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Windfall

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– the code that can't be cracked

Apple III gets CP/M

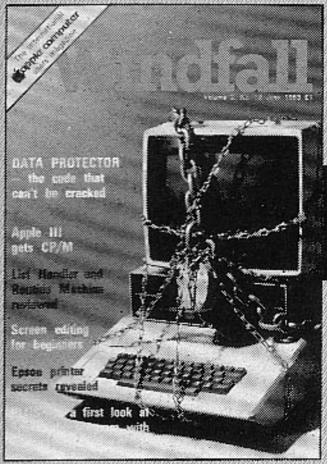
List Handler and Routine Machine reviewed

Screen editing for beginners

Epson printer secrets revealed

PLUS . . . a first look at Savvy, the program with a mind of its own

H. Barnau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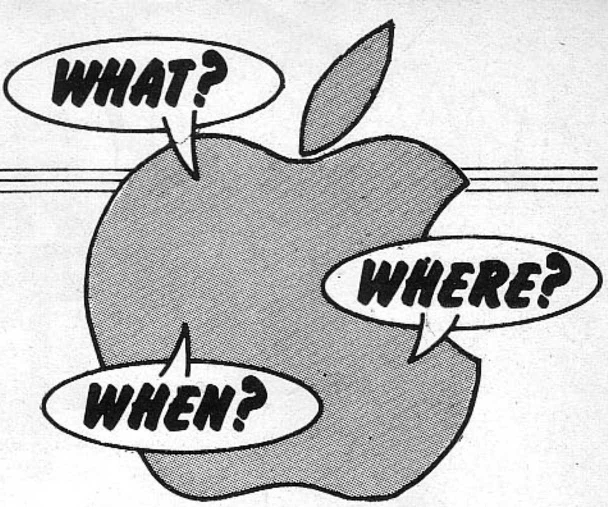
WHAT'S NEWS...

By David Creasey



New philosophy on the software scene

Herb Blumstein (left) at the Feltham warehouse talks of a "tremendous variety of Apple software"

A NEW arrival on the UK software scene could have a major impact on the way software is sold here.

In April Softsel, which claims to be the world's largest distributor of personal computer software, set up its European headquarters at Feltham in Middlesex.

It is offering a wide range of American software which it claims to have tested for suitability, and a support and information facility which it says will help dealers provide a better and friendlier service to users.

It is still busy sizing up the UK market place and UK managing director Herb Blumstein says it isn't clear whether the British market is completely polarised between groups of business only and home/hobby only users, or those who use their micros for a variety of interests.

"But what we are offering that market, whatever it is, is a chance to come alive, to discover the tremendous variety of Apple software that does exist and a chance to really use it," he said.

The company handles material from a wide range of hardware manufacturers, software houses and book publishers. Well known Apple software products include those from Ashton Tate, Broderbund, Microsoft, Peachtree, Sierra On-Line, Sirius, Videx and Visicorp.

Blumstein compares the software market to the top twenty music charts, with flash-in-the-pan successes as well as the long-term stayers, and he believes the user market ought to be able to follow those trends.

Accordingly Softsel offers a "headstart" service to dealers which gives them advance copies of products the company predicts will be best sellers, and a hot list to keep them in touch with what products are selling well in the US.

Just how much of Softsel's philosophy will filter into the UK market depends on the dealers. The company sells only through dealers and doesn't operate a mail order operation.

"If the dealer is good he will pass on the advantages we offer – we give him a chance to get to know his users and to develop a prosperous business," said Blumstein.

Softsel also offers dealers a 30 day evaluation policy which means they can try out a variety of packages and decide whether to stock them or not without any risk.

As a result they should be able to carry larger stocks of the products they know will sell, and can also demonstrate software to a potential buyer without first asking for a commitment to buy.

It provides a master catalogue with details of software products and also runs a product service in which experts handle dealers' problems and queries.

"We don't refer the dealer to the software author or publisher, we try and sort him out ourselves," said Blumstein.

"We are giving people a chance to see what we think is really good . . . and saying we'll get it into this country as fast as possible."

Softsel has an impressive record. In two years it has grown from nothing to a $35 million corporation selling 2,500 products to more than 3,000 retail outlets throughout the world.

Its Feltham headquarters, near Heathrow Airport, will handle sales in the UK and exports to Europe, the Middle East and North Africa, and will carry up to a million pounds worth of software stock.

The company is also setting up a product evaluation service to assess British products for possible sale in the US.

Chatted up by an Apple

INTRIGUING examples of ways in which the power of the mighty Apple can be expanded frequently arrive at the *Windfall* office. But even our hardened team of reviewers had never seen anything quite like Savvy.

The package came from an eloquent address for a start – Rio Grande Boulevard, Albuquerque, New Mexico. It consisted of a neat card that carried a Z80 microprocessor and a mass of additional circuitry, plus a batch of double-sided discs.

And a built-in vocabulary that allows the micro to hold a conversation with its operator – a factory-fitted dictionary that becomes more extensive every time Savvy is used.

A.B. Quist, a veteran American writer of books and magazine articles on personal computing, who knows Savvy well, contributes an introductory article on Page 38. But our own writers will be experimenting with the package, and we'll bring you their own comments in future issues.

Certainly Savvy gives the Apple a new

→

kind of information-handling power. Exactly how that power is to be used, and what new applications avenues it will open up, remain to be seen.

As its makers frankly state: "The use of this power has not been thoroughly explored, even by the developers of the Savvy system. They know that exciting discoveries are yet to be made, classic applications waiting to be developed.

"They are too close to the forest to see many of the trees. And they realise that most of this exciting new work will be done by newcomers to the Savvy system."

Fascinated? So are we. Watch this space!

The mouse trap . . .

A MOUSE is a mouse in Italy, no matter what the purveyors of modern technology would have you believe.

Apparently when Apple employees first took a Lisa prototype to Italy they encountered an extraordinary problem with the country's customs department. The Italian officials wouldn't allow the machine into the country until it has been issued with a livestock import permit to cover its "mouse" pointer device.

There was a delay of some hours before the machine was allowed through – which would have given Apple personnel at the airport plenty of time to ponder over another dilemma facing the company . . .

Apple has anticipated that the ball bearing used to roll the mouse over a table's surface might eventually need replacement, and accordingly has planned to supply spares in packets of two.

Their problem is to decide what to call the spares.

Price lopped

APPLE has lopped nearly £500 off the price of a 256k Apple III. It is also planning to stop production of the 128k version of the III in favour of the more popular, larger and faster 256k machine, although it will still provide full support and upgrade kits for the 128k model.

The basic price of a 256k Apple III is now £2,395. It will also be sold in a variety of bundle combinations incorporating both software and hardware configurations.

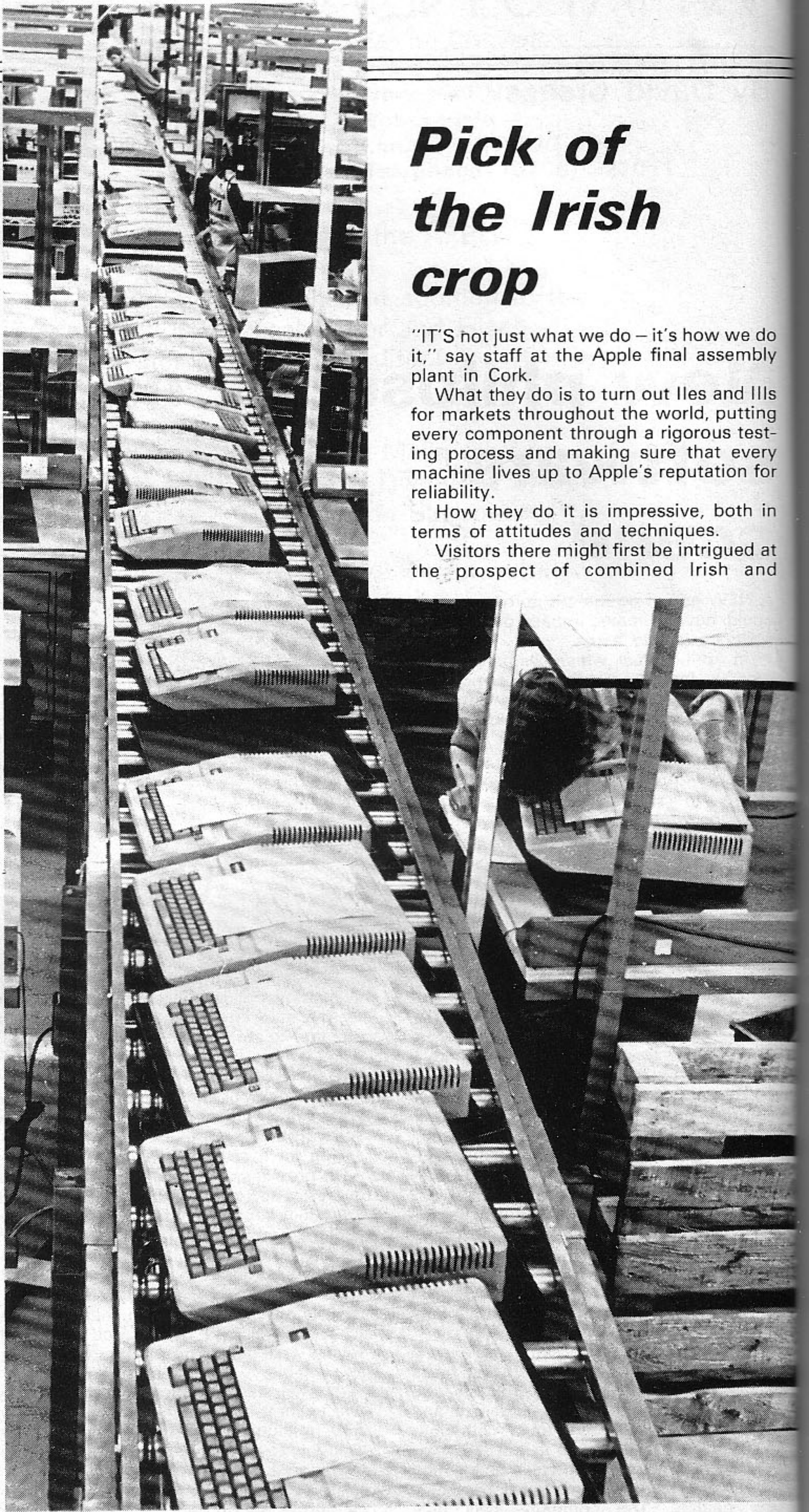
Pick of the Irish crop

"IT'S not just what we do – it's how we do it," say staff at the Apple final assembly plant in Cork.

What they do is to turn out IIes and IIIs for markets throughout the world, putting every component through a rigorous testing process and making sure that every machine lives up to Apple's reputation for reliability.

How they do it is impressive, both in terms of attitudes and techniques.

Visitors there might first be intrigued at the prospect of combined Irish and



PERHAPS heaven starts here in a user's dream – with the chance to take the pick of the crop from an electronic orchard.

These Apple IIes could be English, French, German or Spanish models passing down the conveyor belt at the final assembly process at the Apple plant in Cork.

They're destined for markets throughout the world excluding mainland USA – although some make their way into the US to supplement Apple's Dallas production plant.

American hospitality – both national flags fly outside the plant. The end result is a definite combination of traditional Irish welcome and modern technological efficiency.

Once inside there is a large, bright and comfortable working environment. The plant has adopted an open door policy, giving its 200 employees free access "to the top" – to make a complaint, to make friends.

Staff, many of them from college or university in Cork and most of them women, are encouraged to take a variety of training courses. They frequently change places in the assembly and testing lines so that not only do they retain an interest in the overall process, but they are able to step in to cover for ill or absent staff.

They are encouraged to join a profit sharing scheme, and after six months are entitled to take an Apple home with them on a loan-to-own scheme.

"We emphasise high standards, comfortable conditions and safety," said plant managing director Joe O'Keeffe. "Achieving goals is important to us, and we have developed a mixture of team spirit and innovation."

The canteen is a good example of the relaxed atmosphere that pervades the plant.

A hot meal, prepared by a qualified chef, is served promptly at 12.30 daily. The staff sit straight down to eat, en masse, without any queuing, as the food is already served at the tables. Anyone wanting a different selection does however have a choice.

The atmosphere is a cross between a large family gathering and a dinner party. And in the canteen corner sits an Apple IIe "just in case anyone wants a game during their lunchbreak."

The Cork plant at Hollyhill was opened in 1980 with a staff of 19. It has now doubled in size to 88,000 sq ft and employs over 200 people.

A second plant, 40 miles down the road at Millstreet, was built in 1982 and produces keyboards and other peripheral products.

These components, as well as logic boards, power supplies and disc drive mechanisms from abroad, are sent to Cork for final assembly (the plant receives, for example, several tons of logic boards from the Far East each month).

The testing and quality control procedures are extraordinarily thorough. Asked whether the Apple was ever dropped from a height onto the floor an employee said: "We simulated that with a vibration table – but eventually we discontinued the test because we never had any failures.

"We send inspectors to visit our component manufacturers, because if any component does fail, we want to make sure that it happens with them, and not when the part has reached Cork."

Cork engineers and researchers contributed significantly to the design of the new IIe – especially with regard to "environmental testing" of its many local machines. However they are mainly concerned with the process development and test equipment design, rather than total product research and development.

The company maintains a stringent dealer reporting programme with feedback on initial, three month and 12 month failure rates from dealers in Milan, Paris, Munich, Edinburgh, Glasgow and London. In a recent test of 600 systems supplied through these dealers there was a failure rate of less than 0.4 per cent.

O'Keeffe said: "We have the people, the capacity, the industry and the quality systems in Cork to give our marketing people the edge in Europe."

Superfile distributor

RANMOR Computing is now the sole UK distributor for the Apple version of the free-form British data base manager, Superfile.

The company was set up more than two years ago by brothers Richard and Nick Morley and has developed from a micro dealership into a supplier of software to the trade.

"Superfile meets our needs for systems containing large amounts of variable length text information and also exceeds our requirements for optimum usage of disc space," said Richard Morley.

He added that one of the chief advantages of a sole distributorship was the fact that there was a central point for clients to come for support. Ranmor is normally able to get back to any enquirer within 24 hours.

Superfile is produced by Southdata and allows the entry, storage and retrieval of data, subsequent calculations, the creations of reports analyses and mailing labels and other business functions.

Million dollar moves at the top

APPLE Computer, already a billion dollar company, is paying millions of dollars to ensure that it gets the staff it wants to stay at the forefront of the market.

The company has just appointed John Sculley, the former president of the Pepsi Cola company, as president and chief executive officer. He will also serve as a director.

According to the *Wall Street Journal* it took Apple supremos Steve Jobs and Mike Markkula more than four months to woo the Pepsi Cola boss.

And when he finally agreed to move to California it was for an offer of $2 million in salary and bonus in the first year, $1 million guaranteed severance pay and help in buying a house.

As if that wasn't enough, Sculley was also offered options on 350,000 shares of Apple shares.

The newspaper said the Apple team particularly wanted Sculley because he had the same ideas of how to build the company as they did. "We want you and will do anything we can to get you," said Steven Jobs.

For the head-hunting operation they employed Gerald Roche, head of an executive search firm in New York to woo Sculley. His fee: a mere $333,000.

We hope that the improvement in Mr Sculley's diet, from Pepsi to Apples, will lead to continued healthy growth for his new firm.

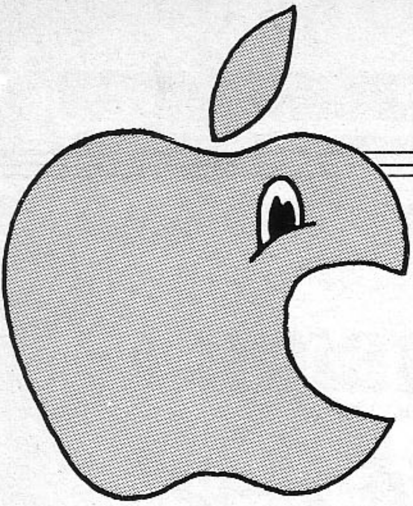
Sculley succeeds Mike Markkula, one of Apple's founders and first chairman of the board, who had been chief executive since early 1981.

He is to continue as a director of the board as well as remaining actively involved in "long-range strategic and technology planning" for Apple.

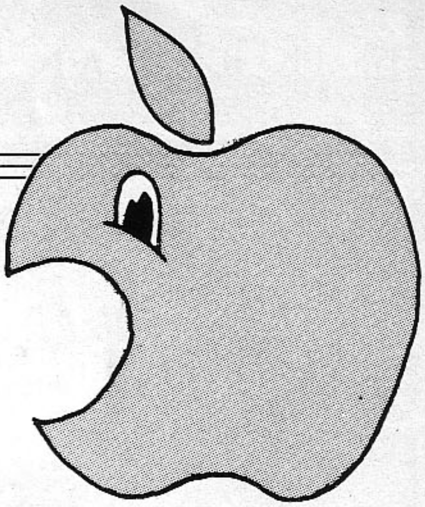
Joining Apple UK after 15 years with Rank Xerox is Dennis O'Connor. He assumes the key role of director of product marketing, and as such is responsible for the company's full product range of computers, printers, disc drive units, peripherals and software, networking and communications systems.

Particular projects he will be working on include preparing the company for additions to the product range, and working closely with software houses to promote the development of an extended software range.

With Rank Xerox O'Connor, 39, covered a variety of marketing, computing and financial functions and held senior positions including head of market planning, major accounts sales manager and head of the advanced systems division.



THINK TANK



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Translating the language card

THE Apple 16k card is normally bought as part of a language expansion package to run Pascal, or maybe an expanded CP/M. A bonus is the ability to run the alternate Integer Basic, loaded from the DOS 3.3 Master Disc when booted. Most owners of the card tend to forget the card is there when using the Apple, which can be a pity!

In a recent Appletip, writes **Duncan Langford-Allen,** I showed how to relocate the copy program FID onto the RAMcard. It was after writing this first program that I remembered an earlier problem that could have been better solved using RAMcard space, and which would show another use for the card.

I had written a database program, and wanted to make it foolproof. I thought that it would be really helpful to provide detailed error messages, and maybe an easily displayed list of options. The trouble was that the text screen was always pretty full, and there just wasn't room in my tightly packed layout for more than a single line for messages.

The screen took a lot of setting up, so it wasn't practical to wipe it and reprint. After several experiments I wrote a M/L program I called Pageswop. This lowered HIMEM to allow room for two text pages, one a buffer, one a "help" screen.

A call to my routine put the current text screen into the buffer and brought down the "error" screen. A further call returned the original. It worked, but used too much memory, and I never really liked it.

However, the basic problem is probably not uncommon, and the RAMcard is well suited to a solution.

My program Screenswop saves the current text screen to the RAMcard on a CALL 816. When a later CALL of 856 is made the original screen is returned with the cursor position intact. The program is in three parts.

The first is an all-purpose routine to move memory on and off the RAMcard in screen-sized blocks. Part two sets up locations within part #1 to transfer the text screen to RAMcard position#a, clears the card for writing, and saves the cursor position. The third part reverses part#2, and returns the saved screen to display.

As some 12k of memory is available on the RAMcard without switching, there is lots of room to store other text pages. If position # a is the buffer, positions # b through, say,# e, could be loaded with text – for example, instructions – and CALLed down when needed. The pages should first be constructed by printing them one at a time, and BSAVED to disc with a

BSAVE SCREEN # N, A1024,L1016

Care should be taken so that the screen is saved exactly as you want it displayed. Check by BLOADing it back.

When you have saved four screens, BLOAD them as follows:

BLOAD SCREEN # 1, A10000
BLOAD SCREEN # 2, A11016
BLOAD SCREEN # 3, A12032
BLOAD SCREEN # 4, A13048

Then

BSAVE SCREENS, A10000,L4064

This will make a single file, which will be faster to load to the RAMcard. It is, of course, possible to load individual screens if you wish. The listing shows how to incorporate a Screenloader into your program. If individual screens are loaded, the addresses are:

Screen# a 53248# b 54264# c 55280 #d 56296# e 57312

To bring the screens down from the RAMcard, you will need to POKE the

```
100  REM SCREENSWOP LOADER
110  FOR I = 768 TO 882: READ J: POKE
     I,J: NEXT I
120  DATA 169,211,133,1,169,247,1
     33,0,169,7,133,3,169,247,133
     ,2,169,5,133,4,173,131,192,1
     60,0,177,0,145,2,136,192,255
     ,208,247,198,4,240,6,198,1,1
     98,3,208,237,173,130,192,96,
     165,36,141,115,3,165,37,141
130  DATA 116,3,169,211,141,9,3,1
     69,247,141,5,3,141,13,3,169,
     7,141,1,3,173,131,192,32,0,3
     ,169,7,141,9,3,96,169,211,14
     1,1,3,169,247,141,5,3,141,13
     ,3,32,0,3,173,115,3,133,36,1
     73,116,3,133,37,96

     ]CALL-151

     *300.0372
     0300- A9 D3 85 01 A9 F7 85 00
     0308- A9 07 85 03 A9 F7 85 02
     0310- A9 05 85 04 AD 83 C0 A0
     0318- 00 B1 00 91 02 88 C0 FF
     0320- D0 F7 C6 04 F0 06 C6 01
     0328- C6 03 D0 ED AD 82 C0 60
     0330- A5 24 8D 73 03 A5 25 8D
     0338- 74 03 A9 D3 8D 09 03 A9
     0340- F7 8D 05 03 8D 0D 03 A9
     0348- 07 8D 01 03 AD 83 C0 20
     0350- 00 03 A9 07 8D 09 03 60
     0358- A9 D3 8D 01 03 A9 F7 8D
     0360- 05 03 8D 0D 03 20 00 03
     0368- AD 73 03 85 24 AD 74 03
     0370- 85 25 60
```

following values into Screenswop:

Mem loc.	Screen #a	#b	#c	#d	#e
769	211	215	219	223	227
773	247	239	231	223	216
781	247	247	255	247	248

So to display the saved screen #c: POKE 769,219: POKE 773,231: POKE 781,255 Screenswop is then activated by CALL 768.

The main routines and the saved pages can be incorporated into programs so that, at any time, you can save the text screen and/or display three or four pages of instructions virtually instantly, at a memory cost of only a few hundred bytes.

Running TASC

WITH reference to Ian Matheson's letter in the April '83 *Windfall* regarding the use of TASC on the ITT 2020, there is an even simpler way to get TASC to run properly which does not involve hardware modification.

Rather than ruining your machine by removing the Palsoft ROMs and inserting integer ones – which may not be readily available – make the following changes to the Hello program on the DOS 3.3 master disc:

```
DEL 10,30
 40 HGR:HGR2:TEXT:HOME:D$=CHR$(4)
 50 PRINT "CONVERT ITT 2020 INTO APPLE ]["
 60 PRINT: PRINT"(REQUIRES 16K RAMCARD)"
200 VTAB10:  PRINT"(LOADING  APPLESOFT
    INTO  LANGUAGE CARD)"
210 PRINT D$"BLOAD FPBASIC,A$D000"
235 POKE 49246,0: POKE –16256,0:
    REM unset graphics latch and enter Apple mode.
```

If you save this as Hello on your TASC disc all you need do is boot the disc and then RUN TASC.

To all intents and purposes you are now using an Apple II Plus. Note however, that you will experience a little difficulty with hi-res graphics. — **Graham Auty.**

First find your array . . .

IF you have been following the saga of the machine code bubble-sorting, which has gone through three refinements so far, you may perhaps be wondering how to get round the detail that all three authors omitted to handle – how do you sort an array if it is not the first one declared in your Applesoft program?

The machine code program appended starts you on the right path by finding ANY array, given its name. It is very short because all the hard work is done by a routine that already exists in Applesoft, namely the GETARYPTR routine that was originally designed as a subroutine to the SAVE and RECALL commands for copying arrays to, or reading them from, tape.

GETARYPTR will accept the name of an array (*without* its subscripts) and return its start address in LOWTR ($9B,$9C).

All that I have done is write a little "wrapper" for a call to this routine to set it up – and return from it – safely. The syntax for calling the routine is:

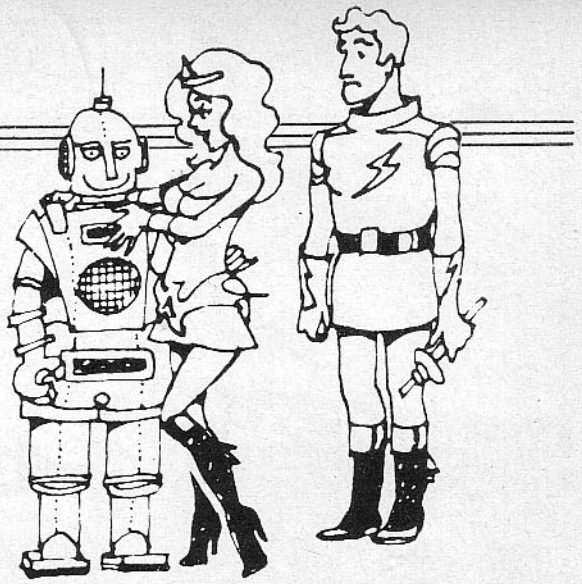
CALL 24576; *(array name)* where the array name can be the name of a string, real, or integer array without its subscripts; the array should be only one-dimensional; the start address is transferred to locations $0,$1; any error message you receive while using this routine should be a sensible one.

The code is so short that it should be obvious how to change any of the details.

