Any **questions?**

Frank Leonhardt sifts through his postbag to see whether he can be of assistance in problem areas.

Q "We have been trying to set up a US Robotics Sportster 28,800 to receive faxes automatically. Our plan is to receive faxes in background while the PC is being used for other processing, and print them later.

The PC is a 486 DX33 with 8Mb RAM running Windows 3.11. It will be running WordPerfect 6 for DOS, under Windows and Access 2.0. These may be open together, and it is possible that Lotus 1-2-3 R4 for Windows will also be open.

Is it practical to expect this system to cope without slowing the foreground application? If so, what fax software would you recommend? Quicklink II, as supplied with the modem, does not cope. It usually causes the PC to grind to a halt and the fax link to crash. Would you recommend upgrading to Windows 95, more RAM, or something else?"

The TACS Partnership

To get anything running alongside Access 2 in 8Mb of RAM you'd be doing well! For anyone running more modest applications, Delrina Winfax should do the trick and it doesn't slow things down too much. However, I wouldn't attempt it in your case as most of the programs you have there are well-known resource hogs.

I use a full-sized office fax machine which is designed to run day and night, for years. They are initially quite expensive to buy, but having the ability to receive faxes without fuss is important to me and to my clients.

If you must have your faxes arriving on a PC, I'd seriously suggest you get another small one to dedicate to that purpose and leave your existing machine alone. Sod's law says that your spreadsheet will decide to crash in the middle of receiving any important message, and unreliable communications are a real pain.

Windows 95 won't help you unless you upgrade your machine's RAM. For the selection of applications you propose, I'd recommend 24Mb as being sufficient. Windows 3.11 has its own fax software integrated with MS Mail, but it is rather awkward to use and is noticeably less efficient in terms of resource use than Winfax.

Going into overdrive

"I have a problem identifying my overdrive chip. I don't know if it is a socket 3, 5, or 7 type. I have an IBM PS/1 (manufactured in 1993). There is a 486 SX33 chip stuck to the motherboard and next to this is the overdrive chip. Right now, there's a 486 DX2/66 Intel overdrive chip in it, and I don't know what overdrive processor I can install.

The information I can give you about the overdrive processor is that where the overdrive socket is stuck to the motherboard, every pin connection from the chip to the board has a number or letter next to it. On one side there are numbers 1 to 19 (meaning 19 pins), and on the other side there are letters A to U (meaning 21 pins). If, from this information, you can figure out what kind of overdrive processor it is, I will be very much obliged."

Rishid Shah
Nairobi, Kenya

You can never tell whether a particular overdrive processor is going to work until you try it. However, you should be able to plug a P24T Pentium Overdrive 83MHz into your machine.

Intel has recently priced this overdrive chip to about the same as a 486DX4/100, making it pointless to consider this lesser chip as a cheaper alternative. There's one catch: the BIOS in some machines won't work with a P24T. As far as I know, the Award BIOS has always been okay, though. The AMI BIOS, unless it's within the last couple of years, has to be changed.

Before buying any overdrive processor, make sure the dealer knows what it is going to be for and is prepared to take it back if it fails to work. Although a chip may work in most machines of a particular type, you don't want to end up being the exception!

386 to 486 conversion

"I have a 386DX40 motherboard fitted with an AMD chip, with 128Kb cache and an IIT 387DX40 co-pro. According to the motherboard manual, it is possible to upgrade to a 486DLC 25MHz chip but this doesn't seem like a worthy upgrade. The current 386 processor fitted is of a surface-mount type that is soldered directly to the motherboard. It also has an unused space that is marked for a 386DX processor. There are jumpers on the motherboard that allow 25MHz, 33MHz and 40MHz configurations.

My questions are: firstly, is it possible to purchase a 486DLC 40MHz or similar

Frank's Bargain Basement

Two readers have taken me to task over my advice to T. Mancini in *Computer Answers* (May), where I wrote that £600 would not be enough to buy a PC capable of running current software releases. Both pointed me toward advertisers whose headline price appeared to prove me wrong.

Since I wrote that piece, RAM has fallen in price by over 50 percent, easily saving £100; but even now I still maintain that a machine suitable for current applications will cost more than this.

If you read the small print, you discover that the £499 "bargain" 486 machines come with certain important parts missing. You wind up paying extra to upgrade the memory to a usable 8Mb, then add a mouse, an operating system, postage, packing and VAT. Remember that current applications need a CD-ROM drive to install them (also extra).

One company in particular, mentioned by both correspondents, has around 30 outstanding County Court judgements against it and is well known by myself as well as the local trading standards office. I'm hardly likely to recommend them in these pages!

