all operational and test facilities
Size	23 x 21 x 6.9
Features	full duplex, synch/asynch, multi standards per unit, trellis-coded modulation (V32)
Price	P.O.A.
Agents	Datacraft (NZ) Ltd

Program structure

by Geoff McCaughan

Subject: Program Structure

[Q] I think I know what 'parameter passing' and 'local variables' are, but why are these two attributes considered so important?

[A] Let's consider a trivial example, a program fragment that accepts input, stores it in an array, and outputs it. In BASIC we might do this:

```
100 REM Input subroutine
110 INPUT I$
120 RETURN
200 REM Output subroutine
210 PRINT O$
220 RETURN
500 REM Main routine
510 A = 1
520 GOSUB 110 : REM get input
530 X$(A) = I$ : REM store in array
540 O$ = X$(A) : REM pass the
    parameter
550 GOSUB 210 : REM output
560 END
```

In a language which allows local variables and parameter passing we might do something like the following. I have used Comal in this instance.

```
FUNC GET INPUT CLOSED
DIM IN$ OF 10
INPUT IN$
RETURN IN$
ENDFUNC GETINPUT
//
```

(continued from p.71)

most of the time. If it all seems too limiting, that's another reason the routine's called BASIC.WINDOWS.

And that just about covers it. I had hoped to get under the hood of BASIC.WINDOWS to show you just how it works, but I seem to have run out of space. For those of you who are interested, send me a stamped, self-addressed envelope c/o *Bits & Bytes* and I'll send you my commented assembly language source code. But include a couple of 40 cent stamps as well, to cover my paper and ribbon costs.

Next month, barring all accidents, arrivals of stuff to review, really early letters or blinding flashes of inspiration, I hope to go on a little about RAMdisks. What's left to say about RAMdisks? Wait and see.

```
PROC OUTPUT (OP$)
PRINT OP$
ENDPROC OUTPUT
//
A:=1
X$(A) = GETINPUT
OUTPUT (X$(A))
END
```

Both these routines do the same job, but in a different manner. Note that, as I said, this is a (very) trivial example and both routines could have been written much more simply, but this will suffice for an example. Commonly when programming we must generalise a routine so that it will work equally well when called from any part of the program. This is why we send O\$ to the output routine instead of the array in the BASIC example, as sending the array would limit the routine to the one instance, and the routine would not be a general one. Similar reasoning applies to the input routine.

Now have a look at how Comal does the same job. IN\$ is local to GETINPUT and so does not take up any variable space, and because GETINPUT is a function, it can be used directly in an assignment statement without any intermediate steps. Similarly we can send the array variable directly to OUTPUT without a redundant variable assignment and OP\$, as a parameter, is local by default. Naturally the benefits associated with this sort of program structure become much more pronounced as the program becomes larger and more complex.

Local variables and parameter passing allow the programmer to produce self-contained routines which will perform the required operation regardless of the state of the rest of the program. They are concerned solely with the data passed to and from as parameters. Also, passing parameters involves a similar syntactic structure to the language itself, so a well generalised routine can become to all intents and purposes a part of the language. Program writing then consists of writing a series of routines which, once operational and debugged, can be treated in the same manner as any other part of the language, a feature which is very important if there is more than one person working on the program. Each prog-

rammer then needs to know only what each routine does and how to call it, and need have no concern for the internal details of what the other programmer has written.

Because this sort of routine is self contained, it becomes a simple matter to use it in a different program, something that can be difficult with BASIC because of variable and line-number conflicts. In addition, note how the Comal program is very much more self-documenting than the BASIC version, which is an added bonus that can make programs a great deal more readable.

Some languages allow parameters to be passed between whole programs. This can be particularly valuable when interfacing to a machine language routine, as anyone who has tried to access BASIC variables from ML will know. Many common operating systems are simply a collection of programs to which the user passes various parameters to be acted on. For instance the MS-DOS command DIR TEXT executes a sub-program called DIR, passing TEXT as a parameter.

Subject: MOD operator

Q: I have a program listing I am trying to copy, and am puzzled by the appearance of MOD in the program. What exactly does this do?

A: MOD returns the remainder of an integer division, and usually the reciprocal operator DIV will also be available, which simply provides integer division. MOD and DIV can be worked around if you do not have them, as the following simple example shows. To extract the low and high bytes of a sixteen-bit number without MOD and DIV we would do something like:

```
X = 53248
HI = INT (X/256)
```

```
LO = X - (HI*256)
```

With MOD and DIV we would simply write:

```
X = 53248
```

```
HI = X DIV 256
```

```
LO = X MOD 256
```


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Managing the Micro: a guide to control and security

a book review by David Cass

It is a pleasure to review this well-written and businesslike little book, a real contrast to the average text on this sort of topic which is likely to be both dull and verbose. Author John High delivers more in 154 pages than some computer texts manage in 300 or more pages of rambling word-processor output.

In detail, the book discusses the current problems of some organisations in making good use of the very powerful new generation desktop micros that are now replacing mainframes in many applications. The author believes these problems are caused by the new computers being so easy to use that unplanned, poorly developed and sometimes inaccurate work is turned out, as in this quotation: "We believe that one of the greatest wastes of time is the amount of time spent by expensive people playing hot-shot programmers".

It offers a balanced discussion of various methods of avoiding this time-waste situation, by understanding and analysing possible micro applications, evaluating the option of a central "Micro Dept" to help out by

co-ordination of technical effort and back-up advice, and using off-the-shelf software packages, customised as little as possible.

As befits a book written for the business community, and derived from the experiences of a major insurance company in the UK, cost-benefit is considered at all times, and most effectively addressed in Chapter 4, Business Analysis, where the Business Analysis Checklist on pages 45-54 should be required reading for anyone in management or with a computer on the desk.

The issues of error, fraud, physical problems and confidentiality, together comprising the broad theme of security, are also discussed in some detail, with another important checklist, Microcomputer Security Audit, to summarise the problems.

One of the strengths of the book is that it does relate to real-life practical problems and offers useful, practical advice that works! Each chapter ends with a summary of points discussed, in a checklist, to be applied to each reader's own business or work situation, with in some cases a scoring sys-

tem to highlight the benefits. I feel that this checklist approach is another of the book's assets, and it is unfortunate that the contents list does not give page references to these lists, which will be frequently consulted.

Who will benefit from the book? I feel that almost anyone with a micro on his or her desk and using it with serious intent in the business or home environment could apply at least some of the checklists to their own applications. But in the business or institutional world, all senior management whose staff are using micros, and all data processing staff should read it and consider its implications for their work. It is not heavy reading, and the summary checklists encourage quick application: the potential benefits in time and money saved, and increased security, could be of great value.

Managing the Micro: a guide to control and security, by John High. Published by Deloitte, Haskins and Sells, Dec 1986, NZ/Australia, and available for \$6.50, incl. GST, direct from its offices.

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This book provides a comprehensive introduction to the way in which computers and digital devices are designed and operated. Though some mathematical background is assumed no previous knowledge of electronics is required. The book concentrates on practical design aspects and will appeal particularly to school, university and technical institute students who have some theoretical knowledge but little practical experience. In addition the text provides valuable reference material for electronic engineers.

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COMMUNICATION

Online Steve Lambert

A guide to America's leading electronic information services* that includes over 20 hours of free connect time - a value worth over \$350.00!

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MacTelecommunications Erickson and Cramer

With this guide, beginners learn to use a Macintosh computer for banking, buying and selling stock, research, and much more. It's all here: an overview of telecommunications, the hardware you'll need, detailed instructions and information for MacTerminal and other communication software, plus the inside story on all the popular network and information services available to you today.

Osborne/McGraw-Hill Our price \$49.62. Save \$3.73.

Mico-to-Mainframe Links Ronald F. Kopeck

Data processing and communications professionals can fully understand the major considerations behind PC-to-mainframe integration with this book. A concise, detailed text thoroughly explains the planning and evaluation process used in determining how PC-to-mainframe linking fits into your office environment. Data transfer, security, and use of existing networks are also discussed.

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SOFTWARE

pfs: Software Made easy Carl Townsend

Why pfs Software? Increasingly, business professionals are recognizing the value of integrated software for word processing, maintaining data files, and generating reports and graphics. This book introduces you to this series, explains its unique features, and helps you learn each program, Write, File, Report, Access and Graph. Contains invaluable tips for integrating programs and working with advanced applications.

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The SuperCalc Program Made Easy Chris Wood

Learn to produce effective budgets, reports, and business graphics with your powerful SuperCalc software. This complete guide to SuperCalc (versions 1.2, and 3) teaches you all the skills you need to take full advantage of this versatile program - from building and organizing a worksheet to using advanced problem-solving techniques and special SuperCalc features. A reference section that lists and explains every SuperCalc command is also provided which is especially ideal for beginners.

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Using Turbo Prolog Phillip R. Robinson

Enables you to maximize your programming skills with Borland's new Prolog compiler. Offers detailed coverage of Prolog syntax and design, and discusses all of Turbo Prolog's statement, functions, and operations. You'll use multiple windows to view and modify programs while watching them run, and you'll learn programming techniques using colour graphics, turtle graphics, and sound.

Osborne/McGraw-Hill Our price \$55.14. Save \$4.15.

Multiplan Made Easy Walter A. Ettlin

A step-by-step instruction book to Microsoft's electronic spreadsheet. This book offers you in-depth explanations of the commands and sub-commands for formatting a worksheet and entering data. Each chapter offers practical applications and provides exercises for you to follow. Ideal for use in large corporations, small businesses, and in the home.

Osborne/McGraw-Hill Our price \$41.33. Save \$3.11.

Jazz Tips & Traps Anderson, Barnhart and Gessin

A collection of helpful hints and quick solutions to unexpected problems that help you get the most from Lotus' integrated software. You'll learn how to use each Jazz function including word processing, graphics, spreadsheet, telecommunications, and database program environments. RAM disks, and macros, are also discussed.

Osborne/McGraw-Hill Our price \$52.38. Save \$3.94.

The Advanced Guide to Lotus 1-2-3 (2nd edition) Edward M. Baras

Delves into more powerful and complex techniques using the newest software upgrade, Release 2. You'll learn to set up your own command menus; use depreciation functions, matrix manipulation, and regression analysis; and convert text files to the 1-2-3 worksheet format.

Osborne/McGraw-Hill Our price \$52.38. Save \$3.94.

Using dBASE II Carl Townsend

Organizes the material in a format that is easy to follow for those new to database programs. Using dBASE II does pay careful attention to the order of learning this system. There's plenty of information to get one started, and the book should provide a solid foundation for later reading on the subject.

Osborne/McGraw-Hill Our price \$55.14. Save \$4.15.

The MSX Book Paul Hoffman

Your fundamental guide to the MSX computers. Whether it's entertainment, education, business application, or household functions that you've got in mind for your MSX computer, this book outlines the many options available to you. Learn how to use the MSX BASIC programming language and the MSX-DOS operating system so that you can gain greater command of your computer. You'll also learn about graphics, sound, and telecommunications capabilities of the MSX machines.

Osborne/McGraw-Hill Our price \$44.09. Save \$3.32.

Using dBASE III PLUS Edward Jones

An update of Using dBASE III, with this book you'll learn to design, create, and display a dBASE III PLUS database, devise entry forms with the dBASE III PLUS screen painter, generate reports, use Query files, and plug into dBASE III networking. In addition you'll find out how to install dBASE III PLUS on a hard disk, conduct data searches, and manipulate assistant pull-down menus. This is a thorough and practical handbook for both beginning and experienced dBASE III users.

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The Framework Book David Kruglinski

This guide shows users familiar with the basics of Framework, how to apply its word processing, data base, spreadsheet, and graphics functions. You'll learn about Framework integration - linking spreadsheets to one another and to data bases; data bases to documents; and Framework to external software including WordStar. You'll also learn about using Framework with MITE telecommunications.

Osborne/McGraw-Hill Our price \$49.62. Save \$3.73.

dBASE III Tips & Traps Anderson, Cooper and Demsey

You'll save computing time and avoid troublesome dBASE traps with this helpful collection of creative shortcuts. Written for beginning and experienced users you'll find hundreds of tips and trap solutions for planning an application system and establishing a database, entering and updating data, ordering and retrieving data, relating databases, customizing screen displays, generating reports, interfacing with other software, and converting files from dBASE II.

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Windows: The Official Guide to Microsoft's Operating Environment Nancy Andrews

Microsoft Windows is the state-of-the-art, graphics-based, low-cost operating environment that brings a higher level of efficiency to every PC user. You will learn to: use all of Windows' built-in desk accessories and the Windows applications, combine specific applications to meet specific business needs, start applications, run them and transfer information among them, use Windows in a network.

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COMMODORE

Your Commodore 64: A Guide to the Commodore 64 Computer Heilborn and Talbott

This is an excellent source book that presents a complete introduction as well as operating procedures for the 3-64 and its peripherals, including disk drives, printers and modems. It also offers tutorials in BASIC with instructions for using color graphics and sound... and an extensive memory guide indicating the most usable memory locations, with explanations of what each does and how they work.

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COMPUTE!'s Commodore 64/128 Collection COMPUTE!