J.P. Lewis

```
;Finding the start address of an Applesoft array.
;           J.P.Lewis          13/5/83
;           Pie II text-editor with ASM/65 assembler.
DATA       =0                  ;To store the required address.
LOWTR      =$9B
CHRGET     =$B1
CHRGOT     =$B7
GETARY     =$F7D9              ;The routine to find an array.
ERRMES     =$DEC9              ;The 'SYNTAX ERROR' message
*          =$6000
           JSR CHRGOT          ;Syntax is  CALL 24576;<array-name>
           CMP £';'
           BNE SYNERR
           JSR CHRGET
           JSR GETARY          ;The start address of the array
           LDY £4              ;whose name is being pointed
           LDA (LOWTR),Y       ;at by CHRGET is left in
           CMP £1              ;LOWTR by the GETARY routine.
           BNE SYNERR          ;For our purposes, it must be a
           LDA LOWTR           ;one-dimensional array.
           STA DATA
           LDA LOWTR+1
           STA DATA+1
           RTS
SYNERR     JMP ERRMES
           .END
```

```
*6000.6020
6000- 20 B7 00 C9 3B D0 17 20
6008- B1 00 20 D9 F7 A0 04 B1
6010- 9B C9 01 D0 09 A5 9B 85
6018- 00 A5 9C 85 01 60 4C C9
6020- DE
```



The Pie Man's life is no piece of cake

FIVE years of my youth were frittered away as an apprentice in a large engineering works. Part of my training involved spending some time in every department in the factory, and one of the jobs I remember well was working on a plastics press making bakelite junction boxes.

The process was "driven" by the cycle time of the press. As one pair of boxes was removed, the terminals and raw plastic were put in the press which was then closed, and the boxes just removed were "dressed" to remove sharp edges.

No sooner had you dressed one pair than the next were ready for removal – if they baked too long in the press they were ruined. Consequently, life was pretty busy as a press operator.

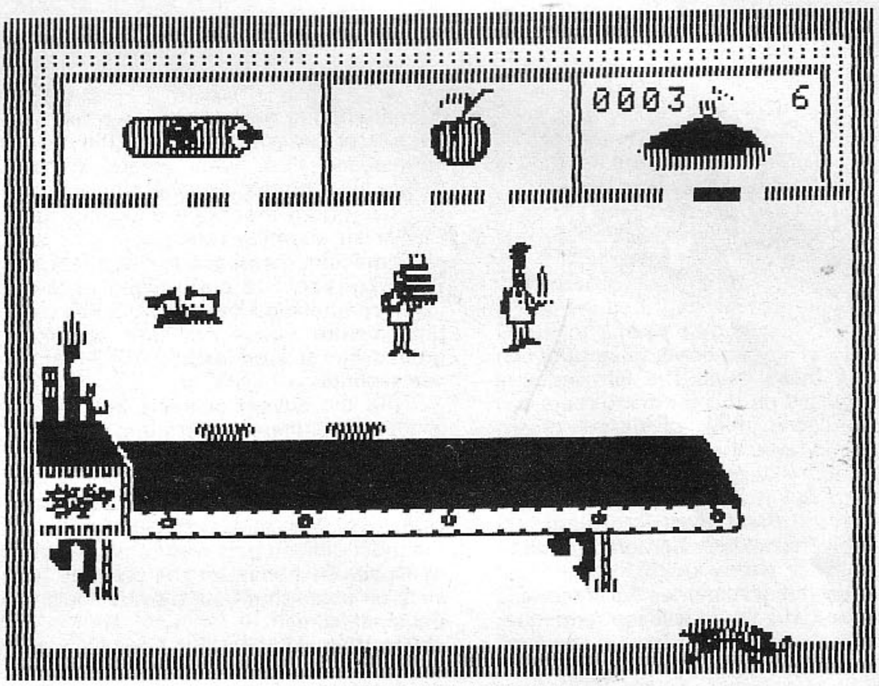
I tell you all this because I've just been playing Pie Man from Penguin Software, and all the old memories came flooding back. In Pie Man you've managed to get a vacation job at the Automated Bakery Company. As pies come along the conveyor belt, your job is to get a can of whipped cream and squirt it on the pie, get a cherry and put it on top, then take the finished pie to the pie bin.

If you haven't picked up a pie before it reaches the end of the belt it drops off with a squelch. It's no good picking up a partly-decorated pie – only completed pies can be put in the pie bin. Your score is the number of pies you successfully decorate, but you're only allowed seven squelches before you're fired.

Once you reach a certain level of production things happen to make life more difficult. Occasionally a slightly tipsy wedding cake baker comes lurching out. If he bumps into you, you drop whatever you are carrying. Also, various grease spots appear on the floor and sacks of flour are deposited between the conveyor belt and the toppings.

Using the joystick to negotiate these is difficult enough, but trying to do it with a half-decorated pie about to squelch off the belt – it felt *just* like working on the plastics press!

As your production increases, so do the obstacles. At various points along the way you are promoted, and if you make it to "lead baker" all the obstacles are swept away. However, the belt starts to move faster at this point. Gradually the obstacles start to appear again as you climb the ladder of promotion.



By CLIFF McKNIGHT

I've made it as far as Baker Superior via Chief Baker, Head Baker and Baker Master, but I still got fired, so I guess there was a level higher – otherwise who would fire me?

Movement via a joystick is easy, the button being used to pick up things. However, if you find yourself holding the wrong thing you have to hit any key on the keyboard (or run into a grease spot). Movement via the keyboard is a bit more difficult, with eight motion keys, a key to pick up, a key to set down and a key to drop.

The graphics are nicely done, having been created with Penguin's own Graphics Magician package – more about that in a separate review.

One thing which certainly distinguishes Pie Man is the fact that it is completely non-violent. Nobody gets killed, mangled in the machinery, drowned in the cream vat or exterminated by alien weevils.

If you do a good job you get promoted. If you do a poor job you get fired. It's a bit of olde worlde naivety which comes as a refreshing change after an overdose of Zargs, Grebs, Klingons and Morons, and I think Penguin are to be congratulated.

When all the manufacturing industries have either died away or been automated, when the manual workers of the world are mere button-pushers, people will be able to play Pie Man as part of their home computer-based history course. What was it like to work in a factory, Grandad?

Title: Pie Man
Authors: Eagle Berns and Michael Kosaka
Publisher: Penguin Software
Requirements: None stated

Space... the Apple's final frontier

SCHOOLBOY joke: How many ears does Mr Spock have? Answer: Three – a left ear, a right ear, and a final front ear (howls of laughter). Before space was invented, it used to be a Davy Crockett joke ("king of the wild frontier"). I have a theory about how there are only four basic schoolboy jokes, but I'll save that for another article.

Space has certainly captured the public imagination – indeed, it seems to be all that some of my students have between their ears these days. The film industry has capitalised on this for many years and although I can think of a few recent examples where the beings-from-space were friendly – Close Encounters, E.T, The Man Who Fell To Earth – many of the films have propagated interplanetary xenophobia, from Flash Gordon through to Alien.

Computer space games have quite a long history. The first that I can remember were variations on the "Moon Landing" type. I remember playing one of these on a time-sharing system sat at a teletype. On a busy day you could enter the various inputs and then wait several minutes before learning that you were now thrusting away from the moon and burning up fuel at an alarming rate.

Somehow, messages to the effect that you were about to crash didn't have any urgency when you knew it would be some time before your grim fate would be ground out at a prehistoric 10 characters per second.

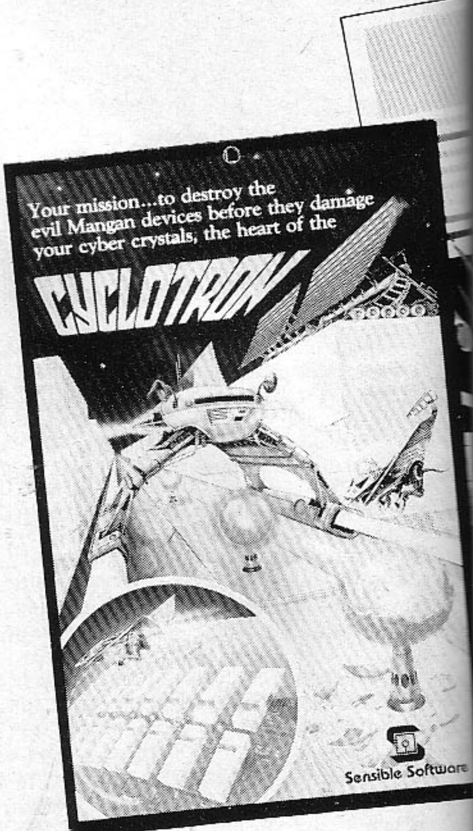
With the advent of minis (no, *not* the skirts), space games started to develop. I remember playing Asteroids on a PDP-12. The plot of this game was fairly simple. Two adversaries had to shoot each other while avoiding chunks of rock. As I recall, the most difficult part was actually getting two pairs of hands on the controls from such an angle that both players could see the small screen.

The first Apple space game I played was Stellar Invaders – remember it? By comparison with some of today's games, it was a bit primitive – two movement keys and one firing key, none of which could be changed to suit personal preference. No pause facility either.

It did have sound effects, though, and I've spent many a happy hour blasting away. It's still around, too. Someone mentioned it to me recently and was spurred on by my high score of 2580. Is this a record, I ask myself?

As you might have guessed by now, the batch of games I'm about to describe all have one thing in common, a space theme. Of these, Asteroid Field (Cavalier Computer Corp) is a bit, but not much, like the game I played on the PDP-12. However, in Asteroid Field the lumps of rock sometimes seem to have a mind of their own.

Basically, the game involves blasting everything in sight – mostly rocks, but sometimes aliens who shoot back. At such times the ability to enter hyperspace is potentially useful, but it can backfire and lead to your downfall. On keyboard, two keys control direction of rotation, a third key provides thrust and a fourth is used for firing. The keys used can be redefined, and the game can also be played with paddles. The sound effects can be toggled off, and there is an "expert player" mode as an additional challenge.


Your mission...to destroy the evil Mangan devices before they damage your cyber crystals, the heart of the
CYCLOTRON
Sensible Software

One of the themes-within-a-theme is the idea that you have to protect a vital bit of the universe from the aliens. Two games which adopt this framework, yet have completely different styles, are Cyclotron (Sensible Software) and Star Thief (Cavalier).

In Cyclotron, you move along a horizontal axis in the centre of the screen guarding the vital cyber crystal power sources. The enemy Mangans come from above and below along the vertical accelerator tubes, so you have to dash back and forth shooting up and down. If any of the crystals is hit five times it goes critical, totally destroying all other crystals. You have a limited number of repair pods and one "destructor" per level. Increasing levels mean faster attacks but higher scores.

The game is played on keyboard and paddle simultaneously, with the option to redefine which keys are used. Having to use both controls takes a little getting used to, but it is possible. The sound effects can be toggled off.

In Star Thief you manoeuvre in a similar way to Asteroid Field. However, this time you are guarding the vital power pods which the nasty aliens are trying to steal. Although the pods start off neatly in the centre of the screen, shooting an alien who is removing one results in the pod being deposited at the point where the

QUICK SPINS

Juggler: *A fast action game in which you try to accumulate a new high score by juggling various types of objects. Seven levels of play.* (Innovative Design Software)

Shuffleboard: *An Apple version of the classic game found on the decks of ocean liners as well as in your favourite pub. Two games – Tally All and Cut Throat. For two players, or can be played against the computer.* (Innovative Design Software)

New World: *The year is 1549. As England, France or Spain you race for supremacy in the New World. Raise your flag in many colonies, accumulate large armies and navies, return great stores of gold to the crown of your country. Emerge victorious! For 1 to 3 players.* (Epyx)

alien was shot. This makes protection progressively more difficult.

You have an unlimited number of lives and unlimited firepower, but the game ends when all the pods have been stolen. One unusual and very nice feature of Star Thief is that there is an option to play a two-person game, but the two players cooperate to destroy the alien hordes. With my nimble-fingered daughter on keyboard and me on joystick, the aliens don't stand a chance!

As the name implies, in Star Blaster (Piccadilly Software) you are once again blasting away. This time you move up and down a vertical axis on the right hand side of the screen and the aliens come at you in waves. There are eight levels of difficulty, your ultimate aim being to destroy the Dragonian Annihilator. The game can only be played with paddle or joystick, and the sounds can be toggled off.

An interesting feature of Star Blaster is its demo mode, which allows you to play the game without getting killed. You don't get any points either, but it's useful for seeing what sort of baddies to expect on each level.

Finally, Warp Destroyer (Piccadilly Software) is something different again. Although you have two-dimensional movement, the various events are coming "out of the screen" at you, thus creating a sort of 3-D effect.

Although the first phase is a tracking task in which you must keep your sights centrally positioned in order to steer through subspace, subsequent levels are the more usual dodge-and-blast affairs. Mines, fighters and probes all conspire to stop you destroying the Zalbian base and recapturing one of your 12 planets. If you do destroy the base, off you go to the next planetary system.

The game can be played with keyboard, paddles or joystick, the latter being by far the easiest for most of the tasks. However, you can't sit too far from the keyboard because you have to press RETURN in order to detonate shots that have landed on the Zalbian base. Sounds can be toggled off, and the direction of both horizontal and vertical movement can be switched if you are using paddles or joystick.

Of the five games I've described all except Asteroid Field have a pause facility. Cavalier seem to have eschewed the industry standard ESC key in favour of CTRL-R in Star Thief, and in both of these games ESC causes the game to restart.

Talking of industry standards, it would be nice if all games allowed one to specify which keys are used. Of the above batch, only Cyclotron has this facility. Perhaps game writers are assuming that most people will play with paddles or joysticks, but ex-teletype bashers like me often seem to prefer keyboard.

While I'm moaning, I might as well get another one off my chest. I wish the plastic bags that some games arrive in had wider openings. In many cases, the opening is about 3mm too small to allow the instruction sheet out without bending, and with some it is even difficult to get the disc out. There's nothing like a good moan, is there?

Nature detests a vacuum, so they say, and the vacuum of space has certainly been an inspiration to many game writers. I'm constantly amazed by the variety of space games, though I suspect that a taxonomy of them would yield very few "species". On the other hand, there is probably an Psychology Ph.D to be had from a cross-cultural study of alien characteristics. Can you tell your Mangans from your Zalbians?

Cliff McKnight

Title: Asteroid Field
Author: James L. Nitchals
Publisher: Cavalier Computer Corp
Requirements: Apple and disc drive

Title: Star Thief
Author: James L. Nitchals
Publisher: Cavalier Computer Corp
Requirements: Apple and disc drive

Title: Cyclotron
Author: Marv Long
Publisher: Sensible Software
Requirements: Apple II or II+ with 48k

Title: Star Blaster
Authors: Mark Kriegsman and Geoffrey Engelstein
Publisher: Piccadilly Software
Requirements: Apple II or II + with 48k

Title: Warp Destroyer
Authors: Eric Varsanyi and Thomas Ball
Publisher: Piccadilly Software
Requirements: Apple II or II+ with 48k

Stop FID fretting

For anyone with only one disc unit, the following briefest of patches to FID may prove useful to stop that program's continual requests for slot and disc information (particularly irritating when using the Copy option). The amended program will still stop, with appropriate messages, at disc swapping points.

The menu will also still, apparently, offer the "Reset slot and disc" option; this will now be meaningless but no harm (or effect) will ensue if you are perverse enough to try it. Like FID, the amended version may be loaded into a language card for immediate recall, using Duncan Langford-Allen's routine (February 1983 Windfall).

To apply the patch, run the Basic program, amending line 100 if you are not using the usual slot 6. Disc 1 is implicit in a single disc system (or you would not be able to boot!) and this is covered in the remaining POKEs. Subsequently.

```
100 SLOT = 6
110 D$ =  CHR$ (4)
120 N$ = "FID-DLE"
130  PRINT D$"OPEN"N$
140  PRINT D$"WRITE"N$
150  PRINT "POKE 4895,"SLOT":POKE 4896,"SLOT":POKE 4893,1:POKE 4894,1:POKE
       2328,255:POKE 2363,96:POKE 2439,96:POKE 4899,255"
160  PRINT D$"CLOSE"
170  PRINT D$"LOCK"N$
```

```
BLOAD FID
EXEC FID-DLE
BSAVE MYFID(or whatever),A2051,L4686
```

Note that FID loads to the same memory area as an Applesoft program – hence the indirect, EXECfile approach shown here. Alternatively the corresponding POKEs may be directly keyed in after a BLOAD of FID.

R.P. Brown

Text fix for IIe

For users of the higher Text program by Synergistic Software (also A.P.P.L.E. for members) there is a small fix that is required to run it on the Apple IIe.

There is a conflict at location $1F. To fix it **BLOAD HIGHER TEXT**, enter the monitor and change the following locations to $1A.

```
* C07:1A
* C68:1A
* EEE:1A
* EF5:1A
* F7A:1A
```

Then do a **3D0G** and **BSAVE HIGHER TEXT,A2145,L6145**.

For users of the Timekit by Glamire Electronics I found a problem when I tried to alter the time on the Apple IIe. The Timekit software makes use of the higher text program, so by changing it as shown above the problem is eliminated.

Peter Trinder

Query banished

Fed up with getting an unnecessary ? after an input statement? When entering, for example,

```
10 PRINT "ENTER VALUE";
20 INPUT X
```

Change line 20 to

```
20 INPUT""; X
```

Allan Dubost

Input switch

This subroutine is a substitute for the INPUT statement and accepts any character (comma, quotation marks, leading and trailing blanks etc) except RETURN. To reject any other character the test should be included by PEEK (J+511) between lines 10030 and 10040.

```
10 GOSUB 10000: REM replaces input
10000 CALL(–657): REM Gets keyboard input
10010 A$=" ": REM Set A$ to null
10020 FOR J=1 to 256: REM 256 bytes
   maximum input
10030 IF PEEK (J+511)=141 THEN 10060:
   REM C/RETURN Other character tests here, if
   required
10040 A$=A$+CHR$ (PEEK(J+511)–128):REM
   Build up input line character by character
10050 NEXT J
10060 RETURN
```

The input string is known as A$ but may be converted to whatever is required by LET N$ (or whatever) = A$.

Allan Dubost

Lower case printing without clumsy coding

While the unadorned Apple will not display lower case characters, most printers will do so if 32 is added to the Ascii code of the letters. This can be done by using a CTRL character as an indicator in a string of text and processing each character in turn in Basic, but this procedure can lead to clumsy coding.

A better method is to intercept the output and add 32 at this stage. The routine listed is for a 48k system with DOS in operation and the printer in slot 1.

```
BA69-    8D 92 BA     STA    $BA92
BA6C-    C9 93        CMP    £$93
BA6E-    D0 09        BNE    $BA79
BA70-    A9 20        LDA    £$20
BA72-    38           SEC
BA73-    ED 91 BA     SBC    $BA91
BA76-    8D 91 BA     STA    $BA91
BA79-    AD 92 BA     LDA    $BA92
BA7C-    C9 C1        CMP    £$C1
BA7E-    30 0E        BMI    $BA8E
BA80-    AD 92 BA     LDA    $BA92
BA83-    C9 DA        CMP    £$DA
BA85-    10 07        BPL    $BA8E
BA87-    AD 92 BA     LDA    $BA92
BA8A-    18           CLC
BA8B-    6D 91 BA     ADC    $BA91
BA8E-    4C 02 C1     JMP    $C102
BA91-    00           BRK
BA92-    00           BRK
```

The routine is stored in an unused area of DOS from $BA69 and could be made into a permanent patch if required. (see "Bag of Tricks", Pages 6-7). CTRL S is used to select and de-select lower case, but a different character could be used by changing the value at $BA6D.

The routine is selected by changing the DOS output hooks at $AA53/4 to point to $BA69 –

POKE 43603,105: POKE 43604,186

```
10  DO$ =  CHR$ ( 4 )
12   PRINT DO$;"BLOAD L/C MLR2"
20   POKE 43603,105: POKE 43604,186
30   PRINT "THIS IS A LOWER-CASE TEST."
40   PRINT DO$;"PR£0"

]RUN
This is a Lower-Case test.
```

The hooks are returned to their normal, COUT, values by the PR 0 which must be issued as a DOS command. A PR#1 is not needed as the JMP at the end of the routine selects the printer slot.

A similar routine can be used to provide inverse VDU display without having to split the print line with numerous INVERSE, NORMAL commands.

```
BA69-    48            PHA
BA6A-    C9 93         CMP    £$93
BA6C-    D0 07         BNE    $BA75
BA6E-    A9 3E         LDA    £$3E
BA70-    38            SEC
BA71-    E5 32         SBC    $32
BA73-    85 32         STA    $32
BA75-    68            PLA
BA76-    4C BD 9E      JMP    $9EBD
```

This routine also uses CTRL S to select and de-select inverse text. It is selected by changing the output address at $9D04/5 to $BA69,

POKE 40196,105: POKE 40197,186

It is switched off by returning these values to $9EBD,

POKE 40196,189: POKE 40197,158

If $BA6F is changed to $7E then letters will be displayed in flashing mode, other characters in inverse. In order to flash everything, the outgoing character would have to have $40 added to its code if it was less than $C0 (see reference manual, Page 32).

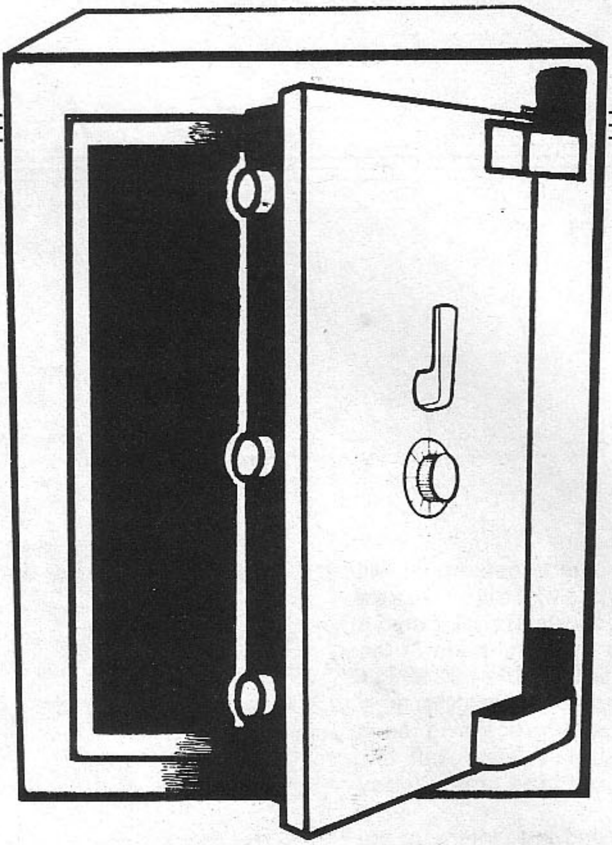
These routines can be typed in from the monitor and saved as below:

Lower case: **BSAVE (name),A$BA69,L$2A**

Inverse text: **BSAVE (name),A$BA69,L$10**

If both routines are required then the Inverse Text can be stored at $BCDF and the selection POKEd values changed to 223 and 188 respectively.

Philip Bolt



DES can keep your data safe

WITH the advent of electronic mail, electronic funds transfer and the distributed office, an increasing amount of confidential data is being stored on disc and transmitted between terminals and computers.

The information may be financial, where a high degree of security is required, or it may consist of sensitive commercial dealings, personnel records, legal documents, etc., which could cause difficulties or problems if they fell into the wrong hands.

It is not too difficult to take a copy of a disc, or listen in on telephone lines with the cheap, yet sophisticated communication equipment presently available and then examine the information at one's leisure.

The relatively simple precautions, if any, employed in many data systems prove a minor obstacle to the determined "attack". The following describes the operation of a unit whereby the Apple terminal user can reduce this possible security problem to a minimum.

Data encryption moved out of the military and political spheres in 1976 when an IBM encryption algorithm was accepted by the American National Bureau of Standards as the encryption mechanism for all federal non-military applications. It is known as the Data Encryption Standard (DES) and is likely to be adopted as such in this country. The card shown in the photograph opposite utilises this standard.

The algorithm changes the plain data into an unintelligible cipher form under the control of a key; the change being to such an extent that the transformation is entirely different for each key value.

The algorithm, which has been made public for almost 10 years now and has not yet been cracked, uses multiple modulo 2 addition, permutations and substitutions to ensure that the key or plain text cannot be discovered from the cipher text.

The very simple modulo 2 example in Figure I shows the difficulty of retrieving the original information when the "carrys" are lost unless the correct key is available.

The standard uses a 56 bit key with 64 bit blocks of plain text to produce, after 16 "rounds", 64 bit cipher blocks of data giving a "key space" of 2^{56} – or 10^{17} different key combinations. This is an extremely large number, and ensures that if each key combination was tried in turn by a fast computer it would take many years before all were covered.

The key can frequently be changed or multiple encryption made with different keys to maximise security. This alogrithm has recently become available in large scale integrated circuit form.

The encryption card can operate in one of three modes.