● *So here's a challenge: what is the cheapest new Windows 95 machine available? It must have 8Mb of RAM, a CD-ROM drive and all the necessary keyboards, mice, monitors and software (on CD-ROM), a year's warranty and be on sale to the public.*

We're all DOOMED... or are we?

Doom and disaster will visit all computers one year before the end of the millennium. It's true! By the time you read this, questions should have been raised in Parliament about the year 2000 bugs, and the government will be whipping up a right bally-hoo about it. The theory goes that when computers' clocks change from 1999 to 2000 it will expose bugs in lots of software — and there is some truth in this.

Early last year, I asked readers to perform a little test to see whether their PCs' clocks could cope. Most didn't. (If you want to try it yourself, set the clock to 31st December 1999 at 23:55 and turn the machine off for ten minutes.) Over 80 percent of PCs you tested thought it was something other than the 1st of January 2000 when turned back on. And, before any more smug Amstrad 1640 owners write to me, I know this is an honourable exception!

It will be an annoyance, certainly, but I haven't yet found much in the way of PC software which suffers a serious problem. Mainframes are a different story, as most of their software is written using COBOL. Unlike modern programming languages which store years as full binary numbers, a lot of COBOL-type software packs a two-digit year into eight bits using a system called Binary-coded Decimal.

So why is there such a problem? Consider a program which checks to see whether a 25-year life insurance policy has matured. The logic might be "if this-year minus starting-year equals 25, then pay-out-time". This is fine if you are subtracting 1980 from 2005, but disastrous if the years are only two-digit (i.e. 80-05).

*Will the end of the millennium take your PC by surprise? Find out by zooming it forward to the year 2000...**

Mainframe users will doubtless be hiring self-styled year 2000 experts, at exorbitant rates, by the coachload. Some of these will try to make you think your PCs are in great danger, too. They're almost certainly not, but if you want to be sure, all you have to do is back up all your data, set the clock to 2000 and see what happens.

My free advice to mainframe managers is to start dealing with it now. Either that, or convert all your investments into gold bullion and book an extended Christmas break in 1999. Two years should be long enough.

clock-doubled chip?; if so, will it work on my motherboard? Next, would the co-pro need to be changed if upgrading is possible? And finally, what would be the price of such an upgrade, and would it be too expensive to be worthwhile?

A performance increase of a factor between 50 to 100 percent only is required and I am happy to de-solder the current 386 chip if necessary."

A. Knight
East Sussex

I'm afraid you would be wasting your time trying to upgrade this motherboard. The 486DLC was actually a special 486-compatible chip which fitted into a 386 socket. It wasn't as fast as a standard Intel 486, but it did support 486 instructions.

However, this is all academic as I've been unable to track down anyone who still sells the chip, and I am unaware of anything else you could use to get a reasonable performance boost for the money. Cyrix does a set of 386 to 486 converters, the fastest of which operates at an external clock frequency of 33MHz and costs £150. For the same money, you could buy a new 486DX4/100 motherboard with 16Mb RAM. Add about £50 for a reasonable Pentium 75. If your budget is really tight you may be able to find an old motherboard (£50) which would take your 30-pin SIMMs and use a 486DX2/66 compatible processor in it, costing around £20.

SIMMple explanation

"I am considering buying some extra SIMMs to speed up my PC. Friends of mine, to whom I have mentioned this, hold different views: some say, yes, it will speed up; others, who have tried it, have been disappointed with the results. I am now totally confused. Help!"

C. Brewer

During the past few years of high RAM prices, a myth has grown up that processing speed is a function of memory size. This is based on the observation that a machine which runs Windows slowly can be speeded up by doubling its RAM. The belief that increasing RAM size always leads to a speed improvement follows on from this, with some users rating machines by memory size and disregarding the processor entirely.

So what has memory size got to do with speed? Consider an analogy. Supposing you had a Luton van and a motorbike. The bike has the fastest engine (processor) but the van has lots of room in the back. Now suppose you were in a hurry to send a copy of PCW *from London to Oxford. The motorbike is the obvious choice.*

Okay, supposing you needed to deliver 20 copies. Again, the bike would be quicker even though it might wobble a bit. Above 20 copies, though, load carrying capacity comes into play: the van, trundling up the M40 at 50mph, can deliver a large consignment of magazines in far less time than the motorbike (which would take several trips).

So think of the magazines as being the software. When the software fits into the available capacity, the speed of the processor is paramount. As soon as it doesn't fit, the processor has to go mad juggling small chunks.

It's exactly the same within a computer. If the software you are running fits into the machine's working storage (called RAM these days) all will be fine. But try to fit in something too large and you get a very steep fall-off in performance. If you have more working storage than you require, it is just wasted. Unlike the Luton van, you aren't being slowed down by dragging the unused box-shaped coachwork behind you.

