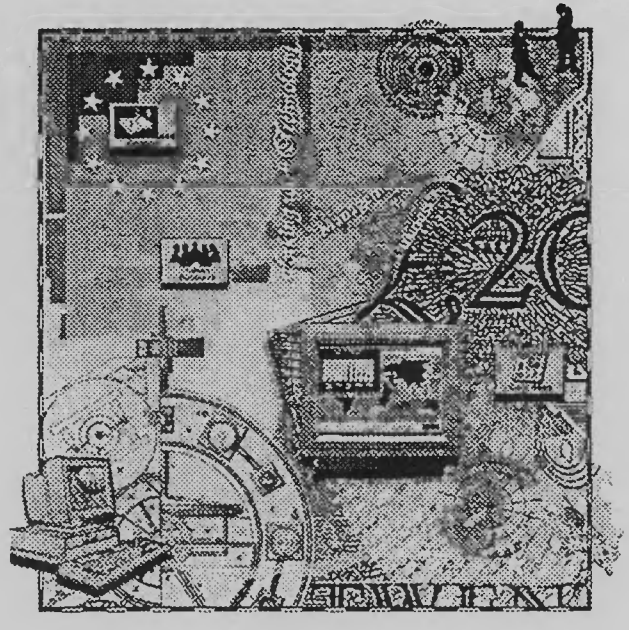
Computers For The Arts...



Marketing and Management

by Michael Prochak

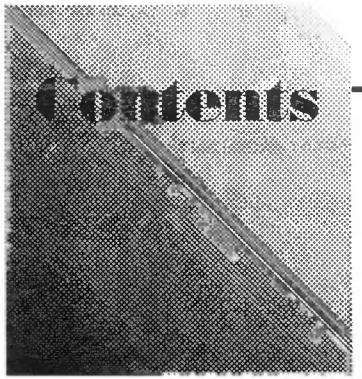
THE **ARTS COUNCIL** OF ENGLAND

Edited by Vanessa Rawlings-Jackson, Keith Allen and Phyllida Shaw.
Published by the Arts Council of England. ISBN 0-7287-0654-7

This report is available in alternative formats. Please ring 0171 973 6467 for further information.

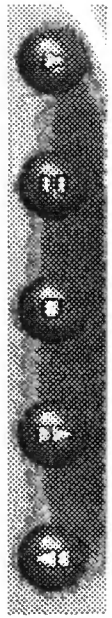
The Arts Council of England is committed to being open and accessible. If you have any suggestions on how to improve our service, or want to make a complaint, please write to our Head of Secretariat, Arts Council of England, 14 Great Peter Street, London SW1P 3NQ, telephone 0171 333 0100.

Computers For The Arts



Note

While every effort has been made to ensure accuracy, it should be pointed out that because of the nature of the IT and digital industry, pricing and system specification may be subject to change and modification without notice. Prices quoted do not include VAT or additional handling and service charges. All prices and information were considered to be correct as of July 1995.



FOREWORD

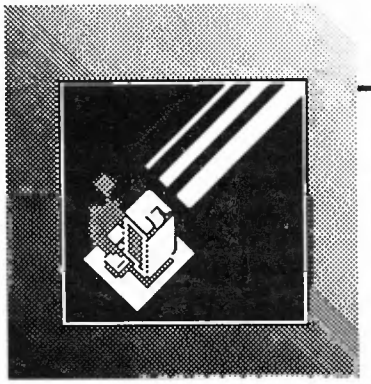
This is an extended version of the report "Computers for Arts Marketing" prepared by Michael Prochak for the Arts Council in February 1991 to stimulate greater awareness of the many ways in which computer technology can assist in both managing and marketing the arts.

The report is not intended to provide definitive guidance on the systems which are best suited to specific purposes. The views on particular hardware or software are his own and not necessarily endorsed by the Arts Council.

As all arts organisations differ in their circumstances, their resources and in the ways in which they want to use computers, it would be prudent when considering the acquisition of a new system to seek specialist advice and obtain up-to-date information on models and prices.

Business Assessment and Planning Department
Arts Council of England

Overview



'The information superhighway is about the global movement of weightless bits at the speed of light. As one industry after another looks at itself in the mirror and asks about its future in a digital world, that future is driven almost 100% by the ability of that company's product or services to be rendered in digital form.'
Nicholas Negroponte
Being Digital

Like the Gutenberg publishing revolution of the 1500s, the digital media revolution of the 1990s is dramatically changing the world for everyone – from artists, publishers, film and video producers to content providers, venues and technology companies. If all the hype in national newspapers and magazines is to be believed, we're all *screenagers* now and in an increasingly complex and confusing world of converging digital technologies, both producers and consumers alike need to be better and more accurately informed. Just as sophisticated personal computer technology and desktop publishing software revolutionised the print industry, today, computer-based digital media systems are shaking the very foundations of the arts, music, television, film and video industries. Prices of converging computer and media systems are becoming increasingly competitive and, in the digital domain, traditional roles and jobs have begun to merge uncomfortably.

As the lines between writers, performers, designers, producers, managers, directors and even marketing and sales staff begin to blur, thanks to powerful and affordable digital desktop solutions, it becomes

increasingly important to examine just how the industry at large might be affected. Who will benefit and who will lose out?

Technologies such as video-CD are beginning to take off and there is a growing interest in new methods of distribution such as video on demand, interactive cable, high definition television, CD-ROM, CDPlus and the Internet. But despite the media hype, things are not always what they seem and many magazine and newspaper stories are still firmly rooted in the realms of science fiction. At Milia 95 in Cannes, Apple's Satjiv Cahil warned that we are not yet on the information superhighway, but only in the driveway. However, there is no doubt that the Internet, digital TV, virtual reality and other broad-band systems will have an increasingly significant impact on all aspects of our work and leisure.

The CD-ROM market alone was projected to grow to nearly 50 million PC-based systems in 1995 supporting in the region of 15,000 published titles. If you start counting dedicated gaming machines and MPEG movie players, that number increases even more. Wider

consumer availability could help drive CD-ROM prices down and some traditionally non-computer outlets are beginning to take an interest in multimedia titles. Booksellers like Waterstone's currently sell CD-ROM titles in around a third of their shops and most of these have demonstration kiosks where customers can explore titles before parting with their money.

The other vexing issue for developers and producers is which hardware platform to support. Currently, CD-ROM titles are generally published for PCs or Macintoshes. Phillips is still desperately flogging its own CD-I platform but increasingly, this is being seen as the proverbial dead horse by the rest of the industry. VideoCD is maturing rapidly and already many CD-I and computer CD-ROM drives can be adapted to play VideoCD, CDPlus or movie titles. Other consumer set-top players, such as the Sony PlayStation and Apple's Pippin are beginning to enter the home/consumer market and perhaps the ultimate winner will be the system that eventually supports multiple formats. Eventually, TV-based players will work more like VCRs. They will have an immediacy and accessibility that today's computer-based, on-line services can only

Overview

According to Jim Reilly, a senior marketing official at IBM, the current philosophy of mass marketing is 'we make, you take...we speak, you listen.' The only problem with this approach, according to Reilly, is that if we speak and you don't listen, or if we can't tell if you're listening, then the only recourse is to speak more loudly and more often. However, if what we make is not what you want to take, then all we can do is cut our price and hope someone else takes it.

fantasise about and the expanding range of titles and entertainment on offer could create a very serious threat to traditional notions of live entertainment and particularly, the role that arts centres, theatres and galleries will play in the future.

For the arts, these developments hold perhaps as many threats as opportunities and in what is becoming an increasingly digital age, simply ignoring the issues won't make them go away. All of these converging technologies will have an overwhelming effect on how people use their leisure time and where they will choose to spend their money. In the future, will people queue at a crowded theatre box office for tickets or battle an agency phone service in order to see a production that they may or may not know anything about and may or may not enjoy? Or, will they log on to their TV set-top Net system, surf through the various films, videos, concerts, exhibitions or simulations available, look at some digital video highlights of various programmes and then book what they want to see, pay for it immediately on-line, and have it piped directly into their home exactly when they want to see it? Science fiction? Many technophobes might like to think so. But this is happening now and

despite the arguments to the contrary, a crucial question is, how will arts professionals stop potential attenders from deserting live productions when we still haven't managed to offer effective on-line or even kiosk-based ticketing facilities and still sneer at the possibility of using digital video for previewing or marketing live performance?