- Point to point communication between Apple terminals not containing a host computer.
- Local storage of encrypted programs

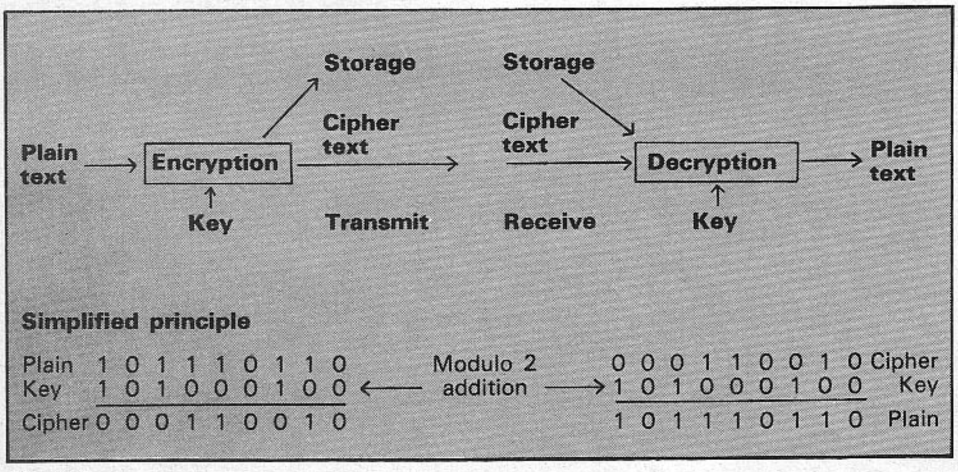


Figure I

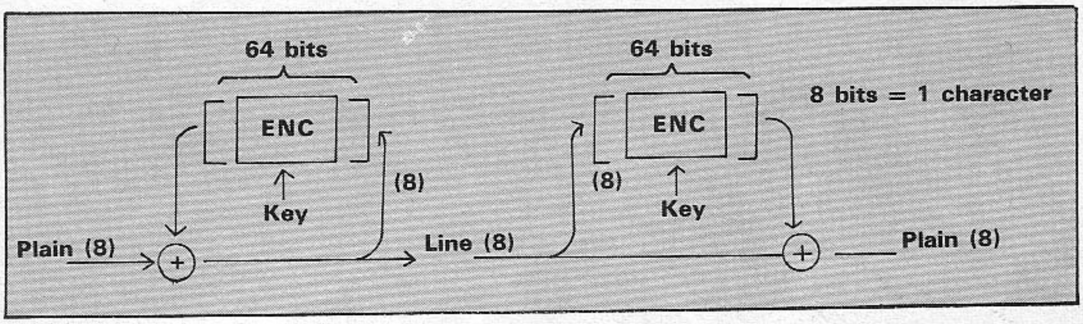


Figure II

and data files on the Apple disc system.

- Communication between an Apple terminal and a host computer for storage and retrieval of encrypted information in its memory bank. The operation of these modes is controlled by programs stored in ROM on the card, the appropriate program being selected by a CALL command after the card has been activated with a POKE instruction.

In the secure storage mode Applesoft or Integer Basic data is passed through the encryption chip after it has been initialised with the chosen key, consisting of any eight character combination, including control characters, from the keyboard.

The encrypted form is then stored on a disc and can be catalogued in the normal manner.

If this cipher text is later downloaded from the disc and listed complete rubbish will result. Often the listing continues to run because the end of line/file pointers are never reached, or it is maybe much shorter in length than the original because the control characters in the encrypted form are not displayed.

When operating in the communication modes, a suitable modem must be used to convert the digital codes from the card into equivalent speech signals for transmission. The card incorporates a communication controller that allows full duplex, asynchronous transmission at the CCITT standard rates to 9.6 k bit/sec; the required rate being selected from the keyboard.

Different rates for transmission and reception allow asymmetric duplex operation, such as is used on the Prestel data bases and other viewdata systems.

The DES algorithm can be used in a number of ways to obtain the required security but the method chosen by the card is a stream cipher feedback arrangement as shown in Figure II.

In this case the DES is used as a pseudo random number generator, its output being continuously exclusive OR-ed (modulo 2 addition) with the plain text. The decryption process operates in the same manner – an identical pseudo random stream of bits being generated in synchronism to retrieve the plain text after another exclusive OR operation. This method has a number of advantages when used in the above applications:

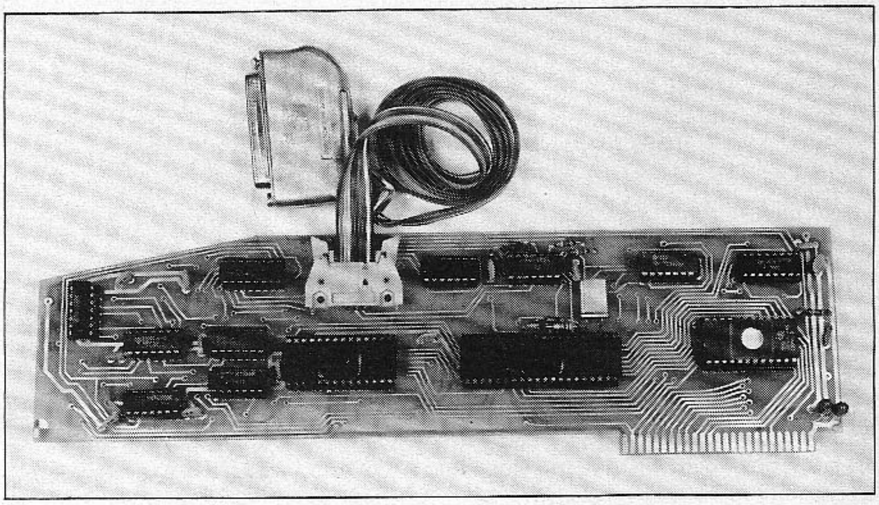
By P.W. SANDERS
and
V. VARADHARAJAN

☐ There is a chaining of the encryption – the output cipher text character becomes dependent upon the previous eight characters of cipher and plain text, as well as the key, which removes the problem of straight forward substitution of characters to alter the message without knowledge of the key.

☐ The system has a self-synchronising property when confronted with transmission errors. A error within a cipher text character affects that character and the following eight characters only on decryption, after which the system automatically becomes resynchronised.

☐ The arrangement is very flexible, allowing a mixture of plain and encrypted characters under keyboard control. With block cipher, eight character blocks must always be used, necessitating "padding" if less than eight encrypted characters are needed. With this "byte" feedback a single character can be efficiently encrypted.

A stand-alone unit has been developed for any computer that has the same facilities as the card, but being connected between the RS 232 interface output of the computer and the corresponding input of the modem.



The encryption card

The Apple III, which is starting to gain popularity in Britain after a slow start, is now set for a major boost with the release by Apple of the long-awaited CP/M softcard.

The card, which costs £299, gives Apple III users access to a vast library of CP/M applications packages.

Apple III CP/M – three micros for the price of one

By GEOFF REISS

NO one can pretend that the Apple III set the world alight in the same way as the Apple II, but Apple III is not a bad deal for people who want to take advantage of a more powerful machine and who have become committed to Apple II software.

When you have got lots of data files and word processed letters all set up on Apple II format you really will find it awkward to suddenly move to a Cromenco or something.

Apple III gives you an 80 column, big memory machine with all the 1980s features plus a built-in Apple II. There is a disc that makes the Apple III think it is Apple II and perform just like its little brother.

The slight problem is that there just hasn't been the financial motivation around for software houses to get down to writing tons of good software for the Apple III.

There aren't that many Apple IIIs around and it happens to use a unique dialect of basic called Business Basic. However nice Business Basic is, it is rare so software has to be specially re-written in that language and it means lots of hard work for little return.

Recognising this problem in many machines some time ago, manufacturers noticed that there was an awful lot of software written in a language called MBasic (Microsoft Basic) which works under an operating system called CP/M.

The CP/M operating system is available for lots of different machines and is very popular. It performs the same kind of job as Apple II's DOS and Apple III's SOS.

So a quick and dirty way of getting lots of people to make their mind-boggling software available on your new computer is to somehow get the CP/M operating system up and running on it.

And MBasic is just one of the languages available under the CP/M operating environment.

That is exactly what Microsoft and Apple Inc got together to do with the Apple III, and the result is the new Apple Softcard III System.

The Apple III with the Apple III Softcard can run Apple III, Apple II and CP/M software. The next good bit is that you can quite often exchange files between these three operating environments. This, put together, can make quite an attractive package.

The Apple III Softcard comes in a very smart blue box and there seems to be an awful lot of stuff in it. You are going to feel that you have got your money's worth.

Firstly, there is a lump of hardware and this is the softcard itself. It is a simple matter to instal this into your Apple III. There are nice drawings showing you where to put your screwdriver and how to push the card into the second of Apple III's four expansion slots.

If you managed to put a disc controller card into your Apple II or managed to pull your vest on yourself this morning, the installation of the softcard will not strain your brain too much.

On the inside of the lid of the box of goodies are a few useful pointers. It tells you what you have got and where you should begin and which book tells you about which part of your new system. This is an excellent idea.

If you have ever bought some powerful software package and opened the manual to find Appendix A helpfully staring you in the face then you will know what I mean.

Buying the Apple III Softcard effectively is like buying a new computer, so there are instructions on how to put it together, a book about the operating system and a book about the first language that you can use – Microsoft Basic.

Because this is a "computer within a computer," as the advertising blurb claims, there is an extra book which tells you how to get the "inside computer" to talk to you, your screen and your printer through the "outer computer". That is, how to get the CP/M system to work with Apple III SOS and device drivers. Beware, – this is one of the problem areas.

There are two discs in the box – the CP/M master and the CP/M utilities. One works under the CP/M operating system and the other under the SOS.

So, here you are with your Apple III Softcard plugged in, three books in your hands and you're ready to go.

You are ready to tackle the real problem and that is installing your standard device drivers onto your CP/M disc so that the system will operate with your peripherals.

This is tricky. If we had not already gained a deep understanding of how these things work and been 167 IQ geniuses (genii?), we would have been still struggling to install the CP/M system onto our Profile hard disc system.

There is something wrong when an operation like this that so many people will have to execute turns out to be so complex.

I shall not go into the details of Microsoft Basic and CP/M due to the following logic. Either you wanted the Apple III Softcard so that you could use some piece of CP/M software like Wordstar or you want to do some development in Microsoft Basic.

If you come under the first category, you need not learn much about the language or operating system and, if you come under the second, you should be familiar with it already.

What I expect you need to know is the difference in the Apple as compared with the normal CP/M system like a Rair Black box or a Superbrain. If I have got that bit of logic wrong please accept my humble apologies.

I was disappointed to see when I first booted my Apple up and I got the message:

```
Apple Softcard III CP/M
56k version 2.20
(C) 1982 Microsoft Corp.

A>
```

The disappointing bit is the 56k. Here I am with a 128k Apple III and all I can use under this new operating system is 56k!

Any self-respecting native CP/M system would give me 62k or so, and my Apple II CP/M system with language card gives me 56k. I wonder if RAM goes off with lack of use, like muscles?

Still the A> prompt means I am up and running in CP/M. Sure enough, typing DIR gives a DIRectory of the disc, so I am definitely not in SOS. There is PIP (the file

→

transfer program like FID) and COPY (the disc copy utility) and all the usual CP/M bits and pieces.

If you type MBasic and press RETURN, you run a software package with that name and that package gets you up and running in MBasic. This gives you the typical OK prompt.

MBasic seems to have settled down into a predictable form almost wherever you find it these days, with a few exceptions where extra features are offered, like on the IBM PC.

I shall only mention one case where we found MBasic on the Apple III CP/M system to be at odds with MBasic everywhere else, and that is in the area of screen control.

In Applesoft, if you want to send the cursor to a particular place on the screen, you use HTAB and VTAB. In Business Basic these are replaced with HPOS and VPOS.

In MBasic you send to the terminal a sequence of control codes and then send the numbers that relate to the desired row and column. The control code sequence that says "here comes a new cursor position" and the relationship of the number sent out to the desired row and column varies from terminal to terminal, so CP/M software packages allow for this.

There is a bug in the Apple III CP/M system. If you want to send the cursor to the ninth row or column, you have to print CHR$(9). This does not work. As soon as MBasic gets a CHR$(9) it thinks that it is a TAB instruction and moves the cursor off the right.

The only way we could get the cursor to go to the ninth column was to move it to the tenth row and then move it back one.

Now, if you happen to be working with your own CP/M MBasic software, this is a pain but that's all. If you have taken someone else's software designed for Apple II CP/M, then you could be in for trouble.

It is true to say that installing any MBasic package is going to be very tricky and installing any other CP/M package is not going to be a breeze.

The format of Apple III CP/M discs and Apple II CP/M discs is identical so that you can read files from one to the other.

This does not necessarily mean that you can use Apple II CP/M software on your Apple III as the CP/M differs and there are other differences. You can, however, create a letter using Wordstar or a list under Dbase II on your Apple II and then update it on your Apple III, if you so wish.

There is a facility that allows file transfer between SOS and Apple III CP/M called SOSXFER. You can use this to take a file from SOS and translate it so that your Apple III CP/M system can understand it.

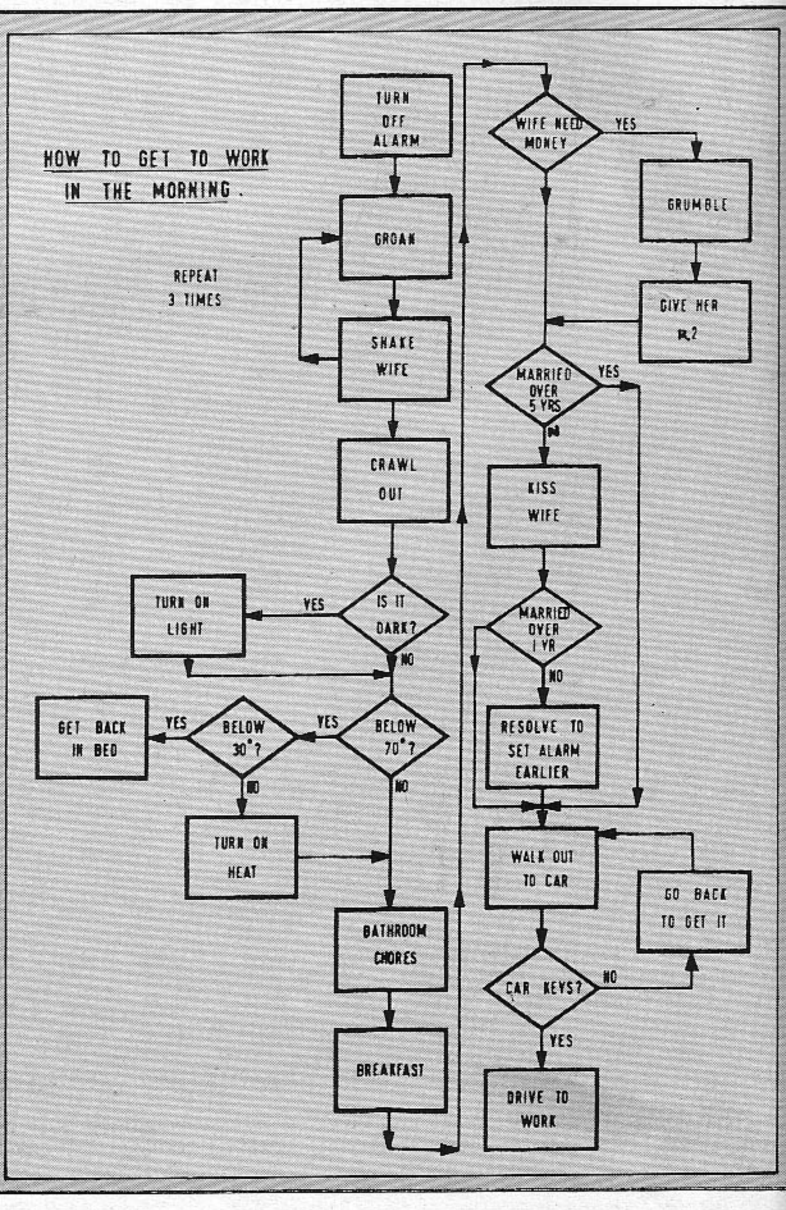
This seems to be a utility aimed at the software engineer as I can only think of two file structures which would not need to be messed around with after transfer.

One is the DIF format that seems to be gaining some acceptance within spreadsheets and the other is a file structure written specially for the occasion.

If you happen to have an Apple III, the Apple III Softcard is a good way to extend it as you get to use Apple III and CP/M software all on the same machine. If you simply want to be the proud owner of a CP/M computer then there are better ways of achieving that aim.

The Apple III Softcard feels as if Bill Gates at Microsoft has done the minimum possible to get CP/M and MBasic running on the Apple III and excessive enthusiasm has not been a problem.

It is a simple, straightforward implementation, with the minimum essential features and a few bugs. Surely someone could have found a way to get a full 64k available from a 128k machine.



Go to work on an Apple

Flowchart comes from the magazine of Unilever Apple Users Group in South Africa

SAVVY

The program that thinks for itself

By ANTON BRAUN QUIST

YOU have two choices in dealing with your conventional computer:

1. You can use it in a "video game/business game" mode. This lets you make selections from a "menu" of choices, and lets you type in some information when the machine asks for it.

2. You can give up your present career, and knock yourself out for two years, figuring out how to become a skilled programmer, so you can create a whole list of choices yourself, instead of just picking one from someone else's list.

The program "package" scheme, represented by the first choice, is great, as long as the programmer who writes the packages anticipates all of your needs, your tastes, your habits, and your probable changes of mind. That programmer can make the computer sing, draw pictures, ask questions, show lists, even talk, in some cases. The computer's power is dazzling.

But it's not a good listener. If it offers you these items on a menu:

1. *LIST PERSONNEL*
2. *INVERT MATRIX*
3. *RUN LAPDOG "A"*
4. *HELP*
5. *None of the above*

you had better respond with one of those letters, or the machine assumes you are incompetent. If you type "HELP WHAT?" it won't tell you. If you say: "WHY WOULD I WANT TO INVERT A MATRIX?" it treats your earnest question as nonsense, and gives you another display of baffling choices.

If you have the patience – and the analytical turn of mind that makes such work appealing – you can use the packages comfortably to do good work. You have to change what *you* know, because the computer won't change.

The conversation is one-sided. You speak when spoken to, do what you're told, and hope it all works out to your advantage. Except in certain cases.

Most of the talk about systems that "use plain English" and are "user friendly" boils down to the same old story of filling in the blanks, and choosing from a menu. But now there's something new afoot, a different idea creeping in among the tried and true.

A few systems actually try to understand what you mean by what you type, instead of refusing even to consider imprecise, grammatically improper or incomplete instructions.

Some excellent "database inquiry languages" have been at work on big systems for years. They allow you to describe the information you want in quite plain terms. Then they "parse" your sentences, do a thorough grammatical analysis, look up the words in a dictionary, and fetch out the information they think you want. Some of these systems are uncanny in their ability to respond to questions like "What were total sales by region during March in the continental United States?"

The analysis soaks up a lot of computer resources, and microcomputers have not yet grown powerful enough to handle the bigger, better systems. Even the good systems tend to reject ungrammatical street language – "English as she is spoke" – instead of trying to figure out what you mean by what you say.

Again, *you* are flexible: the machine learns hard. Besides, database inquiry isn't the whole story. The system should understand imprecise instructions to write programs, too, and change existing packages to suit your needs.

Take heart – microcomputer systems that actively *try* to understand you are here.

For example, suppose you had an Apple II computer and wanted to strike up a conversation about this very magazine, the one you are reading at the moment.

Clearly, the computer is exactly like any person with whom you open a conversation; if it has no experience with the subject, it can't say anything informative about it.

(People are always walking up to computers at conventions, and typing questions like "What is my grandmother's name?" Then they are annoyed when the machine can't tell them. Similarly, if you ask the machine something about *Windfall,* and it has, unaccountably, never read the magazine, its best possible response may be "Huh?")

Well, we tried an experiment with an Apple II equipped with a special device called Savvy, made by Excalibur Technologies Corporation. Savvy is one of the new wave, using adaptive pattern recognition processing to figure out what you are talking about, before turning the computer loose on it.

First we wrote this descriptive paragraph:

Windfall is an Apple-based computer users magazine published in England. Readers accustomed to Yankee publications will find Windfall a bit surprising. It looks different, feels different, and has a newsy, reportorial style quite unlike the institutional style of US computer magazines. It is well worth picking up a Windfall.

Then we read through it, and noted a few questions that the paragraph suggested. Examples:

Who publishes Windfall?
Do they publish anything else?
In what way does it look different?
In what way does it feel different?
Who edits Windfall?

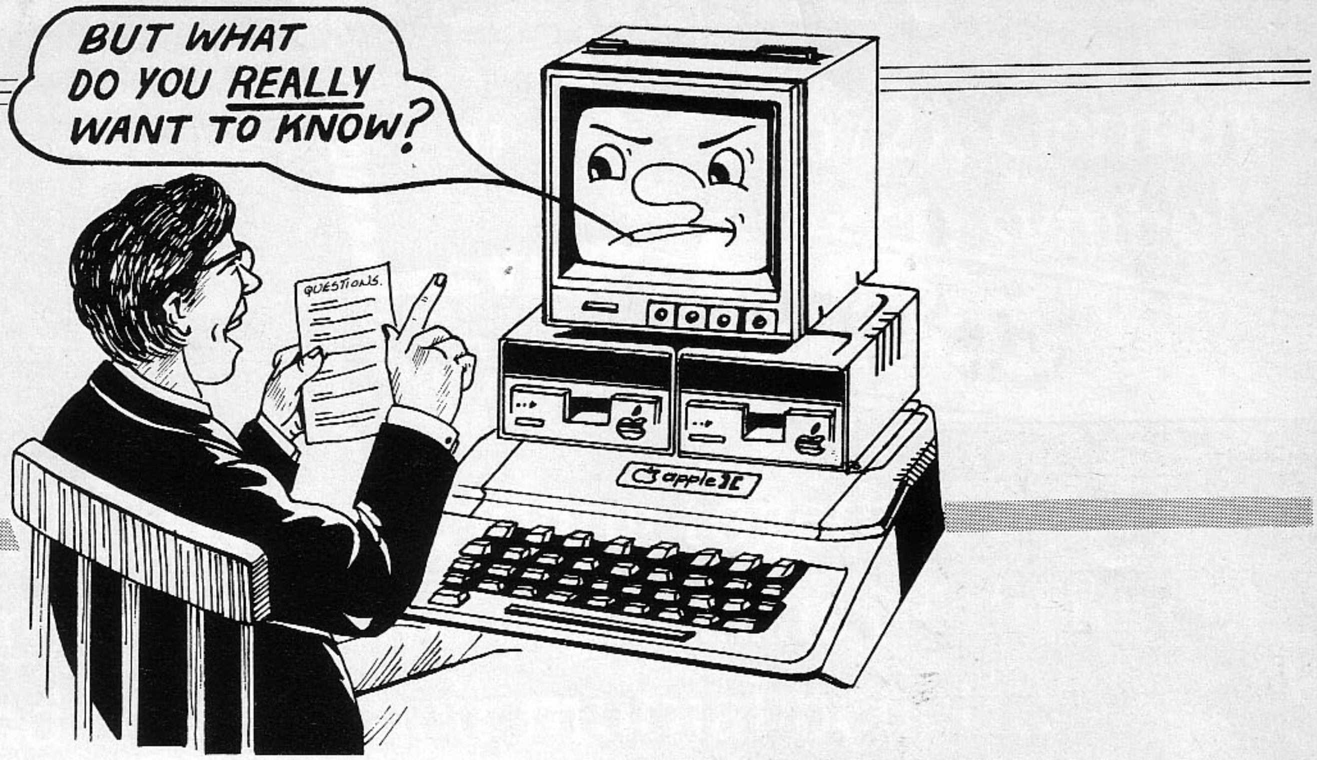
Then we taught Savvy what those questions *mean* by making each question the name of a program that pulls an appropriate answer out of a file, and shows it.

So, if we typed, Who is the publisher? Savvy would respond: *"Windfall is published by Database Publications Ltd."*

So far, this was not unusual. Then we made things a bit more complex by putting differently worded answers to the

---

A.B. Quist is editor of Machine Intuition Magazine



question in the file, so the machine would give the same information in different words when the question was asked repeatedly.

Who publishes Windfall?

Windfall is Published by Database Publications Ltd.

Database Publications Ltd. is the publisher.

Database Publications Ltd. does this magazine among others.

Then, too, we taught Savvy a couple of alternate ways to ask the same question.

Who publishes Windfall?
Name the magazine publisher.
Who is the publishing house?

Database Publications Ltd. is the publisher.

Now for the magic of the new technology. We asked this question: Who is publishing Windfall magazine.? And got this answer: *Database Publications Ltd. is the publisher.*

Notice that the question is not any of those that Savvy had learned, but Savvy looks at the whole phrase, and without parsing, without doing key word matching, says to itself, "Of all the patterns of symbols I have ever seen in my entire life, which is this pattern most like?" In this case, the machine decided that the pattern just had to belong to the publisher group.

With just a bit of additional training, we were able to hold a fairly sensible give-and-take with the machine. In fact, with exposure to phrases in other languages, Savvy could handle Fractured French, Spanglish, or Mock German with ease.

"Wer ist der editor von Windfall" might be associated with "who edits Windfall", and Savvy would respond appropriately to an enquiry like, "Listen mate, who ist der bloke was edits dieser Windfall?"

This is a sample conversation right off the screen of the Apple with Savvy, after the machine had been trained to provide appropriate answers to half a dozen questions based on that descriptive paragraph above.

What would you like me to do now?

Who is the publisher of Windfall?

Database Publications Ltd is listed as the publisher of Windfall. (They are in "Europa House." All UK publishers seem to be kept in "houses." From Albuquerque, New Mexico, that seems exotic.)