PCW Contacts

Delrina 0181 207 3163

• Upgrade Processors:
Powermark 0181 956 7000
Simply Computers 0181 498 2100
Intel 01793 431155

** Film-still from Diamonds Are Forever; courtesy of the National Film Archive*

Any **questions?**

If you have a PC problem or think you could help out other readers, contact Frank Leonhardt.

"I would be grateful if you could help me with a problem I am having with downloading files. When I download software from either the World Wide Web via Netscape 2.0, or FTP via my ISP (U-net) the speed starts at around 3K/sec and then gradually goes down to below 1K/sec. I am running Windows 95 with 16Mb RAM and always connect at 28800.

It has been mentioned that there is a problem with some Sportster modems having faulty chips causing 'spiralling death syndrome'. I have contacted US Robotics which stated that my ROM is the latest revision for the internal Sportster modems. The company advised me to use AT&F1&A3& K3S54=96. I placed this in the 'extra settings' in advanced connection settings of modem set-up but it did not rectify the problem. The 'highest speed' is set at 115200."

Chris Norton
Birmingham

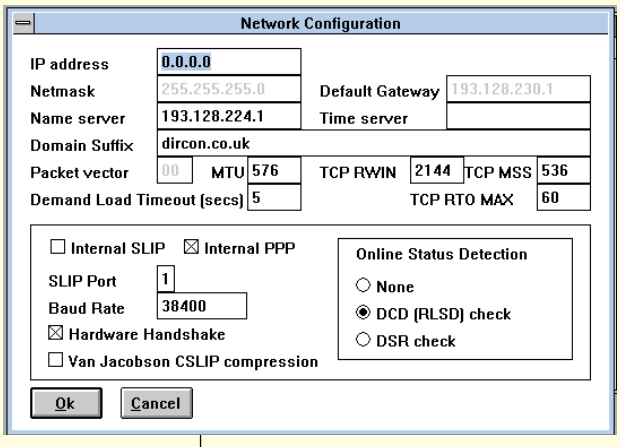
Internet connections operate in strange ways and Netscape's reported performance seldom has anything to do with the modem's operating speed. You will probably find that your system is transferring packets of data at full speed but is pausing a long time between some or all of the packets.

If you can, monitor the data transfer to and from the modem in some way. This isn't easy with internal modems (one of the reasons I prefer the external type with flashing lights), but you can sometimes examine the data using the PPP connection software. For example, users of Trumpet Winsock can select an option to monitor the raw data.

Assuming you are getting inter-packet gaps there are several possible causes. The problem could well be at the remote end where the FTP server isn't able to send your file down the line quickly enough due to the number of simultaneous users. There could also be a delay anywhere in between, caused by too many people using the same line at once.

There may be something you can do about it at your end, however. A lot of dial-up Internet connections are set up with inappropriate parameters as a default. They work with some sites and do a go-slow on others. If you have Trumpet Winsock this may well affect you.

The parameters to change are MTU from 1500 to 576, RWIN from 4096 to 2144 and TCP MSS from 1460 to 536.



TCP/IP parameters look confusing but you have to get them right

I've found that these work considerably better than the original higher values as larger packets tend to end up getting divided into smaller chunks and failing to arrive for re-assembly before they are timed-out.

Quest for speed

"I have an IBM 486SLC2 50MHz computer, with Quantum ProDrive ELS170AT 12Mb of RAM and 64K cache memory. Having checked my system with Norton's sysinfo 8.0 25E, I have the following results. Overall performance 50.1, Disk speed 7.0 and CPU speed 71.7. However, when I checked an 80486SX 25MHz computer (4Mb), the results were lower. When I played with Windows 3.1 and WordPerfect for Windows it seemed much quicker than mine. Also, I noticed that this machine has got a SCSI hard drive.

Is the answer to buy a SCSI hard drive or is my speed problem caused by other reasons? Is upgrading to 128K of cache worth the money? Secondly, I have already upgraded to 12Mb, from 4Mb. In my opinion, the only difference seemed to be that I could load multiple programs at once. My computer did not seem to be a lot quicker. Is this also due to my hard disk?"

Alfred Hamstra
Finland

I'm not generally impressed with benchmark programs, especially those which only take a few seconds to run. The results can never be taken at face value. In the real world I would expect an Intel 486SX-25 to be noticeably faster than an IBM 486SLC2-50 because the IBM chip is really a clock-doubled 386 in disguise.

Put simply, it takes more clock cycles to execute most instructions than would a proper 486SX. In an attempt to redress this imbalance, IBM has clock-doubled and tripled its 486SLC processors but Intel has also tripled theirs in the form of the 486DX4, so a wide gap still exists between the product ranges. So how does IBM justify calling it a 486? Simple, it handles the extra "486" specific instructions (albeit more slowly).

