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The continued saga of Apple's legal battle worldwide is, in a strange way, a back-handed compliment to Apple. If the original machine was not so well designed, if the concept had not been so brilliant, then no one would have bothered for one moment to copy it. There are dozens of computers out there that no one has even thought of copying.

Will Apple win in the end? Without stepping on any judicial toes, I have to say that I think so. I am well informed on the situation as I spend so much time in Singapore, Hong Kong and Taiwan — territories where pirates abound.

What is happening is that the major manufacturers are giving up the unequal battle and are concentrating on other projects instead. (The fact that the other projects in the main consist of ripping off IBM, who are replying with unrivalled ferocity, is somewhat beside the point.) Apple's belated but thorough legal defence is beginning to show results, and although the latest Wombat development is an interesting one, I truthfully feel I have heard the death knell for imitation Apples being made by major manufacturers.

This does not mean for one moment that there will not be imitation Apples. There will, by the hundreds. But they will be made in half dozen lots to sell to tourists and enterprising smugglers rather than to the United States — where the US customs takes great pleasure and delight in smashing them with sledgehammers — or Australia, or Europe.

Everything in the garden would, one would have thought, been lovely. But there is no such thing as a Hong Kong or Taiwanese entrepreneur who is willing to see his business fail over a simple legal formality.

They have turned their sights on the biggest potential export market of them all. Already a consignment of MedFly has been bought "for evaluation" in the Peoples' Republic of China. And the man responsible for the sale is a previous distributor of Apples in Australia. In Beijing at the end of last month I saw several fake Apples which had plainly originated in Hong Kong. (For political reasons, Taiwanese machines would not be welcomed with open arms).

Effectively, there is no real copyright law in the People’s Republic of China and it would be extremely easy for Hong Kong fake manufacturers to move across into the PRC and set up business with the government's blessing.

It will be a most interesting development. Nothing is ever boring on the Apple front.

Gareth Powell
If you’re using it with a modem to communicate with the outside world it can tell the modem that the computer is ready to accept data by dialing 0.

Another data control technique is to transmit the ASCII 128 character (Print Control) to a modem of those who have wanted to know what ASCII 128 stands for, it is the American Standard for Information Interchange.

In this case, the extended data line is connected instead of the data ready, and the printer can transmit the appropriate code when it is full or not ready to accept data.

As you can hopefully see, the first application works with a direct connection between the computer and the printer, whereas the second can be applied using telephone lines.

This means you could, if you wanted to, drive a printer at a remote location over the phone, always assuming that your computer can switch off its data flow fast enough to prevent an overflow at the printer.

Think of it like a tap with a long hose filling a bucket at the other end and you’ll get the rough idea.

With RS-232 in full duplex the lines used are protective ground, signal ground, transmitted data, received data, received line signal detector and, possibly, data carrier. The received line signal detector, which is often called the carrier detect, says, in effect, “I can hear a signal” which says that somebody is trying to talk to me.”

In a duplex stage there has to be a carrier signal going out from the modem and coming into the computer, otherwise the connection will be cut.

In half-duplex modem applications the lines are used in both directions and these are request and clear to send. If you can imagine two cars approaching each other on a single lane bridge you will have the idea.

“Request to send” comes from a car that flashes its headlights to ask if it can go ahead and cross the bridge filling up the single lane.

The other car flashes its headlights with a “clear to send” to allow the oncoming car to come through safely.

These lines control the direction of the half duplex separation.

The “request to send” is the computer’s way of saying it is ready to start talking and the “clear to send” is the modem’s way of saying it is ready to listen.

The “request to send” causes the modem at that end to turn on its transmitter and when it’s finished sending its information it turns off the request line and the modem switches off its transmitter.

All this fascinating information we got from an article by Dave Crounce which appeared in “ByteLines” in volume 2 number 3.

It was a fairly technical article and we have written it to make it easier to understand. Our hope is that we haven’t in any way failed to comprehend the essential information. No doubt some readers will quickly let us know if we have.