Now for the Commodore 64 and the Commodore 128, this collection brings together some of the best games, applications, and utilities from COMPUTE! Publications. All programs run on the 64 and the 128 running in 64-mode. Additionally, there are sections detailing the advanced special features of the powerful, new 128 computer.

COMPUTE! Our price \$33.53. Save \$2.72.

Mapping the Commodore 64 COMPUTE!

An invaluable memory map. Complete details on the functions of pointers, the stack, ROM and Kernal routines, and more. BASIC programmers will find easy-to-understand explanations of advanced programming techniques. Programmers using machine language will find a wealth of useful locations and ideas for programming. For intermediate to advanced programmers.

COMPUTE! Our price \$38.16. Save \$3.09.

100 Programmes for Business and Professional Use Paul Garrison

Each of these 100 short programs fulfills one specific need and runs on IBM PC, PC XT, PCjr, and all Apple II computers. Covering such topics as inventory, loan analysis, accounts payable, name and address lists, advertising cost analysis, invoice printing as well as many other business and personal applications.

COMPUTE! Our price \$69.52. Save \$5.23.

Advanced MS-DOS Ray Duncan

Shows programmers how to fully access the hidden power of MS-DOS. This book covers: screen, keyboard, file, and record access. The internal structure of MS-DOS disks. The Intel/Lotus/Microsoft Expanded Memory Specifications. Creating installable device drivers and filters to extend MS-DOS. Useful comparisons with UNIX and CP/M.

Microsoft Our price \$82.86. Save \$6.24.

APPLE

Apple Machine Language for Beginners Richard Mansfield

A clear, detailed and thorough tutorial on programming in machine language for the Apple II, II+, IIe and IIc. Includes LADS, one of the most efficient and powerful machine language assemblers currently available.

Compute! Our price \$38.83. Save \$2.92.

Machine Language of Beginners Richard Mansfield

Much commercial software is written in machine language because it's faster and more versatile than BASIC. This book is a step-by-step introduction to the subtleties of machine code. Includes an assembler, a disassembler, and utilities, to help beginners write programs more quickly and easily. Covers many popular home computers.

COMPUTE! Our price \$41.90. Save \$3.15.

Printer ribbon economies

by Lok Man Loong

In these days of high replacement costs for dot matrix printer ribbons it is a pleasant experience to learn of a simple way to extend the life of fabric ribbons. This article deals with the type used in the National Panasonic model KX-P1091 and is equally applicable to many other ribbon types, including those used in standard typewriters.

Most ribbons are thrown away long before the ribbon is truly worn out, but in this exercise a ribbon may have its life extended many times before replacement finally becomes necessary.

The P1091 ribbon cassette has a hole into which a sharp pointed object is inserted to flip a springy piece of metal. This pushes the ribbon against the rubber wheel containing additional ink to re-ink the dried ribbon when the ribbon first becomes faint.

The first stage in preserving the life of your ribbons – and this would appear to be applicable to almost all ribbon types – is to re-ink them either internally or externally, depending on the physical construction of the cassette.

Buy a small bottle of "Numbering Machine Ink" from your local stationery shop. This ink is the thick type used in the Post Office for their metal franking stamps and is much thicker than the type used for rubber stamp pads which will dry out very quickly. A bottle of Carters numbering machine ink, made in the U.S.A. cost me \$HK30. This is just over \$NZ6.50, about half the price of a Panasonic ribbon here in Hong Kong.

For some types of ribbons it may require some patience to apply the ink thinly to the exposed ribbon and then wind it into the cassette to expose a new area to treat, but this patience is rewarded by a much extended ribbon life.

With the 1091 cassette there are four small cut-outs in the side of the casing which will accept the blade of a small screwdriver. Careful twisting of the blade will release the two sections to reveal the ribbon squeezed into the right side of the cassette while the left side is taken up with the reservoir wheel.

With care, reset the spring back to its original position so that the spring



rests against the outside casing. Take the numbering machine ink and apply several drops to the reservoir wheel, and then wipe the top of the ribbon stored in the right side of the cassette with a very small amount of ink. This ink will work its way down to the bottom of the ribbon within a short time.

After doing this, reassemble the cassette making sure that all internal parts are still in the correct position.

Re-insert the cassette into the printer and feed a piece of friction feed paper into the printer. Set the printer to Tractor and then switch on holding down the LF button so that the printer goes into Test Print mode. After several passes of the printhead, move the Friction/Tractor paper feed switch to allow the paper to move up and see how dark the print has become.

Switching back to Tractor mode will save paper while the ribbon cycles round getting re-inked when passing the rubber wheel reservoir. Should the print be too light, add some more ink to the reservoir and to the top of the ribbon.

Finally, when the printout is suitably dark, the printer ribbon can be returned to service.

As an indication of life of treated ribbons, the one I am using was installed in my Super 5 EP1201 printer, a similar model to the

National Panasonic P1091, in April 1986 and it is now mid-February 1987. The ribbon has been re-inked three times and is still usable for a long time.

Two last things can be done before going to the expense of replacing the cassette ribbon. Place a small coin under the ribbon cassette just behind the printhead, which will cause the printhead to strike a new area of the ribbon and thus extend the life of the ribbon. Care should be taken to ensure that the coin does not fall off and damage the mechanical or electronic parts. The other point to bear in mind is not to raise the height too high or parts of letters will not be printed.

Also, it is possible to remove the ribbon entirely and replace it back inside the cassette with the area which was the top of the ribbon now at the bottom, and thus giving the printhead yet another new area to use. Doing this is not too messy, and can be undertaken by those wishing to practise the very maximum of economy.

Even with re-inking, the time will eventually come when the ribbon will need to be replaced when holes start to appear, but for the small investment in time and ink, you will have saved yourself a lot of money.

Fonts of knowledge

by John King

The idea is sound. Have a full-blown desktop publishing system on the company microcomputer, complete with laser printer and one of the several MS-DOS packages now available. Do all the clever layout work, complete with graphics, on the screen and most of the printout on the 300 dpi laser and, when really top-quality final print is needed, output the file on to disk and whip it round to your friendly neighbourhood typographer. He can put it straight into his 2,500 dpi resolution laser machine and present you with what you've always wanted - real professional printout at minimal cost, and all under your direct artistic control.

Unfortunately it doesn't yet work like that. The technology's there, certainly, but what is preventing this happy state of affairs is that old industry problem - lack of standardisation.

The machines will recognise the contents of the disk file, but the problem lies within the font designs of the individual laser printers. What one calls, for example, Times roman looks very similar to another printer's Times roman, but its mathematical equivalents of height, width, spacing, hyphenation, and all the other factors relating to the very exact science of typography will be different. The result is lines which don't justify properly, columns of different lengths from those carefully set out on the screen, space for graphics of a different shape, and a most unsatisfactory mess, not at all what has been visualised.

In most cases, that is. One laser printer manufacturer has in fact gone to the trouble of matching its fonts to an internationally-recognised standard, and material laid out with Pagemaker on the same manufacturer's micro is able to be directly processed on Linotype machines to the (typesetting) industry's usual high quality. The result is what many people would like to see with their own systems, but can't.

That manufacturer is Apple, first with what is now recognised as the desktop publishing (a term invented by Aldus, of Pagemaker fame) industry standard on its Macintosh. The micro world is divided sharply

into two opposing camps: those who swear that Apple and Macintosh is the only real way to go, and will point to its superior user-friendliness and the demonstrated success of the Mac/Pagemaker combination; and those who strongly resist such ideas and will go out of their way to prove them wrong.

The two sides will probably never agree, but at the moment there's reason to believe that Apple still holds the upper hand. In the case of the DTP output, Apple's advantage is in its fortuitous standardisation right from the start.

The Apple LaserWriter uses fonts from Adobe, the Postscript-based page description language now also adopted by IBM, which are copyright from International Typeface Corporation. ITC is one of two worldwide typeface companies, the other being Mergenthaler, generally recognised as being unique to itself. ITC fonts are also used by Linotype, whose laser machines are used by a number of printing bureaux and so are compatible with the output from the Apple system.

"In MS-DOS, nobody knows what's needed," says Mike Taylor, "but that doesn't stop the salesmen. It's OK in-house, but useless when trying to upgrade by taking disks to a bureau with Linotype laser machines."

Mike Taylor is sales manager for Delairco, Apple dealer and Linotype distributor for Australia and New Zealand, and as such could well be seen to be promoting his company's products by pointing out the opposition's bad features. However, while admitting his vested interest, he insists that he is doing it to protect the industry in the long run.

"I don't want people out there to be buying something that isn't going to work for them," he says. "There are so many wild stories, claims and counterclaims that it's frightening. There must be machines sitting out there unused."

"When looking to buy a system, ask a few serious questions, and get a few serious answers - in writing. It's all very well saying you only need an XT, but you also need a graphics card, mouse, MS-Windows and that sort of thing. It all adds to

the price."

The growth path, he says, is on to bigger and better printers, but they must be compatible with existing equipment. It's perfectly possible to use an MS-DOS system, of course, using such a Postscript language-based package as Pagemaker and a LaserWriter, which allows a disk to be transported directly to a bureau for the final, high-quality 2,000-plus dpi printout.

But there's another method currently being explored - and used productively - by some magazine and book publishers. It's not desktop publishing in the now-accepted sense of the term because there's no way of doing layouts on the computer screen, but as a means of bypassing the actual typesetting process and its costs it does show promise.

For a long time the thought of keying text twice has rankled with those time-and-motion types who like super efficiency. Somebody sits down at his word processor and rattles off an article, which is sent into the magazine where the sub-editor goes through with his pencil (traditionally blue, although a red ballpoint is much more satisfying) and makes corrections. The text is then delivered to the typesetter who keys it all again, into the machine which produces the high-resolution bromide in columns which are later cut up and pasted on to sheets in the layout stage.

Wouldn't it be much better, everybody says, if the output from the word processor could be directly edited and the disk taken around to the typesetter to be put in and the bromide made from that?

Such things are possible, and companies like Rennies, Artspec and Typocrafters are providing such a service in Auckland at the moment. The word processor output needs to be converted into a straight ASCII file without all the usual WP commands, but as long as the final result looks the same, nobody will realise the process hasn't been through the usual number of steps.

And this very article has been produced in this way. It may be a step short of the ideal desktop publishing situation, but it's a step in the right direction.

Keynote speaker



Tim Hartnell

In line with previous years, the keynote speaker at the Software Awards dinner at Computing 87 will be an overseas expert in his field. Addressing the function on Thursday 28 May is Tim Hartnell, author of more than 60 computer books, many of them best-sellers and translated into some six languages all over the world.

Two of his better-known recent books are *Exploring Artificial Intelligence* and *How to Program the IBM PC - if you've never programmed a computer before*, while his latest is *Desktop Publishing - The Book* which is, not surprisingly, a guide to desktop publishing. He is currently writing a book on MS-DOS and is a contributor to a number of Australian computer magazines.

An Australian who regularly commutes between his Melbourne and London offices, Hartnell also writes software which is exported to several countries. He is rapidly becoming recognised as an expert in DTP and will be presenting seminars on the subject at the exhibition.

His keynote address at the Software Awards dinner will outline trends in the computer industry, the basic topic being "Where the Industry's Heading". It should not be thought to be all heavy going, however, for Tim Hartnell's talks are known to include light-hearted descriptions of some of his contacts with such well-known world-wide names in the industry as Adam Osborne, Clive Sinclair, and experiences at the parties of Microsoft's Bill Gates.

Tradition of success

The overall winner of this year's Software Award, sponsored jointly by *Bits & Bytes* and Verbatim, can look forward to considerable success in the field, if the experience of previous winners is anything to judge by. The annual award is designed to highlight New Zealand capability in software production and promote the idea of local expertise.

Kiwisoft, a small Auckland company, won the first award in 1985 with a graphics package for the Commodore 64 and BMC, born out of the hobby market. Expansion since then, however, has seen it move out of the microcomputer area into minis, with considerable success in exporting both software and specialised hardware.

In conjunction with DEC and its Pro380 range, with costs of input/output devices related directly to commercial and industrial applications, Kiwisoft has developed its own photographic input scanner and graphics manipulation software. Overseas users include a Feltex company in Melbourne with a carpet and textile design station, and more recently a computerised Indentikit system for the Tokyo police. Kiwisoft managing director Rachel Salive reports that other police forces around the world are showing great interest.

But some micro applications are being developed now for the VAX-mate and PC/AT ranges, including a logo system to allow the newspaper industry to edit and control logos for classified advertisements. Another system which is interesting the trading banks is signature verification, which can operate on PCs to allow tellers to verify cheques without having to rummage through voluminous filing drawers.

In the pipeline, according to Rachel Salive, is document archiving using WORM (write once, read many times) disks for bigger companies' mass storage in permanent electronic form. Kiwisoft is tailoring hardware and developing the software for full-colour archiving, each disk being able to

hold 24,000 A4 pages to a resolution of 300 dpi.

More than doubled

And if expansion is any indication of success, Soft-Tech is currently doing well in the industry. With a staff of four when it won the 1986 Software Award for its aluminium joinery production system, the Hamilton company currently numbers 10 and is concentrating on manufacturing and geographical information applications.

"We're doing well overseas," says Soft-Tech's David Price, "and in the process of expanding to other markets, doing American market research. We're going through the procedures of forming a joint venture with a Thai-American company."