Digital media is a valuable tool and arts producers, providers, managers and marketeers need to understand what it can do for them and how they can use it to their own best advantage. This report is intended for just that constituency who may not yet know a lot about the purely technical side or even the potentiality of the digital revolution, but who are at least keen to find out.

To this end, I am aiming to provide a broad industry overview, a description of the various converging areas of development and a basic vocabulary for understanding and surviving in cyberspace. I am also assuming that arts professionals are now generally better informed and more knowledgeable about personal computer systems and appropriate business/management software, as well as more specific

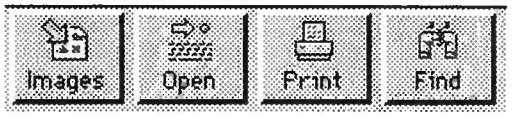
industry applications, such as computerised box office systems. To this end, there is less hand holding than in my previous report, although all the relevant areas it covered have been updated and reprised here in a more condensed version.

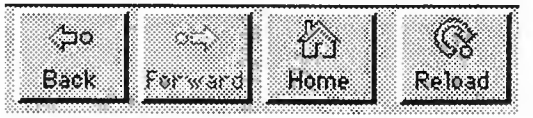
This should allow you to have a better understanding of what you need to know and how to find out more, and enable you to make informed decisions about the future development, direction and implementation of your own information and marketing/management strategies. However, this report is not intended to be used as a comprehensive DIY manual, nor is it meant to provide answers to everything you ever wanted to know about computers, digital media and the information superhighway. No such single solution exists and you should be very wary indeed if anyone tries to sell you one.

New hardware and software applications suitable, desirable or even essential for use in the arts are being developed all the time. And while it is probably unreasonable to expect any arts professional to learn everything there is to know about emerging digital technology, it is

Remember

For any computer system to be effective, it is essential that the arts organisation has clearly thought out the purpose for which it is to be used. This doesn't simply mean deciding to buy a computer. It involves everything from assessing current systems, outlining information needs, exploring software options, assessing staff and training requirements, assuring back-up, maintenance and after-sales support, ensuring that the system is powerful and complete enough to address current tasks while remaining flexible enough to be expanded and developed to cope with possible future needs as well. It also involves knowing when you, as a user, can develop or modify a particular application yourself and when it is best to call in the services of a consultant or developer.





Remember

Compatibility is a bit of a red herring nowadays since an Apple Macintosh will read and write DOS and Windows disks and files can easily be exchanged between both platforms. Both work harmoniously on any current networking configuration, both can share the same printers, and despite the 'thousands of software applications' claim of the Wintel world, nearly all popular business software applications are available for the Macintosh as well. There are only two areas of conformity which have any significance when choosing a personal computer system:

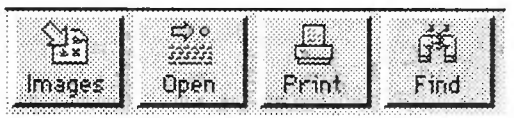
• data compatibility, or the ability to exchange and use information on a variety of different kinds of machines

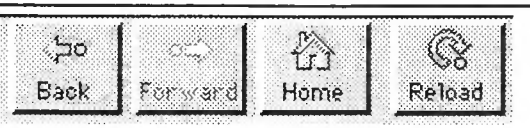
• expansion potential and connectivity, or the ability to upgraded as technology advances, while being able to communicate with other systems.

increasingly important that someone within every arts organisation is familiar with the jargon and has some understanding of where each of the various bits of technology and innovation fit into the current marketplace, or at least where to begin to look for accurate, impartial advice.

Whether these developments eventually lead to cyber-theatre or virtual concerts, no one can say. Predicting the future can be dangerous as well as foolish and, in retrospect, embarrassing. As former US president Dwight Eisenhower used to say, 'No one knows what the future will be...and it's been like that for years.'

Any modern personal computer will do nearly anything you want it to do, depending on the amount of time, money and hassle you're willing to invest to get it to work. However, for arts organisations, even more so than 'normal' businesses, the goal should be to acquire a system that does what you want it to do with little effort, no hassle and at a price you can afford. Despite the extreme level of marketing hype surrounding certain PC processors or operating systems, all current

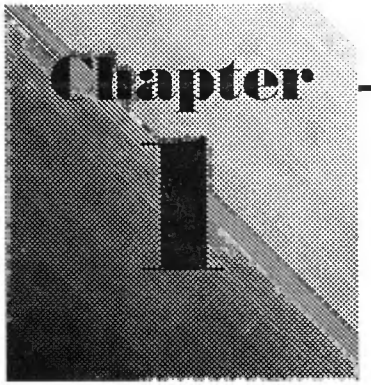




hardware and software has evolved to a sufficient level of sophistication and power to allow for a considerable degree of personal choice. Do not be intimidated by industry FUD (Fear, Uncertainty and Doubt) and do not buy any system just because someone calls it an industry standard or because 'it has thousands of software applications.'

The whole industry is changing rapidly. Today's standards could easily become tomorrow's Betamax and 'thousands of available software applications' is a meaningless claim if you only need four. The most important consideration is how you work and what you want your system to do. Any PC system needs to be powerful enough to do the tasks required and easy enough to be used effectively by the typical person or persons with whatever level of computer literacy is likely within a given professional sphere. The rest is just blue smoke and mirrors.

Michael Prochak



PCs In The Arts

Traditionally in the arts, as in most other fields of business in what is rapidly becoming a digital information society, the prevailing belief has been that by simply computerising information recording and analysis, it is possible to gain a competitive edge and create new wealth.

If information is not thought out and managed, it's not really an asset. When developing information management capabilities for the arts you need to know:

• what strategy to adopt
• what system of information management would be appropriate and relevant to your organisation
• what stages you will need to go through in developing your capabilities.

Yet today, most computerisation in the arts continues to be introduced as a rather *ad hoc* tactical means of speeding up existing or traditional tasks. Most of the major technological advances of the 1980s, such as personal computers, fax machines and cell phones, when used at all, still tend to be introduced to support existing methods of working and rarely as a result of a larger, visionary picture or strategy. So, while personal computers are now widely used in the arts, they are still not widely used imaginatively or to their full potential.

Few arts professionals are fully aware of current and on-going developments within the computer industry or even the range of existing solutions and technologies that may be available for their

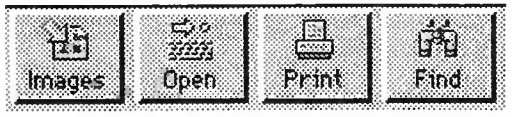
While reading computer magazines and articles can help you make more informed decisions about your systems needs, evidence suggests that few decision makers in the arts have the time or the inclination to do so. According to a recent survey by Banner & Co, only 37% of decision makers in small businesses read computer titles, compared with 62% of decision makers in large organisations.

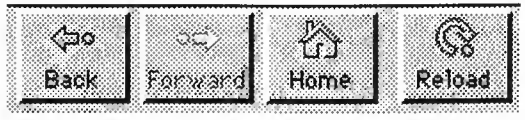
particular needs and requirements. Although more and more people have entered this arena offering a variety of services, there are still very few reliable sources, consultants or contacts to which arts professionals can turn for impartial, informed advice or analysis. While many consultants have diversified into areas of computerisation, software development and box office advice, most have only the most basic understanding of existing technology and little grasp of future trends and developments. This means that arts managers, like many businesses, will not always get the advice they need even from consultants or developers who appear to have some loose claim to technical experience or practical association with the arts.

When choosing consultants, look carefully at their background and experience, make sure they have no ties with any particular manufacturer or dealer and don't be taken in by the size of the firm. What you want is relevant expertise and experience, not necessarily an expensive firm of management accountants who have diversified into IT, communications or on-line systems because they perceive it as a lucrative and potentially gullible market.

Remember

You are not likely to get totally unbiased advice from a computer dealer. Dealers are in the business of selling kit and they will inevitably try to sell you whatever kinds of systems they sell... whether they're right for your organisation or not. Never take a sales-person's word that a particular system will do everything you want it to, unless they can demonstrate it to you there and then without a catalogue of excuses.





PCs In The Arts

At the moment, most typical applications of personal computers in the arts involve:

- **text processing**
- **spreadsheets**
- **databases**
- **graphics and design**
- **computerised box office systems.**

These are generally applied at the most basic business level and, in most cases, are not exploited to their full potential.