I hear a symphony

The latest improvement in lotus 1-2-3 is the truly latest selling program in the world – is Lotus Symphony which will be launched in Australia at the end of July at a price and format, special characters and other features of the program are the same.

Lotus Development says: “We have taken special care to ensure that Symphony integrates well with Lotus 1-2-3, and important IOD on the Apple’s monopoly.”

In fact, when he was in the middle of the Apple court case (more on this later) he woke up very early one morning and composed the following is a sample of what the court papers again. And a fairly long read it must have been. “I knew that Apple had lost their source code so we had to do to prove that we had an indefinite startup. CTRplus is a program designed for banks to deliver information to their customers. Presumably the program comes with its own supply of red ink. Then there is a new database system called NPL Information Management System which gets around most of the complicated problems of database programming.

From Human Edge Software comes The Sales Edge, the Management Edge and The Negotiation Edge.

MicroSoft have added Word, the extremely powerful word processing program – to MultiPlan, thus underlining their dedication to the Macintosh which started when they supplied their immensely powerful WordStar word processor to the program. To go with it is Chart and File. They have a pretty way with imaginative titles at MicroSoft.

Software Publishing Corporation has released their FFS series for the Macintosh and it should be in Australia Real Soon Now.

Infosoft will let you play lots of games including the mind baffling Zork series and similar adventures of the future.

Blue Chip has released Millionaire, Tycoon and Baron. We await with interest further games in this area such as Destitute, Impoverished and Bankrupt, when we will be able to play with a good chance of pulling off the Trifecta.

In peripherals Davong have released a series of hard disk storage for the Macintosh, running from 5 megabytes right up to 32 megabytes. On the evidence in front of us this would appear to be an exercise in futility, because if you need hard disk storage with the Macintosh why don’t you buy a Lisa
Say it again, Sam

by Gareth Powell

I have just been listening to my Apple delivering the Gielgud address. And after that it read out the sciolopy from "Hamlet", OK, it didn't sound like Sir Laurence Olivier, nor yet Sir John Gielgud. It didn't even sound like John Singleton.

But it was a voice. With pauses, stress, low notes, high notes, emotion. It did not sound like one of the Dalesk from "Dr Who". It sounded like someone speaking over a fairly old telephone.

The worker of this miracle is a small board and program called SAM, which stands for the Software Automatic Mouth produced by Don't Ask Computer Software. (I am enraptured by the name of this company and can visualise all sorts of conversations. "Who do you work for?" "Don't ask").

New generation

This is one of a new generation of speech synthesizers. The originals had flat, tinny monotone voices. Sometimes it was difficult to understand what the devil they were saying, except whatever it was seemed horribly impolite.

These early synthesizers used a "speech compression" of one sort or another. The way in which the system works is as follows. A phrase or word is recorded as a whole. Then using a piece of mathematical conjuring, the wave form produced by this phrase is transformed into a digital signal (all those 0s and 1s that make computer understand) so that it can be saved on a silicon chip without taking up a lot of room. When a phrase is needed it is simply called up from memory and transformed back into a waveform. Depending on the sophistication of the techniques and the quality of the loudspeaker, the sound ranges from barely adequate to quite acceptable. But you are, of course, restricted to the words or phrases you have recorded and then programmed into the chip. As there is only a finite amount of space the numbers of words or sentences available to you are limited.

Unlimited vocabulary

SAM is an unlimited vocabulary (and, indeed, an unlimited language) speech synthesizer. It achieves this by breaking speech down into phonemes - these are the atoms, the building bricks of spoken speech. And there are a lot fewer of these phonemes than you imagine. With English you can make a reasonable stab at reproducing the English language with just forty of them. But a phoneme is not the beginning and the end. Timing is everything. Therefore you need a way to introduce a time for the phoneme to sound and a time for blending one phoneme into another. Using these controls you can specify timing, intonation and inflection.