Soft-Tech uses Wangs as its parent computers, but because its software is written in C the systems are transportable to other hardware. A current move is into CAD-based mapping, with staff going to the US for CAD training, and the company is looking at data acquisition systems to operate with PCs, with a view to a later upgrade to mainframe CAD files.

"Land information systems are the way to go," Price believes, quoting one forecast which indicates that \$200 billion per year will be spent by the year 2000. Such systems are definitely expensive, however, making use of the very latest in technology in maps, aerial photography and laser disk equipment, and the majority of current work is being done in Asia.

But although Soft-Tech is still developing its manufacturing software, it won't be entering this year's Software Award competition. A process control and data acquisition system is under way for the plastics industry, with expert factory scheduling and materials and resource planning, but is not yet ready.

"Just watch out for us next year, though," says David Price.

Computing 87 – a show to be remembered

Computing 87, being held at the Overseas Terminal, Princes Wharf, Downtown Auckland on 28, 29 and 30 May, promises to carry on the tradition set by previous exhibitions and be the year's major computer event for New Zealand.

New hardware will be on display, much of it for the first time in this country, including the Amiga 500 and 2000 models, Macintosh's SE and II, several new 80386-based computers, and such peripherals as optical disk storage systems, or WORMs.

Seminars will cover a wide range, including desktop publishing, local area networks, computer-aided drawing (otherwise known as DTP, LAN and CAD respectively), multi-users, communications, and retail

point-of-sale. In addition, product seminars will see the release and demonstration of new items, both hardware and software, as the exhibition will be the launching pad for a whole raft of products.

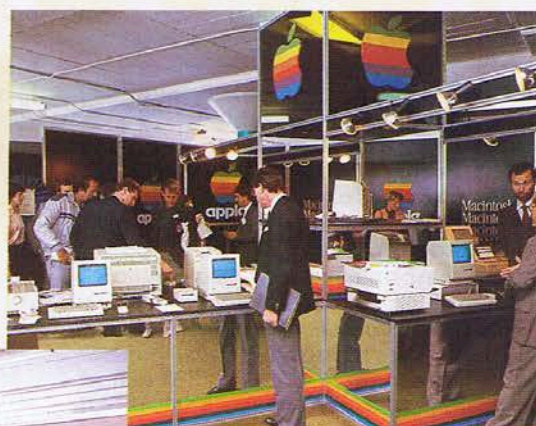
The third annual Software Awards, sponsored this year by both *Bits & Bytes* and Verbatim, will be presented at a special industry dinner at Kingsgate Centre during the evening of Thursday 28 May. Keynote speaker will be Tim Hartnell, the Australian computer expert, and the awards will be presented by the Rt Hon R.J. Tizard, Minister of Science and Technology. Four separate categories are open this year: Business, Education, Farming, and Recreation, and the judges are presently

evaluating the entries.

In association with the awards is a new feature of the show. A special Software Showcase area in Hall 2 is devoted entirely to New Zealand-written software, showing the wide range available from an industry which contributes much to the country's export earnings.

Computing 87 is open from 10am to 6pm on the three days. Admission is free by business invitation on the Thursday and Friday, and \$3 per adult, \$1 per child for the general public.

The show catalogue will appear in the June issue of *Bits & Bytes* which is being printed early to coincide with the event.



VALUABLE DATA SAVED BY ANTI-STATIC DISK LINER!

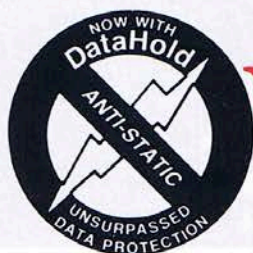
Static charges in offices around the world are wrecking valuable data every day.

More than 1500 volts of static charge can be generated by a walk across a carpet. If you're carrying a normal floppy disk at the time, the charge goes instantaneously into the magnetic media.

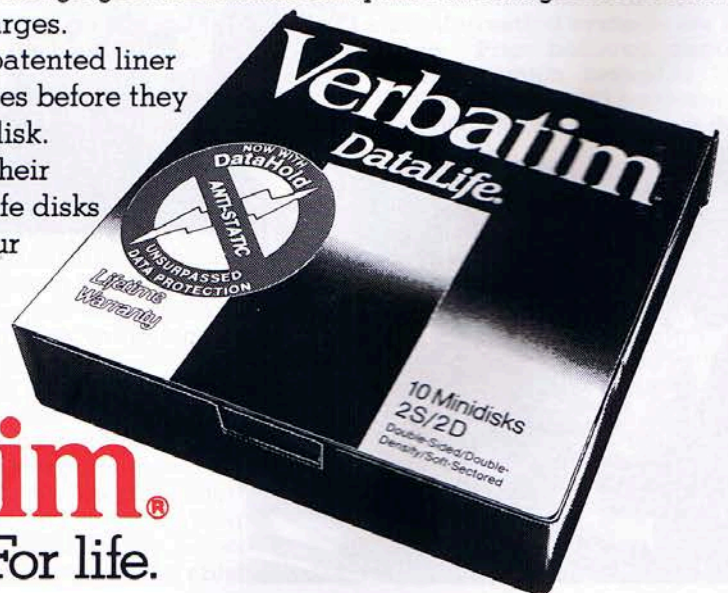
One floppy diskmaker has beaten the charges.

Verbatim DataLife diskettes now have a patented liner called DataHold, which disperses static charges before they can penetrate to the data storage area of the disk.

With this exclusive protective liner, plus their 100% error free certification, Verbatim DataLife disks confidently guarantee to store and retrieve your most valuable data without incident for at least a human lifetime.



Verbatim®
Word perfect. For life.



And a warm welcome to...

by Mark Lim

You don't know me yet, but I'm your new Apple Columnist – and does that make me sound like some kind of almighty expert!

The fact is, though, that I'm probably much younger than many of you – I get my BA from the University of Auckland this month – and far less experienced in matters of 'real world computing'. So why am I writing this column instead of you?

Well, why not?

I will admit to certain interests and prejudices, which will no doubt reveal themselves, but the way I see it, this column is as much yours as mine, so write to me. Please! I can't promise to be much help all of the time, but you never know what a little publicity can't do. And besides, I need ideas on how to fill the pages of this column.

Basic.Windows

Having got all of that off my chest, it's now time for a quiz. A very short quiz – only one question:

How hard is it to do windows on an Apple II?

By that I don't mean Macintosh-style windows, with title bars, elevators, size boxes and all that, far less a proper Windows, Icons, Mouse and Pull-down menus (WIMPs) user environment. All I mean is the ability to place a box of text on top of some pre-existing text, play around with that box, and – when we're done – remove it to see our original text still waiting for us.

Actually, windowing an Apple II is not very hard at all, at least not when we've dropped all the bells and whistles. Listing 1 is a machine language routine which, with a properly-written BASIC driver, can open and close a maximum of 256 windows, and will only take up 2254 bytes of memory. Of those 2254 bytes, only 206 bytes are actual program. The rest, exactly 2kb, is window buffer – where we store the text underneath a window we're opening.

An Owner's Guide

To use this routine – which I've called BASIC.WINDOWS – simply include all of Listing 1 in your own program. Then, when you run your program, GOSUB 25000 (or wherever it is you've put BASIC.WINDOWS). This causes ProDOS, or DOS 3.3, to allocate 2kb of window buffer to the routine. Do this only once, otherwise you'll run out of memory quick smart. (The error message will be NO BUF-

FERS AVAILABLE).

To open a window, CALL 807. this causes BASIC.WINDOWS to copy all of the data in the Main and Auxiliary Text Pages to its window buffer, overwriting anything already stored there. To close a window, CALL 844, which does exactly the reverse. this means that BASIC.WINDOWS can work with an 80-column display. In fact, BASIC.WINDOWS was designed that way, since I don't see much point in windowing in 40 columns.

Notice that I mentioned that BASIC.WINDOWS overwrites its own window buffer when it opens a window. This doesn't mean, however, that you can only open one window at a time. BASIC.WINDOWS stores the number of the page at which its window buffer begins at memory location 768. If you let $X = \text{PEEK}(768) * 256$, you can then PRINT CHR\$(4) "BSAVE WINDOW.n,A"X",L2048", where n is a count of how 'high' the window you're saving is 'above' the background text on your screen.

This count is updated by BASIC.WINDOWS every time it opens and closes a window, and you can get it for yourself by PEEKing (772). If you were to BSAVE your windows to the / RAM volume of your 128kb machine, you'd be able to have just about 32 windows open on your screen at once, and all from BASIC.

Caveat

As anyone who has tried to deal with the Apple's text and graphics display from assembly language would no doubt testify, the way such data is stored in memory is – to say the least – bizarre. Let's just take the Apple text display as an example, since that's what BASIC.WINDOWS deals with.

Two blocks of memory are set aside for the display of text, and they are called – logically enough – Text Page 1 and Text Page 2. Programs store text they want to display in either of these two pages and the Apple's display hardware then reads these memory locations and prints text to the screen. Text Page 1 begins at memory location 1024 (\$0400) and Text Page 2 at 2048 (\$0800). Since 2048 is also where BASIC programs normally begin, most of the time we use Text Page 1 only.

Now, you might think that this text page would be organised in a linear fashion, with VTAB 1 HTAB 1 stored at 1024, VTAB 1 HTAB 2 at 1025, VTAB 2 HTAB 1 at 1064 (ie, 40 memory locations on) and so forth, but it isn't. The first line of our text display

Listing 1: BASIC.WINDOWS

```
25000 FOR I = 773 TO 974: READ X: POKE
      I,X: NEXT : CALL 773: RETURN
25005 DATA 169,8,32,245,190,176,24,141,
      0,3,105,3,141,1,3,105
25010 DATA 1,141,2,3,105,3,141,3,3,169,
      0,141,4,3,96,76
25015 DATA 12,190,32,145,3,169,4,133,6,
      169,7,133,7,173,0,3
25020 DATA 133,8,32,119,3,141,84,192,
      173,2,3,133,8,32,119,3
25025 DATA 32,177,3,238,4,3,96,32,145,
      3,173,0,3,133,6,173
25030 DATA 1,3,133,7,169,4,133,8,32,
      119,3,141,84,192,173,2
25035 DATA 3,133,6,173,3,3,133,7,32,
      119,3,32,177,3,206,4
25040 DATA 3,96,160,0,132,60,165,6,133,
      61,162,255,134,62,165,7
25045 DATA 133,63,132,66,165,8,133,67,
      32,44,254,96,104,168,104,170
25050 DATA 165,6,72,165,7,72,165,8,72,
      173,28,192,72,173,24,192
25055 DATA 72,141,1,192,141,85,192,138,
      72,152,72,96,104,168,104,170
25060 DATA 104,48,3,141,0,192,104,16,3,
      141,85,192,104,133,8,104
25065 DATA 133,7,104,133,6,138,72,152,
      72,96
```

is indeed stored from 1024 on, but the second begins at 1152 (\$0480), the third at 1280 (\$0500) and so on until the eighth, which is stored from 1064 (\$0428) on. Don't try to understand all this; it's not worth it.

I could have used some formula to calculate all those base addresses, or a table to look them up from, but that would have made BASIC.WINDOWS too big to fit where I wanted it to – from 768 (\$0300) on. (As it is, BASIC.WINDOWS fits with just one byte to spare.) So I decided to copy all of Text Page 1 to my window buffer, that is $2 * 1024 = 2048$ instead of $2 * (40 * 24) = 1920$ bytes. (Those twos come in because there is another Text Page 1, in Auxiliary Memory – where BASIC programs can't go – which we have to save as well if we want to window in 80 columns.)

The problem is this: those 2048 – 1920 = 128 bytes are not unused. These 'screen holes' – the ones in Main Memory in particular – are where configuration information about our various I/O devices is stored, such as baud rate, word length, and mouse location.

If you were to reconfigure your printer or modem in between opening and closing a window, or if you were to move your mouse, chances are you'd lose touch with them after you'd done with that window. The thing to do, then, is to lock out reconfiguration of I/O devices and mouse moves during this critical period which, unfortunately, happens to be

(continued on p.61)

On the yellow brick road

by Joe Colquitt

Last time, the steps needed to write your adventure were outlined. Hopefully you've thought up a topic and objective, number of locations and so on. This month sees the start of programming, so get your keyboards ready.

Modify your own program using mine as a guide. For instance, I'm using only 15 locations. You may want to use 40, so make adjustments to the DIMension statements, room descriptions etc. If a printer is available, use it, especially in the later stages when loose ends need to be tidied up.

The first routine to be described is the response routine. Although INPUT can be used, it does leave itself open to corruption by people entering CRSR keys or CLR etc. Subroutine 1 is a GET loop, which means that every key press can be examined and eliminated if it falls outside the prescribed ASCII range.

The maximum length of the response can also be preset. This shouldn't be necessary in an adventure, which typically has a two-word response requirement (verb/noun), but the routine is quite suitable for inclusion in any program. Because the routine is a GET loop, a 255 character response is possible.

The second part searches the response for a space between words, thus finding the verb and noun. It then makes a substring of the first three letters of each and compares this with the verbs and nouns acceptable to the program. If a direction is entered (eg NORTH or just N), the implied verb GO is assumed. Any other single word answer causes an error message.