Beware other manufacturers tagging

processors as 586, which might make you believe you are getting an alternative Pentium rather than a souped-up 486. Not all non-Intel processors are below par, however, so it pays to shop around.

SCSI disks can sometimes be faster than IDE, and are the fastest disks available. However, unless your disk performance is particularly bad you will probably be disappointed if you upgrade. It would be easier, cheaper and probably faster to add a better E-IDE drive and adaptor to a machine of your class.

Twelve megabytes of RAM on a Windows 3.1 system is probably all you'll need. Having more would allow you to use more simultaneous applications, assuming that these were economical with the infamous windows "system resources". It is often the case that these run out long before the system RAM. Windows 95 likes to have 16Mb of RAM to begin with and as it doesn't suffer from the resource problem to the same extent, adding more RAM will allow you to run more programs at once. Because it is more robust than 3.1 it makes this practice less like insane recklessness, as well.

There are exceptions to the above suggestions. In particular, if you are using software which manipulates large sound or graphics files (like audio editors, video or photographs) then the more RAM you have the better.

Learning C++

"I am a student, with no experience of C or C++. I have programmed before, but to a trivial level and only in BBC Basic and Word Basic. I have several months free now, and I would like to get really stuck in to some learning in C++. I want to be able to program Windows applications. I am thinking of getting Visual C++. Is this a good option?

Of all the books I have seen, none deal with people who haven't seen C or C++ before, and none seem very specific to teaching with visual C++ in mind. Can you give me any suggestions?"

Garan Jenkin

There are several major Windows C++ compilers available, the most prominent being Microsoft Visual C++, Borland, Symantec and Watcom. Any of these would be more than adequate for someone starting out (the differences in the feature lists only come in to play when dealing with esoteric commercial development problems).

Watcom has the advantage that it can target multiple platforms like OS/2 (something which Microsoft has discontinued). Borland has been producing low-cost development tools since its inception. It has separate Windows and OS/2 compilers available with variable documentation quality. At a cost of around £70, its Turbo C++ represents good value. Microsoft C++ 4.0 is huge. It needs Windows NT or Windows 95 and loads of RAM to use, but it is the standard. For those with more modest hardware, version 1.52 is still available. This still requires 8Mb of RAM with Windows 3.1 and it has more features than you can shake a stick at for around £80 (Version 4.0 is around £400).

Symantec is my favourite at the moment, but this is based on my taste for efficiency above all else. It runs on Windows 3.1 and upwards, with both 16-bit and 32-bit versions of the compiler, which can target either platform. In other words, you can develop for Windows NT using a compiler running on 3.1. Its documentation is good, but it does cost around £400.

If I had a free choice (which I do) I'd plump for Symantec for day-to-day use, with Microsoft on the shelf for when compatibility was all-important. With a budget to consider, Turbo C++ or Microsoft VC++ 1.52 are good choices.

Books are more of a problem. The "C" compilers mentioned come with plenty of example programs but these can be heavy going for beginners. Your best policy would be to look at as many as possible and pick one you personally find easy to understand.

Once you are past the absolute beginners stage, the "bible" of C++ is The C++ Programming Language *by Bjarne Stroustrup (the language's inventor). This is also available in an annotated version, and is divided into a tutorial and a reference section (though it does proceed quickly).*

Frank's Bargain Basement

IDE, the most popular interface for connecting hard disks to PCs, was described as the "poor man's SCSI" when it first appeared. Like SCSI, it moved the drive controller electronics from the PC to the drive itself, allowing the use of longer connecting cables and faster transfer rates. The older system of ST-506 was limited in speed because it sent raw and vulnerable data from the drive, along a cable to the controller.

But why should IDE (which stands for Integrated Drive Electronics) still be so much cheaper than SCSI after all these years of integration and volume sales? The best reason I can think of is that SCSI adaptor and drive manufacturers like having a higher margin than would be possible in the cut-throat IDE market.

SCSI does have its advantages in high-end applications, although speed is no longer one of them with the arrival of E-IDE. A SCSI bus can have up to seven peripherals on it and each peripheral can consist of more than one disk drive (though this feature is now rarely used).

E-IDE supports a maximum of four drives. You may have noticed SCSI drives are available with far greater capacities than E-IDE, too — the only reason for this can be profit margin protection.

Then, along comes Iomega and gives the game away. Its SCSI ZIP drive has a Macintosh-style SCSI connector on it which makes it difficult to sell it to PC users. So what did Iomega do? They started selling their own Adaptec-compatible SCSI adaptor for just £35. It has a Macintosh (25-Way D) socket on it, though you can plug in a Mac-to-PC cable if necessary. Apart from this, its just a cheap-and-cheerful SCSI adaptor which would be ideal for normal hard disks, scanners, CD-ROM drives, tape streamers and other exotic storage devices.