The end result can be quite excellent, providing you are willing to experiment and use a phonetic language which looks not at all like the English you are used to. For example "baby" comes out as "BESIB" while "transportation" comes out as "TREATSNPOHRTAEYSHUN". Not the simplest language in the world to write, but the end results are eminently satisfactory.

It is important to use a reasonable loudspeaker in a good case with this new generation of voice synthesizers, otherwise no matter what you do, the sound will come out tinny.

To demonstrate how versatile a speech synthesizer like SAM can be, I wrote a small program for it to speak three short sentences in Cantonese, a language of immense subtlety and using seven tones to each word.

The sentences were quite comprehensible. Which means that the synthesizer is a lot smarter than I am. When I speak Cantonese (admittedly with a Welsh accent) I am very frequently misunderstood.

Issue warnings

This relatively inexpensive form of speech synthesiser (I paid under a hundred dollars for mine, but a half-smart electronic technician could wire one up from the several kits available for less than that) means that my computers can now talk. And, better still, issue warnings to anyone who is using, say, a word processing program, and is about to do something horribly wrong like wipe twenty pages of copy. Then the computer can speak up loud and clear and say "Save it first, you donor! Or some other suitable phrase. I've programmed mine to say "Far worse things than that but I am, after all, a journalist.

Getting a computer to talk is relatively easy. But can we get them to listen?

Voice recognition

I think the answer at the moment is probably not. I've tested a multiplicity of boards attempting to give effect and the state of the art is probably the board produced by Texas Instruments for their fair professional personal computer. It is true that it does react to certain commands. And it is true that it does achieve a very high level of voice recognition. But not nearly high enough.

There is very little point in having a computer that understands instructions like "save", "stop" and "print". These can be far too easily catered for with a single key stroke.

What is needed is a computer to which you can dictate letters. If a personal computer cannot format and type out a letter direct from voice dictation, then in my opinion, that computer does not have voice recognition.

And as far as I know there is no computer in the world that fulfils that criteria. Yet.

Airline answering device

In Finland there have been some amazing breakthroughs in this area but, there is still a long way to go. I tested a fairly esoteric and immensely expensive setup in the United States that was programmed to operate as an answering device for an airline.

The conversation went something like this. "Good morning, where would you like to travel?" "Hong Kong?" "Hong Kong. We have flights leaving every day. What day would you like to travel?" At this stage I inadvertently sneezed. "Thursday," said the computer.

Voice recognition still has a long way to go. But synthesised speech is already here and readily available. If you use it for nothing more than making a compressed game of strip poker a little more lively (I have, it does) it seems to me worth the price.

A word on the care and maintenance of your micro computer...

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Further thoughts on the Apple IIC

by Gareth Powell

In our last issue we reviewed at great length the new Apple IIC which we consider one of the major personal computers of our time. It is a machine which will send Apple surging even further forward on the path to prosperity.

But even at this early stage people are wondering about ways in which the machine is going to expand, ways in which the machine is going to be improved.

The first obvious area is in the disk drive. At the moment Apple have made, in our opinion, the perfectly correct marketing decision to retain a standard five-and-a-quarter inch floppy disk drive built into the side of the machine.

Twin drives?

But there is no doubt that in the relatively near future (and how near that future is no one knows) the single drive will be replaced with either one, or even possibly two, 3.5 inch, double-sided, double-density drives from Sharp, with whom Apple have a working arrangement.

When that happens we will have effectively four disk drives with a total capacity of something approaching two megabytes.

However, the four drive disk because on the newest systems each side of the disk is addressed as if it were a disk drive. What this will mean is that the machine is that for word processing we will be looking at packages that access the disk as if it was virtual memory.

Where else do we see changes?

Go faster stripes

The 65C02 can probably be given some extra speed. At the moment this new microprocessor has a clock speed of 1023 Megahertz and will perform up to 500,000 eight-bit operations per second. It would not be a task of insuperable magnitude for that clock speed to be doubled. Apple’s Lisa, and to a lesser extent the Macintosh, have been criticised for not being quite as fast as one could wish. There are few applications for the IIC where extra speed is needed, but there is no doubt that in those applications – specifically spread sheets – it would be extremely welcome.