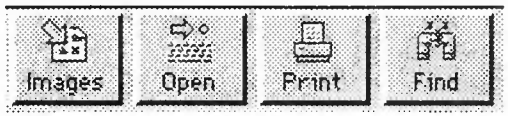
Marketing activities, particularly market research and communications, have attracted considerable attention in recent years, as has the concept of networking, communications and the use of multimedia technology. There is also interest now in portable technologies, particularly for market research and data capture, and a slow recognition of potential applications for developments such as digital video, multimedia, self-access kiosks and on-line marketing and selling.

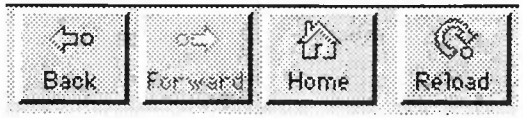
Many arts organisations have begun to use *dedicated* marketing applications for survey analysis, statistics and demographic mapping, in conjunction with more traditional applications such as databases and spreadsheets. Some are even devising their own integrated solutions, using data gathered from a variety of sources. Unfortunately, there is still a tendency to gather a vast amount of data types without always thinking through just how valuable it might or might not be and precisely how or why it might be used, as well as maintained.

A great advantage to all potential users of emerging technologies today is the way the computer industry as a whole is finally beginning to

You can achieve the same results with a variety of PCs, printers and software configurations. The main differences between systems include:

- **how long they take to learn**
- **how fast a novice can achieve results**
- **how much memory and storage they require**
- **how easy it is to remember how they work**
- **how usable your results are with other systems**
- **how secure they are**
- **how easy they are for occasional users to understand.**





integrate standards, applications and functions, so that information can be quickly and easily passed from one part of the system to another or even to an entirely different system. This means that once you have all the appropriate and relevant information, the right computer system could definitely improve your speed, efficiency and effectiveness.

But while IT is becoming increasingly important in the arts, those who use it successfully are still the organisations that concentrate on the *information* more than on the *technology*. Computers and related technology can only be exploited successfully in arts management and marketing if organisations focus on getting the right information, recording it accurately, and applying it over and over again. Often, arts organisations fail to exploit information effectively because managers do not appreciate or understand its value and the need to manage it. This means that the real problem is frequently an organisational one, not a technical one. This can only be rectified at the highest levels and not left simply to marketing and technical staff or the arts equivalent of middle managers. Real management is about judgment and balance. Trying to use computer technology for all the management,

The benefits derived from using PCs in the arts include:

- **efficiency**
- **productivity**
- **image enhancement**
- **motivation**
- **communication**
- **style**
- **professionalism**
- **job satisfaction**

The penalties of inappropriate or bad implementation are simply the opposite.

Improved technology and communications will increase the potential of collaborative working and the ability of people in the arts to share ideas via desktop and mobile PCs. For example, networking and conferencing could allow a number of people to author a document or piece of marketing material from whatever location they happen to be in and make alterations and additions in real-time. Applications such as Lotus Notes and other networkable PIMs (Personal Information Management) programs will enable managers to organise and coordinate activities and 'meet' colleagues in virtual conferences via standard phone lines and over the Internet.

administrative and marketing analysis in the world will prove to be of little value if it does not lead to fundamental changes in behaviour, attitude and practice.

When discussion and consultation over the creation of a national arts strategy was at its peak, few noticed that there was a glaring and critical omission. No one seemed to recognise the burgeoning effect of evolving and converging digital technology on the delivery of work and services to the public. The effect of technology on leisure activity is now a key issue that affects how the arts can and should target potential attenders, the way it creates new markets, how its customers gain information and book tickets and, in fact, the whole customer care issue. Multimedia, CD-ROM, digital video and the Internet will make an impact on every aspect of arts production, management, delivery and marketing. All aspects of the arts should now combine the best of technology with the best content and communication while striving to become more personal. Essentially, the arts, like nearly every other industry today, are passing through a technological discontinuity of epic proportions, which they are not even remotely prepared for.

The old paradigm, a system of mass production, mass media and mass marketing, is being replaced by a totally new paradigm - a one-to-one economic/information system. The future will be characterised by customised production, individually addressable media and one-to-one marketing which will totally change the rules of business, competition and growth. Instead of market share, the goal will be share of customer - one customer at a time. This discontinuity will be every bit as disruptive to our lives, and as beneficial, as the Industrial Revolution, changing the very structure of society while empowering some and disenfranchising others.

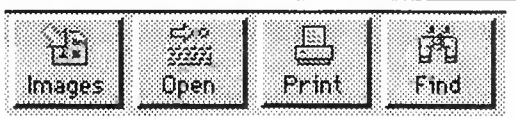
When planning or upgrading your computerised marketing system, ask yourself:

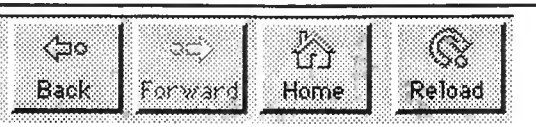
• how closely do planned developments relate to your marketing and sales goals?
•will the system provide the information you need about your actual and potential customers, particularly their spending habits and propensity to spend?
• will the system show you which of your marketing decisions were right and which were wrong and why sales were lost or not made?
• will it provide information on whether your sales/ advertising costs are too high or whether the size of your mailing list is uneconomical to service?

Profiting from marketing data requires a unique combination of power and simplicity. You need to be able to:

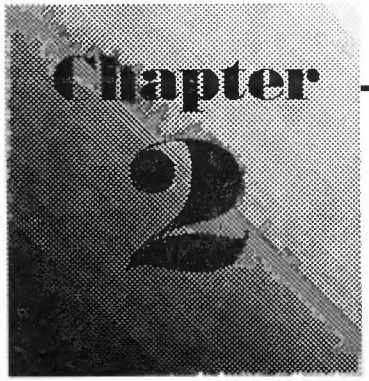
•draw on data from a wide range of sources
• select the exact data sets you want
• combine and analyse them
• repeat and refine the process until you can see and underestimate how to profit

This digital, one-to-one future has immense implications for individual privacy, social cohesiveness and the alienation and fractionalisation that could come from the breakdown of mass media. Whatever happens, it will change forever the way we seek, choose and use information, education and entertainment and it will redefine how we choose to use our leisure time. According to marketing guru Don Peppers, as well as continuing to create 'haves' and 'have nots', new class distinctions will be created between the 'theres' and 'not theres'





or the 'wired' and the 'disconnected'. The economic system will be driven more than ever before by genuine innovation and human creativity. In the coming digital world, ideas will be the real currency of exchange.



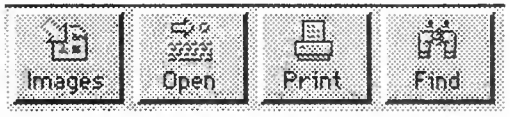
Techno-Trends

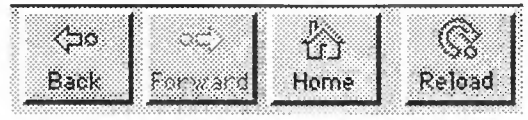
Personal computers are moving into our daily lives in an exponential fashion. Currently, in the US, 35% of families and 50% of teenagers have a personal computer at home. Worldwide, 30 million people are estimated to be on the Internet already and 65% of all new computers sold worldwide in 1994 were for the home. In 1995, 90% of all PCs sold were expected to have modems and CD-ROM drives. With over 100,000 CD-ROM drives sold throughout Europe every month, forecasts indicated that by the end of 1995, more than 500,000 homes in the UK would be equipped with multimedia capabilities. Computing is not about computers any more. It is about living and what people do with their lives.

According to Nicholas Negroponte, by early in the next millennium, your right and left cufflinks or earrings may communicate with each other by low-orbiting satellites and have more computing power than your present PC. Your telephone will not ring indiscriminately but will receive, sort and perhaps respond to your incoming calls like a well trained personal assistant. Schools will become more like museums and

playgrounds, where children will assemble ideas and socialise with other children all over the world, and the arts and mass media will be redefined by systems for transmitting and receiving personalised information and entertainment. As we interconnect ourselves, many of the values of a nation state will give way to those of both larger and smaller electronic communities and we will socialise in digital neighbourhoods, in which physical space will be irrelevant and time will play a different role.