Low-end SCSI adaptors from other sources are bound to be pushed down in price eventually, but whether or not you're planning to use a ZIP drive this board has to be a bargain. And for anyone with Macintosh peripherals they wish to use with a PC from time to time, it's the perfect answer.

PCW Contacts

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Computer Answers Web site at **http://www.users.dircon.co.uk/~wombat/answers/**.
Letters may be sent to *PCW* at **VNU House, 32-34 Broadwick Street, London W1A 2HG**. Sorry, but due to the high volume of correspondence, individual replies are not normally possible.

The C++ Programming Language by Bjarne Stroustrup. Addison-Wesley. ISBN 0-201-12078-X
Grey Matter ("C++" Compilers) 01364 654100
Iomega (Zip Zoom card) 0800 898563 (from UK); or ++35 318 007 5133: or www.iomega.com

Any **questions**?

If you have a PC problem or think you could help out other readers, contact Frank Leonhardt.

Q "I am currently using three PCs in a limited space (each of which is constantly being accessed by modem) and would like to ditch two of the monitors and keyboards and access all three machines via a single monitor and keyboard connected by a 'box of tricks' to all three machines.

For 'political' reasons I am unable to network the machines and hence I wondered if you knew of any products which would be of use to me?"
Paul Starling

What you ask sounds relatively simple, a three-way switch, but there are problems which make it rather more expensive than you may have expected. While switching the video signal between monitors is easy enough, assuming you're not using a fancy "green" monitor which turns itself off, keyboards are a lot more stroppy. There is a fairly constant two-way conversation taking place between the PC keyboard controller and the processor in the keyboard. If this gets interrupted then both the PC and the keyboard are prone to becoming confused.

A keyboard switch has to pretend to all the connected PCs that they are constantly talking to their own keyboard and convince the keyboard that it is always talking to the same PC. This rules out the possibility of a simple and inexpensive manual switch.

Although you didn't mention a mouse, these are just as much trouble as the keyboards. If you can stand having three keyboards and possibly three mice but just one monitor, then the cheapest solution is a simple video switch. If you want to switch more, you'd better check your bank balance.

There is actually a software solution to this problem which doesn't involve remote control over a network. MARC (Multi-Access Remote Control) is a package which successfully allows one PC to control many others using simple serial connections as well as a network. It has the added advantage that you can see a shrunken display of all the PCs you are controlling on-screen at once.

Which controller? What memory?

"I am currently using a 386DX system upgraded with a Cyrix DRX2-66 processor. It is equipped with 8Mb of RAM, a SoundBlaster CD-ROM player (2x speed) and a Quantum LPS420AT IDE HDD (420Mb). I use OS/2 Warp and Lotus SmartSuite for OS/2.

I have two questions. Firstly, my HDD transfer rate is currently rather slow (<800Kb). I am planning to purchase an EIDE controller: are my current CD-ROM player and HDD compatible with an EIDE controller? If this is the case, can you suggest which one (brand/type)?

Secondly, my motherboard can only take 8Mb on-board and for an additional 8Mb I have to use a proprietary memory board. But I have read that my board will accept any 16-bit memory expansion board and this is what I plan to purchase. Do you know of a 'good' 16-bit memory board which can take 8Mb of RAM and is compatible with OS/2 Warp?"
BL Halim

EIDE adaptors added to existing machines often seem to cause trouble, except when they are being added solely for a CD-ROM drive. That being said, your existing hard disk (and a second unit, should you choose to add one) should work without problems.

From your description, I suspect you have a Creative Labs CR-563 CD-ROM drive. These have a Panasonic rather than an IDE interface, although the 40-way cable is the same. There should be no conflict between either the sound card or special interface board you are currently using to attach the CD-ROM.

As for the memory question, although memory boards were popular in earlier years, processor speeds have greatly outstripped the fixed expansion bus performance and have created an unacceptable bottleneck.

Apart from upgrading PS/2 machines with a micro-channel (which is faster and allows wider addressing) I don't know of anyone still making such boards. Unless any readers know differently?

Pushing the file limits in DOS

"I need to develop a DOS application which must have about 100 files open at the same time. DOS states a maximum of about 255 but I have written a few programs (C++, QBasic) which all fail at around 20. I have fiddled with CONFIG.SYS and even played around with the standard C header files, but with no success. Is there a (relatively) easy method of overcoming this 20-file limit under DOS?"
Chris Fellows

I take it you have already tried increasing the limit in CONFIG.SYS using the FILES= entry? If you set FILES=30 you have the chance to open a maximum of 30 files at any one time, and so on. I suspect you may be having trouble with the stdio libraries which came with your "C" compiler. These often have an internal limit imposed on the array of file handles. It can sometimes be determined by looking at the manifest constant FOPEN_MAX in stdio.h.