What would you like me to do now?

Does the company publish anything else?

They publish Computer Dealer too.

What would you like me to do now?

In what respect does Windfall look different?

Well, for one thing, the height to width ratio of the pages gives the magazine a slightly different shape from U.S. magazines.

What would you like me to do now?

Is the appearance different in other ways?

Gosh, even the paper finish looks different, among other things.

What would you like me to do now?

How can a magazine feel different?

That's an unanswerable question. It just does!

What would you like me to do now?

Don't get huffy. The notion of feeling different puzzles me.

Well, the paper has a different texture from that in, say, Personal Computing.

What would you like me to do now?

That's a start. I guess. Who edits Windfall?

The Managing Editor of Windfall is Derek Meakin.

What would you like me to do now?

That suggests there are other editors.

David Creasey is on the masthead as News Editor.

What would you like me to do now?

Is Windfall a big magazine?

The issue we were looking at is about a hundred pages in length.

What would you like me to do now?

Apart from the physical size of the magazine, is it influential?

The magazine is "big" in the sense that its impact upon the community is signficant.

→

What would you like me to do now?

Ah, thank you.

We aim to please.

What would you like me to do now?

Speak again about that difference in feeling.

Maybe they use a different kind of clay coating. What do I know?

What would you like me to do now?

That will be enough for now. Thank you very much.

You are quite welcome.

Now that's not exactly traditional computerese.

If the system can be trained to run a program that answers questions like these, it can be trained to execute any command, or run any other sort of program. In fact, systems like these are already calculating payrolls, handling mailing lists, doing word processing, and running projections in street language on microcomputers.

Computers that learn our language(s) are already here, trying hard to be helpful, instead of demonstrating their superior knowledge. They promise, and deliver, a lot more than those traditional two choices. Instead of becoming a programmer, or hiring a human programmer, you may find yourself buying a robot programmer.

That robot has been trained to write coded instructions for the computer automatically after a conversation in which you explain in plain language what the job is, step-by-step.

Conversational programming is so new that many computer experts still shake their heads over the concept. Others are chattering away in conversation with their own new systems.

Are you after my job, you mechanical nitwit?

"Nobody here but us programmers, boss."

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Telephone 0452 416301 Telex 43521

Computer Accuracy Where it counts

LIST HANDLER

You could do worse than follow Santa's example..

By BARBARA and CHARLES ENGLISH

LIST Handler is sold as a file manager program for Apple II (I suppose we must now try and get used to writing Apple IIe). It consists of two double-sided discs, the List Handler plus the List Handler utility, tutorial list and tutorial documents and a 73-page users guide. All are contained in a standard leather-look, padded folder.

The package is advertised in association with the word processing program Word Handler, also from Silicon Valley Systems, and reviewed in *Windfall* in April. Files from sources other than Word Handler or List Handler itself have to be converted in order to be used. The manual states that translation from any other program that uses DIF (Data Interchange Format) such as Visicalc is possible but could be tricky, and we didn't attempt it.

List Handler uses a neat 66-column character set which, because it uses the hi-res screen, requires no additional hardware. For creating, sorting, printing and selecting from lists, the package offers a very wide range of options.

The advertisements suggest that Santa Claus uses the program to get the presents right . . . his list being temporarily unavailable, we thought we would create our own list, a catalogue of *Windfall* articles, and play around with sorting those.

The package allows you to set up a number of different fields, that is, labelled areas into which data can be added. This data can then be used in form letters, labels or lists. Using the utility disc we created six fields for our articles catalogue, as follows:

Field 1: Title
Field 2: Author
Field 3: Volume
Field 4: Issue
Field 5: Pages
Field 6: Comment

The program allows lists with up to 255 fields, an enormous capacity that permits complex records to be kept. Each field can contain about 200 characters, so that you can write in some detail in each. Creating the fields on our list disc was completed in a few minutes.

Swopping the utility disc for the main program, we selected from the main menu "Add Records" which puts on screen the first five fields (the sixth and any subsequent field are on later "pages" of the record) and invites you to add the information (the variables). We put in:

Field 1: (Title) MicroModeller:
Crystal ball of the '80s?
Field 2: (Author) Sutton, D.C.
Field 3: (Volume) 1
Field 4: (Issue) 1
Field 5: (Pages) 16-19

Here we met the barrier that caused us more grief than anything else in the program. As touch typists we can enter variables in fields very quickly but we don't normally look at the screen, only at what we are copying. But when entering data, List Handler does not, once the fields on one page are completed, scroll to the next page automatically – the cursor returns to the top of the first page – so if you zip onwards without looking, you find that you have overwritten the entries because you forgot to type CTRL-N to move to the next page of the record.

We made this mistake many times, finding out in the process that correcting errors is not particularly easy, as the editing commands are primitive compared with those of a word processing program. A nice touch, however, is that if you try to do something the program doesn't allow the Apple makes a friendly zap noise, like the household cat when you're cursing it for walking across the keyboard.

Once all the information on the *Windfall* articles had been entered correctly we could search the data in two ways, on screen or as part of a printing routine. On screen it is possible to search all fields or any particular field for a word, phrase or character. For instance, as we had entered under Field 6: (Comment) phrases like "Graf Spee game review", "Review of Lisa", "Book review", it was simple to select and look at all the records containing the word "review" (upper and lower case differences are immaterial).

This very powerful search function is only available on screen – List Handler's search and print routine is not quite so flexible.

List Handler prints form letters, labels and lists – routines which share most of the same characteristics. For the example being used, we used the "print list" option. It is not possible in the print routines to search for strings, words or characters, unless they form the whole content of the field. So whereas in the screen search described above we could use "review" as a keyword to select any (Comment) that included the word "review", the printing routines could not isolate that word only from the whole text of the field, and if we wanted to select and print the details of all reviews, we should have set:

Field 7: (Review)

and add a standardised entry such as "yes" where appropriate. It is then a simple matter for List Handler to select all Field 7 = "yes" records.

Suppose you wanted, in the example we're using, to select and print all David Creasey's *Windfall* articles – Field 2: (Author) "Creasey, David" can be searched for, selected, and printed out with as little or as much additional information from other fields of the records as you want. A very fast routine (the manual claims 400 records selected and sorted in about a minute) gives you all

→

LIST HANDLER

David Creasey's articles in a few seconds.

Selection is based on eight possible logical relationships (equal to, equal to or greater than, etc.) operating alphabetically, numerically or chronologically. So in our example the search routine is actually "if Field 2 (Author) is alphabetically equal to Creasey, David, then select and print . . ."

Beyond selection lies sort. Here the printing routines of List Handler have the power to sort information into an alphabetical, numerical or chronological sequence, either ascending or descending (that is A-Z, Z-A etc.) Any one of the potential 255 fields can be used to determine the sorting order.

These sorting routines only work in the print-out, and the list will remain on the disc in the order in which it was originally entered. They are fast and effective and can be used for many purposes beyond the mailing lists which form the basis of almost all the manual.

Virtues: List Handler is fast, flexible in its fields, generous in its field space. The program enables you to hold 240,000 records on line at the same time with multiple disc drives (a maximum of eight) – that's what the manual says, but we didn't have that many records.

It's easy to operate and we like the way it saves the data and most of the formats automatically as you exit through the main menu. The character set is pleasant to read. The manual is well written (though has no index) with few mistakes in it and none of great significance. Also List Handler is much cheaper than most data management packages.

Vices: Three problems; the first is the non-scrolling of the fields when entering data, combined with very limited editing commands (mentioned above). The second, making the fields into an appropriate label or list for the printing routines is a foul job, as you have to "walk through" every field to find the one you want, and there is no help from the prompts. For example, to print a list of one Windfall author's articles from our data, you are offered a menu like this:

PRINT LIST	**INPUT DOCUMENT**
CTRL-N: Next page	**RETURN: Start new line**
CTRL-E: Exit to main menu	**CTRL-X: Clear line**
CTRL-F: Use field variable	**CTRL-L: Load document from disc**

You have to add to this page the fields you want printed, and the order in which you want them printed. The routine is:

Hit	***Result***
CTRL-F	*Title*
Space bar	
CTRL-F	*Title*
Rt arrow	*Author*
Space bar	
CTRL-F	*Title*
Rt arrow	*Author*
Rt arrow	*Volume*
Space bar	

and so on. A combination of CTRL-F, right arrows and space bars (with returns to space out the lines) is necessary. We found this required a great deal of concentration, even in the restricted number of fields we were using, and the thought of doing this for 255 possible fields is daunting. And whenever you left this part of the program (by printing the list, or by returning to the main menu) this particular page lost all the information you had set on it – whereas the other pages of the printing routines (such as the sort order) retained their entries.

Why is this? David Creasey mentioned a similar loss (of tab-settings) in Word Handler *(Windfall,* April 1983).

The third problem is that each disc used by List Handler can contain only one list – a new list wipes everything else off the disc. So you might have to buy more discs – but we hear that they are going to get cheaper.

Summary: A good product, with great capacity for storage and powerful select and sort routines. A bargain at the price. The manual is aimed at the mailing list market, but we could think of lots of other uses – making bibliographies, storing and sorting scientific data, or the answers from the vast surveys beloved of social scientists.

We wish we had had List Handler last time we had to make a book index. We will use it for this next time – only two fields to set up (entry word and page number) and a fast alphabetical sort for a great number of items.

List Handler is produced by Silicon Valley Systems and distributed in the UK by Pete and Pam Computers. It costs £89.95.

Variant record route to dumping pictures

HERE is a very clean, simple, and fast way of dumping a Pascal hi-res picture to disc, using my favourite trick, the variant record. Define a picture as a packed array of 8192 characters (or 0..255 if you prefer); then define a record which can be either an integer or the pointer to a picture.

Once you have done this it is easy to put a picture into a file of pictures simply by setting the integer part of the record equal to the start of a hi-res page (8192 or 16384), then turning it into a pointer.

Loading a picture takes slightly under four seconds. However using a RAM128 as a pseudo-disc, and switching HGR with HGR2 by POKEs, I have managed to get a file of 15 pictures displayed continuously at a rate of about two per second. The programs below give an example of saving and retrieving a little hi-res doodle.

J.P. Lewis

```
program makeart;
uses turtlegraphics;
type
    picture=packed array[0..8191] of char;
var
    pointer:record
            case b:boolean of
                true:(where:integer);
               false:(page:^picture)
            end;
    f:file of picture;

procedure doodle;
begin
    initturtle;
    moveto(0,0);
    pencolor(white);
    moveto(0,180);
    moveto(60,180);
    moveto(0,0)
end;

begin
    rewrite(f,'gallery');
    doodle;
    pointer.where:=8192;
    f^:=pointer.page^;
    put(f);
    close(f,lock)
end.
```

```
program showart;
uses turtlegraphics;
type
    picture=packed array[0..8191] of char;
var
    pointer:record
        case b:boolean of
            true:(where:integer);
           false:(page:^picture)
        end;
    f:file of picture;
    ch:char;

begin
    initturtle;
    reset(f,'gallery');    (*NB reset also does a get*)
    pointer.where:=8192;
    pointer.page^:=f^;
    readln(ch);
    close(f)
end.
```

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Convention programme in detail

Friday June 3

Chairman: Peter Brameld

10.45-11.45am. "Apples in Business" – Dave King, Sales Development Manager, Apple UK.

Explaining why and how Apples can be used effectively, the hardware and software available, and factors involved in getting a business system up and running successfully.

12 noon-1pm. "Business Case Studies".

Malcolm Harby, Director of the Heathrow Squash Club will explain how he transferred a manual record-keeping system onto an Apple, together with some of the problems and subsequent benefits involved.

Tom Williams, Ormskirk Computer Services will discuss the order processing, invoicing and inventory control system being used by Apple's European Headquarters in Zeist, Holland.

1.30-2pm. "Lisa Presentation"

Two video films introducing Lisa and simulating its use in an office. Also on display will be the American "final release" version of Lisa.

Chairman: Cliff McKnight

2.15-3.15pm. "Education – Factors Influencing the Choice of Programming Languages" – Janet Rothwell, Senior Consultant (Education and Training Liaison) National Computing Centre.

Outlining the languages available and their relevance at various levels in the educational system.

3.30-4.30pm. "Education – Case Studies"

Ronald Stemplis of Holy Cross High School examines the merits of the school's network of 15 Apples, how they are integrated into the curriculum and also discusses some of the problems they have had using the advanced remote operating system.

Dave Brunner, of Fulmead School, uses Apples for administration, software development and teaching, and also accesses an external software library through a modem.

Saturday June 4

Chairman: Peter Brameld

10.45-11.45am. "Financial Spreadsheets for Beginners" – Mrs Fran Teo,

A qualified accountant and independent consultant describes in simple English what a spreadsheet is and how a beginner should go about purchasing and using one.

12 noon-1pm. "Advanced Spreadsheets Applications" – Stephen Mandelin, UK branch of Intercalc and Nick Levy, Specialist Lecturer.

A high-powered discussion of Multiplan, Advanced Visicalc, and DIF Techniques plus a demonstration of "Reflective Visicalc" and an open forum.

1.30-2pm. "Lisa Presentation"

Chairman: Max Parrott

2.15-3.15pm. "Software Utilities" – Mike Glover, Leicester Computer Centre.

Disc utilities (including rescuing data from a faulty disc), a "tour" of a disc, line editing and a hand-holding walk through a machine code program.

3.30-4.30pm. "The Apple as a Laboratory Tool" – Dr Peter Gorry, University of Manchester.

Instrument interfacing; strategies needed for programming in real time; and the Apple as an intelligent terminal.

Sunday June 5

Chairman: Cliff McKnight

10.45-11.45am. "Networking" – Paul Wright, Blyth Computers.

Using a local area network in business, what's available and where it is leading.

12 noon-1pm. "Databases and Word Processing" – Paul Rayner, Great Northern Computers.

Business practice and procedure; how to select a database that suits YOU; word processing within a database environment.

1.30-2pm. "Lisa Presentation"

Chairman: Max Parrott

2.15-3.30pm. "Software Portability" – John Ash, Chairman, UK Pascal Users' Group.

Software for the 1980s – what it can do, how it will affect the market place and where it's going. Looking at file sharing, high resolution graphics and hardware independence.

Meet old
introduce

APPLE lovers have a chance to exchange views and experiences and to see the latest hardware and software releases at Apple '83 – Britain's major Apple event of the year – at the Fulcrum Centre, Slough, from June 3-5.

It is the second annual get togethe organised by *Windfall* and is run in conjunction with the Apple Users' Convention which brings together leading experts to talk about a wide range of Apple topics and applications.

A major feature of the show will be the first public showing in the UK of the final American release version of Lisa.

This latest Apple – hailed as the biggest breakthrough yet in personal computing – is being released in the US

Find out

IF you have a sneaking suspicion that you could put your Apple to better or more efficient use, the Apple Users Convention, held at Slough in conjunction with the Apple '83 Exhibition, will provide answers, ideas and stimulation.

Software is the key to the effective use of Apples. Our speakers will look at how to get more out of software, where it is going in the 1980s, how it is used in a variety of applications including schools, the laboratory and business, and will also unravel a machine code program and the storage structure of a floppy disc.

We'll be highlighting the major new micro, Lisa, with a daily presentation explaining what it is, how it works and how it can be applied in an office.

Dave King of Apple UK will give a concise overview of the effective and intelligent use of Apples at all levels of business as well as discussing some of the software and peripheral equipment available.

Continuing the business theme we have expert presentations covering the use of spreadsheets, database packages and networking.

To show the range of possible business applications we've invited the manager of the Heathrow Squash Club to describe how an Apple helps him keep his membership in shape – and how he made the change from a manual worker to an Apple addict.

And Tom Williams, managing director of Ormskirk Computer Services, will dissect the order processing, invoicing

friends... and yourself to Lisa

this month and will be available in the UK from the middle of July.

Many companies will be displaying Lisa-related products, investigating the prospects for software development, networking and for bringing a "Lisa-look" to the II, IIe and III micros, as with Asolv's Small Talk M8 operating system which offers a multiple window style system incorporating a three-buttoned mouse.

Apple has plenty to show off in the way of new products quite apart from Lisa, and is running a major stand featuring new printers, disc drives for the Apple III and plenty of applications software for both the IIe and III.

Several stands at the show will be networked by Symbiotic Computer Systems using their Symbnet fibre-optic local area networking system, together with the Omnis database package to provide an information facility for visitors.

Other standholders with an interest in networking include Keen Computers, CW/P and Owl Micro Communications, who will also be demonstrating a means of linking the Apple to the Philips LaserVision to provide an interactive training aid.

New from RP Computer Products is a set of 16 programmable function keys for the Apple II, Robocom will be demonstrating their latest Bitstik graphics system for the II and IIe, the Robo 1000, and major systems houses such as Jarman and TABS will be showing the latest enhancements to their range of business and accounting software.

There'll be music on the Apple with the Alpha Syntauri demonstrated on the Future Music stand, and the most recent software releases from both home and the US will be available on the SBD and Pete and Pam stands.

● *Overleaf are details of reduced-rate hotel accommodation and special rail fares for Apple '83.*

how to use your Apple better

and inventory control system being used by Apple's European headquarters at Zeist in Holland.

An independent consultant and qualified accountant, Mrs Fran Teo, will present a beginner's guide to spreadsheets, outlining her own development in using Visicalc and giving advice on buying and first using a package.

Spreadsheet experts Nick Levy, a *Windfall* columnist and independent lecturer, and Stephen Mandelin, chairman of InterCalc UK, will give a joint presentation incorporating a look at Multiplan and Advanced Visicalc, DIF techniques and a question and answer session. A highlight of their talk will be a demonstration of "reflective Visicalc" – a program which allows two people based hundreds of miles apart to work simultaneously on the same Visicalc model.

With local area networks in the news and definitely in the future of micros, Paul Wright of Blythe Computers will explain their history, show what networks are available for the Apple and consider their facilities and advantages in the small and medium sized business environment.

Paul Rayner, of Great Northern Computers, says that database packages are one of the key applications on a micro, and he predicts: "Databases will be to the next generation of micros what Visicalc was to the last." He'll examine some of the database packages and related word processing programs available, explain some of their differences and suggest how a businessman can go about selecting a package that best suits his requirements.

Bridging the gap between business applications and general user interest will be John Ash, chairman of the UK Pascal Users' Group and also a commercial software developer.

In a key speech he will explain the capabilities of software in the 1980s, provide evidence to back up his claims and look at changes in software development that will radically influence the marketplace both for users and developers.

"In the 1980s", he said, "all mini computer software will find its way down to micros. Software in the future will encompass file sharing, hi-res graphics and will be hardware independent."

Looking at software today will be Mike Glover of the Leicester Computer Centre. His presentation will be essentially an "action" display with demonstrations of line editing and global editing (not so easy on an Apple) and the use of disc utilities.

"I'll demonstrate a program dying a horrible death and will then show how to go in and find out where it has gone wrong and how to get it running again," he said. "I'll also step through a machine code program, so people can watch it working and take the audience on a tour of a disc, showing them such things as where the catalogue can be found."

Software in schools is also relevant. Janet Rothwell of the NCC outlines the factors involved in choosing programming languages for use at all levels of the education system.

One of our education case studies, presented by Ronald Stemplis of Holy Cross High School in Hamilton, Scotland, discusses the problems encountered when the school networked 15 Apples with an operating system not commonly known or widely used in the UK.

Dave Brunner of Fulmead School in the London Borough of Havering supervises the use of three Apples and three BBC Micros at all levels of school life – in the classroom, in administration and at club level where pupils get down to serious programming. He'll demonstrate two "home bred" graphics packages as well as show how the school links up with the software library run by the borough computing centre.

Most of the sessions over the three day convention are inter-related and although they can be categorised simply as business or non-business, they have a general relevance to all users.

More specialised however is Peter Gorry's discussion of the laboratory Apple. He'll cover three main areas: the Apple as a data processing tool using readily available packages for statistical treatment, matrix calculation and curve fitting (including the use of packages not normally considered as "scientific", such as Visicalc and Apple Business Graphics); instrument interfacing; and the Apple as an intelligent terminal for communicating with large mainframe machines for calculation and database access.

Learn screen editing the easy way

By NICK AVGERINOS
and GRAHAM KEELER

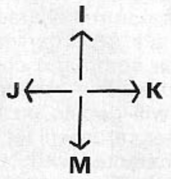
SCREEN editing is the name given to the process of modifying a program line displayed on the monitor screen. It is an extremely useful process, but some experience is needed in order to use it. The natural tendency for beginners is to try and alter the screen display under the misconception that this alters the program line in memory.

The first point to understand, therefore, is that the process entails the re-input of the line, making use of the characters already on the screen to save typing. This is achieved by means of the right-arrow key, which transfers characters it passes over into the keyboard buffer, regardless of how those characters got onto the screen.

The concept of the keyboard buffer is central to screen editing. When a program line is typed in it is initially stored in a temporary area of memory called the keyboard buffer, and only when the RETURN key is pressed is the line transferred to the Basic program. This is why typing errors can be readily corrected with the left and right arrow keys before RETURN is pressed.

In order to edit a faulty line, it must first be displayed on the screen. To get it there type LIST, followed by the relevant line number and then RETURN.

Pressing the ESC key once puts the computer into the edit mode, and in this mode the I, J, K and M keys form a directional key pad as shown below.



These keys may be used repeatedly, or in conjunction with the REPT key to move the cursor to any place on the screen without affecting the contents of the keyboard buffer.

With the cursor positioned over the first character of the line, one press of the space bar cancels the edit mode, and the right arrow key is used to "grab" the useful parts of the line from the screen. Characters can be changed by retyping, and except within REMs and strings, characters can be deleted by changing them to spaces. Small insertions can also be made in place of the spaces generously sprinkled into program lines by the LIST command.

A problem arises with larger insertions, or deletions within REMs or strings where spaces are significant. (For the latter purpose, the command POKE 33,33 should be issued before LIST to suppress the extra spaces normally included. This tip has been given in *Windfall* before.)

For deletions the characters must be skipped over in the edit mode, while for insertions the cursor must be moved to a blank line in edit mode, the extra characters typed in, and the cursor moved back to the correct position on the original line again in edit mode.

During this process the beginner can find it very difficult to picture what the computer is actually recording. This has been our experience from the short course on the Apple for Beginners, which the Computers in Education Centre runs regularly.

We have therefore developed a tutorial program to simulate the screen editing process in which the top half of the screen behaves normally while the bottom half displays the contents of the keyboard buffer. This program starts on Page 86. With it the beginner can practice screen editing and actually see what he is producing for the corrected program line.

It should be emphasised that the program is not a true editor, it simply simulates screen editing for the user to gain proficiency in the process. The line or lines to be edited must therefore be entered first. Pressing RETURN clears the contents of the keyboard buffer and starts a new line on the upper screen display.

This display does not scroll however, but when it becomes cluttered it can be cleared at any time by pressing CTRL-R. The program is quit by typing CTRL-Q.

As an example of the sort of exercise to try with the program, type in a line such as:

```
100 PRINT "EDITING IS
VERY DIFFICULT"
```

Edit this by deleting the characters "VERY" to give

```
100 PRINT "EDITING IS
DIFFICULT"
```

Then try making an insertion. Copy over the line up to the "D" of "DIFFICULT", then move the cursor to the line below, type in "NOT" and move back to the "D" again in edit mode before completing the line.

The program assists this process by displaying a flashing message to remind you when you are in edit mode. The result should be the line

```
100 PRINT "EDITING IS
NOT DIFFICULT"
```

The program does not of course allow the execution of any Basic commands. For our short course we have a more elaborate program which responds to the commands LIST and NEW. This program is too long to list here, but any reader interested in it is invited to contact us at the Computers in Education Centre, University of Salford, Salford M5 4WT, for further details.

Turn to Page 86

Understanding the Epson Part II

Make life easy – talk directly to your printer

By MIKE GLOVER
and
CHRISTOPHER ROPER

LAST month we saw how to handle the Epson from a word processor, and learned that not all the control characters we wanted to send to the printer were able to survive the journey through the various system programs such as DOS, the monitor and even the printer card. Now we will concentrate on the user who wants to program in Basic.

To turn the Epson on from the keyboard all you need do is to type PR#1 (assuming that the printer card is in slot one). From a Basic program however it is advisable to issue this as a DOS command. To do this precede the command with a CTRL D. A line of Basic to do this would read:

```
10 PRINT CHR$(4); "PR#1"
```

If you intend to print beyond column 40 make sure that the printer card does not echo characters back to the screen. If this is allowed to happen your program may be damaged, as most Basic programs start in memory where the text screen finishes. Printing beyond the width of the screen could result in overwriting part of your program.

This line:

```
20 PRINT CHR$ (9)    ;"80N": REM
    CTRL I 80N
```

not only tells most printer cards to set the right hand margin to 80 columns but also not to echo back to the screen.

Unfortunately the Epson 8132 card does not follow this convention, and it is necessary to POKE 1656 + slot with the column width, that is, POKE 1657,80 for slot 1. While it is possible to do this in your own programs most commercial software expects the former approach using CTRL I. For this reason some programs will not tab properly beyond column 40. If you have this problem then the only fix is a ROM change. A replacement EPROM is available.

Many users get confused when the TAB function from Basic appears to fail beyond column 40. Even more get confused when trying to set up tabs using the method outlined by Epson in their manual.