The 65C02 is a CMOS (complementary metal oxide semi-conductor) departure from the 65C02 microprocessor which has served Apple so well over the years. It is an extension of the 65C02’s instruction set with 27 new instructions, and offers faster graphs and arithmetic operations. It runs, as we have already said, virtually all existing Apple II software. But new software will be written to take advantage of the new instruction sets and this new software will not in itself be compatible with the IIC and the II+.

The IIc extends the use of custom-designed integrated circuits beyond that of the original IIC design.

Integrated circuits

There’s an input/output unit and a memory management unit, plus a custom timing generator chip that generates several time and control signals and a general logic unit that provides logic control required by the system.

The disk controller unit is the same as the disk controller on the Macintosh and is a one-chip, large-scale integrated LSI version of the disk controller originally designed by Steve Wozniak for the Apple II.

It is referred to as the IWM, and if somebody isn’t seriously pulling our leg we’re assured that stands for the integrated Woz machine.

The increased use of LSIs (large-scale integrated) ICs has permitted Apple to reduce the number of chips in the IIc. It has sixteen 64K bit Random Access Memory chips which gives the computer a standard 128K bytes of RAM. Besides these RAM ICs the IIc only has 21 chips.

Fewer chips

This is quite amazing when you consider that it is three chips fewer than the number of non-RAM ICs in the IIe, despite the fact that many of the functions performed by cards such as the disk controller, the serial interfaces, the 80-column cundy, and so on are included in the IIc as standard. With the IIc there are of course no slots readily accessible to the user.

Apple have clearly made the decision that portability and ease of use are of far greater importance than expansion possibility.

The IIc is marketed specifically for people who have no desire to mess around with the hardware. (For people who like to mess around, the IIc will still continue.) Moreover, the IIc lends itself to some quite dramatic improvements, which may be seen implemented by Apple – or even outsider suppliers – in the relatively near future.

ProDOS

The IIc comes with the Apple’s recently-released ProDOS operating system. This offers a considerable increase in performance over the normal 3.3 of the IIe.

ProDOS includes UNIX-like file structures compatible with the Apple /// operating system. Not much point we admit, in that the Apple /// appears at long last to be going down the gurgler.

Apart from the thousands of software producers painting in the wings with their new offerings, Apple themselves are introducing a new set of software for the IIc including an integrated database management, word processing and spread sheet program in the form of a package which can take advantage of the vastly expanded memory, Apple Educational Classics and a new version of called Apple Access II.

The IIc is absolutely interesting because the IIc does not currently have a built-in modem. The IIc Read Only Memory appears on the surface to be very similar to the IIe ROM as far as programmers are concerned.

In fact actual it was redone almost completely. Most interestingly a series of 32 graphic characters were installed in the character generator ROM. These characters, which Apple call Mouse Text, are a series of icons designed to let programmers set up a user interface very similar to that found in the Lisa and the Macintosh.

Enter the mouse

This means that we will be seeing Mouse-controlled IICs and we will also have a new mouse icon on the IIC screen before very long.

These characters, incidentally, can be called directly and therefore it will be much faster to move them around the screen than the bit-mapped characters which are a feature of the Macintosh.

The full-screen flat panel display Apple hope to introduce later this year comes from Sharp. It is a liquid crystal display which works off a series of individual pixels twice as high as they are wide. This makes the characters in the display appear somewhat flat.

However, even in the 80-column display mode the characters appear very crisp and the display produces quite remarkable high-resolution graphics.

LCD display

It is stated that the liquid crystal display panel will have three graphics modes

- Low resolution – 40 horizontal by 40 vertical.
- High resolution – 280 horizontal by 192 vertical.
- Double high resolution – 560 horizontal by 192 vertical.