To increase the limit, you can often adjust the symbol definition and recompile the libraries. Alternatively, the array can sometimes be dynamically allocated at run-time — consult your compiler documentation or, more reliably, have a good rummage through the startup module source. The alternative is to design your software in a way which doesn't require so many open files in the first place — DOS isn't terribly efficient at juggling lots of open files!

Waking up to PC fax

"To take full advantage of Windows 95, I recently upgraded my motherboard to a 133MHz Pentium with 16Mb of RAM. I have also installed an external fax/modem connected to the serial port. The fax/modem runs from the same line as the phone with the equivalent of a splitter box to filter calls.

The computer has an energy-saving feature, as emblazoned by the BIOS at bootup, but I have not yet enabled this feature. According to the manual, the jumper switch can be enabled if I install an energy-saving switch on the front panel. The manual states: 'System will be wake up while the keyboard or mouse be touched' (*sic*). I understand that part, but it doesn't really apply in my case; what I would like to do is leave the computer switched on, and then 'wake up' if a fax comes through. Would this work? Failing that, if I switch off the monitor and leave the system running permanently, would that consume a lot of electricity?

As I live in Italy, power cuts are not exactly unknown: so if we have one, would there be any problem about the computer re-setting? Which .INI file would I need to install the Fax .EXE file to reload? I use Eclipse software, which was supplied with the Electronic Frontier Modem as recommended in your recent tests [February 96]. It seems to do a good job."

Nigel Hinton

Some machines can be programmed to "wake up" on receipt of a ringing signal from an external modem (pin 22 goes high in time with the ringing) but these are fairly rare. External boxes are available which use the ringing signal to turn on a mains socket into which you can plug your whole computer.

Although this sounds like a good idea, you are then left with the problem of getting the machine to turn off again: unless the fax software supports this feature, it's not easy. Then your caller has to wait for the machine to boot before it can start receiving faxes. These could be some of the reasons why these devices can no longer be found on the market.

Using the low-power mode of your PC is probably the best idea. The bulk of the power consumption normally goes on the monitor so having one of these, which turns itself off, would be a great asset. Next to this, the disks and the processor are the most power hungry — though small (in size) modern drives use only a fraction of what they used to.

The power consumed by a processor is proportional to its clock speed. Energy is used each time a transistor in the chip changes state, and the faster it is running the more switches occur. Turning down the processor speed is therefore a good idea if you can do it. Beware the "turbo" buttons, found on many motherboards, which actually turn down the bus speed and leave the processor running at full tilt. If you want to turn down the processor clock rate, a switch connected to the speed selection jumpers is often the only way.

You can leave the PC out of things and use a type of fax/modem which stores incoming faxes until the PC is turned back on. As you'd expect, these cost more and their storage capacity is necessarily limited, but for a small office they could be just the job.

Personally, I have always had a real fax machine for incoming transmissions — and a solid, reliable, commercial one at that (purchased second-hand). The beauty of fax should be that it is always available, quick and straightforward to use. Getting a PC in the way has got to be a step backwards.

To get programs to start automatically when you boot Windows 95, place them in the Start Up section of the Start menu. You can do this by placing them in the "Start Up" folder, which is usually found in the \Windows\Start Menu\Programs. If your system is set up to keep start menus separate for each user then yours will be in \Windows\Profiles\username\Start Menu\Programs, where "username" is your user name.

Frank's bargain basement

Things are looking interesting on the CPU front at present. You can always buy the latest, greatest Pentium from Intel, but for those on a budget, price/performance is more important.

So how do you get the most bangs per buck? My favourite, for quite a while now, has been the Pentium 75: I never liked the P-60/66, which ran at 5v rather than 3.3v and got rather too warm. A P-75 can be had for well under £100 now and they perform rather well.

All current Pentiums run at external speeds of 50, 60 or 66MHz. A P-75 actually runs externally at 50MHz, multiplying this internally by 1.5. The P-100 is actually the same chip, clocked externally at 66MHz. Faster Pentiums simply multiply the external clock by two or 2.5, ending up with a P200 multiplying up a 66MHz by three (so it is said).

Intel doesn't guarantee that a chip sold as a P-75 will run at 100MHz if you change the jumper on the motherboard, but plenty of people have done this for a long time now without problems and saved about £100 each. It may reduce the life of the CPU, so doing this is entirely at your own risk but who wants to keep the same processor forever?

You not only have Intel processors to choose from now: Cyrix and IBM are launching a 686 which fits into a Pentium socket (the Cyrix 585 is actually a souped-up 486). AMD is about to deliver something, too.