There is also a growing cultural convergence which means that the traditionally perceived polarity between technology and humanities or between science and the arts is likely to be bridged by multimedia. To the average person in the street, multimedia or the integration of text, sound, graphics, video and animation is an exciting but confusing concept. Media delivery technologies such as CD-ROM and even the Internet have been evolving at a rapid pace and are starting to become commonplace throughout the arts, music, video, business, home and education markets. These opportunities or perhaps threats for some traditional areas of the arts will continue to grow rapidly over

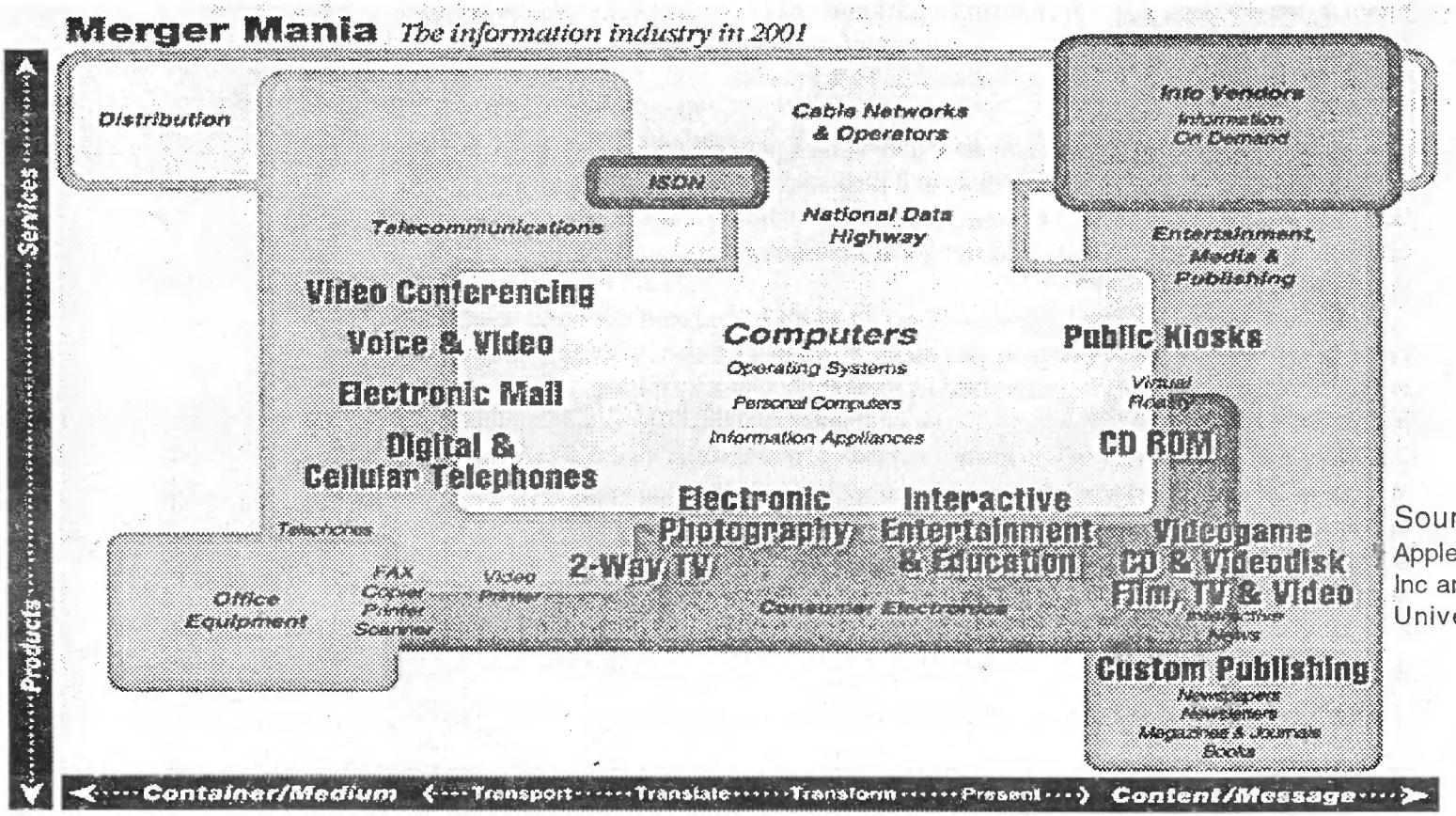




the next decade as CD-ROM technologies advance and other delivery media, such as 'on-line' services over telephone and cable networks, evolve. As delivery technology advances, the content and the user experience will also evolve, moving from a passive experience involving text-oriented information to a more interactive experience featuring richer media such as video, sound and animation.

A study by Harvard University, commissioned to increase understanding of the factors that are shaping the new media age, confirmed the rapid convergence of computer, telecommunication and consumer electronics. This has resulted in a synthesis of products and services that, just a few years ago, were as separate as a telephone and a television. As industries such as publishing, film, video and telephony move rapidly from their traditional analogue media (*eg* paper, film stock, video tape and copper wire) to a common format digital media (*eg* CD-ROM and fibre optic cable), the borders between television and computers, telephones and electronic notepads merge irrevocably. Areas of intersection can be seen as 'hot regions' of opportunity as indicated in the diagram overleaf.

Techno-Trends



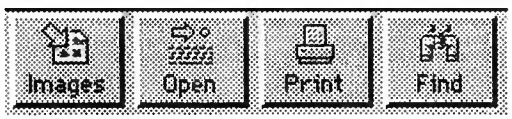
Source:
Apple Computer Inc and Harvard University

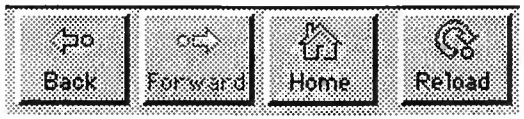
Techno-Trends

Digital media is expanding at a rapid pace and will continue to do so in the years to come. The promise of interactive television, of new communication technologies, of improved video and audio technologies and the convergence of many industries that were formerly separate promise to make the future an exciting one.

Media-rich data will greatly increase the network bandwidth requirements. At the same time, the increase in the scope and depth of data transmission will mean that new protocols and enabling technologies will be required to transport data, not only locally between devices, but also between media servers, across local area networks and wide area networks, and between high bandwidth applications, such as those used for video conferencing and other collaborative applications.

As telecommunication and cable companies provide greater bandwidths for distribution of video and audio data, there will be a shift away from CD-ROM as a delivery and storage medium to a more distributed development delivery and a storage architecture more akin

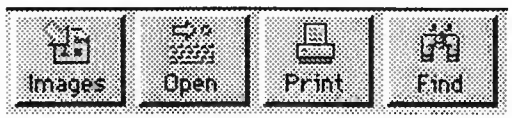




to today's client-server architectures. Already 'intelligent television', or set-top boxes, have begun to deliver the interactive services of home shopping, video on demand, distance learning, and other arts, entertainment and commercial services.

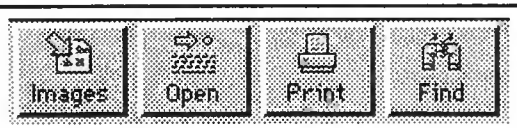
These media-rich services are rapidly evolving from the text-centric, on-line services such as the Internet. Whether the device that delivers these services in the future will be a computer with television capabilities or a computer-based, set-top box, like those currently being tested by BT and some of the cable companies, remains to be seen; but there is little doubt that computers will become more personal and probably a lot more like television, rather than traditional televisions becoming more like computers.

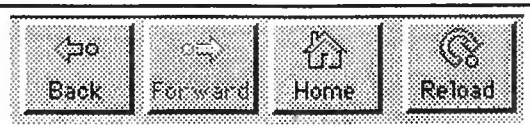
For the arts to survive and succeed in this emerging digital world, they must begin to adapt to it now, before continuity runs out on them. This is why it is becoming increasingly important to view the arts from a wider perspective and to avoid the traditional, introspective navel gazing that has characterised much of the industry in the past.