In truth we can’t see how this is going to work but no doubt all will come clear when we see the finished machine working with its liquid crystal display units.

Whether the Apple IIc lacks as far as we’re concerned is a modem.

There is no doubt that at some time in the very near future we will see a modem included in the IIc.

C/PM software

Whether we will ever see a Z-80 card added – the other obvious omission is another question altogether.

The use of C/PM software is a fairly major area with Apple. Z-80 cards are one of the most common additions to the Apple II. We cannot see why there should be any major problems including a Z-80 icon on the IIc design as it stands, and it may be that we will see this in the near future.

Taking it from the top, we can say that as if stands the IIC is one of the most desirable computers we have ever tested.

We can also look forward to the possible implementation of something like the Macintosh/Lisa software in the near future.

Future thoughts?

A little further into the future it is quite possible that we will see one or even two micro disk drives built in instead of the current five-and-a-quarter inch floppy disk drive.

It is also quite likely that we will see an implementation of the Z-80 chip so that the machine can run C/PM software.

If you want sky blue yonder stuff, we believe that the IIc will be the last version of the IIC which will become available which will use the guts of the Macintosh as its base and will provide the user with half a Megabyte of Random Access Memory. There is no doubt that it can technically be done. It will be up to the marketing people to decide whether people who appear to be collectively mad ball – to decide whether such machine would be a world-wide winner. We know that it is true of the IIc. We suspect it would be true of such a hybrid machine.

Apple in the lead

The Apple IIC firmly establishes Apple’s position as one of the two major companies in the hardware computer market. It will need a revolution of major dimensions to move it from that position.
The new Scribe colour printer
by Duncan McCann

The new Scribe printer which we described in our last issue is a plain-paper thermal printer with colour capability. That's news some explaining.

We got it wrong. When we first read about it we were imagining all sorts of complex thermal-printing techniques. What in fact the Scribe is is print on almost any paper surface - we understand it can even print on projection transparencies.

It has two resolution modes and can either operate at high speed at 80 characters per second or it can produce letter-quality printing at 50 characters per second. It is relatively quiet.

Where we got misled was in thinking that the print head worked without a ribbon rather like the old Silventype. In fact, the print head consists of 24 resistance elements that are arrayed in a vertical strip.

When the machine is printing the head pressures against a ribbon. This ribbon is made of polyester and uses a carbon-filled paraffin ink. The resistance elements in the head pulse briefly which melts the ink to deposit on the paper.

We now realise the area of extremely high technology.

The design of the print head permits a resistance element (and remember there are 24 of them) to rise to a temperature above 1000 degrees Celsius and then to drop to below 35 degrees Celsius within the space of several hundred microseconds.

The lower range is well below the melting point of the paraffin wax in the ribbon.

The result is that the letters do not smudge one into the other. The dot resolution of the Scribe can range as high as 63 horizontal by 52 vertical dots per square centimetre in letter mode.

There are two ribbons which you can use with the Scribe. One is all black for standard printing and the other is a colour ribbon that has different colours laid out in consecutive bands. Although there are only three colours, the Scribe, by placing dots close together, gives the impression of providing a seven-colour spectrum.

The Scribe, priced at around $500 odd retail, is not ideal for an office situation where there is going to be a vast throughput of printing.

That is because of the cost of the ribbons. A black ribbon will provide about 80,000 characters and will cost something between seven and ten dollars. Working it out very quickly, that's about 12,000 words or over 20 cents for a medium-length letter.

Colour ribbons are going to cost as much as $14. This means that the Scribe will be ideal for use where high throughput of printing is not required and a very quiet printer which can produce colour graphics is needed.

If you are willing to put up with fairly low-quality printing, it is possible to rework the black ribbon and run it through at least three times. We know because we've seen it done. But the end result is something less than spectacular.

There is no doubt that with this Scribe machine Apple has made a major breakthrough, which is going to create a fairly substantial stir in the electronic printing area.