The location data lines follow as subroutine 2. There are several ways of storing the information. Either a loop can be used, or each room description may be assigned directly, eg LOS(1)="description". Be aware that wordy string descriptions take up a lot of room, and a better

approach for a large game would be to store the strings by POKEing them, and passing the room number to a machine language subroutine for printing. This is a fairly simple task if only plain text is required, so I'll show you how later in the series.

The major advantage of storing data this way is that RAM under ROM can be used. This means that for example 4kb of BASIC RAM can be reclaimed, and the data stored in an area that BASIC couldn't have used anyway. Strings also have a nasty tendency to consume far more than just their implicit size. Bits of dynamic strings can slowly fill memory above the program, eventually corrupting the program unless sometimes tedious garbage collections are performed.

The numbers after the descriptions are the interconnections for the rooms. If you refer to last month's diagram, you'll see how it works. The four numbers correspond to the rooms reached by going N,S,E,W. Taking line 50030 as an example, the numbers 1,6,4,2 mean that entering: NORTH takes you to room 1 SOUTH takes you to room 6 EAST takes you to room 4 WEST takes you to room 2

If you were in room 1, entering SOUTH takes you to room 3, but NORTH, EAST or WEST produces 'YOU CAN'T GO THAT WAY'.

You should have drawn a map of your adventure. Substitute the descriptions and connections that I've used in mine. If you wish to use UP and DOWN follow this method. Although I've not covered this yet, a variable holds the room number you're in as you move around. So if you're in a room that can be exited by going UP or DOWN, allow the input routine to accept UP or DOWN only if the room number is equal to a room that can be exited by UP or DOWN. In the example adventure, UP will be accepted only if you're in room 13 (cupboard), and DOWN only if you're in room 14 (loft). This would apply to ladders, basements, cellars, or even planes, balloons, submarines and the like.

Note that three of the connections for room 8 (the garden) lead back to the garden. Only WEST will get you out of the garden, and NSE keep you in it. Similarly, the pavement can only be got off by NORTH. (The first 15 rooms could have been written as the first part of a much larger adventure).

A fiendish maze is easy to con-

```
60000 PRINT:PRINT"WHAT NOW ";:RE#=""
60005 PRINT"[crvs on]";[c]left];
60010 GETR#;IFR#=""THEN60010
60015 R=ASC(R#);IFR#>95THEN60010
60020 RL=LEN(R#);IFRL>27THEN60030
60025 IFR>31THENRE#R#R#;PRINTR#;:
        GOT060010
60030 IFR=13ANDRLTHENPRINT" ":RETURN
60035 IFR=20ANDRLTHENRE#LEFT$(R#,RL-1);PRINTR#;
60040 GOT060010
60045 :
60050 NO#="" ;VB#="" ;NO=0 ;VB=0
60055 FORI=1TORL:IFMID$(R#,I,1)<>" "TH
        ENVB#VB#MID$(R#,I,1):NEXT
60060 V1#VB#VB#LEFT$(V1#,3):FORI=1TO
        NV:IFVB$(I)=VB#THENVB=I:GOT060075
60065 NEXT
60070 VB=1:NO#VB#;GOT060085
60075 IFLEN(V1#)+1>LEN(RE#)THENNO=0:RE
        TURN
60080 NO#RIGHT$(R#,LEN(RE#)-1-LEN(V1#
        ))
60085 N1#NO#;NO#LEFT$(NO#,3):FORI=1TO
        NN:IFNO#NO#(I)THEN60100
60090 NEXT
60095 NO=0:RETURN
60100 NO=1:RETURN
```

Comments

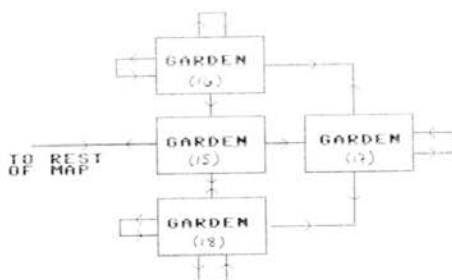
```
60000,60005 print prompt,null Response#
60010,60015 get key, check for >Z
60020 check length of response
60025 if 31>key<95 add to string
60030 if key=RETURN,terminate
60035 if key=DEL,take last char off
60040 loop
60050 clear noun and verb variables
60055 find the space
60060 truncate verb to 3 chars,compare
        to verb list. If found,VB=1
        if not found,assume direction and
        implied GO. Assign response to
        noun string, eg if NORTH was ent
        ered, verb=GO,noun=NORTH
60075 if LEN(verb#) is the same as LEN
        (Response#),then only one word
        was entered. Exit
60080 get the second word,starting at
        the space
60085 truncate noun, and look for it in
        the noun list
60095 if not found,NO=0 (unrecognised)
60100 found,NO=1
```

```
50000 DIMLOS(15),LOZ(15,3)
50005 FORI=1TO15:READLOS(I)
50010 FORJ=0TO3:READLOZ(I,J)
50015 NEXTI:NEXTJ
50020 DATA IN A ROOM WITH A DESK,0,3,0,0
50025 DATA IN A ROOM WITH PORCELAIN FUR
        NITURE,0,0,3,0
50030 DATA IN A HALLWAY,1,6,4,2
50035 DATA IN A BEDROOM,0,0,0,3
50040 DATA IN A CUPBOARD,0,0,6,0
50045 DATA IN THE HALLWAY,3,10,7,5
50050 DATA IN THE LOUNGE,0,0,8,6
50055 DATA IN A GARDEN,8,8,8,7
50060 DATA IN A GARDEN,0,12,10,0
50065 DATA IN THE KITCHEN,6,13,11,9
50070 DATA IN THE DINING ROOM,0,0,0,10
50075 DATA IN THE DRIVE,9,15,0,0
50080 DATA IN A CUPBOARD,10,0,0,0
50085 DATA IN A LOFT,0,0,0,0
50090 DATA ON THE PAVEMENT,12,15,15,15
```

Comments

```
50000 DIMension arrays for locations
50005 READ descriptions and connections
50020 data for locations and connections
```

(continued on p.86)



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Evolution of computer languages

by Evan Lewis, Ph.D.

Although COBOL, FORTRAN and BASIC are the languages used in the majority of computer installations, Pascal is used increasingly in educational institutions because it encourages students to develop good programming habits. This background will influence the way they approach programming in other languages.

Some hope that Pascal will displace the older languages, but this does not seem to be happening very rapidly, probably because of the inertia of the large number of existing programs. Many organisations have preferred to update existing programs to meet new needs rather than rewrite large packages in new languages. The simpler languages are also more compact and can be more readily implemented on small microcomputers.

Instead the tendency is for the older languages to evolve (not without human intervention!) to incorporate many of the features of the more modern languages. New versions of the older languages are usually "upwards compatible" so that programs written using the older versions can be compiled or interpreted without modification using the new systems.

The IF statement is a classic example of convergent evolution of languages features. In early versions of FORTRAN, IF statements always required branching to specified statement numbers and took the form:

```
IF (A-5) 100, 200, 300
```

The expression in brackets was evaluated and if the result was negative (indicating that A was smaller than 5) control would be passed to a statement labelled 100. If zero (A=5) it would go to 200 and if positive 300. This made spaghetti programming almost unavoidable. Later it was made more comprehensible by taking the form:

```
IF (A.EQ.5) GO TO 200
```

But in modern versions of FORTRAN and structured BASIC (such as BBC or DEC BASIC) the IF statements look very similar to those used in Pascal:

```
IF A = 0 THEN
  PRINT "can't divide by zero"
  B = 1
ELSE
  B = C/A
END IF
```

A further distinction between languages has been the way they are

converted into machine code for execution directly by the computer's hardware. FORTRAN and Pascal have traditionally been compiled languages which means that the whole program is analysed and converted to machine code before it is run. This is often a multiple pass process resulting in extremely efficient code. If, however, a single change is made to the program the whole thing has to be compiled again. This takes time and slows down program development and debugging.

BASIC on the other hand is translated into machine code by an interpreter at the same time as the program is running. Only one statement is interpreted at a time, which means that the machine language cannot be treated as a whole program and optimised. This results in less efficient code which runs tens or even hundreds of times slower than compiled code.

Furthermore, in many implementations of BASIC the machine code representing a single statement is discarded as soon as it has been executed because of a shortage of space in memory to retain it. This results in repeated interpretation of statements and consequently slow execution of BASIC programs.

There are, on the other hand, significant advantages for the programmer in using interpreted languages like BASIC. During debugging the program can be stopped at will and the values of the variables examined. The values can be changed and execution resumed from the point where it was stopped. Individual sub-programs can be executed in immediate mode and the results checked easily.

In some implementations even the program can be changed and execution resumed where it left off. The interface between the language, editor and operating system is often seamless and almost invisible so that making changes to the program is not a complex task.

Compiled languages generally require the programmer to run an editor program to make even small changes to the file containing the program source code, and the other interactive features are not usually available.

The increased use of BASIC with the advent of microcomputers has led

to the development of true compilers for BASIC, resulting in a significant increase in the speed of execution and decrease in size of the resulting machine code programs. Some of the space saving results from the fact that the original BASIC statements (source code) or the BASIC interpreter or compiler need not be retained in memory once compilation has produced the machine code (object code) which can be run directly by the machine's hardware.

Compilation can also be used to help protect programs against unauthorised alteration or copying, since machine code is much less intelligible to humans than the high level language it was derived from.

Compiled BASIC is still not as fast as FORTRAN or Pascal, but program development is streamlined by the advantages of an interpreter and the final program can still benefit from the speed and compactness provided by compilation.

This blurring of the distinctions between features of programming languages might logically lead to the development of a single universal general-purpose programming language used by everyone. Many experts believe that this eventuality is unlikely, because there will always be distinctly different application areas where different types of languages are required. Historically there has been a stratification with FORTRAN used in scientific and mathematical applications, COBOL used in business, Pascal in education and BASIC used on microcomputers in all of these fields. Thus each language has its niche and like animals will evolve according to the requirements of its niche.

However, the niche itself may not remain so clearly defined. As microcomputers become more powerful, BASIC may be displaced in favour of other languages such as Pascal. New technologies (such as networking and concurrent programming using multiple processors) with associated languages will become more important in all areas of computing.

Programmers are likely to continue to have a range of different programming languages to choose from. And of course there are more powerful, higher level languages and packages being developed by the fifth generation projects.

Of Menus, BASIC and CP/M

by James Lawry

If your disk collection is anything like mine, most of your disks will fit into one of two categories: either those with several games on them (those you wrote yourself, of course!) and scarcely if ever changing, or "working" disks with a variety of programs being developed constantly and the content changing continually. When it comes to running the programs, a disk menu as found in a lot of commercial software comes in handy. This is a program (usually saved under the name DISK.BAS and loaded with the command RUN "DISK") which lists the programs available. The user selects one and it is loaded and run automatically.

The problems with using one of these on a working disks are obvious: the list must be continually updated as the selection changes. Solution: use the disk menu 1 listing. This gets around the problem by printing the disk directory on the screen, and reading the filenames using the COPYCHR\$ function. (Because of the use of this function which is not in the 464's BASIC, the program will run on only the 664 and 6128.) The user can move around a highlight bar on the disk directory itself using the cursor keys or joystick, and then press ENTER, COPY or FIRE to make his choice. The facility to change between user areas is also provided, using the < and > keys.