The easiest way to tab is to POKE location 36 with the column you wish to tab to. The following example should make this clear, and also show how to set up for a width of 132 columns.

```
10 D$ =  CHR$ (4)
20  PRINT D$;"PR#1"
30  PRINT  CHR$ (15): REM  CTRL O
      CONDENSED
40  PRINT  CHR$ (9);"132N"
50  POKE 36,1: PRINT "LEFT";: POKE
      36,132 / 2 - 3: PRINT "CENTR
      E";: POKE 36,120: PRINT "RIG
      HT"
```

To set tabs directly in the Epson you need to send the sequence ESC D followed by the Ascii value of each tab position followed by Ascii 0.

So to set tabs at columns 10, 30 & 60 use the following line

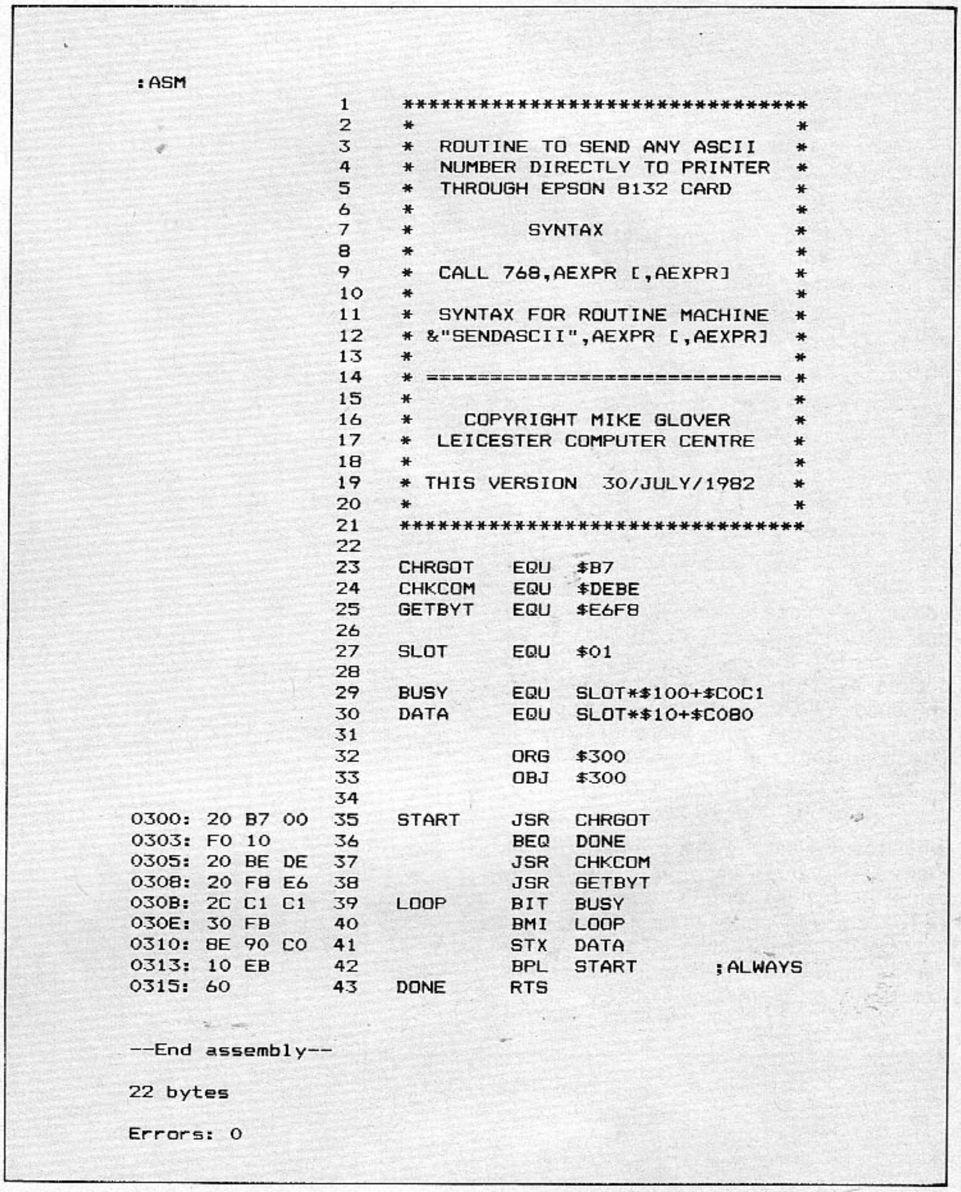
```
10  PRINT  CHR$ (27);"D"; CHR$ (1
      0); CHR$ (30); CHR$ (60); CHR$
      (0)
```

Now to move to these tab settings you print the HT control character (Ascii 9) and if you have a printer card that uses CTRL I as the command character not a lot will happen. The reason is that the printer card will gobble up the CTRL I.

Most printer cards will let you swap the command character with the sequence CTRL (oldchar) CTRL (newchar) so CTRL I CTRL B would let CTRL I get through but CTRL B would cause the printer card to expect a command to follow it. Consult your printer card manual to see how your card works.

To make life a lot easier let's see just how we can get all our commands through to the printer without being stripped out by the firmware and DOS. The solution is quite simple – we bypass all the system programs and talk directly to the printer. Indeed, we will be printing without apparently turning the printer on.

To help us we will use a 22 byte routine that can be poked in from Basic. You don't need to understand assembly language to use it but the source code is included for the curious. The routine is printer card dependent and I include ver-



```
:ASM
        ********************************
        *                              *
        *  ROUTINE TO SEND ANY ASCII   *
        *  NUMBER DIRECTLY TO PRINTER  *
        *  THROUGH EPSON 8132 CARD     *
        *                              *
        *          SYNTAX              *
        *                              *
        *  CALL 768,AEXPR [,AEXPR]     *
        *                              *
        *  SYNTAX FOR ROUTINE MACHINE  *
        * &"SENDASCII",AEXPR [,AEXPR]  *
        *                              *
        * ============================ *
        *                              *
        *    COPYRIGHT MIKE GLOVER     *
        *  LEICESTER COMPUTER CENTRE   *
        *                              *
        * THIS VERSION  30/JULY/1982   *
        *                              *
        ********************************

        CHRGOT    EQU  $B7
        CHKCOM    EQU  $DEBE
        GETBYT    EQU  $E6F8

        SLOT      EQU  $01

        BUSY      EQU  SLOT*$100+$C0C1
        DATA      EQU  SLOT*$10+$C080

                  ORG  $300
                  OBJ  $300

0300: 20 B7 00  START     JSR  CHRGOT
0303: F0 10               BEQ  DONE
0305: 20 BE DE            JSR  CHKCOM
0308: 20 F8 E6            JSR  GETBYT
030B: 2C C1 C1  LOOP      BIT  BUSY
030E: 30 FB               BMI  LOOP
0310: 8E 90 C0            STX  DATA
0313: 10 EB               BPL  START       ;ALWAYS
0315: 60        DONE      RTS

--End assembly--

22 bytes

Errors: 0
```

sions for the Epson 8132 card and the Grappler.

The bypass routine works as follows. You make a CALL to the address where the routine has been POKEd, followed by a comma and an arithmetic expression. This may be followed optionally by more commas and arithmetic expressions.

The routine first checks that the end of the statement has not been reached and then looks for a comma. The expression is then evaluated and the result placed in the X register. The printer is checked in a loop to see if it is busy and when it is not the data is put directly onto the printer data lines from the X register. A branch is made back to the beginning of the routine and the whole cycle starts again.

By using the Basic input routines directly and by putting the information directly on the printer output lines, we have avoided giving any of the other programs in our computer a chance to gobble up or modify a single character.

Here is how to use it. Include a line such as the following into your Basic program.

```
1000  DATA  32,183,0,240,16,32,19
      0,222,32,248,230,44,193,193,
      48,251,142,144,192,16,235,96
      ,0: FOR AD = 768 TO 768 + 22
      : READ BYTE: POKE AD,BYTE: NEXT
      : REM  EPSON 8132
```

Or for the Grappler this:

```
1000  DATA  32,183,0,240,28,32,19
      0,222,32,248,230,160,16,185,
      129,192,41,8,208,249,138,153
      ,129,192,153,130,192,153,132
      ,192,24,144,223,96: FOR AD =
      768 TO 801: READ BYTE: POKE
      AD,BYTE: NEXT : REM  FOR GRA
      PPLER
```

Now include a line such as

```
2000  CALL 768,27,67,9: REM  SET
      FORM LENGTH IO 9 LINES
```

or even

```
2000 ESC = 27: CALL 768,ESC, ASC
      ("C"),9
```

which is the same thing but easier to read.

The tab setting routine used above could now be written much more simply as

```
10  CALL 768,27, ASC ("D"),10,30,
    60,0
```

and could be invoked by a CALL768,9 knowing that the printer card won't be affected. You will, however, make your programs more portable if you avoid this tabbing method and stick with POKE 36 ,N.

A program follows which makes extensive use of the bypass routine. It opens with a matrix of dots, together with appropriate editing commands which allow you to design your own characters. When you are satisfied with your design you can test print it. Finally, you can create a text file or an EXEC file, which allows you to EXEC the design into your program.

The program uses a technique called bit image printing. Although this sounds fearsome it really is quite easy to understand. When the Epson is in bit image mode it allows you to fire any one of 8 pins independently of each other. Each pin has a value associated with it as per the following table:

BINARY	PRINT HEAD	DECIMAL	
1000 0000	X	128	TOP PIN
0100 0000	X	64	
0010 0000	X	32	
0001 0000	X	16	
0000 1000	X	8	
0000 0100	X	4	
0000 0010	X	2	
0000 0001	X	1	BOTTOM PIN

To fire the top pin you need to send the value 128 to the printer when it is in the bit image mode. To fire the bottom pin the value 1 should be sent, and to fire more than one pin the sum total of their values needs to be sent, that is to fire top, bottom

→

and third from bottom pins send the value 133 (128+4+1).

To print the following character

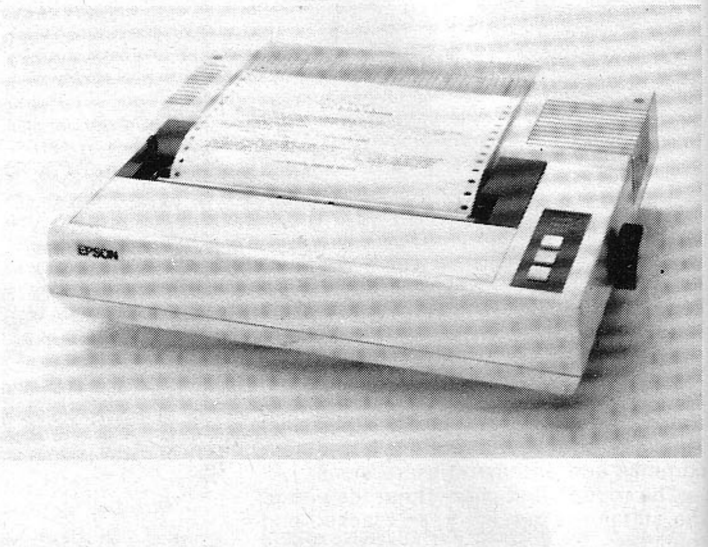
```
128  . . . . . X . . . .
 64  . . . . . X . . . .
 32  . . . X X X X X . .
 16  . . X . . X . . X .
  8  . . X . . X . . X .
  4  . . . X X X X X . .
  2  . . . . . X . . . .
  1  . . . . . X . . . .
```

add up the values for each column and we get 0,0,24,36,36,255,36,36,24,0 – a total of 10. This number needs to be divided by 256 and the remainder (10) and dividend (0) put on to the front of the list. Precede this with the codes for bit image printing and you have:

27,75,10,0,0,0,24,36,
36, 255,36,36,24,0

which can be sent to the printer either as their Ascii values or more conveniently using the bypass routine.

To conclude opposite is a table setting out most of the common commands and showing how to use them from your programs.



```
1  REM      :?CHR$(13);CHR$(4)"SAVE BIT IMAGE EDITOR,D1"
2  REM    LINE 1 IS A TRICK FOR USERS OF LINE EDITORS SUCH AS "THE DEVELOPER" -
TYPE " &E1 <CTRL> Z <CR> " TO SAVE YOUR PROGRAM QUICKLY
100  REM  ********************
102  REM  * EPSON BIT IMAGE  *
104  REM  *  DEMONSTRATION   *
106  REM  * (C) MIKE GLOVER  *
108  REM  *    LEICESTER     *
110  REM  * COMPUTER CENTRE  *
112  REM  *   0533 556268    *
114  REM  ********************
200  REM
        - INITIALISE -

202 D$ =  CHR$ (4): PRINT D$"NOMON I,O,C"
204  DIM C(40,2): TEXT : HOME :HT% = 1:VT% = 1
206  DATA    0,173,132,03,41,240,74,141,132,03,96,173,132,03,41,15,10,10,10,141,
132,03,96 : FOR AD = 900 TO 900 + 22: READ BYTE: POKE AD,BYTE: NEXT : REM  SUB T
O SHIFT HIGH (901) & LOW (911) NIBBLE INTO BITS 6-3 ;USE 900 FOR I/O
208  GOSUB 1000: REM  BYPASS ROUTINE
210  FOR I = 0 TO 639: PRINT ".";: NEXT
212  POKE 34,17
300  REM
        - EDITOR -

302  HOME : INVERSE : PRINT "FILE ";FL$: HTAB 16: PRINT "COMMANDS": NORMAL : VTA
B 20: PRINT " C)HANGE Q)UIT      I       ^S)AVE  ^L)OAD": HTAB 18: PRINT "J   K": H
TAB 20: PRINT "M";
304  HTAB HT%: VTAB VT%:A$ = "": GET A$
306  IF A$ =  CHR$ (19) THEN  GOSUB 908: REM  SAVE IMAGE
308  IF A$ =  CHR$ (12) THEN  GOSUB 910: REM    LOAD IMAGE
310  IF A$ = "C" THEN X = ( PEEK ( PEEK (41) * 256 +  PEEK (40) +  PEEK (36)):
PRINT  CHR$ (X + (X = 170) * 4 - (X = 174) * 4)
312  IF A$ = "K" THEN HT% = HT% + (HT% < 40)
314  IF A$ = "J" THEN HT% = HT% - (HT% > 1)
316  IF A$ = "I" THEN VT% = VT% - (VT% > 1)
318  IF A$ = "M" THEN VT% = VT% + (VT% < 16)
320  IF (A$ =  CHR$ (12) OR A$ =  CHR$ (19)) THEN 302
322  IF A$ <  > "Q" THEN 304
400  REM
        - SCAN SCREEN -

402 N(1) = 40:N(2) = 40
404  FOR R = 1 TO 2
406  HTAB 1: VTAB 18
408  HOME :FLAG = 1
410  FOR I = 39 TO 0 STEP  - 1
412 C = 0
414  FOR J = 0 TO 7
416 V = (174 -  PEEK (1024 + J * 128 + I + (R = 2) * 40)) / 4
418 C = C + V * 2 ^ (7 - J)
420  NEXT J:C(I,R) = C
422  VTAB 18: HTAB I + 1: PRINT "^";: CALL  - 958: HTAB 18: VTAB 19: PRINT C
424  IF C <  > 0 AND FLAG THEN FLAG =  NOT FLAG
426  IF FLAG THEN N(R) = N(R) - 1
428  NEXT I
430  NEXT R
500  REM
```

```
        - MENU -

502  HOME : PRINT : INVERSE : PRINT "OPTIONS";: NORMAL : PRINT : PRINT "1 - TEST
 PRINT": PRINT "2 - CREATE EXEC FILE": PRINT "3 - CREATE TEXT FILE": PRINT "4 -
RETURN  TO EDITOR"
504  VTAB 19: HTAB 9: GET A$: PRINT A$: IF  VAL (A$) < 1 OR  VAL (A$) > 4 THEN
PRINT  CHR$ (7): GOTO 504
506  ON  VAL (A$) GOTO 602,702,802,302
600  REM
        - TEST PRINT -

602  GOSUB 900
604  CALL 768,27, ASC ("A"),8
606  CALL 768,10
608  CALL 768,27, ASC (DY$),N(1),0
610  FOR I = 0 TO N(1) - 1: CALL 768,C(I,1): NEXT
612  CALL 768,10
614  CALL 768,27, ASC (DY$),N(2),0
616  FOR I = 0 TO N(2) - 1: CALL 768,C(I,2): NEXT
618  CALL 768,27, ASC ("A"),12
620  CALL 768,10,10: GOTO 502
700  REM
       - CREATE EXEC FILE -

702  HOME :LN% = 1000: GOSUB 902: POKE 33,33
704  IF FL$ = "" THEN  INPUT "ENTER FILE NAME ";FL$
706 EF$ = FL$ + ".EXEC": PRINT D$"OPEN"EF$: PRINT D$"DELETE"EF$: PRINT D$"OPEN"E
F$: PRINT D$"WRITE"EF$
708  LIST 1000
710  PRINT : PRINT LN% + 10;" CALL768,27,ASC("; CHR$ (34);"A"; CHR$ (34);"),8"
712  PRINT : PRINT LN% + 20;" CALL 768,10,27,ASC ("; CHR$ (34);DY$; CHR$ (34);")
,";N(1);",";0;: FOR I = 0 TO N(1) - 1: PRINT ",";C(I,1);: NEXT
714  PRINT : PRINT LN% + 30;" CALL 768,10,27,ASC ("; CHR$ (34);DY$; CHR$ (34);")
,";N(2);",";0;: FOR I = 0 TO N(2) - 1: PRINT ",";C(I,2);: NEXT
716  PRINT : PRINT LN% + 40;" CALL768,27,ASC("; CHR$ (34);"A"; CHR$ (34);"),12"
718  PRINT : PRINT D$"CLOSE"EF$
720  POKE 33,40: GOTO 502
800  REM
        - CREATE TEXT FILE -

802  GOSUB 900: IF FL$ = "" THEN  INPUT "ENTER FILE NAME";FL$
804 TF$ = FL$ + ".TEXT": PRINT D$"OPEN"TF$: PRINT D$"DELETE"TF$: PRINT D$"OPEN"T
F$: PRINT D$"WRITE"TF$
806  PRINT  CHR$ (27); CHR$ (65);D$
808  PRINT  CHR$ (27);DY$; CHR$ (N(1)); CHR$ (0);
810  FOR I = 0 TO N(1) - 1: POKE 900,C(I,1): CALL 901: PRINT  CHR$ ( PEEK (900))
;: NEXT : PRINT
812  PRINT  CHR$ (27);DY$; CHR$ (N(1)); CHR$ (0);
814  FOR I = 0 TO N(1) - 1: POKE 900,C(I,1): CALL 911: PRINT  CHR$ ( PEEK (900))
;: NEXT : PRINT
816  PRINT  CHR$ (27);DY$; CHR$ (N(2)); CHR$ (0);
818  FOR I = 0 TO N(2) - 1: POKE 900,C(I,2): CALL 901: PRINT  CHR$ ( PEEK (900))
;: NEXT : PRINT
820  PRINT  CHR$ (27);DY$; CHR$ (N(2)); CHR$ (0);
822  FOR I = 0 TO N(2) - 1: POKE 900,C(I,2): CALL 911: PRINT  CHR$ ( PEEK (900))
;: NEXT : PRINT
824  PRINT  CHR$ (27); CHR$ (65); CHR$ (12)
826  PRINT D$"CLOSE"TF$
828  GOTO 502
900  REM
        - SUBROUTINES -

902  HOME : PRINT "NORMAL OR DUAL-DENSITY? (N OR D) ";: GET AN$: PRINT AN$: IF
NOT (AN$ = "N" OR AN$ = "D") THEN 902
904 DY$ = "L": IF AN$ = "N" THEN DY$ = "K"
906  RETURN
908  HOME : INPUT "NAME OF FILE TO SAVE? ";FL$: HOME : PRINT D$;"BSAVE";FL$;",A$
400,L$3FF": RETURN
910  HOME : INPUT "NAME OF FILE TO LOAD? ";FL$: PRINT D$;"BLOAD";FL$: RETURN
912  REM
        - FIRMWARE BYPASS ROUTINE -

1000  DATA  32,183,0,240,16,32,190,222,32,248,230,44,193,193,48,251,142,144,192,
16,235,96,0: FOR AD = 768 TO 768 + 22: READ BYTE: POKE AD,BYTE: NEXT
1002  RETURN : REM   NOTE THIS VERSION IS FOR EPSON 8132 PRINTER CARD, CHANGE LI
NE 1000 TO SUIT YOUR CARD
```

MODE	Command	ascii	BASIC Example
*Enlarged on	ESC W	27,87	?CHR$(27);"W"
*Enlarged off	ESC W	27,87	?CHR$(27);"W"
Enlarged on	^N	14	?CHR$(14) (clears at line end)
Emphasised on	ESC E	27,69	?CHR$(27);"E"
Emphasised off	ESC F	27,70	?CHR$(27);"F"
*Double on	ESC G	27,71	?CHR$(27);"G"
*Double off	ESC H	27,72	?CHR$(27);"H"
*Superscript on	ESC S ^@	27,83,0	?CHR$(27);"S";CHR$(0)
*Subscript on	ESC S ^A	27,83,1	?CHR$(27);"S";CHR$(1)
*Sub/Super off	ESC T ESC H	27,84,27,72	?CHR$(27);"T";CHR$(27);"H"
*Underline on	ESC - ^A	27,45,1	?CHR$(27);"-";CHR$(1)
*Underline off	ESC - ^@	27,45,0	?CHR$(27);"-";CHR$(0)
Condensed on	^O	15	?CHR$(15)
Condensed off	^R	18	?CHR$(18)
*Emphasised/ Double on	ESC E ESC G	27,69,27,71	?CHR$(27);"E";CHR$(27);"G"
*Emphasised/ Double off	ESC F ESC H	27,70,27,72	?CHR$(27);"F";CHR$(27);"H"
*Enlarged/ Condensed on	ESC W ^A ^O	27,87,1,15	?CHR$(27);"W";CHR$(1);CHR$(15)
*Enlarged/ Condensed off	ESC W ^@ ^R	27,87,0,18	?CHR$(27);"W";CHR$(0);CHR$(18)
UK char set	ESC R ^C	27,82,3	?CHR$(27);"R";CHR$(3)
USA char set	ESC R ^@	27,82,0	?CHR$(27);"R";CHR$(0)
Set VTABS	ESC B{TABS}^@	27,66,{TABS},0	
Set HTABS	ESC D{TABS}^@	27,68,{TABS},0	See below for example

Set Horizontal Tabs to 8,16,24,32,64

?CHR$(27);"D";CHR$(8);CHR$(16);CHR$(24);CHR$(32);CHR$(64);CHR$(0)

VTAB	^K	11	?CHR$(11)
HTAB	^I	9	?CHR$(9)

(if this is your printer card control char then swap it ie. ^I^B)

FORMFEED	^L	12	?CHR$(12)

Line spacing can be set in n/72" by the sequence :-

Set 1/4"	ESC A n	27,65,n	?CHR$(27);"R";CHR$(n)
Reset 1/6"	ESC A ^R	27,65,18	?CHR$(27);"A";CHR$(18)
	ESC 2	27,50	?CHR$(27);"2"

Form length can be set to n lines by the sequence :-

ESC C n	27,67,n	?CHR$(27);"C";CHR$(n)

^ Means letter following is a control character

* Type /// and FX only

Mike Glover 1983

Epson printer crib sheet

Word puzzles present a printer problem

"Create Word Puzzles With Your Microcomputer" By Ernest E. Mau. Published by Hayden Book Co, New Jersey, 1982 304pp.

THE first thing to notice is that this book isn't written specifically for the Apple. In fact, if you have a standard machine you may not want to bother with it at all. The programs contained in it are written in Basic-80, which is a bit different from Applesoft. However, there are several points which argue for the book's inclusion in a *Windfall* review. I'll deal with these now so you can judge whether to carry on reading.

Firstly, many people have a CP/M card and run Microsoft Basic: versions 5.1 and higher present no problems. Secondly, it is possible to adapt the programs for Applesoft, and the author indicates the areas where changes will be necessary. Thirdly, the book is a very good tutorial in string handling. There are many number-crunching books, and many books which devote a chapter to strings, but this book is wholly devoted to string handling.

A potentially serious problem concerns the output device available. The output routines are written for a serially interfaced Qume daisywheel that accepts control codes as part of the data stream. Most Diablo and Xerox daisywheels should only necessitate minor changes to the programs. However, the author says that "a considerable amount of reprogramming will be necessary to accommodate a parallel-interface daisywheel printer that does not accept control codes in the data stream *or a non-daisywheel printer* (p.12, emphasis added).

If you are still with me, I'll now describe the book. It is not one that you can just pick up and start typing the programs in without reading the text. In fact, the puzzle programs don't start until Chapter 7.

Chapter 1 is an introductory chapter about "puzzlecrafting" and presents arguments about why it might be computerised. Leading on from this, Chapter 2 describes the necessary system configuration and hardware. Minimally, you need 48k, two disc drives, a VDU and a printer (subject to the restrictions already mentioned). The Basic must be one that supports certain string functions like LEFT$, RIGHT$ and MID$, so Applesoft is obviously suitable.

Chapter 3 describes the program modifications likely to be necessary if Basic-80 isn't available. Applesoft has many of the functions which are used, like CHR$, ASC$, STR$, VAL and LEN (you remember Val and Len, don't you?). There are some which it doesn't have, like SPACE$, STRING$ and INSTR, but the author provides examples of how these functions may be circumvented. Applesoft is even mentioned occasionally, so you don't feel left out in the cold.