For example it is only a few weeks ago that we were testing the C Itoh 8510C, which we considered to be, for a colour printer, a good buy at around $1,400. This card was almost immediately trumped by Hewlett Packard announcing a colour printer in the same price range.

How they are going to compete with Apple, offering this colour printer at $500 more, beggars the imagination.

Of course, the simple fact of the design of the Scribe is is that they will not require their ribbons replaced so frequently and they will not cost as much to run.

Possibly... We believe that the design of the Scribe and the way in which it fits so well with not only the CC; but also the Macintosh and the Lisa, means that once again Apple have stolen a march on all their competitors.

Apple Scribe colour printer

Learning the language
by Gareth Powell

Do you have to be able to write programs to use an Apple Computer?

Before we rush in with the obvious snap answer of no, of course not, let's think about it for a while. It is permissible to drive a car without having the faintest idea how the combustion engine works. But there is no doubt that you will be a better-equipped user and buyer if you do know some basic mechanics.

You can eat at a first rate restaurant and not have the faintest idea of the ingredients of the various dishes and still enjoy yourself. You will enjoy eating more if you know something about the food and its preparation.

You can take great pictures with a 35mm camera and not have the faintest idea of how you press the shutter release. But I'm willing to bet good money you will take better pictures if you have at least a vague idea of how your camera works.

Simplest no

So when we ask the question, do you need to know programming to use and enjoy an Apple, the first and simplest answer is no, of course not.

Almost any problem that can arise in the world of personal computers has almost certainly been solved somehow, somewhere by a professional programmer, and it is unlikely you will be able to do it better. There is no point in re-inventing the wheel when you could be doing something far more profitable and enjoyable with your time.

Yet I am of the view that it is almost essential for you to know at least the rudiments of programming if you are ever going to get the full benefit of your Apple.

In this magazine we are opposed to jargon and the obscure language so beloved of professional programmers. And we have taken a very gentle line on programming, feeling too much on programming would frighten readers off. And we are probably right in that belief.

But now the time has come to say that while we are really not into running courses for absolute beginners in BASIC, we think that anyone with an Apple should at least try to see whether they can grasp the rudiments.

All goodies

To check on this growing belief I have been using a series of programs that teach you to write in BASIC, your basic, as it were, personal computer programming language. And all of them, without exception, were well written, well conceived and well documented.

I have not yet found a dud. Remarkable.

They take the absolute beginner step by step (that is, in fact, the name of one of the programs) through the essential elementary details of programming.

At the end of a short course of these programs you certainly couldn't write a full scale accountancy package. But you should be able to write at least a simple program that would set up, for example, a personal telephone directory.

There are, of course, some people who find immense satisfaction in writing programs.

They are the many sort of people who enjoy solving crossword, playing chess, or working out wiring diagrams. They become happy home hobbyists, because they enjoy programming for its own sake.

I'm not talking about them.

Getting to that level of expertise is extremely easy, and anyone should be able to do it in a week or so.

The lessons I have been looking at ranged over several titles. Don't worry about whether your local computer shop stocks precisely...
Where electronics are going

The Consumer Electronics Show ended last month in Chicago. There was always a theoretical limitation on an 8-bit computer but this has now been overcome by the elegant system of bank switching. There are lots of boards that will give you more memory than you know what to do with. The semi-rotund Harry Harper at Zoloty will fit you up with an extra 256K in double smart time.

Do you have any concept how large a spreadsheet you can make with that much memory? Enough to keep the board of BHP happy.

Where such memory comes in very handy is when you pretend that it is a disk drive and load a program on to it. Then instead of the computer having to repeatedly access the real disk drive – which can be a time-consuming business – it can obtain the information from the pseudo disk which is the extra RAM card. This makes some accountancy programs operate at three times the speed.

User-definable keys

Another area where you may feel your Apple is lacking is that of user-definable keys. These are keys which can be defined to enter a series of pieces of information that otherwise you would have to laboriously type in before you started using, say, a word processing program.