A problem arises if there are too many files to fit in the window in which the disk directory is displayed, when some of the files scroll off the top of the screen so they cannot be loaded. If all the files that can be run are BASIC programs, then this can easily be solved by substituting "*" .BAS" for "*" ." in line 80. This means only files with the subscript "BAS" are listed.

```
10 'disc menu 1
20 'by J. Lawry
30 ON ERROR GOTO 370
40 DEFINT I,J,V,X,Y
50 MODE 1:INK 1,26:PEN 1:INK 0,0:INK 2,6
:INK 3,18:PAPER 0:BORDER 0:CLS
60 WINDOW#1,1,28,3,19:WINDOW#2,1,28,21,2
1:WINDOW#3,1,40,1,2:WINDOW#4,30,40,3,22:
WINDOW#7,1,40,1,25:WINDOW 1,40,23,25
70 y=4:x=1
80 user$="0":filespec$="*.*" 'change
filespec$ to "*.bas" if necessary
90 DEF FNdirspec$(user$)+":"+filespec$
100 PAPER#3,0:PEN#3,1:LOCATE #3,16,1:PRIN
T#3,"DISC MENU"
110 PAPER#7,0:PEN#7,3:LOCATE#7,1,2:PRINT
#7,STRING$(28,154):CHR$(158)+STRING$(11,
154):FOR I=3 TO 21:LOCATE#7,29,I:PRINT#
7,CHR$(149):NEXT I:LOCATE#7,1,20:PRINT#7,
STRING$(28,154):CHR$(157):LOCATE#7,1,22
:PRINT#7,STRING$(28,154):CHR$(155):STRIN
G$(11,154)
120 PAPER#4,0:WINDOW SWAP 4,0:PEN 1:LOCA
TE 4,1:PRINT"KEYS:PEN 2:PRINT"Use curs
orkeys "CHR$(240)CHR$(241)CHR$(242)CHR
$(243)"to move thehigh-light to the file
you wish toload, thenpress "CHR$(24)"C
```

```
OPY"CHR$(24)+"or "CHR$(24)"ENTER"CHR$(24
)",
130 PRINT "Or use thejoystick tomove
thehigh-light,then presseither "+CHR$(2
4)+"FIRE"+CHR$(24)+"button."
140 PRINT CHR$(24)"<"CHR$(24)"&"CHR$(24)
">"CHR$(24)":Change";:PRINT " user area"
;
150 WINDOW SWAP 4,0
160 PAPER#2,0:PEN#2,2:LOCATE #2,1,1:PRIN
T#2,"File selected:"
170 PAPER#1,0:WINDOW SWAP 1,0:CLS:PEN 1:
:DIR,FNdirspec$:WINDOW SWAP 1,0:y=4:x=1
180 v=VPOS(#1):IF v<8 THEN LOCATE #2,15,
1:PEN#2,1:PRINT#2,"No files ";:GOTO 2
40
190 file$="":FOR i=x TO x+11
200 LOCATE #1,i,y:file$=file$+COPYCHR$(#
1)
210 NEXT
220 PEN#1,3:LOCATE #1,x,y:PRINT #1,CHR$(
24):file$:CHR$(24);
230 PEN#2,1:LOCATE#2,15,1:PRINT#2,file$;
240 a$=LOWER$(INKEY$):j=JOY(0):IF a$=""
THEN 240
250 CLEAR INPUT
260 IF a$="," AND user$>"0" THEN user$=M
ID$(STR$(VAL(user$)-1),2):GOTO 170
270 IF a$="." AND VAL(user$)<15 THEN use
r$=MID$(STR$(VAL(user$)+1),2):GOTO 170
280 IF v<8 THEN GOTO 240
290 IF (a$=CHR$(240) OR (j AND 1)) AND y
>1 THEN LOCATE #1,x,y-1:IF COPYCHR$(#1)<
">" THEN GOSUB 350:y=y-1:GOTO 190
300 IF a$=CHR$(241) OR (j AND 2) THEN LO
CATE #1,x,y+1:IF COPYCHR$(#1)<">" THEN
GOSUB 350:y=y+1:GOTO 190
310 IF a$=CHR$(242) OR (i AND 4) THEN GO
SUB 350:x=MIN(x,1):GOTO 190
320 IF a$=CHR$(243) OR (j AND 8) THEN LO
CATE #1,x+15,y:IF COPYCHR$(#1)<">" THEN
GOSUB 350:x=MAX(x,16):GOTO 190
330 IF a$=CHR$(224) OR a$=CHR$(13) OR (j
AND 16) OR (j AND 32) THEN CLS:LOCATE 1
0,2:PEN 1:PRINT"Loading ";file$;:RUN use
r$+":"+file$
340 GOTO 240
350 PEN #1,1:LOCATE #1,x,y:PRINT#1,file$
:;:RETURN
360 ' error trap
370 IF ERR<>32 THEN PRINT ERR,ERL:STOP
380 IF DERR=144 THEN CLS:PEN 3:PRINT"Ple
ase replace the disc, then press any
key";:CLEAR INPUT:WHILE INKEY$=""::WEND
:CLS:RESUME
390 IF DERR=146 THEN CLS:PEN 3:PRINT"Ple
ase put the original disc back in the dri
ve, the right way up. Then press any
key";:CLEAR INPUT:WHILE INKEY$=""::WEND
:CLS:RESUME
400 PRINT DERR,ERL:END
```

```
10 'disc menu 2
20 'by J. Lawry
30 ON ERROR GOTO 380
40 DEFINT a-z
50 no.of.games=6 'change to suit
60 FOR i=1 TO no.of.games
70 READ name$(i),file$(i)
80 NEXT
90 INK 0,0:INK 1,26
100 MODE 1:PEN 1:PAPER 0
110 KEY DEF 72,1,240: ' up
120 KEY DEF 73,1,241: ' down
130 KEY DEF 74,1,242: ' left
140 KEY DEF 75,1,243: ' right
150 KEY DEF 76,1,13: ' fire 2
160 KEY DEF 77,1,13: ' fire 1
170 PEN 1:LOCATE 15,2:PRINT"GAMES DISC":
PEN 2:LOCATE 15,3:PRINT"=====
180 FOR i=1 TO no.of.games
190 LOCATE 9,2*1+3:PRINT i;:".name$(i)
200 NEXT
210 LOCATE 4,19:PEN 2:PRINT"Use arrow ke
ys and "CHR$(24)"RETURN"CHR$(24)" or jo
ystick"
220 PRINT "or type a number to select."
230 choice=1:GOSUB 320
240 in$=INKEY$:CLEAR INPUT
250 IF in$=CHR$(13) THEN chosen=choice:G
OTO 360
260 IF in$>CHR$(49) AND in$<CHR$(48+no
.of.games) THEN IF choice<ASC(in$)-48 T
HEN choice=ASC(in$)-48:GOSUB 300
```

```
270 IF in$=CHR$(240) THEN choice=choice-
1:IF choice=0 THEN choice=no.of.games:GO
SUB 300 ELSE GOSUB 300
280 IF in$=CHR$(241) THEN choice=choice+
1:IF choice>no.of.games THEN choice=1:GO
SUB 300 ELSE GOSUB 300
290 GOTO 240
300 y=2*old+3:LOCATE 13,y
310 PRINT name$(old);
320 y=choice*2+3:LOCATE 13,y
330 PRINT CHR$(24);name$(choice);CHR$(24
);
340 old=choice
350 RETURN
360 LOCATE 9,23:PRINT"Loading "name$(cho
sen)";..."
370 RUN file$(chosen)
380 IF ERR<>32 THEN STOP
390 IF DERR=146 THEN LOCATE 1,23:PRINT C
HR$(18);:PRINT TAB(10),"Wrong disc!"CHR$
(7);:RESUME 240
400 DATA Raffles,raffles.bas
410 DATA Amthello,othello.bas
420 DATA Pontoon,pontoon.bas
430 DATA Electric Fencing,fencing.bas
440 DATA Telly Tennis,tennis.bas
450 DATA Bomber,bomber.bas
```

For games disks, use disk menu 2. This is a very user-friendly menu, again using a highlight bar to choose a program. The two programs contain a few points of interest:-

Lines 110 to 160 of disk menu 2 demonstrate a use of the KEY DEF command. The joystick is redefined to return the same ASCII values as the cursor keys, and the fire button to return a value of 13 (the same as the ENTER key). This is a quick and easy way for BASIC game programmers to incorporate joystick and keyboard control in their programs.

ASCII values 7, 18 and 24 are used in several places. PRINT CHR\$(7) causes a beep from the speaker which, incidentally, flushes the sound queues and is the same beep that you get in direct mode when you try to do certain illegal things such as moving past the end of a line using DEL or the cursor keys.

PRINT CHR\$(18) clears the line from the cursor position to the edge of the current window, and PRINT CHR\$(24) exchanges the pen and paper inks, causing printing to be inverse. These control functions are listed in Chapter 7 of my (664) manual, and are often very useful, especially in other languages that don't have these commands built in, and also in the CP/M sign-on string (see below).

Long variable names are used mostly. Variable names in Locomotive Basic can be up to 40 characters long, all of them significant, so it is a good idea to use long names and make your programs easier to understand. Notice especially "no.of.games" in line 50: if you want a variable name of more than one word, you can use full stops to separate the words (not underscores like

Exploring GW-BASIC Pt.2

by Bryce Utting

Continuing the list of differences between Sanyo BASIC and the IBM PC's GW-BASIC/BASICA:

LOCATE [row] [, [col] [, [cursor] [, [start]), stop]]

The main difference between the two BASICs is that the shape of the cursor can be changed. Start and Stop give the raster lines for the top and bottom of the cursor, allowing it to be changed to underline, midline, fullblock etc.

ON KEY (n) GOSUB line

N sets various functions allowing different keys to be trapped:

1-10 function keys

11 Up arrow

12 Left arrow

13 Right arrow

14 Down arrow

This can only be used when KEY(n) ON has been executed.

OPEN filespec [FOR mode] as [#]file number [LEN=record length]

This syntax is extra to the standard Open command but performs exactly the same task. Mode is one of Output/Input/Append but cannot be

explicitly set to Random (which, ironically, is the default). LEN can only be specified for random files and is the same as the record length for the other Open command.

The devices "LPTn:", "COMn:", "KYBD:", "SCRN:" can be used but may cause errors when used as random files. Note that the colons are required.

PAINT [STEP] (x,y) [,area [,border] [,background]]

Unlike Sanyo BASIC's PAINT, this allows patterned fills. Area is either a colour or a pattern and is the colour/pattern to fill the paint area with. The area's border is specified with a colour and/or a pattern.

Patterns are strings up to 64 characters long, each character corresponding to one line of pixels, resulting in a block eight pixels wide and up to 64 pixels high. The pattern itself sets/blanks pixels by examining the bit patterns of each character (the character itself is not used). This means that a pattern must be designed as a series of 8-bit binary numbers, eg:

11111111 = 255

00010000 = 16

00010000 = 16

11111111 = 255

00000001 = 1

00000001 = 1

This would be used as PAINT (x,y), chr\$(255)+chr\$(16)+chr\$(16)+chr\$(255)+chr\$(1)+chr\$(1) and would fill an area with a brickwork pattern.

When Background is used, the paint would stop not when a solid boundary is reached, but when the background pattern is found. This program fills the screen with one pattern, blanks an area, and fills the empty space with another pattern using the first as a boundary:

10 SCREEN 2

20 PAINT (320,100),chr\$(85)+chr\$(170)

30 LINE (200,80)-(500,120),0,bf

40 PAINT (320,100),chr\$(136)+chr\$(34),chr\$(85)+chr\$(170)

PMAP (expression, function)

This is identical to Sanyo BASIC's POINT function.

POINT (x,y)

Returns the colour of a pixel. Also POINT (function), where a value is returned depending on Function and the current graphics cursor position:

0 Returns physical x co-ordinate.

1 Returns physical y co-ordinate.

2 As 1, but scaled for WINDOW.

3 As 2, but for y.

SCREEN [mode] [, [burst] [, [active] [, [visual]]]

Sets the screen mode. Mode = 0 is text (40 or 80 columns), 1 is medium graphics (320 x 200 in 4 colours), 2 is high resolution graphics (640 x 200 in 2 colours).

Burst either enables or disables colour. In mode 0, Burst = 0 disables colour and Burst ≠ 0 enables colour. Mode 1 is exactly opposite and Burst has no effect in mode 2.

Active sets the active page, ie the page that the computer writes to. This is not the same as the Visual page, which is the page displayed on the monitor. By changing Visual, pages can be switched quickly for animation purposes. In 40 column mode, pages 0 to 7 can be used, while 80 column only allows 0 to 3. Note that paging is only allowed with mode 0 (text).

SCREEN (row,column [,function])

Returns the character at position (Row, Column) on the screen. Function is either 0 (default) which returns the character, or non-zero (for mode 0 only) which returns the colour attribute for that position. For example, V=SCREEN (8,4,1) returns the colour attribute for the character at location (8,4), which can be decoded as FOREGROUND = V MOD 16 BACKGROUND = ((V-FOREGROUND)/16) MOD 128

SHELL command

Executes the MS-DOS command in the string Command, which can contain either a command file (.COM), an executable file (.EXE), a batch file (.BAT) or a single command (eg., "FORMAT B: /S /8 /1"). BASIC cannot itself be reloaded with SHELL.

VIEW PRINT top TO bottom

Defines a text window, used only for PRINT, LOCATE, CLS, and the screen editor. The window is reset to VIEW PRINT 1 TO 25 when a mode change takes place (ie., with SCREEN).

WIDTH device, size

If device is "LPT1:", sets the line width for the printer. Also if "LPT1:" has been opened as a file, WIDTH file number, size can be used.

WINDOW [SCREEN] (x1,y1)-(x2,y2)

SCREEN inverts the y axis, so that positive y is up (as in the traditional Cartesian system). Negative co-ordinates are also allowed.

(continued from previous page)

on the BBC). Remember that upper and lower case letters in variable names are treated as identical.

To customise disk menu 2, enter the number of games on the disk in place of the '6' in line 50, and change the data in lines 420 onwards. For each game, enter the name of the game and the corresponding filename (the one which you would have used to run the game manually), separated by commas of course, after the word "DATA". If you have more than about seven games in the list, the display will not work and you will have to redesign the screen output. An easy way would be to remove the "2" in line 320 and "2*" in lines 190 and 300. If there are more than nine games, you will obviously not be able to select some of them using the number keys, and if there are more than ten you will have to dimension the NAME\$ and FILE\$ arrays with:

55 DIM name\$(no.of.games),
file\$(no.of.games)

When typing in the listings, it may be easier to define one of the function keys as "CHR\$(" since the function is fairly extensively used. Save the programs under the name "DISK" before running them, as they will be wiped from the memory if you load a program while testing them.

Go FORTH

by Brian Conquer

Are you looking for a challenge? Are you looking for flexibility? Are you looking for speed... power?

Are you a beginner who wants to understand your computer more? Are you a programmer who wants to understand the hardware better? Or maybe you are a hardware hacker who wants to understand more about programming.