Chapter 4 describes database organisation, and Chapters 5 and 6 contain programs for creating and manipulating the various databases. You need different databases for the different puzzles (although some can be used for more than one type of puzzle), which is why typing the programs in straight away won't get you very far.

In fact the databases are the key to the whole enterprise. Ernest Mau has built up an enormous database over several years, which is one reason why he can afford to give the programs away in the book. Even if you have exact system requirements, it will be some time before you could compete with him in selling puzzles.

As he points out, he also has an established network of contacts and outlets that would take you some time to duplicate. In principle, though, the programs are capable of producing saleable puzzles and Mau has obviously found it lucrative in the past. Presumably the "softening" puzzle market will be compensated for by sales of the book!

Chapters 7 through to 23 contain the various puzzle programs and each has a puzzle description, a program description and a description of the program operation. All the popular puzzles are here – word-find, word spiral, cryptogram and cryptolist, acrostic, and so forth. The only obvious omission is the conventional crossword.

Mau does have a program that constructs crosswords from a database of over 75,000 words, but he describes it as "not a practical program at this time". A *compiled* version apparently takes a minimum of six hours to run! He's working on it, though.

The programs seem well written, with thought having been given to speed of execution and economic use of storage space – necessary considerations with such large databases. For these reasons much use is made of multiple statements per line, and REMs are obviously not used. However, to make interpretation easier the author uses certain conventions. For example, the printout routines generally start at line 500 and external routines typically begin at line 1000.

If you are at all interested in word puzzles I think you would find this book interesting. The chances are that you'll have to put some work into modifying the programs, but Applesoft seems to be reasonably compatible.

I think the biggest drawback is going to be that many of the people who are interested aren't going to have a Qume printer (or a daisywheel of any description). Perhaps the second edition will be written for parallel interfaced Epson dot matrix printers too.

Cliff McKnight

One way to confuse and to personalise DOS is to change the requirement to type in:

```
PRINT CHR$(4); "CATALOG"
PRINT CHR$(4); "OPEN FILENAME"
```

To change the "CHR$(4)" portion just type in: `POKE 43698,192` (normal is 43698,132) or include the line early in your program.

What you have done is change the code character from CTRL-D (CHR$(4) to @. Now to execute a DOS command you can type in

```
PRINT "@CATALOG"
PRINT "@OPEN FILNAME"
```

Allan Dubost

THE basic theory behind network analysis and critical path analysis in business was discussed by Peter Thomason in the February issue of *Windfall*.

Here he delves further into the principles involved and reviews two packages that cover resource usage analysis on the Apple II – APM and Micronet, a CP/M-based version of the same package.

He will conclude his discussion next month with a review of Microplanner.

Resource usag and Micronet

TO understand the capabilities of project management packages for the Apple we must first examine the "big brother" yardstick – the general requirements of project management on a mainframe computer system.

Without an understanding of the theory and principles involved, most businessmen would have difficulty in successfully applying the packages to the task of improving their company's productivity.

In general, a mainframe system comprises seven modules – Input, Merge, Time Analysis, Resource Aggregation, Resource Scheduling, Cost Analysis and Output – and each module must be processed in the proper order if the system is to be used fully.

If resource analysis is used, then the preceding four stages are necessary. In turn, the analysis could be limited to input and output for a data checking facility. The input will not always start the analysis process because a re-analysis may be required from existing data. For example, a previous run may have produced a data file but not the output.

When many activities interlink in a project it is impossible to "see" the detailed and overall picture without some degree of pencil and paper, calculation, visual aids and so forth.

The network is no more than commonsense specified activity by activity.

Most managers will have drawn a time based chart and found that it is a matter of redrawing the same barchart if they want to produce an up-to-date version. The mental process they go through in deciding the start points and lengths of each bar, the number of bars and perhaps how they should be broken up into smaller work elements, is identical to the mental process involved in defining the activity list, the logical order of activities and individual activity durations when using a network analysis package on the Apple.

It is also a lot easier to see what you are doing than when drawing up bar charts because when using PERT/CPM you only have to consider one thing at a time. All the considerations come together when the network is drawn, input to your Apple, then analysed in detail and output.

Taken to this level of detail and subsequently time analysed, any project or complex situation is far more easily understood than if a few bars are drawn on a chart. It has the additional advantage that by altering a few numbers on the network a reasonably simple calculation can provide a new, updated "picture".

Many complex operations do not require more than a time analysed network, and if so it is silly to become more complex. However, if a resource conflict might occur then the time analysis result might prove difficult to implement.

Hence the need for resource analysis.

For example, four activities might each require the same resource. Time analysis says that they can all start together . . . but time analysis does not take resources into account, it only works out the earliest and latest logically possible activity start and finish times.

If the total float (the difference between earliest possible and latest permissible activity times) on these four activities will allow them to be started and finished one after another – that is the whole project is not then delayed – then the single resource can be used by each activity in turn.

Any number of activities might be in resource conflict at any point in time. When resource smoothing is carried out on one activity and it is moved forward in time to resolve this conflict then it will immediately change all other resource interrelationships throughout the remainder of the network.

A mainframe can handle thousands of different resources with hundreds of thousands of activities. But most people only need to smooth between a few dozen and a hundred or so resources for a project having between a few hundred and a few thousand activities.

It is virtually impossible to resource smooth without a computer – I doubt very much if anyone would try to manually smooth more than a Visischedule-sized project, if at all.

An apparent major difficulty facing small businesses who wish to use their Apple as a project management tool for resource scheduling is that resource availabilities must be specified for the project together with resource requirements for each activity. However, it is quite possible within any small business to develop systems which can generate this resource data.

Cost analysis as a detailed control mechanism is not generally available or required within the PERT/CPM environment because normal accounting systems are used to dissect individual budgetary performances.

As a general management tool when a specific schedule has been established the Cost Analysis Module is used to find out how much it will cost a company to use a resource in a given time period.

A very useful result is to show that a project has time or performance deficiencies if running late and/or inefficiently. This is shown by producing the actual cost, budgeted cost and projected cost on the same printout.

Each analysis produces additional fields in a file containing records of activity data, time analysis, resource analysis and cost analysis. At the output stage these are sorted, selection/sequence/format keys used and then printed.

It is very important to professional project management that information is provided selectively.

APM (Apple project manager)

APM runs on a 48k Apple with one or two drives. It costs £137.

A utility program is used to set up the system parameters, such as the number of drives and printer configuration. Next the

analysis with APM

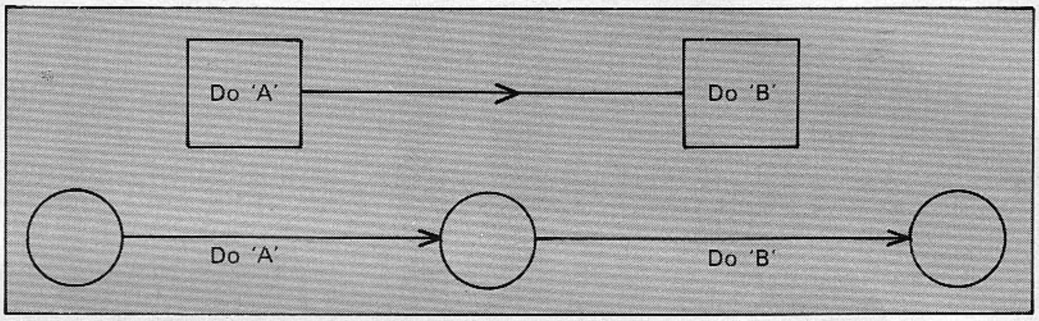


Figure I

user must define project parameters such as the main title (used for output headings), the maximum number of activities (up to 2,000, depending on the other data entered), the calendar I.D. (identifying the specific calendar, held on disc, to be downloaded into core for this particular network analysis) and the codes I.D. (which identifies a specific Codes file, the codes being abreviated activity descriptions).

Liberal use of these codes greatly reduces core usage and thus increases the maximum processable network size.

To input network data the user is asked for the preceding event number, succeeding event number, duration and description for each activity, and he can specify starting and finishing activities, within the overall network.

Scheduled starts (preset earliest start times) and scheduled finishes (preset latest finish times) can be specified for activities. These will over-ride time analysis calculations and are effectively management time impositions.

Also definable are "milestone" activities – selection keys for use on output which can provide a simplified general view of the overall project time performance.

It is also possible to sort outputs and to print a reduced printout in which program masks are used to select specific activities. This is useful for management reports but is limited to description selection and thus cannot be used to highlight other areas such as negative floats. APM also produces conventional bar-charts.

Durations and calendars are restricted to whole days, thus APM would not be suitable for very fine scheduling where hours or shifts have considerable importance. To create a calendar one specifies start and finish points and then those days which are regularly worked/not worked.

This file can subsequently be modified to include holidays or non-working days. APM does not lend itself to overtime schedules unless these are in whole days.

It carries out normal time analysis, and for most users who do not require a more sophisticated approach it is a very good, well thought out, time analysis program.

However, I would have liked to be able to move sub-networks around using an edit facility, because in larger networks there are often several almost identical sections which can be built into a library and retrieved, altered and added to the main network.

It is also a great pity that no changes can be made in the initial project parameters because a network can often be re-used with modification in a different application.

However, as far as it goes (that is Time Analysis only) APM is a competent package and can be recommended as good value for money to most small businesses.

Micronet

Written by the authors of APM, Geoff Reiss and Robert Fearnley, this package is not unnaturally based on APM and for this reason it is reviewed in the same article.

The package runs on Apples with Z80 card under CP/M. This makes the processing a little quicker and the capacity, somewhat smaller than APM due to the size of CP/M, is reduced from 1500-2000 activities to 550.

The manual is well written and contains similar sections to the APM manual, namely a tutorial followed by a reference section. No user should have much difficulty in getting this package off the ground.

It handles both arrow-based networks and precedence diagrams. Precedence diagrams are made up of boxes which contain activity data linked by arrows to other similar boxes whereas arrow networks are made up of arrows which represent activities linking together "events" or nodes. See Figure I.

In a very similar manner to APM, dates are daily duration times, calendars are "created", reports generated, project data input. The major difference is in more elaborate report selection and the addition of resource usage analysis.

Micronet resource analysis is resource aggregation, or finding the resource usage from early or late time analysis results. Resources are limited to a single level of resource usage over the whole duration of an activity. It does not carry out resource smoothing.

Having said that (the resources include cash which will produce a very useful cash-flow curve), the smoothing operation mentioned previously does not necessarily provide a fabulous advantage if, as is conventional in some industries, the logic of the network (precedence diagram) can be sensibly drawn to depict some of the scheduling process.

For example, if the first floor of a block of flats contains 20 rooms through which

→

plastering must work one room at a time (because it is assumed that only one plastering gang will be available) then the network can be drawn with 20 consecutive activities which themselves, room by room, have both completion of the previous work (say electrical) as well as completion of the previous room as restraints. Then some resource scheduling has been done already, so perhaps a smoothing operation would have little value.

On the other hand, a matrix of arrows representing five trades working through 20 rooms and each having other work on the site which could be carried out at the same time will present a planner with a slight headache.

Among other things, the planner is using the computer to produce a resource planning equivalent of the old bar chart. Somehow this seems a little silly – but applications must suit the software concerned and if several thousand users are more than satisfied with Micronet then that speaks for itself. Personally I doubt that some users understand the benefits of resource smoothing sufficiently to use it properly, therefore Micronet could be the happy medium.

Micronet claims to have over 3,000 users in construction, engineering, computing, space, publishing, manufacturing and scientific research. Two major construction groups, Laing and Sheppard, have adopted Micronet as their group standard and have purchased multiple copies.

Micronet costs £650 plus a Z80 card if you don't have one already. It is a more expensive system than APM, but provided there is a need for resource examination then this might be a modest cost to many smaller and not so small businesses.

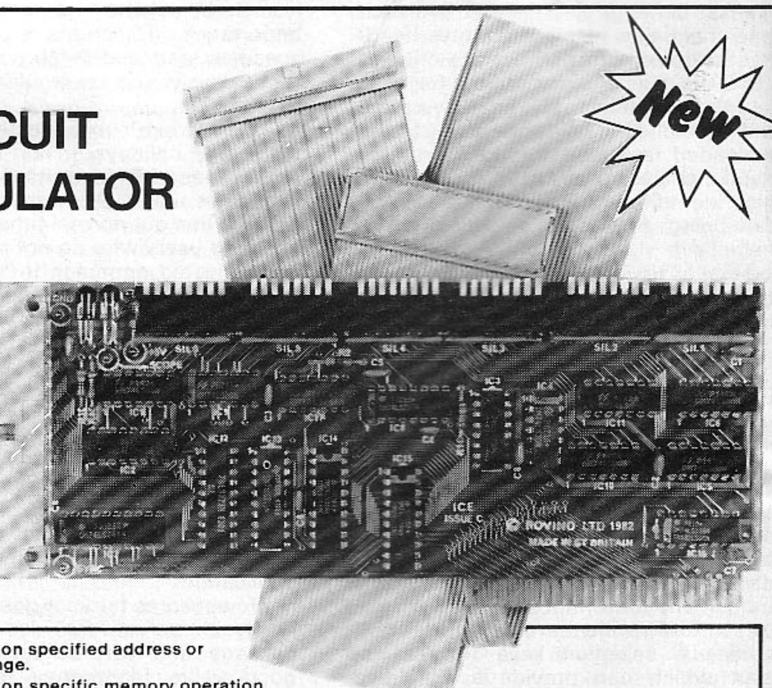
If comparing mainframe systems with Apple software such as APM and Micronet seems to be a little unfair, it must be said that a mainframe can be hired for the operation whereas an Apple is usually bought. To compare fairly, therefore, one must look to the results and then to the costs.

First the results. Either APM or Micronet would produce fairly equivalent results in the Apple enviroment as the mainframe could produce with much more sophisticated hardware and software. This is due to a fairly rudimentary software system. It is only if large (very large by most standards) applications are to be processed or if much more advanced management science application is required, for instance true resource scheduling, product breakdown, netting, batching and scheduling, that a mainframe would be necessary – although Microplanner goes quite a long way towards true resource smoothing.

So, in the environment in which one might expect to find an Apple micro, it is no real benefit to have a mainframe, at least for this application, unless very advanced processing is necessary.

As to the cost, these applications are usually costed on a ridiculous basis by computer bureaux – so much per activity and so much per output – which makes it rather expensive as well as unrealistic since good management reporting requires a lot of short reports.

All in all, the average small user could do a lot worse than stick to his Apple with either APM or Micronet, depending on whether he (she) needs the resource examination component of Micronet. You will also be in a real-time environment whereas mainframe applications will be in batch mode.



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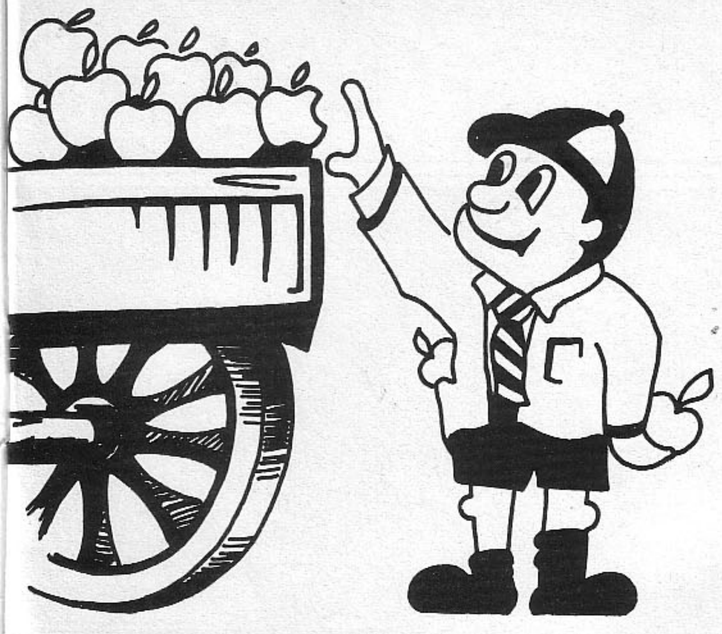


applecart

Monthly review of
Apple in education

User defined characters with Apple Pilot

By
TONY
COOK

Department
of Biology
New University
of Ulster

IN an article entitled "Pilot – a language for high flying teachers?" in the January 1983 issue of *Windfall*, Brian Rushton outlined the basic, simple features of the Apple Pilot language. It is essentially a language designed to facilitate the presentation of lesson material on the screen, to enable the asking of questions and the acceptance and evaluation of answers.

It is simple to start using, having only four basic commands. They are: T for Type text; A for Accept a response, M for Match the response to the correct answer and J for Jump to the next section.

There are a number of extra facilities with Pilot which a little more programming will enable even the fairly naive user to incorporate into teaching programs. On the Pilot Author disc itself are four editors. The Lesson Editor creates the text/question/answer routines and can call files from the other editors. These ancillary editors allow the use of alternative character sets, graphics and sound.

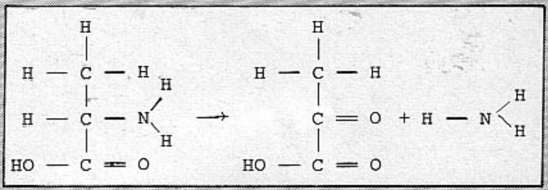
The purchase of another disc (Pilot Animation) allows a user to animate some sorts of diagram. This article will concentrate on character sets, graphics and animation.

I am the person who stands up half way through a film thinking the National Anthem is being played so I will not attempt any comment on the Sound Effects Editor, though judging by the responses of my colleagues to the sample programs – pieces by Beethoven and the Lone Ranger – it must be quite good.

Until you have experienced the freedom of user defined character sets it is difficult to appreciate how useful they can be. Any science text is littered with unconventional characters. There are, for instance, very few convenient chemical symbols and no subscripts or superscripts on an Apple keyboard. How on earth can even a fairly simple chemical reaction like the one below be displayed?

$$C_6\ H_{12}\ O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O$$

Or even worse – a structural formula:



With a user defined character set all these are possible. The best way of doing it in Pilot is to adapt the Ascii character set provided on the Lesson disc. This is because every time a character set is changed within a program the new set has to be loaded from disc. Adapting an Ascii set allows the same set to be used throughout the program with the consequent saving in time.

Incidentally, Apple Computer should design a version of Pilot which holds more of the program in memory. It really is incredibly tedious when the machine has to find and load from disc even the most trivial information. There are quite a few characters on the keyboard whose use can be avoided and these characters can be redefined as more useful things.

In the equation given earlier we lack |, –, =, and → and so we redefine ! as |, $ as –, " as → and * as =. We go to the Character Set Editor and ask it to edit the Ascii file. The screen then displays three boxes.

A large central one shows an array of seven by five blank grids, each one of which is made up of eight by seven little squares. Two small squares on the right provide maps of the central array, the upper one indicating the character typed, the lower one showing what it now represents. The little squares in the central grids are filled to produce the new character.

It would be a waste of time to describe exactly how it is done because all you need to do if in doubt is to type ESC? and the screen displays all the instructions on how to move the cursor, how to fill, erase copy, etc. Pressing the space bar gets back to the grid and new characters may then be created. A set is made up of 96 characters but only 35 can be displayed in the array at one time. Having created the new characters they can be saved as the set CHEMSET and used in a lesson created by the Lesson Editor. The lesson looks like:

```
tx:chemset
t:
t:    H               H
t:    !               !
t:  H$C$H           H$C$H
t:    !   H           !            H
t:  H$C$N<  $"        C*O    + H$N<
t:    !   H           !            H
t: HO$C*O          HO$C*O
t:
t:
t: alanine  $"  pyruvic acid + ammonia
t:
as:
e:
```

The as: command at the end is merely to prevent the display disappearing in a whirring of discs as Pilot gropes its way back to the Lesson Editor. The Character Set Editor therefore is very useful for those unconventional little things like X^2, K^+_{in} and Na^+_{out}.

In science teaching it is essential to be able to put over diagrammatic material, and for this the Graphics Editor is ideal. It operates on what Apple call a rubber band cursor. This means that the current cursor position is joined to the previous one by a line of dots. This line can be drawn in (D) or erased (E) giving a very convenient method of drawing.

A diagram can be drawn on an acetate sheet and attached to the TV screen. It can then be easily "drawn" round, using the rubber band cursor and drawing the line in when it is in the right place.

As with the Character Set Editor when you get into trouble, like forgetting how to draw circles, squares or boxes or how to fill in closed areas, just type ? and all the relevant commands are laid out before you.

The Graphics Editor in Pilot is more useful than a Graphics Tablet for drawing diagrams. It will draw anything that can be drawn with the Tablet but it will also allow the use of upper and lower case text on the same screen. Furthermore, the drawing is saved as a sequence of commands rather than as the whole screen with a considerable saving in memory.

Where an instantaneous picture is required it can be provided using a "quickdraw" facility invoked by ending the graphics file name with !. This speed is achieved at the expense of memory space as it is when using the Graphics Tablet. The Character Set and Graphics Editors are then both very easy to use and useful.

Both the special effects editors described here are very useful for the construction of teaching programs. Their use takes a little practice but once mastered they provide a flexible and comparatively simple way of presenting labelled diagrams and unconventional symbols on the screen. These facilities, when combined with the Pilot language itself, make Apple Pilot one of the greatest aids to the production of materials for Computer Aided Instruction.

To be concluded

Gertruc
shows
the wa

IF you were surprised at the government initiativ to get a computer in all primary schools, you'll b even more surprised by some of the package produced by The Learning Company.

As their advertising literature says, "now th computer age is three to thirteen". These package are not simply games, either. As the name of th company suggests, they are meant to encourag learning of important concepts.

Six packages are currently available in thi country, of which I have seen four. I'll describe eac in turn and then make some general comment about all of them.

Juggles' Rainbow: This package is aimed a three to six-year-olds. It is designed to be useabl by non-readers and teaches a variety of spatial con cepts. Two strips are provided for placing acros the keyboard to divide it in various ways.

Some of the exercises use a vertical strip an require responses to either the left or right of th strip. Others use a horizontal division to teac "above" and "below", and some use both strip simultaneously to teach combinations of thes concepts.

The quadrant sectioning is also used to teac shape recognition of the letters p, b, d and q – th ones most often confused by children learning t read. A couple of adult-supervised sessions ar recommended, after which the child is ready t take over.

Gertrude's Secrets: This package is aimed a four to nine-year-olds. Gertrude is a go-gettin goose which helps children to learn logical thinkin while they play with colours and shapes.

There are seven different forms of puzzle in Ger trude's world. Two kinds of loop puzzle teach ele ments of set theory and Venn diagrams; three trai puzzles require use of colour and shape concept and an attention to sequence; and two arra puzzles use colour and shape concepts within matrix.

Gertrude's Puzzles: This package is aimed a six-year-olds and over. It follows on from Ger trude's Secrets, developing more complex concept

Gertrude spearheads micro invasion of primary schools

along the same lines. For example, instead of matching colour or shape in an array puzzle, the child is now required to organise the pieces in terms of differences.

Similarly, the Venn diagrams are more complicated (up to three overlapping sets), and the train puzzles now have interconnected nodes instead of being simply sequentially organised.

Bumble Plot: This package is aimed at eight to thirteen-year-olds. It contains five programs which teach various aspects of two-dimensional co-ordinate geometry. By using a central origin, the child learns to use both positive and negative co-ordinates.

According to the literature, this package builds on Bumble Games (which is for four to ten-year-olds) but unfortunately I haven't seen this one.

All the packages make extensive use of both colour and sound, although in all cases the sound can be turned off. Both Juggle's Rainbow and Bumble Plot could be used in monochrome, but they lose impact – who ever heard of a monochrome rainbow?

The presentation is excellent. They come in attractive disc-sized cardboard folders which contain the disc and manual. Although the manual is loose, the disc is slotted in and cannot fall out.

The manuals are very well written and illustrated and could be used by the appropriate-aged child if he or she can read. For non-readers, the manuals make an excellent script for the adult-in-charge.

The two Gertrude packages use shapes, and the default shapes are the square, triangle, diamond and hexagon (which looks roughly circular). They also have six other shapes (for example, faces, flowers, bugs and monsters) which can be substituted to provide new interest.

In addition, any shape can be taken into the editing room and modified very easily. These can then be used in the puzzles. For example, we edited the shapes to contain the initial of the child using the package, much to their delight. The children also enjoyed creating their own (personalised) shapes!

An interesting aspect of these two packages is the way in which wrong responses are treated. If, for example, a shape or colour is placed in a set where it doesn't belong, it simply slides out of the set and sits at the bottom of the screen. In the more complex puzzles, pieces may be incorrectly placed but at the end they will rearrange themselves to show the correct solution.

Where keyboard skills are required, these are taught at the start of the package. My only real criticisms relate to this section of some of the packages. In the two Gertrude packages the user is led through all the keyboard instructions before being given the joystick option.

Also, in Gertrude's Puzzles the user is instructed to "but" something instead of "put" it – a bit confusing. Some of the children noticed the American spelling of "colour", but maybe this is what is meant by computer literacy!