From what I've seen, the claims made for the 686 aren't justified. While some instructions are undoubtedly faster than a Pentium, floating-point performance doesn't look so good. In addition, the entry-level 686 runs at double the external clock rate rather than 1.5x like Intel's. This gives its internal instructions a boost but each time it goes out to the bus the advantage disappears. This isn't to say it's not a good chip — and when a .35 micron version is produced, it should be even better. Whether it gives a better bang-per-buck than a P-75 depends on its final selling price and this is not available at time of writing.

If there is an update to this it will appear first on the *Computer Answers* Web site (see the *Contacts* panel).

A P-75 chip, costing less than £100, runs rather well

PCW Contacts

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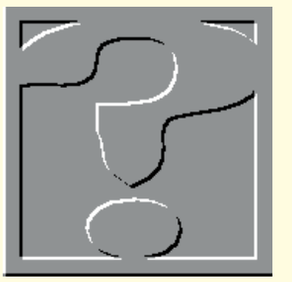
There is a *Computer Answers* Web site at **http://www.users.dircon.co.uk/~wombat/answers/** which may contain late-breaking news. Letters may be sent to *PCW* at **VNU House, 32-34 Broadwick Street, London W1A 2HG**. Sorry, but due to the high volume of correspondence, individual replies are not normally possible.



Any **questions?**

If you have a PC problem or think you could help out other readers, contact Frank Leonhardt.

Q "I have read so much about different sound cards that I am not sure of anything except that *PCW* recommends at least a wavetable version.

I currently have an Amiga with MIDI interface connected to a Roland e-10 keyboard and run the Sequencer One software. This is quite good, but I am limited to the keyboard for sounds as the Amiga is a bit limited (only four channels) and the keyboard is not general MIDI, just plain MIDI. I plan to buy a Gateway P100 with an Ensoniq sound card and speakers in the next couple of weeks.

How does PC sequencing work? Will I be able to use my Roland for just the keys and utilise the GM-sounds on the PC-card? Do sound cards have MIDI interfaces built in? How good will the PC sounds be — on a par with a good keyboard? Is a good sound card like a synthesiser without the keys? I don't want to buy a PC and then find I still have to use my Amiga. And what does 'wavetable' mean?

Your advice would be appreciated."

Neil O'Connor

The de-facto standard sound card for the IBM PC is the SoundBlaster 16 made by Creative Labs. Most other sound cards are compatible with this and use it as their base-level specification, so it's a good place to start.

There are six main components to the card: a synthesiser, a DAC/ADC section for playing and recording digital sound (known as wave files), a mixer which adds the various sound sources together, a MIDI and a joystick port, and some form of CD-ROM drive interface.

The joystick port is really only useful for entertainment applications and needs no further explanation. The CD-ROM interface is generally of the IDE type in current sound boards, if they support one at all. In the early days, sound boards formed the hub of a multimedia upgrade so included proprietary CD-ROM interfaces.

The ADC and DAC (Analogue to Digital Converter and vice versa) is used to record and play sound samples. These days they are nearly all capable of operating in several quality modes up to 16-bit samples at 44kHz or greater, and in stereo. However, this isn't as useful as it sounds for music applications unless you are interested in using the PC as a digital recorder; which is actually a practical proposition.

The interesting parts for the music maker are the synthesiser, the mixer and the MIDI ports. The basic synthesiser is of the FM (Frequency Modulated) type. This uses the same principle as the Yamaha DX7, among others, which was responsible for many of the uninspired backing track sounds of the early eighties.

The normal FM synthesiser chip found on sound boards is the OPL3. If you like this sort of sound you can certainly have some fun with its 20 partials (simultaneous sounds). However, just because it can make 20 distinct noises at once, you might be disappointed to find it isn't much of an improvement on the Amiga's four.

The Amiga had a system which allowed each of its sound channels to play very rich sounds, whereas you have to gang up several FM partials to get good effects.

The better sound cards use a system called Wave Table synthesis, in which the notes are actually stored as digital recordings. These sample recordings are used to calculate the output wave for the required note as and when required — not an easy job, but the effect is often quite realistic.

Most wavetable synthesisers can handle 32 partials. Each partial can be used on its own and still produce a rich sound. While this may be adequate for popular music, don't try to simulate an orchestra!

If you have a sound board with basic FM synthesis and you want to upgrade to wavetable, this can sometimes be done using a daughterboard. These plug on to a sound board with a suitable socket and appear to the PC to be an extra, external, MIDI synthesiser. In fact, it is possible to upgrade some wavetable cards like the AWE-32 with an additional wavetable module if you want to go mad. Several upgrade daughterboards are available, the most famous being Creative Labs' own WaveBlaster.

The MIDI ports are all fairly standard and trouble free once you've discovered that they need an external adaptor cable to make them work. The cable itself contains the opto-isolators missing from the sound board in a large plug.