Take the issues of delivering and marketing arts product. By the end of the decade, many of the larger magazines will offer subscribers, not only personalised advertising but also personalised editorial content. Fax machines, already found in over 30% of Japanese homes, will be found in more than 50% of American and British households. Home appliances will respond to spoken instructions and set-top boxes and even games consoles, such as Nintendo, will be used for homework, connecting televisions by phone to databases to provide reference, text, news and video. Customised pay-radio programmes will be delivered over cellular bandwidth and we could see the emergence of over 500 TV channels over cable or satellite. Millions of households are likely to have digital equipment attached to their TVs, allowing a certain amount of interactivity which may be used to communicate back to the programme provider, either directly through a cable operator or by using a wireless cellular network and satellite connections.

Affordable video conferencing and video phone systems are already available and offer an interesting approach to collaborative work within a variety of areas in the arts. Once a video dial tone is available,





anyone with a phone and television camera will be able to go into the business of 'broadcasting' for fun or profit. While these new digital technologies may sound far fetched or inaccessible to the arts, just the opposite is true. Most of this is here and now and all of it is accessible in a way that mass media has never been before. In a future of video mailboxes, e-mail, the Internet and of computers sorting, storing and forwarding individual communications, old economies of scale that gave an overwhelming advantage to gigantic marketers will gradually evaporate.

Every 20 years since 1900, the amount of computational power that can be bought for a pound has increased by a factor of a thousand. That's more than a million-fold increase since 1950 alone. If the real cost of manufacturing cars had declined at the same rate since 1950, today it would be cheaper to abandon a Rolls Royce and buy a new one than to put coins into a parking meter. To put it another way, for what it cost an arts marketer in the 1950s (if such an animal existed then) to keep track of all the individual purchases and transactions of a single customer, today's arts marketer can track the individual purchases and

transactions of several million customers - one at a time. Advances in computing and communications technology now put a share of customer approach within reach of virtually every arts organisation, regardless of size.

Focusing on share of customer instead of overall market share is probably the least expensive and most cost-efficient means of increasing overall sales, but since there is no way of knowing, yet, precisely how these digital scenarios will come about, the arts cannot afford to rely on a crystal ball to develop an entry strategy.

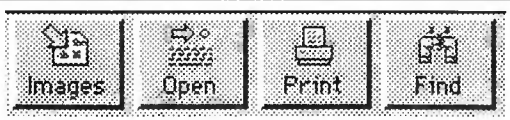
Each area of arts creation, production, management and marketing starts with a different mix of skills and objectives and each will have a different view of the attractiveness of interactive digital creation and distribution. With this in mind, certain trends in personal computer development should be watched carefully. For example, despite the hype, Windows 95 will not become the dominant operating system of the 90s. Commercial and business users will either wait for the next generation of Windows NT or decide they do not want to be dominated

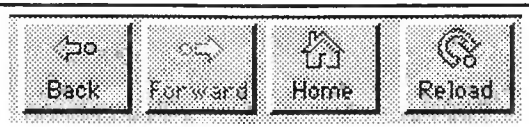
by a single company and move towards the more open approach offered by the CHRP (Common Hardware Reference Platform) currently being developed and supported by IBM, Apple, Motorola and dozens of other well known hardware providers.

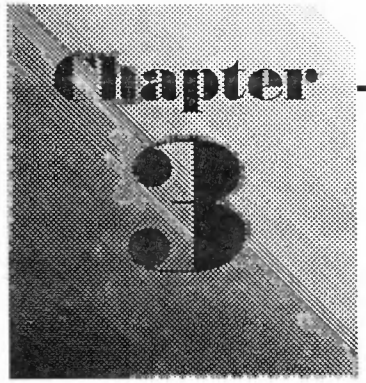
Power PC, in its various incarnations, will also offer a technological edge over the existing and even the predicted Intel processors and should be considered when looking at more 'future-proof' and upgradeable systems. The best choice for arts managers and producers buying a personal computer system today is the one that is the most powerful, most expandable, most upgradeable and most connectable and the one that delivers all of those characteristics for the best value for money.

This will not always be the one that has the best marketing or the most expensive advertising campaign, but just as the arts eventually discovered, when they first began to embrace personal computers, in the emerging digital age there can be no 'one size fits all' approach. Where one arts organisation may be able to survive quite nicely with a

standard 486 Intel PC running Windows 95, another may require a Macintosh 8500 with full video and multimedia capabilities. Another organisation may be large enough to require both and will need to know that both systems work transparently on the same network and can share data simply and easily. The trick is simply to ask the right questions and to refuse to be bullied.







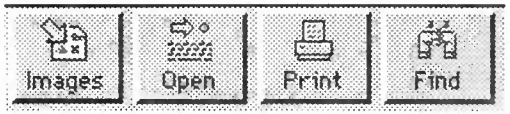
On The Box

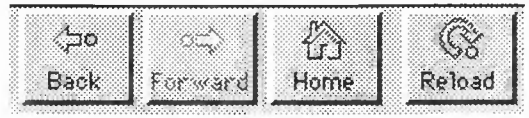
If there is one trait that characterises the perceived attitude of computerised box office suppliers, it would have to be arrogance. This is not my opinion, but one offered in a totally unsolicited manner by several existing and potential box office system consumers.

While most of the rest of the commercial computer hardware and software industry engage in what is effectively a full-time job of PR and marketing to keep the press and prospective clients up to date with their latest advance, most computerised box office suppliers apparently find it a chore to let you have any genuinely helpful information about what they offer and how much it might cost. And if you want a full-scale demo, don't hold your breath. Nowadays, the view here seems to be that it is a sellers' market and if you want one of these marvellous systems, you will make whatever effort is necessary to procure it. They will simply cash your cheque. If that sounds a bit strong, it's because that's the way a lot of customers currently feel and it would be misleading to pretend otherwise.

Computerised box office systems should enable you to:

• attract more new customers
• persuade existing customers to visit more often
• encourage existing customers to spend more
• reduce the number of lapsed customers and losses to competition

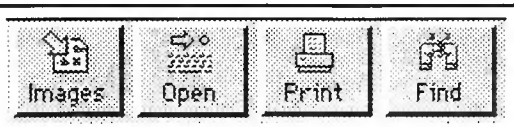




Remember
All data loses relevance over time. A marketing database, whether integrated within a box office system or running separately, needs the ability to record the dates when information updates are required and offer, for example, 'ageing routines' if you need to capture customers' ages. In any marketing system, the ability to use captured data, enhance it with observed data, and then expand its usefulness from model data, is crucial.

Despite the inevitable marketing hype surrounding these products and the increasingly cut-throat competition, most surviving systems currently available in the UK tend to provide varying degrees of remarkably similar functionality. But like in the early days of personal computers, what you get and what you can use depends on how much you spend and how much time, effort and hassle you are willing to invest to get what you want out of the system. Like buying any personal computer, for many arts organisations the overriding factor in choosing a computerised box office system is cost. Size and turnover of a venue are also considerations when choices about the size and power of a system, or even, in some cases, deciding if a computerised box office is really necessary.

When looking at any box office option, it is worth remembering that many popular systems have substantial hidden costs for things like site licences and maintenance, so always be sure you are comparing *like with like* when shopping around. Some companies and consultants have a tendency to spread a good deal of misinformation about their competition, so be sure to check all facts for yourself rather than relying



Ticket sales

Look for:
- **ticket issuing and tickets printed as sold**
- **better quality tickets**
- **easy refunds, exchanges, resales**
- **quick, efficient sales**
- **easy agency/remote sales**
- **search for availability**
- **'Best Seats' auto-offer option**
- **variation of seating layout**
- **easy, quick search for reservations**
- **credit card transactions without vouchers**
- **simultaneous sales for the same performances**
- **discounts and concessions**
- **advance and group sales**

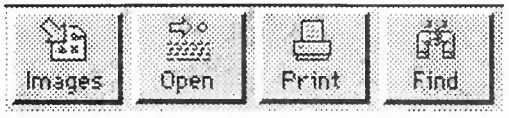
on second-hand gossip. Even reviews of products are often simply one person's view and may not represent an extended period of hands-on usage in a real-world environment. Also, hardware specifications and performance are improving almost daily so don't be persuaded into buying a system just because it will run on some of your existing antiquated kit.

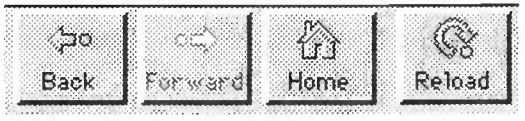
When it comes to equipping a box office, although it is more expensive, it is always advisable to buy the latest and best performing systems you can afford. No one wants to use a system with brilliant marketing functions if it seriously slows down the business of selling tickets, and no one is going to make the effort to analyse marketing data if the computer system is so slow that it takes several days to process.