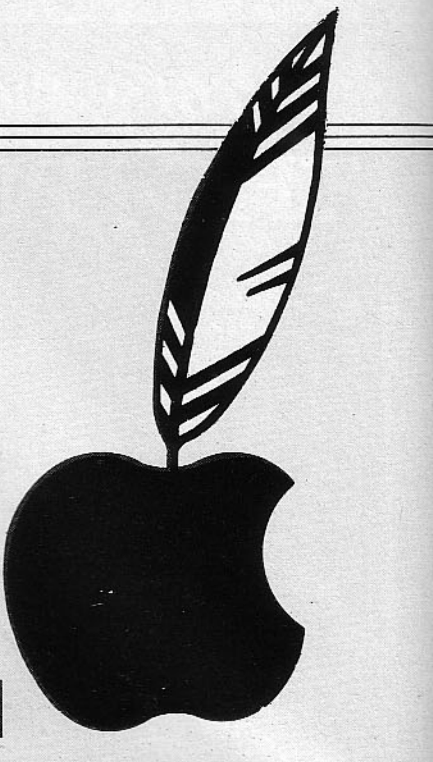
Everyone who tried these packages enjoyed them, including a few adults who suddenly found their mental processes stretched (or strained).

Non-readers coped extremely well with Juggles' Rainbow even on their first introduction to the Apple. As with any package, the abilities of the individual child are more important than the age stated on the packet. However, the age-banding on these packages seems quite accurate, given that proviso.

Unfortunately, the prices are quite high. Juggles' Rainbow costs about £24, the two Gertrude packages about £43 each, and Bumble Plot about £35. In America they are aimed at both the educational and home markets, but my guess is that the £ price will restrict them to the educational market in this country.

This is a great pity because those schools which have a micro mostly don't have an Apple. I don't know if the packages are available for "the other 6502 machine" (as advertised extensively on BBC television) but I think it would be a pity for these packages not to be widely used. They're certainly the best general-purpose educational packages I've seen.

Cliff McKnight



The cry for help that went unanswered

I READ with amusement the letter by Mr Gazzard in your Feedback column, January 1983 issue. Not because the letter is funny, but because the reply by Max Parrott is as much mumbo-jumbo as the Apple manuals are.

Gazzard's letter is a cry for help. Parrott hasn't recognised the struggle that we beginners have.

Nobody goes into a garage and buys a car without first knowing how to drive it.

Plenty go into computer shops and if they can find somebody who will attend to them buy computers as first-time users. When they open the manual what do they find? A book on where to find the oil and how much; how to change the wheel and where to find the jack; how to start the thing on a cold morning.

But anything in the book on driving the car? Of course not, you should know how to drive before you buy.

No computer manufacturer has really understood this. Some have better manuals than others, but Apple does not put one out for a raw beginner. You would expect them of all people to do so, but they don't. So we struggle.

Program publishers can be just as bad. I recently bought a word processing program and the "code" took me four days to crack, in spite of the fact that I have about a year's experience with two other programs of the same type. How will they ever get it recommended by a beginner?

It's not going to be easy Mr Gazzard, for any of us, but numbers are on our side and some day soon some manufacturer is going to give the newcomer the recognition he deserves. That manufacturer will make a killing without a superior product, merely by writing the books in plain sensible English that a novice can understand. – **K.B.R. de Boer, Port Elizabeth.**

Tests on the carry bit

WHY are tests made on the carry bit for less than and greater than/equal to tests when branch if plus (greater than/equal to 0) and branch if minus (less than 0) can be used?

Thanks for a great magazine – how about an auto-line number utility. – **Philip Colmer, Fordingbridge, Hampshire.**

● THE values held in the three registers A,X,Y may each be compared with data held in memory somewhere and each family of comparisons, CMP, CPX, CPY, functions in a similar way.

Consider the CPX family. The specified contents are subtracted from the value held in X, the result is not stored but the Negative, Zero and Carry flags are conditioned, dependent on the result.

Suppose the X register holds the value $E5 and it is compared with the value held in TEST. If TEST holds $E5 then the result of comparison is 0 and BEQ detects the equality. If TEST holds $E3 the result is 2 which is positive, thus BPL would detect the required result and behave as expected.

However, suppose TEST holds 5. The result is $E0 which would be read as a negative number and BPL will fail. Testing the carry bit solves this problem because the carry would be set for each of these example comparisons made above.

Similar arguments apply regarding the BMI instruction and the other families of comparisons.

The idea of publishing an auto-line number utility is a good one. We are always on the lookout for ideas.

The fast 'outsider'

I HAVE been very impressed with the quality of Windfall over the past nine months. It has supplied a lot of information that I was accustomed to getting from Call-APPLE and MICRO-6502 before they priced themselves off the UK market.

The recent arrival of the IIe was a sight for sore eyes. My own Apple might be in semi-retirement, its pre-REV 7 board unable to handle things like the various keyboard-enhancers, option strips, and its disc-drive reluctant to upgrade to 3.3, but the IIe represented all the DIY add-ons in a single, clean design. As for Lisa, sorry (a) I'm not in the right business to put one on "expenses", (b) Why doesn't the mouse have an infra-red link?

As you'll have guessed, I've got a soft spot for my Apple, but last summer a BBC 'B' arrived. It was planned as a graphic terminal for the Apple, though things wen awry.

The Beeb was faster than the Apple (!) the Sublogic 3-D package that shoul have changed that wouldn't talk to the Amdahl 9511–based math processor car that should have clinched the match, an for reasons I've only just discovered, couldn't pass the Apple-calculated co-ordinates to the BBC micro and be confident that they weren't scrambled en-route.

There were other surprises in store BBC graphics plus integer arithmetic were MUCH faster than the corresponding Apple programs, and the flexibility of its 16k Basic left Applesoft standing.

I miss the Apple's LIST formatting though. I like to see spaces around key words, no splitting of key words at ends o lines, an operating system that takes you files away and doesn't bother you with details of colons, quotes, the number o vacant contiguous sectors being too smal (though the disc's almost empty) etc.

I hear that A.P.P.L.E. (Puget Sound plans to produce a new version o Applesoft for '84-5, and I'll wish them luck. Long variable names, print using multi-line DEF FNs and Procedures woul be nice, together with a co-designed compiler. A graphics area-fill command woul be handy, but how will they get all of tha plus Applesoft into 12k? I think they're going to use the IIe's fan-fold RAM.

We have seen so much of the Z-80 an 6809 cards that the arrival of that 3.5 mHz 6502 add-on may prove a renaissance in the Apple II's fortunes. Fo £300 plus VAT I'd prefer a pair of slimline discs, but when the price drops I think I'd get a Super-6502 card for the satisfaction of watching my old Apple outperform its modern rivals. (Anyone fo Mach 3 Space Invaders?)

For the next year or so I'll be spending most of my computing time at a BBC, bu then the second processor situation should have settled down. Given the *choice between a tubed BBC and a IIe + 3.5 mHz card + enhanced Basic, I don't really know which way I'd turn! If the 6502 happens to live in the bottom 64k of a Super-Mac's 68000k RAM, and plays I/O handling when its not emulating IIe, then that's for me!* – **Nik Kelly, Liverpool.**

Two printer problems

I WAS most interested to see G. Fitton's query about using two printers (one in Slot 1 and the other in Slot 2) with Wordstar, and T.N. Thompson's incomplete reply. We have been using Wordstar with a Qume Sprint 5 running off a CCS 7710 serial card in slot 2 for over 18 months.

The Wordstar printer patch area listing provided in Appendix F of the Wordstar Manual lists a subroutine to output a character to the CP/M list device. This subroutine starts at the label LISEND:.

The instruction at LISEND: + 1 puts the BDOS function number (5 for list output) in register C before calling BDOS at LISEND: + 3. The modification is simple: use the Wordstar INSTALL program to change LISEND: + 2 from 05H to 04H so that BDOS function 4 (output to PUN:) is called every time Wordstar thinks it is using LST:.

In Mr Fitton's case he would have to have one Wordstar program installed as standard (to use his Epson from Slot 1) and another using the PUN: modification to utilise the daisy wheel from Slot 2. – **Greville Seddon, Manchester.**

* * *

I WAS interested to read G. Fitton's letter about Wordstar printers in the May Windfall and can offer a simple solution. We have installed several Wordstar systems with both draft and letter quality printers, and obviously faced exactly the same problem as Mr Fitton. We supply our customers with two simple commands, PRN1 and PRN2, which connect either the printer in slot 1 or the printer in slot 2.

The technical details are as follows. Wordstar output is normally directed to the LST logical device. The softcard documentation (P2-19) explains that this can be re-directed to physical device TTY:, CRT:, LPT:, or UL1:, using STAT to reset the IOBYTE. As TTY: and CRT: are the screen, and LPT: is the printer in slot 1, obviously UL1: must be used for the printer in slot 2.

Microsoft expect the user to supply the driver for UL1:. However, it is not a difficult task to patch one of the supplied drivers suitably.

As all this appeared too technical for everyday use before entering Wordstar, we created the two commands PRN1 and PRN2 which patch both the UL1: driver and the IOBYTE. In other words, they connect either the printer in slot 1 or the printer in slot 2 as LST:. Cold-boot default is the printer in slot 1.

These utilities are released as standard with Eicon 8in disc drives, together with programs offering file deletion with verification, "typewriter" use of the keyboard and printer, and reporting on the number of free directory entries on a disc. This utilities package is available to other CP/M users for a nominal charge of £20. – **Dr B. Hutchison, Eicon Research.**

Date conversion

I WAS pleased to see the publication of my article on Date Conversion in the current issue of Windfall. I note, however, that there remains one omission in the Basic program listing which I corrected at the second proof reading.

In line 120 the null string has been incorrectly printed as 120 A$ = : and should read **A$ = ""** **:**

I would be grateful if a correction could be printed. I'm sorry I missed it at the first proof reading – it will be a lesson well learned! – **G.F. Stratton, Stamford.**

Hidden writing on the wall . .

MIKE Gilbert's article "To copy or not to copy" (May Windfall) mentions the drawback of copy cards like Snapshot Two, that they cope best with programs that do not need to re-access the disc once loaded.

In fact, Snapshot Two copies many programs that do re-access the disc.

If a program consists of several fairly independent sub-programs, such as Apple Writer I or Pulsar, one can make separate copies of the sub-programs and then combine them. This is especially easy if the program is in "unlistable" Applesoft, like many business and word-processing systems, because Snapshot Two is very good at making such programs LISTable and SAVEable.

Here's a nifty trick for owners of both Snapshot Two and a nibble copier like Locksmith: Using both systems, you can often copy programs that resist either one.

Make the best copy you can with the nibble copier. Often this copy is capable of everything but booting properly. Now boot the original disc, and use Snapshot Two to dump the contents of memory to a backup disc.

Now you can boot the Snapshot Two backup to get the program running, and use the nibble copier backup to keep it running.

Mike Gilbert queried Snapshot Two for the Apple IIe. Snapshot Two E will be available in early June.

A word about software piracy – DON'T! Whenever you make a backup copy with Snapshot Two, your serial number is encoded and written all over the backup disc.

In cases of alleged piracy, Dark Star Systems will assist the aggrieved party in finding the culprits. You have a perfect right to make backups for your own use, but piracy is theft.

We look forward to the day when programs are as cheap as books, the copyright law protects software, everything is copyable, and Snapshot Two is unnecessary. – **Robert Sather, Dark Star Systems.**

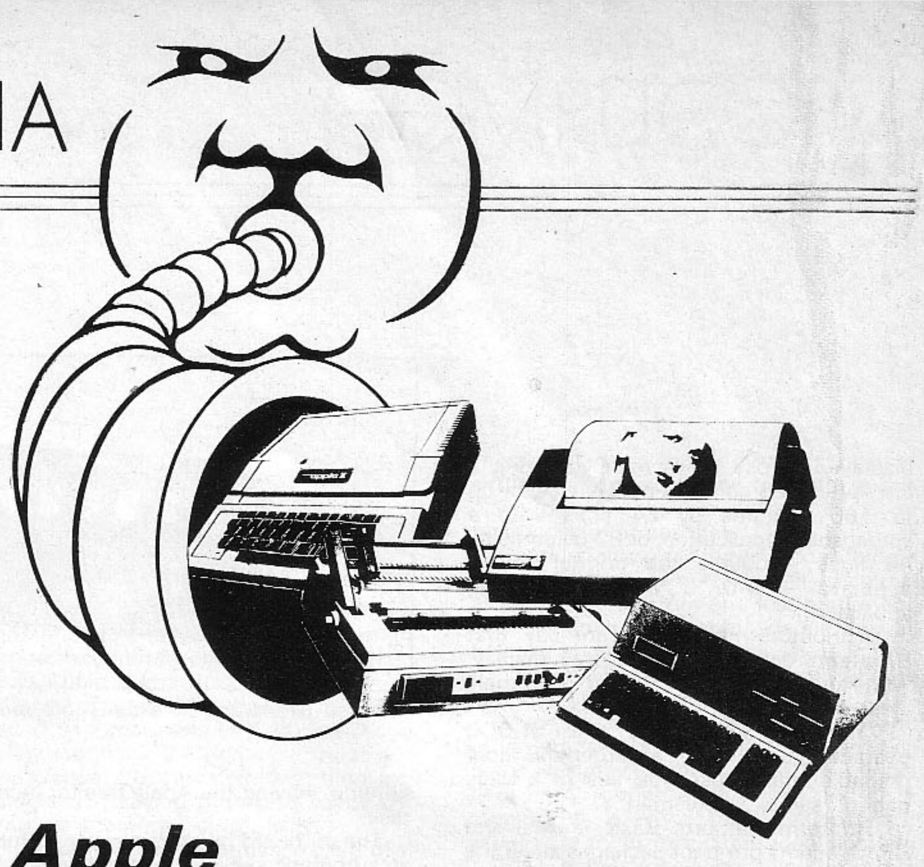
ETHICS

By MIKE GILBERT

To copy or not to copy ... that is the question

Flashback to last month's Windfall

COMPUCOPIA



Protecting the Apple from the world outside

A SOLUTION for managers who want to take their Apple into the harsh environment of the shop floor or an industrial laboratory is the Merlin from Xcalibur Computers.

It is a self-contained unit suitable for bench or rack mounting and can be used for such things as fuel consumption testing for vehicles, performance monitoring, airborne applications; shipping and any application where portability is important.

The Merlin comes as a complete system based either on the Apple IIe or the II Plus, comprising a standard motherboard power supply and single disc drive, or as a bare shell which can be used to repack the user's own Apple II or IIe.

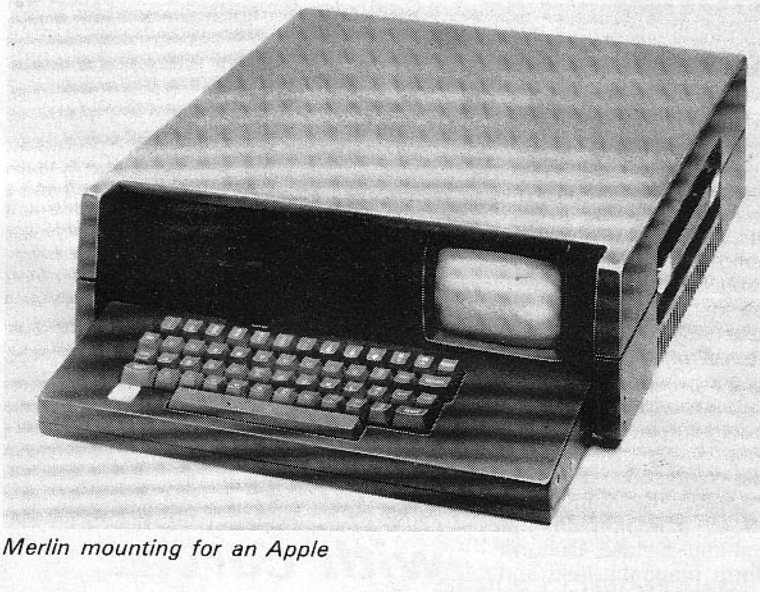
A full qwerty keyboard and 5in black and white monitor is fitted, and when the keyboard is folded away it protects both itself as well as the monitor and disc drive.

The casing incorporates a moulded carrying handle, analogue and digital I/O are offered as options, and the power requirement is 240 volts, 50 cycles.

Xcalibur say that with Merlin the user can tailor a laboratory or industrial Apple to his exact application. The company also offers a range of memory options including a bubble memory and Eprom.

The unit can be customised for lamps, switches, sockets and connectors. The Merlin box costs £150.

Tel: 0604-21051.



Merlin mounting for an Apple

Turnkey payroll

DEVERILL Computers has linked its Payroll package to the Time Lord time and attendance recording device manufactured by Time and Data Systems International.

The module runs on all Apples, and Deverill claims it opens up a new market for Apple in the supply of a complete turnkey system to run a computerised payroll.

It uses information direct from the Time Lord clocking in and out process and so eliminates unnecessary re-entry of data by hand.

The Time Lord uses an RS232 interface. As up to 30 units can be linked into one interface up to a distance of a kilometre, a complete work area or factory could be serviced by the same Apple system.

The unit has battery reserves for up to five days, with memory retention of a month. It is self-programmable to cope with any variation of shift times and rest periods, and feeds the correct information into the Apple to produce weekly or monthly payroll statements.

While the Time Lord collects and feeds data into the Apple, the Payroll package will perform wages, tax, national insurance, pension and statutory sick pay calculations, says Deverill.

The program is written in Pascal, and using a Profile hard disc can handle up to 2,500 employee records.

Tel: 0202-684441.

More on the screen

VIDEX claims to have developed a revolutionary video display terminal that gives "extraordinary powers" to the Apple II, IIe and III.

With Ultraterm a user can choose the number of columns and lines to be

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displayed across the screen, selecting a display of 128 columns by 32 lines, or up to 160 columns by 24 lines with a spreadsheet application, or 80 columns by 48 lines – double the normal screen capacity – with a word processing application.

Distributors Pete and Pam say that Ultraterm delivers a flicker-free display, with an 8x12 matrix giving extremely clear and readable characters.

"You can get more than 4,000 characters on screen – all larger and more readable than those you see in a daily paper," said a spokesman.

Ultraterm supports Basic, Pascal and CP/M, and its pre-boot packages allow the immediate use of Applewriter II and Visicalc. It costs £299.

Tel: 0706-227011.

Educational graphics

THE first three packages in a series of new educational products for the Apple II have been released by High Technology Software Products of Oklahoma.

The Harmonic Motion Workshop presents the concepts associated with harmonic motion using hi-res graphics. A user can alter variables such as the phase, amplitude and the damping factor, and immediately see the effect.

Projectile Motion Workshop illustrates projectile motion under the influence of a uniform force of gravity, and a user can control the projectile's initial velocity and its angle of fire.

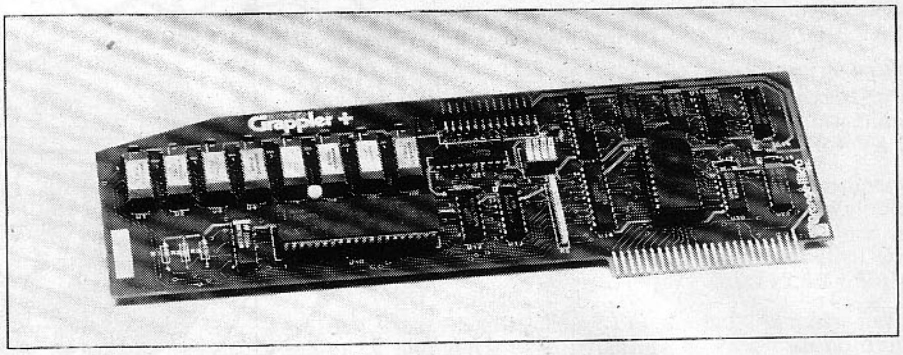
Charged Particle Workshop simulates the motion of a charged particle under the influence of various combinations of electric and magnetic fields. Uniform electric field, uniform magnetic field and crossed electric-magnetic field are illustrated. The packages cost $75 each.

Tel: (0101) 405-525 4359.

Expandable memory

AN addition to the Grappler printer interface series combines an expandable printer memory with the advanced features of the Grappler+, and is compatible with the Apple II Plus IIe and III. The Buffered Grappler has 23 different printing features and a 16k upgradable buffer.

Memory expansion is achieved with the installation of additional memory chips. Two will increase buffering to 32k and six chips can boost printer memory to 64k, when 20 pages of text can be stored for printing, leaving the Apple free for its next task.



Buffered Grappler . . . expandable printer memory

The on-board micro controller performs an automatic self-test routine to check the status of all buffering components. Automatic memory configuration eliminates the need for changing switches and settings when installing additional chips.

Graphics features, accessable by simple control codes, include 90 degree rotation, double sizing and inverted printing. A dual hi-res graphics feature allows pages 1 and 2 of hi-res memory to be dumped simultaneously.

Text features include screen dumping, margin and page length setting, auto skip-over-perforation and word wrap-around. A mixed mode screen dump allows graphics and text to be printed together.

The Buffered Grappler+ works with most popular dot matrix printers and is compatible with Apple Pascal, LOGO and CP/M. It is manufactured by Orange Micro and comes with complete documentation and a parallel printer cable.

Tel: (714) 779 2772.

Coping with curves

NOW available to the scientist are graphic software packages that allow sophisticated curve fitting and data plotting routines to be applied to experimental data.

Curve Fitter features keyboard entry of data, direct entry of data from instruments using ADALAB or any A/D converter, automatic scaling of high resolution graphs and axes, four different plotting symbols, listing of the x or y values interpolated from the fitted curve and easy evaluation of unknowns.

It also allows superimposed curves, a wide choice of different curve fitting routines and is described as an ideal scientific instrument corrector for non-linear detector response.

Also produced by Interactive Microware is Scientific Plotter, an easy-to-use program for drawing professional looking graphs. Features include 20 different plotting symbols, more than one set of data may be plotted on the same graph, error bars indicate range of error and the length and position of axes can be controlled.

Both packages include five sample demonstrations on disc and are available from Heyden Datasystems.

Tel: 01-203 5171.

Kitchen compiler

BEAUFORT Micro Systems has acquired all marketing, sales and distribution rights for the KDS 5000 kitchen planning software developed by Micro-K Computer Design Systems for the Apple II.

The package will be launched by Beaufort through a series of seminars as part of a national marketing strategy which involves a direct sales team servicing retail outlets in conjunction with specific contracts negotiated with manufacturers and importers of kitchen furniture.

KDS 5000 is an integrated planning, design and costing system devised initially for retailers and installers of kitchen furniture. The menu-driven program includes a 360 degree perspective facility which can be called to the screen at any time during the design function.

Units used in the design function can be placed anywhere in the room at any height, and can be repositioned at any time. The program bleeps when a unit being positioned in the design touches an obstructing item.

Drawing on the printer or plotter can be done at any time and drawings can be in plan, perspective plan, section, internal perspective elevation, internal elevation, external elevation, perspective external elevation, or perspective sectional views, from any angle.

Costings, with variable price and tax rates and full unit description, can be printed after the design, effectively giving a customer invoice, suppliers order and manufacturers invoice and product requirement specification.

Any regular or irregular shaped room can be planned taking full account of windows, doors and pipes and Beaufort Microsystems claims the program design and drawing is accurate to 1mm.

Price of the program, which includes one manufacturers catalogue disc and the maintenance contract, is £2,530. Additional manufacturers catalogues are offered at £100 each.

Tel: 0452-416301.

SSP program

A SYSTEM to operate the government's new Statutory Sick Pay scheme is being marketed by management and computing consultant John Rutherford.

The program calculates the sick pay due under the scheme which came into effect in April. It runs on a 48k Apple, a language card and two 5¼in disc drives and can handle 400 employees on one set of discs.

Tel: 0342-712889.

Accounts package

THE functions of sales, purchase and nominal ledger are combined in an integrated accounting package for hard disc-based Apple II and IIIs.

Called Trader, the system is based around two main ledger files. The ledger readily identifies the purchase, sales and contra ledgers, but amalgamates them into a single file, saving both disc space and computer memory.

The nominal ledger forms the basis of all cost and financial analysis.

Two other master files are maintained in support of the ledger files, one identifying suppliers and customers and the other a chart of accounts file which provides the rules for activities such as the allocation of costs and the distribution of revenues.

Distributor Quantum says that an important feature of the package is a method of establishing payment terms and settlement discounts due to customers or claimed from suppliers, which gives complete control of cashflow.

There is also a facility to record budget figures for all nominal ledger accounts assigned to the profit and loss statement, and previous year comparisons for all balance sheet accounts.

Year end routines automatically update previous year comparative figures.

Invoices, credit notes, payments and other transactions for both sales and purchases may be entered through a single data entry routine at any time and each transaction is automatically allocated a voucher number for unique identification.

Data entry procedures allow both due dates and settlement discount details to be specified and payments may be applied against specific invoices or designated as "open credit".

Printed listings of all transactions may be generated before posting to the ledgers, and during posting a register or daybook is

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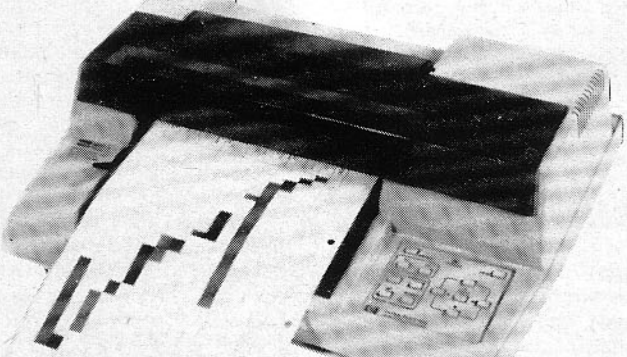
HP's NEW LOW COST COLOUR PLOTTER



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FLOPPY discs that are guaranteed for life are being marketed by BASF. The company's Qualimetric Flexy Discs have a two-piece liner built into their jackets. This traps damaging debris away from the surface and creates extra space in the head access area, ensuring optimum alignment.