If the answer to any of these is yes... then go FORTH.

What is FORTH? It is an interesting high level language which came into being in the late 60s. It is often called a threaded language. The program is built up of words out of a dictionary which are then used to define new words. These in turn are then used to define further words. This process can go on till the whole program can be called and run by declaring one word. In practice this is often, but not always, done.

FORTH is available for many chips ranging from the 8080 to the 1802, to the 68000. Some FORTHS are multi-tasking and/or allow multiple users, for example TASKFORTH (8088 V1.00). There are a number of FORTH engines, chips designed with FORTH as their primary operating system such as Novix's NC4000 and Rockwell's F68HC11.

It is available for a large number of systems on tape, disk or in ROM. Many software houses supply extended packages for most commercial micro systems to meet the FORTH 83 standard. Other groups still supply FORTH to meet FIG-FORTH or FORTH-79 standards.

Manufacturers still try to complicate the issue by not sticking to the standards. An example of this is with my own two systems, one the COMX-35 and the BBC Master. The COMX has a FORTH that runs FIG-FORTH but includes a few FORTH-79 words, whereas my BBC Master meets the FORTH-79 standard, but has additional FORTH words. In both cases the extra words are mainly to make use of the unique features of the system.

Portability of language it is much better than most high level languages, especially (dare I say it) BASIC with its innumerable dialects.

However, FORTH is not immune to proliferation of dialects. Most systems meet one of three standards with some extensions. The first standard that was used was FIG-FORTH, written and distributed in the public domain by the FORTH Interest Group (FIG) in the late 70s. Following on was FORTH-79 and then FORTH-83.

An international standards team ensures that things do not get out of control and that standards are maintained. Because of the nature of FORTH, updates to a newer standard, if required, are not as painful as may be thought. Most updates and extensions required for a system can be put into the dictionary and thus made available for use.

FORTH is a stack orientated language. In fact, it has two stacks: the main stack is used to store numbers, and a return stack for nested calculations. FORTH words are taken off the input stream. They are then checked to see if they are in the dictionary. If so, they are acted on. If not, they are then checked to see if they are a number.

Passing this test means they will be placed on the number stack. Failing the test will cause the word to be printed on the screen followed by a ? (question mark). If you had typed in "times table", missing out the dash, it would come back with times? indicating that times was not in the dictionary, and is not a numeric value.

A space is very important and is used as a delimiter between all entries. To explain what happens I will give an example of simple multiplication, 45×22 . FORTH uses Reverse Polish Notation (RPN) for maths functions:

```
45 22 * . [return] 990 OK
```

Explanation is:

```
45 1st number followed by a space
22 2nd number followed by a space
* the operator again followed by a space
. this is to print to the screen and removes the top number off the stack.
```

[return] the key press that causes it all to happen.

The system then comes back with the answer 990 and finishes with OK. How's that for politeness?

Another example: a For next loop

```
: Times-table 13 1 DO
  13 1 DO
    JI * .
    LOOP
  CR
LOOP;
```

First we define a word so we put the colon : then we name the "word" which is Times-table. The name must not have a space in it and can be up to 31 characters in length. Next 13 is pushed onto the stack followed by 1 followed by the word DO.

This gives one loop. Now we have the second loop, which is the nested loop. We use J and I and although they are not defined as variables,

they can be used as such because they are already in the dictionary. If you wish to use a constant or a variable you have to define them, such as variable I or as a constant I.

Now follow the operators * (multiply) . (print take off the stack) CR (carriage return) move to next line LOOP (do the next number in the outer loop)

; (this is the end of the word definition).

To run the program we just type TIMES-TABLE. In BASIC the above is the same as saying:

```
10 FOR I = 1 TO 13
20 FOR J = 1 TO 13
30 PRINT J * I ;
40 NEXT J
50 PRINT
60 NEXT I
70 END
```

As can be seen, the language revolves round the stack. One of the reasons that FORTH is so fast is that it does not do the complicated checking that BASIC does. It leaves that up to the programmer to do, which is why some people say that FORTH is so difficult. Care is needed when popping a number off the stack or putting on items that may be incorrect, as unusual answers will result.

Because of the reliance on the stack, many words are to do with stack manipulation.

For example, DUP means duplicate the number on the top of the stack. If the stack reads 102 500 9 13 from bottom to top and DUP was executed, the stack would then read 102 500 9 13 13. We can now do a read (.) and the stack will be back to where it started from. SWAP reverses the top two items on the stack and DROP causes the top number to be thrown away.

I have given only a short introduction to the use of the stack here. Likewise the dictionary, where new words are placed after they have been defined. There are special words to allow manipulation of dictionary words and the removal of certain words:

- FORGET must be used with care or you will FORGET more than you bargained for.

- FENCE is a handy barrier to protect some of the words.

So - now if you are not too confused but wish to try a language that is 10 to 40 times faster than BASIC and is so fast that it is often not worth using assembly language, with equivalent hassles... then Go FORTH.

Not user friendly

by James Palmer

Within your computer there is an internal language. It is very fast, complicated and often cryptic. Machine language (or machine code as it is often called) can luckily be safely ignored by most of the people for most of the time.

Occasionally however, it can be your only choice. If a program you are writing requires extra speed or for some other reason can't be written in a popular high level language such as BASIC or Pascal, then using machine language may become a necessity. (In high-level languages your computer interprets your 'English-like' commands, rather than being told exactly what to do using its own simple instruction set.) Compared to machine code, high level programming languages are fun. They are relatively easy to learn and are quite user friendly. Machine code is not.

To try to get an idea why some people use machine language instead of BASIC (or any other high level language), we should first make some comparisons between the two.

Speed: Machine language is often ten or many more times faster than an equivalent BASIC program. When you are running a BASIC program a machine language one inside the computer's ROM (Read Only Memory) interprets each BASIC statement and executes it. This can take up a fair amount of time (say 1/1000th of a second). When you run a machine code program it is not interpreted, but tells the CPU (Central Processing Unit) exactly what to do, and the CPU does it. This is what causes the speed difference between BASIC and machine code.

Flexibility: Machine language has full access to your computer's inner secrets, something BASIC just can't match.

Memory: Machine language generally takes up less memory than BASIC, but this depends on what the program is doing. If your program uses a lot of data then massive amounts of memory can be saved using machine language and the proper data crunching techniques.

Compatibility: Programs written in BASIC, or any other high level language, are much more portable between different computers than machine code routines. Machine language programs to do the same task will often be totally different, even on similar computers.

Features: BASIC has excellent in-built capabilities such as INPUT, PRINT and string handling, which all take a lot of effort to perform in a machine language program.

Ease of use: BASIC is far easier to use than machine language. BASIC programs are easier to write, edit and change, and their English-like syntax makes them reasonably easy to understand. Meanwhile machine language programs are often difficult to debug as the computer has no way of telling you what caused an error or even where it happened, and to make matters worse errors are often fatal – causing the computer to crash (or lock-up), that is just sit there not doing anything.

All of these factors should really be taken into account when deciding what language you are going to write a program in. If it can be written in BASIC then it really should be. But if your program needs more speed or you want to do something that would be impossible in BASIC, machine language may be your only choice.

If possible, it's often best to use machine language and BASIC together as this can give you the best of both worlds. You can write the bulk of your program in comprehensible BASIC and use fast machine language routines to handle special tasks. In this way a program can remain manageable but still go beyond the in-built restrictions of a language like BASIC.

On the Atari

The Atari 8-bit computers (400, 800, XL and XE) all run 6502 machine language, so called because of their CPU – the 6502. It is practically impossible to learn how to program machine language without a good book on the subject. However, this does not mean that you can't easily discover the general principles of machine language, how to use it and perhaps to decide whether or not it is worth learning.

A machine language program is a series of very simple commands that directly control the computer CPU. These instructions are stored in a computer memory as a series of numbers. To execute a machine language routine on the Atari we use the USR

function, its syntax being:

`x = USR (addr [,para1, para2...])`

Where:

– x is any variable name.

– addr is the address of the machine language routine.

– para1, para2... are optional parameters – numbers between 0 and 65535. They are used to pass information from BASIC to your machine language routines.

Before we look at a machine code program, a bit of background knowledge is essential.

- Computers count using binary numbers. A bit (short for binary digit) can be either 0 or 1. These binary numbers are normally found in groups of 8 bits – called a byte. A byte can represent numbers from 0 (binary 00000000) to 255 (binary 11111111). When two bytes are used together values between 0 and 65535 can be handled.

- A computer's memory is a series of locations that can each hold a number between 0 and 255 (that is a single byte).

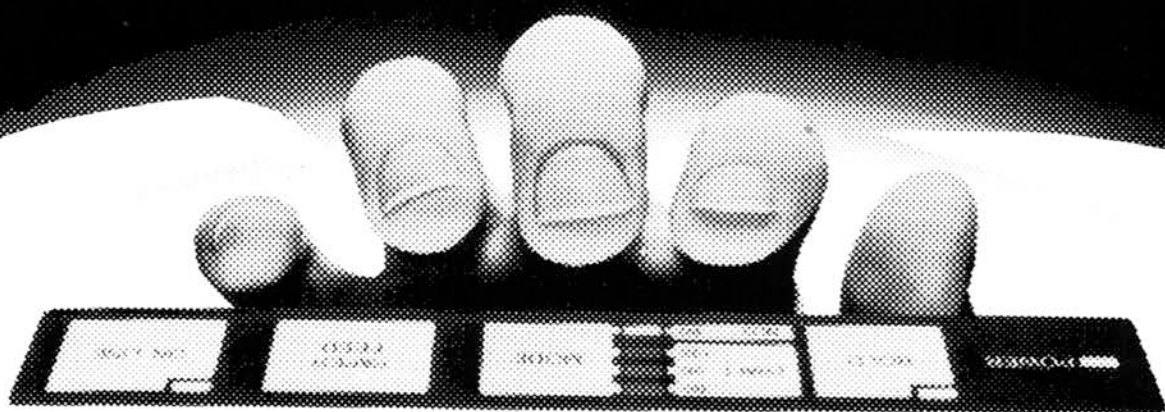
- Assembly language provides a bridge between the series of numbers that make up an executable machine language program and an understandable instruction set with simple commands (eg. LDA #1, RTS, ASL A).

- 6502 machine language programs can use only three "variables", the A, X and Y registers. These registers are similar to variables found in BASIC programs except that they can contain numbers only between 0 and 255.

- The machine stack is an area in the computer memory where it stores numbers and memory addresses for later use. The assembly language instruction to remove the last number, put on the stack and place it into the A register is PLA (pull A off the stack). Only one byte can be removed at a time.

When a machine language program is executed from BASIC (using the USR function) the following information is put on the stack: number of parameters [1 byte]; the value of the parameters (if there are any) [2 bytes each]; and return address to BASIC [2 bytes].

- To return from a machine language routine to the BASIC program that called it, we use the assembly instruction RTS (return from subroutine).



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Simple beginnings

The simplest machine language program is only two bytes long, but not surprisingly it doesn't actually do a great deal.

Command	Code	Comment
PLA	104	Remove the number of parameters from the stack
RTS	96	Return from subroutine.

Before we can run the machine language routine it must be stored in memory:

```
10 DIM ML$(2)
20 FOR N = 1 TO 2
30 READ A
40 ML$(N,N) = CHR$(A)
```

```
50 NEXT N
60 DATA 104,96
```

Obviously there is not much point in the FOR..NEXT loop for such a short routine, but it will be needed for longer ones.

Now to actually execute the program:

```
100 X = USR(ADR(ML$))
```

Note that ADR(ML\$) supplies the address of the string in memory (that is the address of the machine code routine), and also note that no parameters have been passed.

Now RUN the program. Nothing happened? Good, that meant it worked. This routine may not have

done much, but it does show how a machine language program can be used from BASIC. Next month's column will contain a slightly more practical application of machine code – an animation routine.

With any luck you will now have a starting knowledge of machine language, and a reasonable understanding of where and when it can be best used. Machine language is a very powerful tool, but unfortunately it is not as easily learned as BASIC. However, the satisfaction of stretching your computer to its limits can be ample reward for taking the effort to understand it.

Xlent printware

An Atari computer software review by Michael Fennessy

Typesetter by Xlent Software is an incredible example of printware. It is one of the few programs which uses the full 128kb of the 130XE computer. This program contains three main options, Text Editor, Sketch Pad and Print Options, all of which load separately, although there is no need to switch the disk to side B all the time.

Text Editor, when it comes up, looks like an ordinary word processor, but it is far from it. Text Editor features texts in many styles and 32 sizes. It also features more than three character sets, and functions which

make typing in directions, other than right to left, simple. Text Editor also features other special functions.

Sketch Pad is for drawing pictures, icons and symbols. It includes such features as three different sizes of cursor, circle drawing, and other functions including many ways of filling in a picture which has been drawn or the background behind the picture. Things drawn on the Sketch Pad can be transferred to the Text Editor and then further text can be added to them.

The Print Options give a choice of

where on the page everything is to be printed and a choice of many printers including NEC, Prowriter and Panasonic, to name a few.

Although Typesetter is designed to run on the 130 XE computer, a 64kb version is provided on side B of the disk. Overall Typesetter is complicated but excellent. It gives a huge area to work in and puts the operator in full control.