For some strange reason, the MIDI signal comes out of spare pins on the joystick socket rather than having a connector of its own.

Make musical waves with a card like the Sound-Blaster AWE-32 PnP

You will certainly be able to make use of the Roland keyboard by connecting it to the MIDI port. Sequencing software is readily available and basic packages are often bundled with the sound boards. The synthesiser built in to the sound board appears just like any other MIDI instrument in the chain.

Don't get too concerned about General MIDI. What it boils down to is that a GM instrument will have the same sounds on standard patch numbers (for example, 1=Piano, 2=Electric Piano). If your instrument doesn't conform to GM numbering you will have to configure to software so it knows how to translate GM-numbered MIDI files.

Dash it all

"My friend's PC always adds a '-' in documents when using the right arrow cursor movement key. Can you tell me how to stop this from happening?"

Max Waterman

This sounds like an incompatibility between the keyboard driver and the word processor. The first thing to try is to remove any drivers like ANSI.SYS or NANSI.SYS from the CONFIG.SYS file and anything else which looks like it might be related to the keyboard from both

The key to compatibility is the keyboard. Since the IBM AT, shown here, all keyboards have been interchangeable

CONFIG.SYS and AUTOEXEC.BAT. The lines in question might contain KEYB, KEYBUK or KEYBOARD.SYS depending on your DOS version.

If this cures the problem, then start adding them one at a time to isolate the culprit. The reason for suspecting display drivers like ANSI.SYS and its numerous alternatives is that they often intercept the keyboard, too.

It could also be the case that the word processor you are using requires a particular keyboard or display driver which you don't have installed. Check its documentation to find out.

You may have a hardware problem with the keyboard. If it is a standard PC, the best way to prove it is to try a different keyboard.

Since the IBM AT (and other 80286-based models) all the keyboards have been generally interchangeable as long as they have the right plug fitted. The main exception to this rule is the early Amstrads. Mixing pre-AT and post-AT keyboards is not good news as they run at different voltages.

Taking a chance on Acrobat

"I have hundreds of documents in PageMaker 5 format and I need to get them into Microsoft Excel 5.0 or Microsoft Word for Windows 6.0.

Adobe have told me that PageMaker doesn't support any export facilities and that, basically, I don't have a chance. Is there any medium that could be used to convert PageMaker files with .PM5 format into a format such as .bmp or .wmf, that could be embedded into the above applications, or inserted as objects or pictures?"

Jason Smith

This could be a job for Adobe's latest bandwagon following PostScript — Acrobat. This is a system which is intended to allow you to create documents on one machine, which can then be read by all the computers in the entire world. Okay, so it's not quite universal yet, but they are doing quite well with DOS, Windows, OS/2, Macintosh and Unix support.

In case your intended recipient doesn't have an Acrobat reader on their machine, you're currently allowed to give them one free of charge.

To create the documents in the first place, you can use any application you like as long as it has a print option. You then "print" the final version to Acrobat Exchange which converts it into its own standard format (PDF) and stores it in a file. It's as simple as printing it to a printer.

The results can be very good: when viewed, the documents appear to be practically identical to paper versions. PDF files can also be embedded as OLE objects under Windows, which is how they might solve your problem. Unfortunately, however, you don't seem to be able to see the contents unless you actually open the embedded object.

It's probably possible to convert documents into .BMP format but they would end up taking up somewhat more disk space than the originals, to say the least. PDF files appear to be relatively compact, especially considering the cross-platform compatibility they achieve.

Frank's Bargain Basement

By the time you read this, RAM prices will have fallen considerably — and about time, too. I expect 16Mb to be costing less than £200, which is probably low enough to tempt many into carrying out their Windows 95-induced upgrade plans.

So why has it happened? And will prices fall further? More rubbish is talked about RAM supply that most other aspects of the computer industry. Regarding this price movement, I've been told that it was down to the Chinese New Year creating a world glut because all the Far East clone makers closed down for the holiday. Oh yeah? If they did close down the factories, which I somehow doubt, it wouldn't have been for the full two weeks of celebrations. Pull the other one. I think it's far more likely that the DRAM manufacturers have decided to supply Europe direct and get around the 80 percent tariff imposed by the US government. I smell whole-output contracts lapsing left, right and centre.

In the short term, prices are bound to stabilise and probably go up a bit once dealers realise that their large stocks are a liability in a falling market. For the latest situation, have a look at the Computer Answers Web page (see the "Contacts" panel, below).

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Monitor/keyboard sharing
Q-Data (MARC Software)
01349 866127
Keyzone (Various hardware)
0181 900 1525

Sound boards
Creative Labs (various Blasters)
01245 265265
Aztec (Galaxy series) 01734 814121
Orchid (NuSound) 01256 479898
Adobe (Acrobat) 0131 451 6888