A box of 10 single sided, single density 5¼in discs costs £17.90 from Pete and Pam. Ten 8in discs cost £18.90, or £28.90 for the double sided, double density variety.

Tel: 0706-227011.

printed – forming a vital part of the audit trail.

Trader will provide a VAT analysis for sales and purchases in a printed format acceptable to HM Customs and Excise.

The package is written in Pascal and requires a hard disc and a 132 print position printer.

Tel: 01-488 2400.

Order tracker

TRACKING an order's progress through a production system is often difficult and time consuming, especially when the order requires the manufacture of various components, each needing numerous production processes.

To solve this problem Industrial Micro Software has launched a new production control software package, POTS, which runs on an Apple II and enables the user to track orders during their various stages of manufacture.

It incorporates a comprehensive reporting facility and can provide a graphical presentation of both present and future workcentre loads, to assist production control management with short term capacity planning decisions.

Data can be interrogated via order number, part number, due date or a user defined flag or label. POTS costs £500.

Tel: 034 282-2706.

80 column alternative

AN alternative to Apple's own 80 column cards for the IIe is being distributed by Pynwon Software. It costs £80 – the same as Apple's simplified 80 column board – but has eight spare sockets which can be used to upgrade the IIe's memory by an extra 64k.

It runs with all existing software running on Apple's 80 column cards.

Tel: 01-886-0879.

Format transfers

A DUAL 80/35 track 5¼in floppy disc drive is available for the Apple II from Cumana. It incorporates two drives in one cabinet, is supplied, with power and interface cables and connects directly to an ordinary Apple II disc controller.

Cumana says the drives in 35 track mode can read all Apple software including half track software, Pascal and CP/M. In 80 track mode each drive has a capacity of 327k, giving a total storage of 655k when using DOS 3.3.

To utilise the full 80 tracks software patches must be installed in DOS 3.3. With one drive switched to 35 track mode and the other to 80, it is possible to transfer programs between the two formats. An 80 track DOS 3.3 create disc is included in the unit price of £745.

Tel: 0483-503121.

Sales analysis

DETAILED records of historical data are an essential requirement for effective sales management, yet such records are often incomplete, inaccurate and badly formatted.

Compared with the sophistication of the accounts department, many sales offices are in the quill pen era.

Salestrend is a recording and analysis package specifically designed to meet the data handling needs of sales and marketing management. It focusses on the task of recording monthly sales data, displaying trends over time and producting short-term forecasts – all at the individual product and territory level.

Publisher Willow Associates claims Salestrend is simple to set up and run and its place is alongside the word processor in the secretaries' office, with the manager only looking at the end results.

The package contains programs for data entry, analysis, display and hard copy printing. The basic data format is a table made up of 225 cells, each containing the sales – or order – of a particular product in a sales territory. One complete table is entered and stored at the end of each month.

Trends are displayed as a colour graph next to a table of numerical data. Up to three years' data can be plotted. If required, trends can be adjusted for inflation and the effect of different month lengths to isolate underlying trends.

A statistical model provides a six month forward projection of each product/territory sales trend to help the manager with the critical task of sales forecastings.

The package, which runs on a 48k Apple II with two disc drives, costs £285.

Tel. 01-794-2140.

Systems cracker

ORCHARD Software has produced version 4.0 of Copy II Plus, its copy program for the Apple. Managing director Tony Riley says it is the latest weapon in the war of protection versus back-up and is equipped with the latest methods of cracking protection systems.

However he claimed the package will make no difference to existing problems with piracy of software programs – "Our customers are mainly big business types who will happily pay for their software and won't risk using pirated copies, but who do need to be able to back-up their program discs."

He said the package is easy to use and

would copy most software within 45 seconds.

The package which costs £35, is sold as an Apple disc utility system and includes 20 other utility programs. These include a facility to change the switch-on or boot program and a method of checking disc drive speeds to give early warning of the need for a service call.

Tel: 01-580 5816.

Profile back-up

BACK-UP for the Apple III Profile hard disc is provided by the Sintrom 4510, which copies data for archiving purposes from any size of file to a 3M tape cartridge.

It is distributed by Sintrom Electronics and costs £1,358.

Tel: 0734-875464.

Apple reception

APPLES could become a common sight at hotel reception desks with the use of Host. The package is designed to allow a receptionist to control bookings and financial transactions virtually single-handed.

It runs on an Apple with 64k RAM and a Z80 card and uses simple question prompts to take the operator through procedures such as checking in a guest or taking a reservation through its various steps.

Distributors Microsave say checking in a reserved guest with the Host system takes 10 seconds. The package will handle a 100 bedroom hotel for up to 400 days ahead and at any time can give the management a printout to show present or future occupancy, the hotel's financial situation and similar data.

It confirms reservations, produces a guest's bill and caters for VAT, with a facility for up to five rates of tax at any time.

The program can be modified to take into account foreign language requirements of overseas hotels.

Tel: 0272-667503.

Answer to the phone

"THE rationale behind electronic mail is simple," says Tim Keen, managing director of Keen Computers. "About half of the external phone calls made by a company fail to connect while about 30 per cent of internal phone calls also don't get through.

"The amount of management time wasted on these calls is horrific."

Keen says the majority of phone calls

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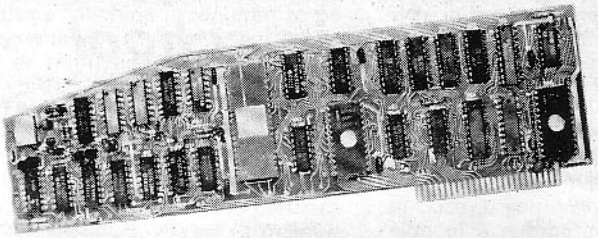
VISION-80



The VISION-80 stands apart from all other cards as the "ROLLS ROYCE" of 80 column cards, as confirmed by every magazine review. Our Rev 3 and modified Rev 4 boards are fully compatible with the Apple IIe and II, giving a superb 9 x 11 dot matrix, full lower case descenders and inverse lower case as well as upper case. This is the only 80 column board that supports Apple's text window and text manipulation commands. It works with Pascal and CP/M, and the following software WORDSTAR 3.00, APPLEWRITER II, LETTER PERFECT, FORMAT-80, ZARDAX, EXECUTIVE SECRETARY, MAGIC WINDOW, VISICALC, MULTIPLAN (CP/M or DOS). A unique and powerful communications facility is present in hardware on the board. RRP £195 + VAT.

VISION-80 VC EXPANSION This pre-boot utility gives 80 columns, and expands memory to 143K when a standard 128K RAM board is installed in any slot in an Apple II or IIe. It gives an expanded Visicalc index and is designed to work with all versions of the 16 sector Visicalc, and all versions of Vision-80. When 128K RAM cards are not in use, the program defaults to either 33K or 17K depending on the presence of a Language card. RRP £29.50 + VAT.

VISION-80 AWII 80 column applewriter pre-boot. RRP £18.00 + VAT.

RAMVIEW-80 This card is fully compatible with Apple's latest 80 column board for the Apple IIe. However, for the same price as Apple's, this board has 8 spare sockets ready to accept 64K of RAM. Works with all software that works with the new IIe 80 column display. RRP £80 + VAT.

ROSETTA A DOS/Pascal utility. This superb Australian program is written in Pascal, and allows movement of any sort of DOS or Pascal program in any direction. RRP £35 + VAT.

Please contact your local Apple Dealer, or PYNWON for the address of one of our Dealers close to you.

UK Dealers please contact:
PYNWON SOFTWARE, 17 Watermill Lane, Edmonton N18 1SU London.
Tel: 01-884 0879

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TC Computing
0265-53155

SWITZERLAND
Lemane CompSA
021-291516

NETHERLANDS
Aramco
070-761716

Open up all sorts of new Applesoft avenues with the Routine Machine

By PETER MEYER

"WHEN the need arises, a solution appears" according to the ancient Taoist philosophers. There were so many relocatable machine language routines which began to appear in the computer magazines in 1980-1981 that a need arose for some method of using several machine language subroutines simultaneously from within an Applesoft program. Moreover, a method was needed which did not presuppose any knowledge of assembly language programming, or, indeed, any knowledge at all beyond that required to program in Applesoft Basic.

Thus such a method should not require the user to be concerned with BLOAD addresses, setting HIMEM or LOMEM, etc, none of which are intrinsic to Applesoft programming. In addition, since there is theoretically a vast array of possible machine language subroutines usable from within an Applesoft program, the method should be general, not limited to appending only a particular set of a few routines.

The Routine Machine (Southwestern Data Systems) satisfies these requirements fully. This program is a 7.5k machine language utility whose essential function is to allow Applesoft programmers to use machine language subroutines within their programs.

It can be used to append up to 255 machine language subroutines to an Applesoft program. Any relocatable routine may be appended, and it is possible to append modules to a program which already has other machine code appended. These subroutines become a permanent part of the program, and are saved and loaded along with the Basic portion.

The Routine Machine is required to be in memory whenever routines are to be appended or removed, but it is not required in order to run the Applesoft program. Thus the 7.5k occupied during program development can be recovered at any time, in particular, after the program has been completed.

It allows the user to avoid the problem of where in memory to locate a needed machine language subroutine so as to avoid conflicting memory usage. But, as with all programming utilities, one must ask: How is the Routine Machine itself to be used without concern for memory conflicts?

In fact, it may be installed simply with the command BRUN ROUTINE MACHINE (with, of course, its disc in the current drive). Your Applesoft program may be loaded either before or after installing the program. And that is all there is to installation.

The main menu offers the following options:

1 Append a module.
2 Remove a module.
3 Remove all modules.
4 Copy all appended code to disc.
5 Restore appended code from disc.
6 Report modules appended.
7 Search for ampersands/calls.
8 Inspect Applesoft line.
9 Display memory map.
0 Exit.

(A "module" consists of an appended routine together with a few bytes of overhead.)

Options 1-5 are concerned with the manipulation of appended modules. Options 6-9 are "report" options which provide information concerning the Applesoft program and its appended modules.

Appending and removing modules is easily done. After selecting Option 1 you simply specify two names, that of the disc file containing the routine to be appended, and the name by which the routine is to be invoked from within your program – known as the "invocation name". Invocation names may be from one to 15 characters in length, for example, "SORT", "SEARCH", "INPUT", "NEW" or even "GO GET A STRING".

At numerous places the program checks to ensure that you are not making any silly mistakes. For example, when you type in the invocation name, it checks that it is legal and has not already been used for some other appended module, and if all is in order then it appends the routine and awaits further orders.

Removing a module is equally fast and easy. Either a single module can be removed, or all modules can be removed at once. If you wish to remove an old version of a subroutine and then append a new version, it can be done in a few seconds.

Options 4 and 5 are concerned with the totality of appended modules, rather than with individual modules. Option 4 is used to copy all appended code to a binary disc file. This is necessary in case you intend to use some utility program (such as Apple Computer's Renumber) which destroys appended machine code. After renumbering, the previously appended modules can be restored to your Applesoft program using Option 5. These options are also useful for saving and appending a set of related routines as a single package.

So much for appending and removing modules. Next is the question of how a module is to be invoked from within an Applesoft program after it has been appended. One might pause here to reflect that the installation of the routines at the end of the Applesoft program is only half the problem, since they are useless unless they can be invoked from within a running Applesoft program. And how are values to be passed to (and returned from) the routines? Thus there is the question of the nature of the interface between the Applesoft program and its appended subroutines.

The approach adopted in the Routine Machine is as follows: An appended module is invoked by a statement in your Applesoft program known as a "module invocation". This consists of the ampersand, "&", followed by the invocation name (in quotes), then the parameter list (if any). For example, the following module invocation might cause the values of A$ and B$ to be swapped:

& "SWAP", A$, B$

As another example, the following module invocation might cause the string array A$( )to be searched from the I-th element to the J-th element for an element containing the target string S$, with the index of the first such element, if any, being returned in the variable N:

& "SEARCH ARRAY" FOR S$, A$(I) TO A$(J); N

Since the invocation name used to invoke an appended module is enclosed in quotes, it can consist of any keyboard characters (except control characters and the quote sign), including Applesoft reserved words, for example GET, PRINT. The parameter list (which is whatever follows the invocation name) can be anything which can be processed by the invoked routine.

The various report options offered provide features which are found in no other program of this type. Where applicable they will work with any Applesoft program, not just those with Routine Machine modules appended.

Option 6 (in the main menu) provides a report of the modules appended, giving for each appended module both its invocation name and the name of the disc file from which it was originally taken.

Option 7 allows you to search a program for module invocations, or for invocations of a particular module, or even for all CALLs and ampersand statements.

Option 8 allows inspection of Applesoft line, both in its ordinary form and as it exists as bytes in memory. This is especially useful when writing a routine which must read and process these bytes.

Option 9 is a general purpose memory map. It shows the location of the program in memory, where its appended machine code (if any) begins, how many bytes of code are appended, etc. It also displays the values of the pointers to LOMEM, HIMEM, the end of array storage, the beginning of the DOS buffer space, etc.

Thus, in addition to its basic function of appending and removing machine language routines quickly and efficiently, the program is also a source of considerable information of various kinds.

The method employed to invoke appended modules allows for maximum flexibility in the notion of an appended module. It is even possible to append data, for example a shape table, as a Routine Machine module. And, even though an appended routine must be relocatable, there is no reason why a program module should not consist of a routine together with internal subroutines and one or more data blocks. (In fact the techniques already exist for writing such routines.)

The program is consistent with the simultaneous use of other utilities, provided that they are installed in the right order. For example, if you install the following utilities (in this order):

Program Line Editor
The Routine Machine
Apple Computer's Renumber

then they and the connection to them will remain intact even though you load and save your Applesoft programs and enter and leave the Routine Machine. (Once installed, the program is entered simply by a CALL 2051.)

The program will be found useful both by Applesoft programmers and by 6502 assembly language programmers. Either you are primarily an Applesoft programmer but you want "the speed and power of machine language in your programs", or you are primarily an assembly language programmer and you want some way to interface your routines with Applesoft. In each case the Routine Machine provides everything you could want except the routines themselves.

If you are a 6502 assembly language programmer then just think of all those useful things that it would be nice to do from within an Applesoft program, and which could be done with an appended machine language routine.

If you are an Applesoft programmer, think of all those useful things which can now be done using appended machine language subroutines. The number of such routines is now increasing rapidly. On the disc are 30 routines, some of which will make you wonder how you ever got by without them.

For example, STRING INPUT.RM is a 41byte gem by Craig Peterson which allows input of strings containing commas and colons (while still allowing you to use a prompt string, as in the standard Applesoft INPUT statement). This routine may well forever replace the Applesoft INPUT command. To invoke it you simply use a module invocation such as:

& "INPUT", A$

or

& "INPUT", "ENTER HERE ->", A$(I)

(The particular invocation name used is optional, as is the particular string variable used.)

If your programs print text (and whose don't?) then TEXT OUTPUT.RM (another routine on the disc) is indispensable, since it outputs text to the screen or to a printer without any wordbreak at the right margin. It is invoked by a module invocation such as:

& "TEXT", A$

As with the standard Applesoft PRINT command, a semi-colon at the end, as in:

& "TEXT", A$;

causes suppression of the usual carriage return. By using this module invocation within a FOR-NEXT loop, as in:

FOR I = 1 TO N:
&"TEXT",A$(I);: NEXT

whole paragraphs of text can be output with no split words.

But the routines on the disc are only just the start. A number of software publishers are now bringing out different series of library discs of "ampersand" routines.

Those on the Ampersoft Program Library discs released by SDS are, of course, directly appendable using the Routine Machine. Routines on library discs in series by other publishers may or may not require slight modification. (See page 93 of the documentation, especially the point concerning any initial comma in the parameter list.)

Already there are over a hundred of such routines available on a few discs. For example, on one of the SDS library discs currently available is a shellsort routine which will sort into alphabetical order 2,000 strings in 11 seconds. Also there is an enhancement of the GET command which will GET only specified characters, say "Y" and "N". (This is very useful when your program is to ask the user a question which requires a Yes/No answer.)

And among the other routines on this disc (which is a good deal more useful than its name "Amper-Sampler" might suggest) is one which allows full use of the RWTS routine in DOS from within an Applesoft program. There is also a routine (especially requested by Ken Sherwin) which reads the entries in the disc directory and stores them in a string array.

By means of Routine Machine modules Applesoft may now be extended in an unlimited number of ways. Everything available in most other forms of Basic can now be reproduced (or improved upon) and made available to Applesoft programmers, if 6502 assembly language programmers will take the time to do it.

In addition, there are all the other useful tasks that are not provided for in any dialect of Basic. And then there are all the uncommon tasks, that might be required only in a single program.

Thus this programming tool, with its versatility and ease of use, opens up many interesting new possibilities in the field of Applesoft programming.

BEGINNERS PLEASE

From Page 55

```
10  HOME
20  PRINT "             ";: INVERSE
     : PRINT "EDITING TUTORIAL": NORMAL
25  PRINT : PRINT
30  PRINT : PRINT "THIS PROGRAM S
     IMULATES THE PROCESS OF"
35  PRINT
40  PRINT "SCREEN EDITING.  IT DO
     ES ";: INVERSE : PRINT "NOT"
     ;: NORMAL : PRINT " ACTUALLY
     "
45  PRINT
50  PRINT "EDIT LINES, NOR DOES I
     T ACCEPT COMMANDS"
55  PRINT
60  PRINT "SUCH AS ";: INVERSE : PRINT
     "LIST";: NORMAL : PRINT ".
     IT WILL THEREFORE BE"
65  PRINT
70  PRINT "NECESSARY TO FIRST TYP
     E IN ANY LINES"
75  PRINT
80  PRINT "THAT YOU WANT TO PRACT
     ICE EDITING."
85  PRINT : PRINT : PRINT
90  PRINT "PRESS ANY KEY TO CONTI
     NUE";: GET A$
95  HOME
100  PRINT "THE UPPER HALF OF THE
      DISPLAY BEHAVES"
105  PRINT
110  PRINT "EXACTLY LIKE THE NORM
     AL SCREEN.  THE"
115  PRINT
120  PRINT "LOWER HALF SHOWS THE
     CONTENTS OF"
125  PRINT
130  PRINT "THE KEYBOARD BUFFER.
      WATCH WHAT IS"
135  PRINT
140  PRINT "ENTERED INTO THIS TO
     SEE WHETHER YOU"
145  PRINT
150  PRINT "ARE CARRYING OUT THE
     EDITING PROCESS"
152  PRINT
154  PRINT "CORRECTLY."
155  PRINT : PRINT : PRINT
160  PRINT "PRESS ANY KEY TO CONT
     INUE";: GET A$
165  HOME
170  PRINT "THE <";: INVERSE : PRINT
     "RETURN";: NORMAL : PRINT ">
      KEY ACTS AS NORMAL, TO"
175  PRINT
180  PRINT "ACCEPT THE CONTENTS O
     F THE KEYBOARD"
185  PRINT
190  PRINT "BUFFER, AND THEREBY T
     O CLEAR IT."
195  PRINT
200  PRINT "(THE CONTENTS ARE NOT
      ACTUALLY ENTERED"
205  PRINT
210  PRINT "INTO MEMORY OF COURSE
     )"
215  PRINT : PRINT
220  PRINT "TO QUIT AT ANY POINT,
      TYPE ";: INVERSE : PRINT "C
     TRL-Q";: NORMAL : PRINT "."
225  PRINT : PRINT
230  PRINT "TO CLEAR THE SCREEN A
     ND START AGAIN,"
235  PRINT
240  PRINT "TYPE ";: INVERSE : PRINT
     "CTRL-R";: NORMAL : PRINT ".
     "
245  PRINT : PRINT : PRINT
250  PRINT "PRESS ANY KEY TO CONT
     INUE"
260  DIM A%(480)
265 X = 0
270  FOR I = 0 TO 480:A%(I) = 32:
      NEXT
280  REM  A%(I) = 32:  ASCII FOR
      SPACE
285  IF X > 1 THEN  GOTO 330
290 X =  PEEK (49152)
300  IF X < 128 THEN  GOTO 290
310 X =  PEEK (49168)
320  REM  CLEAR KEYBOARD BUFFER
330  HOME
340 AX = 1:AY = 2: REM  UPPER COO
     RD'S
350 BX = 1:BY = 16: REM  LOWER CO
     ORD'S
360 LC = 0
370  GOSUB 1150: REM   PRINT LABE
     LS
380  HTAB BX: VTAB BY
390  GOSUB 1030: REM   PRINT LOWE
     R CURSOR
400  HTAB AX: VTAB AY: GET T$
410  IF M = 1 GOTO 630: REM   EDI
     T MODE
420  IF  ASC (T$) = 27 THEN M = 1
     : HTAB 32: VTAB 1: FLASH : PRINT
     "EDIT MODE";: NORMAL : GOTO
     400
430  IF  ASC (T$) = 8 GOTO 830: REM
      BACKARROW
440  IF  ASC (T$) = 21 GOTO 910: REM
      FORWARD ARROW
450  IF  ASC (T$) = 13 GOTO 1260:
      REM  RETURN
460  IF  ASC (T$) = 17 THEN  HOME
     : END
470  IF  ASC (T$) = 18 THEN  HOME
     :X = 10: PRINT "PLEASE WAIT.
     ..": GOTO 270
480  IF LC = 250 GOTO 1130: REM
     BELLSTART
490  IF AX = 40 AND AY = 13 GOTO
     560
500  HTAB AX: VTAB AY
510  PRINT T$
520 N = (AY - 2) * 40 + AX
530 A%(N) =  ASC (T$)
540 AX = AX + 1
550  IF AX = 41 THEN AX = 1:AY =
     AY + 1
560  HTAB BX: VTAB BY
570  PRINT T$
580 LC = LC + 1
590  IF BX = 40 THEN BX = 1:BY =
     BY + 1: GOTO 610
600 BX = BX + 1
610  GOSUB 1030: REM   PRINT LOWE
     R CURSOR
620  GOTO 400
630  IF T$ = "I" GOTO 690: REM
     MOVE UP
640  IF T$ = "M" GOTO 720: REM
     MOVE DOWN
650  IF T$ = "J" GOTO 750: REM
     MOVE LEFT
660  IF T$ = "K" GOTO 790: REM
     MOVE RIGHT
670 M = 0: HTAB 32: VTAB 1: PRINT
     "         ";
680  GOTO 400
690  IF AY = 2 GOTO 400
700 AY = AY - 1
710  GOTO 400
720  IF AY = 13 GOTO 400
730 AY = AY + 1
740  GOTO 400
750  IF AX = 1 AND AY = 2 GOTO 40
     0
760  IF AX = 1 THEN AX = 40: GOTO
     700
770 AX = AX - 1
780  GOTO 400
790  IF AX = 40 AND AY = 13 GOTO
     400
800  IF AX = 40 THEN AX = 1: GOTO
     730
810 AX = AX + 1
820  GOTO 400
```

→

```
830  GOSUB 1090: REM   ERASE LOWE
     R CURSOR
840  IF BX = 1 AND BY = 16 GOTO 8
     90
850  IF BX = 1 THEN BX = 40:BY =
     BY - 1: GOTO 870
860 BX = BX - 1
870  HTAB BX: VTAB BY
880 LC = LC - 1
890  GOSUB 1030: REM   PRINT LOWE
     R CURSOR
900  GOTO 750
910  IF LC = 250 GOTO 1130: REM
      BELL START
920 N = (AY - 2) * 40 + AX
930 N = A%(N)
940  HTAB BX: VTAB BY
950  PRINT  CHR$ (N)
960  IF BX = 40 THEN BX = 1:BY =
     BY + 1: GOTO 980
970 BX = BX + 1
980  HTAB BX: VTAB BY
990 LC = LC + 1
1000  GOSUB 1030: REM   PRINT LOW
      ER CURSOR
1010  GOTO 790
1020  REM  PRINT LOWER CURSOR
1030  HTAB BX: VTAB BY
1040  FLASH
1050  PRINT " "
1060  NORMAL
1070  RETURN
1080  REM  ERASE LOWER CURSOR
1090  HTAB BX: VTAB BY
1100  PRINT " "
1110  RETURN
1120  REM  BELL START
1130  PRINT  CHR$ (7)
1140  GOTO 400
1150  HOME
1160  HTAB 17: VTAB 1
1170  INVERSE : PRINT "SCREEN": NORMAL
1180  VTAB 14
1190  FOR I = 1 TO 40: PRINT "=";
      : NEXT I
1200  HTAB 12
1210  INVERSE : PRINT "KEYBOARD B
      UFFER": NORMAL
1220  HTAB 1: VTAB 23
1230  INVERSE : PRINT "PRESS <CTR
      L-Q> TO QUIT": PRINT "PRESS
      <CTRL-R> TO RESTART";: NORMAL
1240  RETURN
1250  REM  RETURN PRESSED
1260  CALL  - 868
1265  POKE 34,15
1270  HOME
1280  HTAB 1: VTAB 23
1290  INVERSE : PRINT "PRESS <CTR
      L -Q> TO QUIT": PRINT "PRESS
       <CTRL-R> TO RESTART";: NORMAL
1300  POKE 34,0
1310 AX = 1:AY = AY + 1: IF AY =
      14 THEN AY = 13
1320 LC = 0:BX = 1:BY = 16: GOTO
      380
```

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