With technology advancing and component/development costs continuously reducing in price, cheaper, friendlier and more powerful box office systems are becoming more of a possibility everyday. However, without going into sensitive corporate details, be aware that the entire face of the box office computer market has changed

Marketing

Look for:
- **name and address capture**
- **payment method capture**
- **events booked capture**
- **subscription scheme processing**
- **lead capture and account look-up**
- **database management**
- **duplicate record identification**
- **mailing list segmentation**
- **sponsorship data**
- **flexible reporting facilities**





Reports

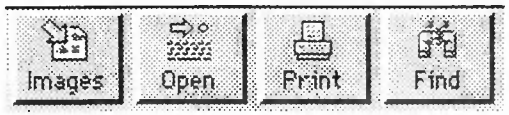
Look for:
- **direct mail and mail merge provision**
- **compute all associated charges**
- **daily sales reports**
- **ledger data and working trial balance**
- **frequency of attendance analysis (various permutations)**
- **attendance, income, programme flowcharts**

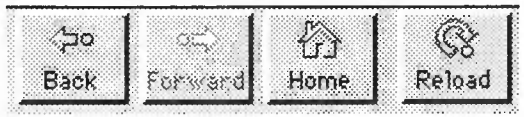
drastically over the past few years. At least three major players have merged, some have simply disappeared, while others have had severe and continuing internal financial difficulties and staff changes. It is worth remembering that no matter how good a product is or how much value for money it appears to offer, if the company ceases trading after two or three years and is unable to continue to support the product, you could find yourself in serious trouble. It is also important to point out that with all box office systems there will be some difficulties and teething problems, particularly during early installation and run-in stages.

One of the major disadvantages of the fall in what is euphemistically termed IBM-compatible hardware prices and the competition to produce faster and cheaper processors, is that the overall quality control has slipped quite noticeably. Cheaper hardware seems to mean a greater incidence of hardware failure, so be prepared for hard disk crashes, network problems and processor glitches when installing any box office system.

Integration with other systems

Look for:
- **links with other spreadsheets and databases**
- **links with standard accounting packages**
- **links with presentation DTP packages**
- **links with other PCs, networks, etc**
- **printer compatibility**
- **communications links**





On The Box

Security

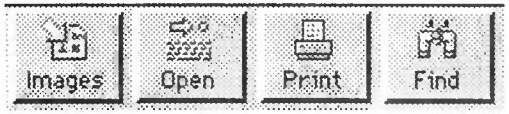
Look for:
- **back-up system for data**
- **back-up system for ticket sales**
- **password protection and definable user levels**
- **surge suppressor/ clean uninterrupted power supply**
- **virus protection**
- **general housekeeping utilities**

Most arts organisations eventually face the problem of how to integrate many types of incoming information. These can include numerical data, text, images, voice and so on. New technologies are emerging that are likely to make these types of information more readily accessible and integrated in the future. It is worth remembering that the real effectiveness of any box office system for marketing depends on the content and character of the database inside the system and the information collected within it. However, no matter how powerful or sophisticated an integrated box office marketing system might be, the primary requirement of its database should be that captured information can be exported from the box office system for use with other software applications for analysis, mapping or other reporting applications. Above all else, look for flexibility as the most vital element in any system in this ever-changing marketing arena.

In previous editions of *Computers For Arts Management*, I tried to provide an overview of all of the computerised box office and ticketing systems available. However, because of changes in technology, vendor R&D and potential client awareness and expectations, I have

Support

Look for:
- **24-hour hotline**
- **on-site call-out facilities**
- **modem link for remote analysis**
- **replacement system loan scheme**
- **extended warranty**
- **insurance**



only chosen to highlight what I now consider to be the eight major contenders for the performing arts market. This means that several systems used in the past by local authority venues primarily for rudimentary ticket sales have not been included. Although such a choice is inevitably subjective, it has been made on the basis of careful analysis of companies' performances over the past few years, combined with consultation with users of various systems concerning issues such as performance, ease-of-use, support and reliability.

System	Rating	Supplier
BOCS	●	The Ticketing Group: 0171-872-9977
PASS/PASS2	●●●●	Select Ticketing: 01727-834303
DataBox	●●●●●	DataCulture: 01908-232404
Encore	●●●●◗	TheatreSoft: 0181-742-8770
THEATAR	●●	Synchro Systems: 0178-274-1999
HEBOS	●●	Synchro Systems: 0178-274-1999
TicketMaster	●●●●	TicketMaster UK Ltd: 0171-344-4000

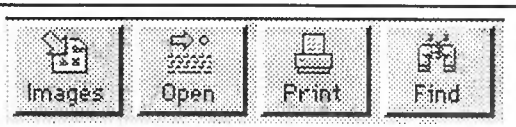
System rating
Each of these systems has a rating on a scale of one to five, five representing the best and one the worst. The ratings are awarded on the basis of a combination of factors, which include price, performance, ease-of-use, support and value for-money. These ratings are intended to be used purely as a preliminary guide and should not be taken as a definitive analysis of all systems in all situations.

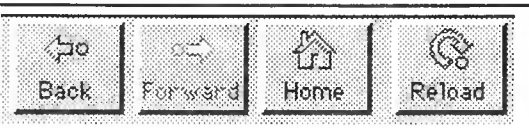
BOCS

BOCS, which stands for Box Office Computer System, was one of the pioneering systems developed by SpaceTime Systems between 1979 and 1981. Although it enjoys a wide level of acceptance worldwide, as an early entry in the box office arena BOCS is now looking somewhat technologically challenged. Even with various marketing and EIS-style (Executive Information Systems) bolt-ons, it does not compare very favourably with emerging PC-based systems like the PowerPC or Intel's Pentium P6. The company has gone through major staffing changes in the past few years and has tended to concentrate more of its energy and resources into its FirstCall ticketing agency network, although there are reports that the entire BOCS system is going to be completely rewritten and ported to a new platform.

PASS

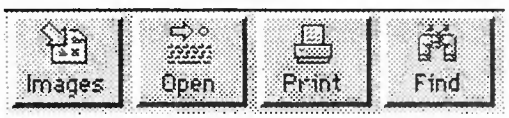
In many ways, it could be argued that PASS paved the way for the mass acceptance and enthusiasm for marketing-based, computerised box office systems in the UK. PASS was the first system to introduce a marketing-centric approach to box office computing and it did so at a time when marketing itself was becoming an increasingly important issue in the arts. As one might expect, other box office providers have





tried to emulate much of the marketing approach pioneered by PASS, although PASS will argue that few can offer the level of sophistication and functionality of its original. Because it was a PC-based system, PASS was designed from the beginning as a system that could be enhanced and expanded with changes in user requirements. Regular system and software upgrades were a major selling point and PASS users have always felt that their input and experiences could have an effect on system developments.

Select has, over the past few years, created a major upgrade of PASS called PASSv2 to help maintain its perceived leading edge in box office technology. PASSv2 is the result of a lengthy period of development incorporating ideas and enhancement requests from venues around the world. It has a similar look and feel to the original PASS, although it now incorporates softer colours on the menu screens and horizontal strips for menu selection, rather than the garish, coloured blocks of the original version.



New Features

Ticketing

- can create a different ticket format for each discount within every performance
- graphics can be printed on ticket by PASS
- ticket formats will support bar codes, images, lines, boxes, filled text, different fonts, etc
- flexible seating maps can be easily designed and screen maps have an 'exploding seat' function which makes it easier for operators to choose seats

Marketing and Reporting

PASSv2 offers two reporting methods. MARC is a full 4GL reporting language enabling the creation of complex reports. MWrite is a graphical application generator which users view as the new USHER. PASSv2 boasts commercial links with CCN who master MOSAIC geodemographics and users can map their audiences with interfaces between PASS and Tactician mapping software.

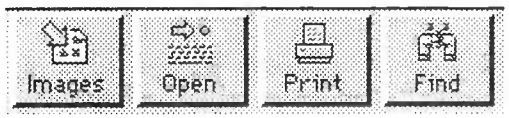
Technology

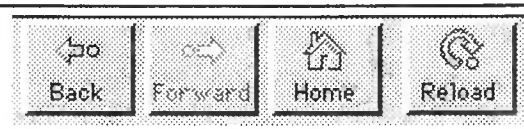
PASSv2 uses what passes for industry standard hardware offering basic entry level 486 systems on a PC-based network. Networking and database software can be upgraded to higher spec hardware and servers for larger venues tend to be IBM RS6000 RISC machines which mean that theoretically, PASS might eventually end up on PowerPCs.