But there are several software programs that allow you to do just that. And you can always add-on a numeric keypad. Indeed, you can buy totally new keyboards to fit on to your Apple which have more than enough user-definable keys.

And they are a lot cheaper than buying a new computer.

There is always a temptation to have the newest, fastest, biggest.

But think about this:

If you get rid of your trusty Apple to buy a new, flash whiz-bang marvel it is you that will be the guinea pig. It is you that will be discovering the bugs. And bugs there will be, we can assure you.

Sometimes it is better to be on the blunt edge of technology. Let some other suckers do the pioneering.

WICO mice

A board which would provide a Mouse capability to standard Apple II machines was announced by Wico Company, which produces a superior line of joysticks. The package is designed to give cursor capabilities to earlier machines.

Quotes

A good quote from this show came from a dealer working out of Colorado. He said:

“I think the software people are finally figuring out just how the computers work.”

On the other hand a dealer from Avon, Massachusetts, said:

“From what I’ve seen so far I would say there is a lack of really innovative software.” A Dutch distributor disagreed. “I think the quality of software is getting better.”

Epson Elf and Fuji floppies

Epson, the Japanese company with a firm base in the United States, introduced the Elf, a hand-size colour television with a minute liquid crystal screen. Look to see this sort of technology extended to computers in the near future.

Fuji announced some of the new 35 inch (9 cm) disks with a capacity of one megabyte, which looks like being the standard for next year.

In the show report it was announced that these disks would have a capacity of “1,000 megabytes” which would make them the biggest memory disks in the history of the civilized world as we know it today. These errors happen to us all.

Educational programs

BroderBund, perhaps one of the most successful software publishers, are now branching out in new directions. They aim to exploit the children’s educational field as well as adding to their Personal Productivity series.

They will be producing a program which features the Muppets and they are also looking to introduce a Bank Street Filer and a Bank Street Manager to join the Bank Street Writer and the Bank Street Speller in the firm’s line of high-selling simple word processing systems.

Cheap printer

OkiData rocked everyone by producing a full-colour printer at $239. The printer uses thermal transfer printing technology – not unlike the Scribe – and at the moment will only work with Apple, Commodore and Atari computers and popular software programs. It is claimed that the printer works with letter-quality printing at 60 characters per second.

Atari top-of-the-line

Atari started to show a new top-of-the-line computer which they say they will launch this year. Their Vice-president of marketing said “We will probably produce new units of the new computer to satisfy demand this Christmas.”

The new computer will have a double-sided double density disk drive, a full-screen synthesizer, and a database. It doesn’t sound too exciting but we’ll have to wait and see.

The Atari machines are going to be capable of running MS-DOS and Atari have announced that they’re going to introduce an expansion box which will enable owners of the 800XL also to be able to make use of that disk operating system.
The first Computer Of The Year that won't be out of date by next year.

The highly respected "Your Computer" magazine has just named the Apple Lisa® as Computer Of The Year, 1984.

In their own words, "People will remember 1983 as the year that Lisa revolutionised personal computing."

Surely good news for the business on the verge of choosing the ideal system.

In the frantic, fast-moving world of micro technology, where new models are here today and gone this afternoon, Lisa seems to be a reassuring exception.

This is the most advanced personal computer in the world, with up to one million bytes of internal memory.

Unlike conventional computers, Lisa works visually, the way you do. Those complex computer commands are replaced with familiar symbols and a palm-sized mouse.

Countless man-hours are saved because Lisa starts being productive from the moment it's switched on. (Even for staff who've never used a computer before.)

Little technical miracles like these don't exactly happen overnight.

Considering they've taken us a good five years to perfect, even if our competitors simply copy, they should be kept busy for some time.

There are three Lisa models of varying price and capacity, any one of which your Apple dealer would be proud to demonstrate.

You probably won't be the only company moving to Lisa technology this year.

We expect quite a few of our competitors will be doing likewise.