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Shown 5884

SVI and MSX compatibility

by Nigel Burrell

Although SVI BASIC was originally contemplated and designed to be totally compatible with the primordial MSX standard, the BASIC was found to have system errors and routine bugs evident only after the release of the two primeval Spectravideo models (SVI318 and SVI328). The later Spectravideo models (MSX: 728 and MSX: 738) released shortly afterwards were then advertised to have the new and true MSX standard which was not particularly good news to the original purchasers.

These owners suddenly appeared to be lumbered with an incompatible computer which could not run the increasing MSX range of world-wide designed software. An MSX software adaptation program was later introduced on to the market, but only some of the MSX range of software was adaptable using this particular utility, which still left the original SVI318 & SVI328 computer owners at a slight disadvantage.

The differences between the SVI and MSX BASICS presented confusing problems of disarray even for the experts, requiring an enormous amount of reading material that was particularly difficult to obtain. Acknowledging this, I thought that I would devote this month's Spectravideo column to explain the differences of some BASIC commands and I/O (Input/Output) port locations. Please note that some knowledge of programming may have to be acquired to understand the following terms.

First of all, there are four MSX statements that are not recognisable in SVI BASIC: PDL (var), VDP (var), BASE (var), and CALL (string var). The CALL statement is mainly intended when ROM cartridge software extensions to BASIC are present. These of course are not available in the SVI.

The SCREEN command in MSX BASIC is more extensive: SCREEN (mode), (Sprite Size), (Key Click Switch), (Cassette Baud Rate), (Printer Option). The PUT and GET commands in SVI BASIC have no MSX equivalents, and the MSX PAINT command has an extra fill-in feature that is only applicable on the multi colour mode.

Extensive hardware differences are also apparent between MSX and SVI. Listed below are the I/O port locations numbered in hexadecimal notation.

I/O PORT LOCATIONS		
MSX		SVI
80-88	RS232C INTERFACE	28-2E
90-97	PRINTER	10-12
98-9F	VDP (9918A)	80-85
A0-A7	PS6 (AY38910)	88-90
D0-D7	FLOPPY DISK CONTROLLER	30-38
A8-AF	PPI (8251)	96-99
Not allocated	80 COLUMN CARD	50-58
" " " "	MODEM	20-26

There are considerable differences between MSX specifications and Spectravideo I/O. This is not however the main problem as MSX suggests using a BIOS call system, similar to CP/M, to act as an interface to these I/O locations. So in theory manufacturers can have different I/O locations and still have software compatibility through these BIOS calls, but more on this later.

The main problem with the two specifications is that SVI uses the I/O ports of the 8255 and AY-38910 for different functions performed within the computer as shown below.

MSX		SVI	
Bit 0	0000-3FFF	8255	PDP or PAD I/P
" 1	Slot Select	Port A	" " " "
" 2	4000-7FFF	" " " "	" " " "
" 3	Slot Sel.	" " " "	" " " "
" 4	8000-BFFF	TRG 1	" " " "
" 5	Slot Sel.	TRG 2	" " " "
" 6	C000-FFFF	Cassette Ready	" " " "
" 7	Slot Sel.	Cassette Read	" " " "
Bit 0	Keyboard Scan	8255	Keyboard Scan
" 1	" " " "	Port C	" " " "
" 2	" " " "	" " " "	" " " "
" 3	" " " "	" " " "	" " " "
" 4	Cassette On	" " " "	Cassette On
" 5	Cassette Write	" " " "	Cassette Write
" 6	Caps Lamp	" " " "	Cassette Avoid
" 7	Sound Mix	" " " "	Sound Mix
Bit 0-7	Keyboard Return	8255	Keyboard Return
" " " "	" " " "	Port B	" " " "
Bit 0	FWD1/FWD2	PS6	Joystick 1 FWD
" 1	BACK1/BACK2	Port A	" " " "
" 2	LEFT1/LEFT2	" " " "	BACK
" 3	RIGHT1/RIGHT2	" " " "	LEFT
" 4	TRG A1/TRG A2	" " " "	RIGHT
" 5	TRG B1/TRG B2	" " " "	FWD
" 6	Key Layout Select	" " " "	BACK
" 7	Cassette Read	" " " "	LEFT
Bit 0	"H" Level	PS6	Bank 1
" 1	" " " "	Port B	" 21
" 2	" " " "	" " " "	" 22
" 3	" " " "	" " " "	" 31
" 4	Joystick 1 O/P	" " " "	" 32
" 5	Joystick 2 O/P	" " " "	Caps Lamp
" 6	Joy. 1/2 Select	" " " "	Rom 2 Enable
" 7	H Lamp (Japan only)	" " " "	Rom 3 Enable

From these lists it is evident why software compatibility poses such a problem. For example, MSX uses a multiplexed joystick system plus a fairly sophisticated slot select system whereas SVI does not. MSX was designed to have all I/O functions accessible by a BIOS in the BASIC ROM. This resides from &H0000 - &H0159 and allows different hardware I/O locations for different machines.

BASIC compatibility

For those of you only working with SVI BASIC programs, there is a reasonable degree of compatibility. If you are working from listings in books or magazines you should be able to type in these programs with few changes.

The major changes will be a oncer for most programs - the MSX Screen 2 is the same as the SVI Screen 1. If MSX programs use Screen 1 there could be a problem, although this is a text screen and should be possible to adapt.

The major difficulty is transferring programs from SVI to MSX computers (or vice versa) without having to type them all in by hand. As I said earlier, there is an MSX software adaptation program for SVI318 and SVI328 users on the market that can convert your SVI machine to MSX, but conversion of your own programs still needs to be typed in by you.

After saying all this, SVI318 and SVI328 owners shouldn't despair. With the MSX software adaptation program you have the best of both worlds - SVI and MSX.

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In support of PDS

Dear Sir,

I take exception to the statements in your "Micros at Work" (March, p.39) about Public Domain Software. The statements made are quite wrong. Firstly your writer does not seem to know that there are at least three sub-divisions of such material: freeware; shareware; and general distribution software.

Your correspondent does software users an unreasonable disservice by describing freeware and shareware as being at a disadvantage when compared with "standard" software. Two fantastic programs that I know of are examples that beat expensive programs hands down, PC-Write and ProComm. Neither is expensive; they cost less than almost all "commercial" programs and there are few programs that are their equal in any respect.

I use a large number of public domain utilities (DDIR, DDATE, COL-OUR and so forth) that are invaluable for everyday operating system utility work. All cost nothing or came on disks with low-cost main offerings. All have no other source or substitute! I also have a range of useful shareware and freeware items that:

- help generate better BASIC programs;
- provide transcendental functions for standard Pascal;
- help teach C language;
- teach touch-typing;
- word process;

- chart my family history; and
- support dBase tracking of business operations.

Freeware disks come with on-line or printable manuals with help screens and worked examples in some cases. Shareware usually has on-disk manuals, help screens, examples and printer support, with a range of printed manuals, reference cards and updates available from the distributor or software author.

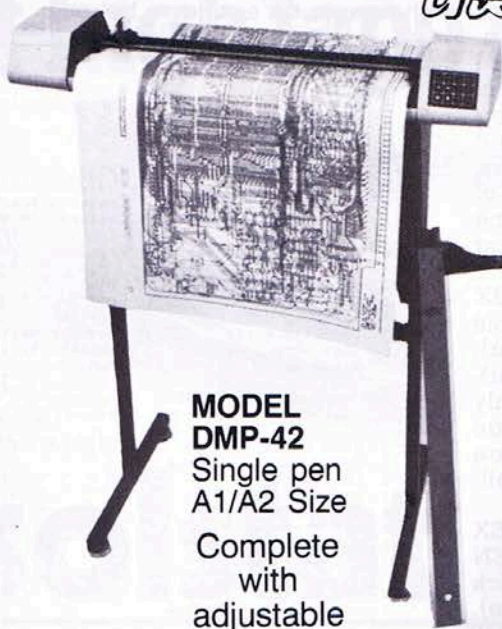
Most of the disks are available for less than \$US10.00 including postage costs; the freeware ones offer support for an additional \$US20.00 or less, while the shareware disks offer manuals, support and updates for under \$US85.00. Many are also available from Bulletin Boards at the cost of transmission time only.

I think your correspondent knows little of Public Domain Software or, because of his/her private interests, deliberately mis-states the case or, most charitably, is only concerned with accounting software (but forgets to say so). Any of those possibilities do your readers no good. You could take much more care to check what your writers are saying, especially when "bulleted" statements in such articles are patently false.

Thanks for your magazine, and keep up the good work.

Lin M. Hall
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PATH to enlightenment

by Selwyn Arrow

This month we take a look at the PATH command. This will be of interest to you if you use subdirectories on either a floppy or hard disk system. If you don't use subdirectories then this should convince you that they are most useful.

When we give DOS an external command or a filename such as CHKDSK or DISKCOPY it has to locate the file with that name to carry out its function. First it looks internally to check if it is a command, but of course in this case it is not found so DOS then looks on the current directory of the logged disk drive for that filename.

The current directory can be either the main or "root" directory or any of the subdirectories on that disk. If the filename is not found there then we get the all too familiar "Bad command or filename" error message. For those not familiar with subdirectories, the root directory is always indicated by the symbol "1" (backslash) and each subdirectory's name is shown separated by that same symbol, eg. A:\subdir1\subdir2\subdir3 etc.

As you can see, you don't have to have a hard disk to use subdirectories as they apply to floppy disks as well.

Searching for commands

This is where PATH comes in. It directs DOS to look in other directories and even other disks (and their subdirectories, of course) in the order we preselect, until it finds the required filename. There is only one catch with PATH: the file we are looking for **must** have the extension of COM, EXE or BAT.

On any disk, but especially on a hard disk system, it is very wise to keep different types of files separated into functional areas. For instance, on a hard disk it is usual to keep most of the files that are originally provided on your DOS disk in a subdirectory called DOS (what else!). The full path name to this directory would then be C:\DOS. To gain access to these files from anywhere else we need to tell DOS to look in that directory by entering:

PATH:\DOS

This line can be entered directly from the keyboard, but we more often

make it a line in our AUTOEXEC.BAT file so that it is always available from boot up time.

The power of the PATH command now becomes apparent. Even if we are logged into the disk in A drive, DOS will still be able to carry out our command by changing to C drive and looking on its \DOS subdirectory for the filename we require. When the job is finished it will log us back onto A drive.

It is important to specify correctly the full pathname to ensure that PATH can work correctly. For instance, if you just specified \DOS, and you were currently on drive A, then DOS would search for a DOS directory on that currently logged drive. That is, it would look for A:\DOS, resulting in the error message when it was not found.

We can specify a particular filename in our PATH if we wish, perhaps:

C:\SYSFORMAT

In this case the only file accessible to us via PATH (without changing to our \sys subdirectory first) is the file named FORMAT.COM.

There is more to PATH than just a

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single directory search. The power of this command also lies in its ability to apply defaults, meaning that we can specify many paths for DOS to search through for our file. To separate each individual PATH we must use a semicolon, as for example:

```
PATH C:\DOS;C:\WORDPROC
```

Now we would be able to enter the name of our wordprocessor program, say filename WP.EXE, from the root directory or even from another drive and DOS would then call it up.

There is a problem, however.

Misplaced files

You will remember from above that DOS can only search for COM, EXE or BAT files with PATH. On the surface all should be OK as your program must have either of the first two of these extensions to be able to run. But most likely WP will have to call up other files from its own directory such as program overlays (.OVR), dictionaries, or of course such text files as letters. Even if WP did work, you would most likely find that any text file that you create will be saved onto whichever drive or directory is current. This could make it difficult to find and you could end up with your correspondence lurking in the most unexpected places.

Now do you remember what we said earlier about keeping similar files together on the same directory?

There is a way around this problem, of course. We can use a BAT file to change to the WORDPROC directory, and it could then return us to the root directory when we are finished. But what if you want to access files on another drive?

Checking other drives

Again this is no problem so long as you specify them fully in your path. There are many good reasons why you would want to do this. I have a PC

with a hard disk plus two floppy drives. My PATH could be set in my AUTOEXEC.BAT file as:

```
PATH C:\DOS;\DOS\UTIL
```

Now when I log into the A drive and I want to copy all its files to the B drive I just proceed as usual with DISK-COPY A: B:. DOS first looks in the current drive for that command file and when it is not found it then changes to C: and locates it in my \DOS directory. When completed it gives me the A:\> prompt as usual. This means I can forget about the distinction between Internal and External DOS command files as they are available to me at all times, no matter where I am in my system.

Better still, I can access many other useful utilities that I keep in my C:\DOS\UTIL subdirectory such as the Public Domain L (an improved TYPE replacement), D (a DIR replacement), WHEREIS (a filename locator) and FT (a text locator). I can also access those very handy disk utility programs such as XTREE and NORTONS UTILITIES which I also keep there for instant access.