Masterfile

The most significant advances in PASSv2 are found in the Masterfile which is the hub of the marketing module in PASS. New features include user-defined screens to over 24 memo pads, information screens and even customer-defined corners on each Masterfile screen, providing the ability to show operators important information about patrons. Virtually any field can be used as a search criteria and users can define different language screens. Telephone numbers and post codes are format corrected automatically and there is a link to the Royal Mail Quick Address program.

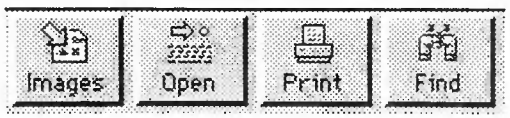
This new software has been available to existing users to try since September 1994 and PASSv2 maintains the modular approach of the original PASS with ticketing, marketing, reporting and fund development available in any combination on any terminal. Select has introduced a





system of floating licences, whereby a number of module licences are assigned to the server, allowing users to log in at different terminals without having to have each terminal licensed for each module.

PASSv2 also makes more use of programmable keyboards which can contain magnetic swipe readers for credit cards and bar code readers for tickets. On general admission screens, PASSv2 can assign a seat and print a ticket in under three seconds. PASSv2 handles subscriptions and 'rollovers', writes reminder letters, handles seating details, can look up performances on key words rather than full titles and can create and maintain 'hot' mailing lists. Select also offers a fundraiser module capable of managing an organisation's membership or donor base and actively involves itself in mapping and research projects with outside agencies and partners. Despite the missed opportunity on the overall interface, PASSv2 has probably taken computerised box office systems into a new era. However, others have learned the price/performance lesson and PASSv2 will have to face one or two extremely competent competitors.



DataBox

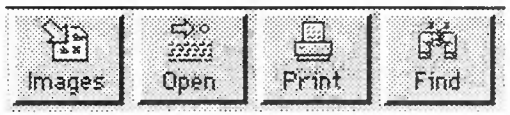
If PASS showed the arts that a computerised box office system could improve marketing as well as ticket selling, then DataBox went one step further by proving that a computerised box office system could improve marketing as well as ticket selling on an accessible system that cost under £6000. So, it is not surprising that over the past three years, DataBox has established itself as one of the most popular and frequently recommended systems available.

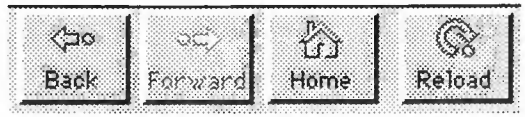
A careful examination of the more than 90 venues now using DataBox reveals just how flexible this software product is and how it has grown to rival and at an increasing number of venues, replace more established and often more expensive options. Interestingly enough, DataBox also continues to sell almost entirely by referral. While DataBox continues to be perhaps the best choice for small to medium-scale venues, it is also being widely accepted by large-scale venues drawn to its uniquely marketing-centric approach. DataBox has probably been subject to more development over the past few years than any of its competitors and offers simple, menu-driven options to generate marketing analysis reports that are unrivalled by most other systems.

DataCulture is endeavouring to continue this level of development and fine tuning and in the last year alone, DataBox has introduced:

- links to Royal Mail postcode files for rapid address entry and post code validation
- on-line credit card authorisation and polling
- sophisticated merchandising features
- direct links between Sage Accounts software and DataBox
- dial-up services for remote sales sites
- room hire module for managing lettings and bookable spaces

Arts organisations can also purchase DataBox Mail, a sophisticated direct mail application derived from the patron database elements of DataBox. This allows users to capture, categorise and prepare reports of information quickly and accurately, including the incorporation of detailed market research and socio-demographic data for under £100 on any normal office PC. Early in 1996, DataCulture is planning to release a new version of DataBox for Windows. This move from the earlier, DOS-based version of Paradox has involved a total rewrite of





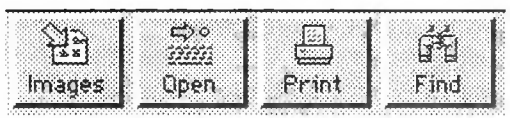
the software. This gave the development team an opportunity not only to bring all current features into the Windows environment, but also to expand on the possibilities offered by the current version. Windows users will find virtually no limitation on the size of auditorium being used, vastly more available price bands per auditorium, a host of new database features and instant links to other popular Windows packages. Moving to Windows is a particularly shrewd move. Although not the best GUI and potentially memory and storage hungry, Windows is now the dominant user-metaphor in the industry and any box office supplier who claims that GUIs are not important or necessary is being dangerously short sighted.

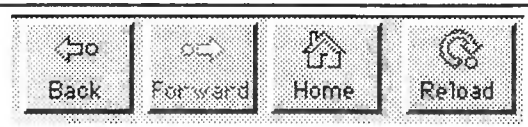
Encore

Encore, from Icon Software, is one of the newest computerised box office offerings and was developed, like DataBox, entirely in the UK. It is also a PC/Windows-based system and the software is written in an extremely versatile and flexible 4GL database allowing for easy modification and the ability to run on a variety of operating systems and hardware platforms. Encore is currently a major competitor for both PASS and BOCS in terms of power, price and features. In many ways,

Encore is reminiscent of the culture surrounding PASS when it first appeared in the UK and it and its sister package FilmStar have already established a track record of performance and reliability. FilmStar is installed in most mainstream cinemas in the UK and Ireland and is gaining market share in the US. Encore developed from FilmStar, using the same development language as that used in Sage accounting software and, although targeted at totally different markets, shares a number of common features.

Initially, the marketing and membership modules in Encore were underdeveloped, but these have been improved considerably and integrate SQL Windows-based marketing and statistic functionality. A membership module has been developed, initially for the BFI, and all marketing functions are compatible with all popular Windows-based software. All marketing searches can be performed with no interruption to box office sales and Encore also supports touch-screen and light-pen technology and runs on any PC capable of running Windows 3.5 efficiently. You can get a basic two-user Encore installation for less than £20,000 which, as mentioned earlier, makes it cheaper all around than



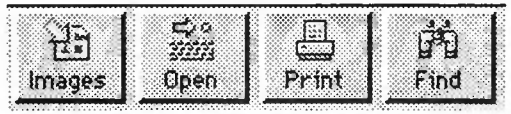


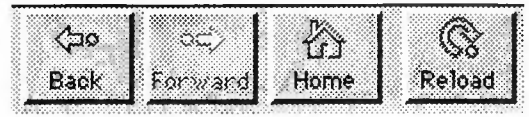
either PASS or BOCS. So while, for smaller venues with limited budgets, DataBox remains the best option, for middle to large-scale venues, including those already using PASS or BOCS, Encore could present a serious challenge.

Synchro Systems: THEATAR and *hebos*

Synchro has been in the ticketing market since 1980. While one of its earliest systems was influential in the eventual development of the original RITA system, most of Synchro's success traditionally has been with local authorities, sports arenas and football clubs, rather than with theatres and arts venues.

Given the merger mania of the 90s, it's not surprising that Synchro absorbed *hebos* and both were eventually acquired by TicketMaster. This suggests that TicketMaster is now poised to offer box office solutions for everything from the smallest venue right up to networked intra-city/country links. In practice, TicketMaster's established telesales service probably remains the strongest link, since this strategic alliance brings access to the 24-hour telephone room where any Synchro client can connect into the TicketMaster facility as and when necessary.



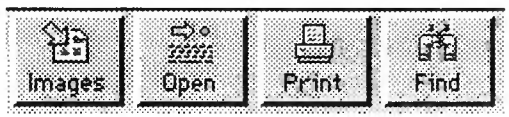


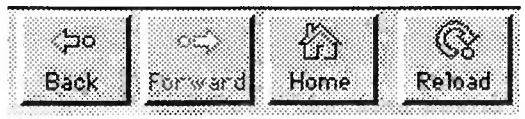
On The Box

The *hebos* ticketing and marketing system was launched in 1989 by a small, innovative software company called Information Education Ltd (IE) which developed the prototype for the Hackney Empire. By 1991, it was being pushed as an affordable PC-based system for smaller venues that traditionally could not afford computerisation. *hebos* is now marketed as a viable option for anything up to an 8000-seat venue and has options for fixed and variable seating. It runs on standard 486 or Pentium PCs on a Novell network and supports a variety of printer options.