Another example would be useful where you have a RAM disk (a portion of memory set aside as a very high speed diskless drive). Assuming the RAM disk is assigned as drive D, in it you could load your most used programs, such as those I mentioned above. You would then use the PATH command:

```
PATH D:\
```

With a multi drive setup you can define the order in which drives (and directories) are checked, so saving time by searching the most likely areas first. For example on a hard disk setup you could use:

```
PATH C:\DOS;\DOS\UTIL;A:\;C\
```

As long as the required file is present in one of these areas it will be found. Of course if you do not have a disk in drive A you will have to respond to the inevitable "Not ready reading drive A Abort, Retry, Ignore?" message, or insert a disk.

Incidentally, DOS always searches through the current directory in the current drive before it uses the PATH command. This means that we don't have to put the current directory into the search path unless we do want to access it from any other logged directory or drive. Since the current directory is always searched first, it means that we cannot get DOS to access files of the same name elsewhere in its PATH. Remember DOS will accept the first matching filename it finds. To use another file of the same name but in another directory or drive, we would need to change to that directory first.

I mentioned earlier that it is wise to organise your programs into subdirectories by subject. I use \DOS, then further subdirectories such as UTILities, PD (Public Domain) for the good stuff I have collected and then use a different set of directories for each of the larger sets of programs and their support files.

For instance, at work I have Wordstar 2000 in a subdirectory named \WS2000. But its menu does have the annoying habit of showing everything in its subdirectory, including all the support programs, overlays etc, when all I want are my text files. Thankfully MicroPro supplies a handy BAT file with plenty of REMarks called WS2.BAT which actually replaces any existing PATH with its own version, after saving your original one of course. Then when you exit Wordstar it replaces its own PATH with your original. Fiendishly clever!

It means that I can type "ws2" from anywhere, and my original PATH is redirected to a temporary file by PATH > C:\WS2PATH.BAT and it is replaced by PATH C:\WS2000;C:\WS2000\SJA. It then changes to the C:\WS2000\SJA subdirectory where I keep all my text files. The cunning part is that Wordstar can still boot from WS2.EXE via the first part of the new PATH and I have only my text files appearing in the menu because that is the current logged directory.

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Little boxes

by Joe Colquitt

This series of articles was written with Commodore 64 6502/6510 in mind. Other 6502 machines (Apple, BBC, VIC 20 etc) will run examples if corrections are made to addresses. The C64 calls ML with SYS, but other BASICs may use CALL, USR etc.

The introductory article in the series dealt with the types of languages, advantages of ML, and a brief look at number systems used in ML. If you typed in the number converter, you should have an idea of how numbers and bits are organised in a computer. To get a fuller understanding, though, it's necessary to do some programming.

When programming in BASIC, it's not usual to use a lot of POKES or PEEKS. More often, the program is made up of such statements as IF..THEN, FOR..NEXT, PRINT, etc. ML relies much more heavily on POKES and PEEKS, because there is no intrinsic facility for storing variables. For example, LET A=100 can't be done in ML. The 100 would have to be POKEd into a memory location, and PEEKed when needed.

Although machine language programming tends toward prolixity, it's extremely flexible. BASIC is analogous to using pre-defined words, but ML is analogous to using letters to make your own words. A steady methodical approach to programming will help you to come to grips with this 'alphabet' and help avoid deficiencies.

The work-horses of ML are the LDA and STA groups, often used in conjunction with index registers. If you have any books on ML, there is bound to be a table of instructions. For quick reference, a short list is reproduced here:

LDA number	immediate
LDA address	absolute (add=065535)
LDA address	absolute (add=0-255)
LDA address,X	absolute X indexed
LDA address,Y	absolute Y indexed
LDA (index),Y	zero page Y indexed
LDA index,X	zero page X indexed
STA (offset,X)	
STA as per LDA except STA number is not used.	

LDA is a mnemonic for Load Accumulator, STA is Store Accumulator. The accumulator is a single byte (780 on the C64) that is used as a temporary storage cell by ML (and BASIC). Numbers (0-255) can be put into it or taken out with ease because the instructions are designed to do this. LDA number is seen in BASIC terminology as POKE780,number. LDA address is POKE780,PEEK(address).

The X and Y registers, when used as indices with LDA, operate in a

fashion similar to, for example, POKE ADDRESS+COUNTER,NUMBER, * where the value in X or Y is the counter. All modes of indexing will be covered in the future.

To return to the first three in the LDA list, below are examples of each. To get them into memory, either run the BASIC loader, or assemble them with an editor (see end of article). Use the SYS numbers to 'run' the routines.

1. stores a character on the screen. My old 64 needs the colour POKEd. Newer models may not. As long as you can see an 'A', that's the main thing.
2. moves the character up a line (ie back 40 spaces)
3. zeros the internal C64 clock. This probably won't work on other than a C64 or VIC 20.

There are several things to note about the data and source listings. First, the ML is poked into a 'safe' area. On the C64, 49152 to 53247 (\$C000 to \$CFFF) is considered safe for ML storage. Really you have to know your machine and other programs you may be running at the same time as the ML to be totally safe. Get a memory map to find out the extent that BASIC uses memory in your particular computer.

Secondly, you'll see how the source code from the assembler outputs numbers in hex. A re-read of the first article will help if you're still unsure of hexadecimal. Of particular importance is the way 6510 handles numbers greater than 255. As you know from Part 1, a single byte can hold 255 maximum. Numbers between 255 and 65535 (255*255) must be split over two bytes, ie 16 bits. The two bytes can be considered as 'units' and 'tens'. When the first byte is full, there is a carry into the next one. The examples below illustrate.

	Byte 1 (Low)	Byte 2 (High)	
255	11111111	00000000	255 'units'
256	00000000	00000001	1 'tens'
257	00000001	00000001	1u+1t
5000	10001000	00010011	136u+19t

There are instructions which increase/decrease the value in a byte. Implementing them affects only one byte. For example, if byte \$C000 contained 255, and you used INC\$C000, the value would roll-over to 0. Generally, you would follow INC with a test of the Zero flag so that the high byte can be incremented if the low byte goes past 255 and back to 0. This is vital when using multiple byte counters, arithmetic, etc.

I don't want to get too involved at this stage, but program 2 demonstrates the principle. I've commented it, if you want to have a go at

understanding it before the topic is covered in detail later.

Thirdly, when a number is put into the accumulator, it can be used as often as necessary without changing the accumulator. Note that when the character is moved, the original is left. To give the impression of a moving character, the location of the original needs to be STA'd with what was there before (in this case, a space).

If you'd like a copy of an assembler (with instructions) for the 64, drop me a disk or tape and sample save. Joe Colquitt, 6 Martin Ave, Mt Albert Auckland.

Note \$00A0 \$00A1 \$00A2 can be used as addresses instead of \$A0 \$A1 \$A2, but they use an extra byte of memory (something not always available).

The same effect could be had by incrementing \$0400 and \$0401 directly. Doing it this way means that if the screen is cleared for some other operation, the values would still be held in \$C000/1.

Program 2: use STOP/RESTORE to break out

```
10 FORI=49408TO49449:READD:POKEI,D:NEXT
15 SYS49408
20 DATA169,0,141,0,192,141,1,192,141,0,
  216,141,1,216,173,0,192
30 DATA141,0,4,173,1,192,141,1,4,238,0,
  192,208,3,238,1,192,162,255
40 DATA202,208,253,76,14,193
```

```
C100 A9 00 LDA#000 :zero counter
C102 8D 00 C0 STA#C000 :
C105 8D 01 C0 STA#C001 :
C108 8D 00 D8 STA#D800 :chars black
C10B 8D 01 D8 STA#D801 :
C10E AD 00 C0 LDA#C000 :POKE1024,
C111 8D 00 04 STA#0400 :PEEK(49152)
C114 AD 01 C0 LDA#C001 :POKE1025,
C117 AD 01 C0 STA#0401 :PEEK(49153)
C11A EE 00 C0 INC#C000 :incr value1
C11D 80 03 BNE#C122 :if < 0 jump
C11F EE 01 C0 INC#C001 :else incr val2
C122 A2 FF LDY#FFF :delay (so you
C124 6A DEX :can see what's
C125 D0 FD BNE#C124 :happening)
C127 4C 0E C1 JMP#C10E :loop
```

Program 1

```
10 FORI=49152TO49179:READD:POKEI,D:NEXT
15 DATA 169,1,141,0,216,141,40,216,169
20 DATA15,141,40,4,96,173,40,4,141,0
25 DATA4,96,165,160,133,161,133,162,96
30 SYS49152
35 GETA$:IFA$=""THEN35
40 SYS49166
45 I1$="000010"
50 PRINTI1$
55 GETA$:IFA$=""THEN55
60 SYS49173
65 PRINTI1$
```

```
C000 A9 01 LDA#001 :get code for
  :white into Acc
C002 8D 00 08 STA#D800 :store it in
C005 8D 28 D8 STA#D828 :colour RAM
C008 A9 C0 LDA#C00 :code for M
C00A 8D 28 04 STA#0428 :store on screen
  :column0, line1
C00D 60 RTS :return
```

move char up one screen line

```
C00E AD 28 04 LDA#0428 :PEEK(1064)
C011 8D 00 04 STA#0400 :POKE1024
C014 60 RTS :return
```

equate three zero page bytes

```
C015 A5 A0 LDA#A0 :PEEK(160)
C017 85 A1 STA#A1 :POKE161
C019 85 A2 STA#A2 :POKE162
C01B 60 RTS :return
```


(continued from p.35)

assistance packages which now abound, it would seem so far to be a success.

A very bold step is this new one into office automation. I guess you could say, "Practise what you preach", so we are installing a local area network (LAN) to connect all our faculty offices together. All typists will be using Microsoft Word on AT machines, while clerks and heads of departments will all have PCs to enable them to access electronic mail, spreadsheeting and databases.

In conclusion

Carrington Technical Institute has progressed from two micros in 1981 to the list you see before you today. Tutors are enthusiastic about using computers, but are limited by the time it takes them to get sufficient knowledge themselves. They not only have to become confident in using the computer facilities in front of a group of students, but they also need to come to grips with how it can best assist them.

It follows that we welcome contact with anyone who can accelerate this progress and prevent the wheel from being reinvented.

As a postscript, I have been honoured with an invitation to attend a UNESCO workshop on innovative teaching using new technology. It will be fascinating to learn what other countries are doing and apply whatever is practical.

(continued from p.72)

struct. I haven't put one in the example (mainly because you don't get lost in your own house), but it is very simple to add one. The diagram below (an extension of the main one) shows how. Three additional locations are added on, each with plenty of 'going nowhere' connections, using a combination of one-way and recursive paths. The rooms are all given the same description, so even though the player may be moving, he doesn't know it. Shame eh?

The three new locations would be given the numbers 16,17,18 and the data

IN THE GARDEN,16,15,17,16

IN THE GARDEN,16,18,17,0

IN THE GARDEN,15,18,17,18

Just three locations arranged like this can cause quite a bit of confusion to a poor player who gets flustered. If a tally of moves is being kept for scoring, a maze trap creates even more frustration.

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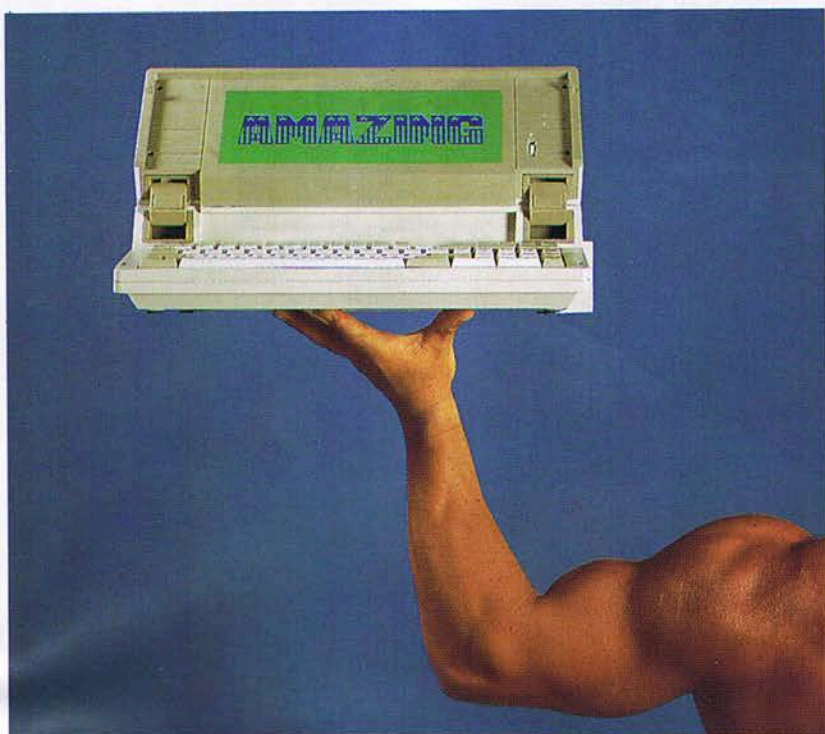
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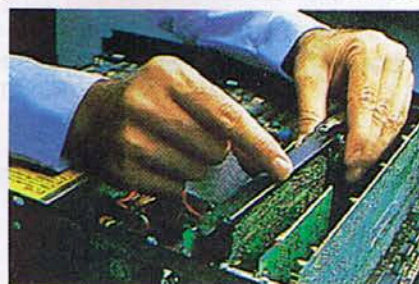
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