Marketing facilities have improved greatly over the years and *hebos* now offers a range of reports, market analysis and graphical functionality, including mapping modules. As a standard PC application with a mouse-driven GUI, *hebos* also allows for easy exchange and export of data to other popular software applications.

THEATAR is Synchro's main contender for middle to large-scale venues and is very similar to its successful ARENAR events ticketing system used by many local authority and sports-oriented facilities. The whole system



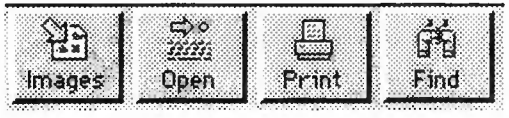


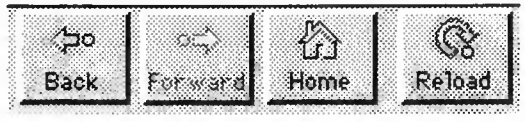
and interface have improved over the years, as have marketing facilities, and reports can be compiled with charts and graphs. THEATAR still runs on a Unix network with a central server, with dumb terminals rather than Windows-based PCs, although you can attach PCs instead of dumb terminals if you specify. Features under development include:

- auto-collect tickets from a hole-in-the-wall-style dispenser via credit card swipe
- the extension of market intelligence gathering and analysis capabilities

TicketMaster

Of the Synchro line, *hebos* is marginally cheaper than DataBox but probably doesn't offer as elegant or as flexible a solution. THEATAR still faces stiff competition in the arts world from DataBox, Encore and PASS and will probably find it increasingly difficult to gain market share outside the sports and local authority arena. TicketMaster is rather like an Internet equivalent in the computerised box office industry. As the world's largest computerised ticketing service with over 3500 clients in the UK alone, it is the leading ticket retailer processing over 10 million

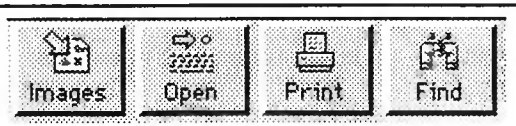


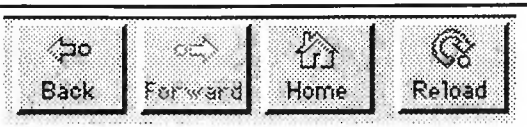


tickets a year, including tickets for the fully on-line, computerised box offices in London's West End.

TicketMaster operates the largest computerised telephone sales bureau allowing customers to book tickets 24 hours a day, seven days a week using credit cards. With its own TM90+ software running on Microvax computers, TicketMaster endeavours to provide clients with a powerful, centralised tool for controlling ticket inventory. Small and large venues can perform a range of functions including single advance sales, season and subscription ticketing, group sales and purchases on the day.

Essentially, what TicketMaster offers venues is the ability to put their entire ticketing and booking operation out-of-house, in much the same way as many companies are now exploring 'data warehousing', while still giving customers the impression that they are dealing with a local box office via a local phone number. TicketMaster can also provide a unique, on-line credit card authorisation facility which can save on card commissions and staff time and reduce losses through fraud.

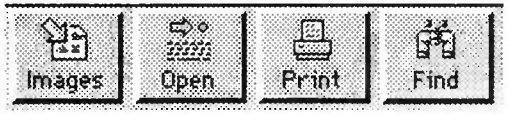


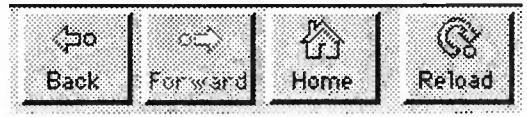


The whole ethos behind the TicketMaster approach is different from any other computerised box office supplier in that it encourages centralisation of resources and offers the facilities to deliver them. TicketMaster is now part-owned by Paul Allen, one of the founders of Microsoft and the company is exploring new ways to sell tickets and market events via digital media, such as the Internet, as well as looking at the possibilities offered through multimedia kiosks and set-top boxes. While just a few years ago the thought of using a centralised ticketing service would have been anathema to all but the West End, many venues have learned that owning a computerised box office system also means owning the problems of maintenance, consumables, staff training and the inevitable obsolescence that comes free with every new computer system. As the very methods and approaches to ticket selling and marketing continue to evolve, perhaps a well maintained digital network approach will have an increasing appeal.

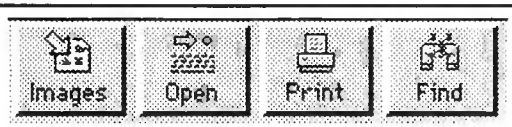
Conclusion

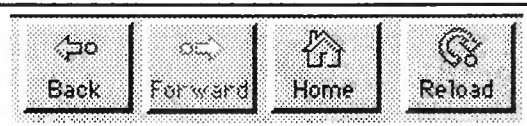
Of the current crop of computerised box office systems, DataBox and Encore remain the best value systems available. PASSv2 is probably as good as Encore, but will be more expensive and probably include a lot

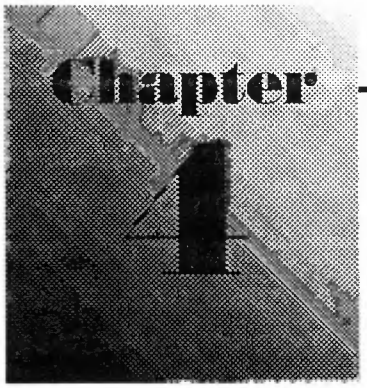




more hidden costs. For BOCS, a complete rewrite and platform-port is considerably overdue and until it happens, it is difficult see the company securing a meaningful market share. Synchro will continue to do reasonably well with *hebos,* although again, for not that much more, even venues with tight budgets could probably manage DataBox. THEATAR is not functional or sexy enough for most arts venues, but TicketMaster may be on to a winner if it can package its network approach in a trendier wired wrapper.







Software Integration

As mentioned in the chapter on personal computers in the arts, most arts organisations tend to use computers for text processing, spreadsheets, databases, graphics/design and computerised box offices. In recent years, there has also been a growing interest in the potential of GIS or mapping software, statistical analysis applications and dedicated market research solutions.

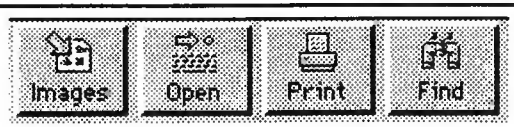
Choosing any of these applications is no different for the arts than it is for any other business. You need software that is powerful enough to do what you require, requires minimal maintenance and is easy enough to use with very little training. It also needs to run on whatever hardware platform you happen to have or are thinking of buying. Again, I cannot over-emphasise the necessity of seeing software demonstrated on the particular PC configuration you are thinking of buying.

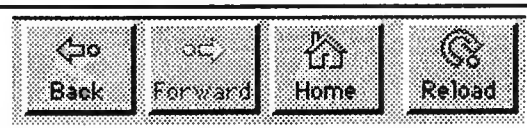
I was asked to do a day's consultancy for an arts organisation that had recently purchased a whole new computer system, including a number of PCs and an expensive Novell network. They had an old DOS-based

database that needed updating and converting to a Windows package and they were also interested in doing mapping and various other market research applications. The salesperson assured them that the PCs they were buying would do everything they wanted. Unfortunately, the PCs were already out of date, were under-powered, had insufficient memory and wouldn't, by the wildest stretch of the imagination, ever be capable of running the particular mapping software that they wanted to use. They had no more money to buy the right sort of equipment and paying me to come up to advise them after they'd already made their purchasing decision was another example of shutting the proverbial stable door after the horse had bolted.

Despite the FUD (Fear, Uncertainty & Doubt) still being spread by dealers and certain software vendors, there's nothing magical or mystical about personal computers and general business software. Just think before you part with your money.

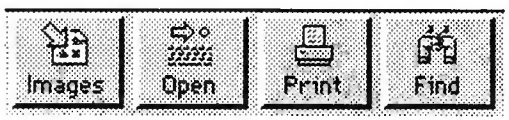
In each of the more general software categories mentioned, there are usually two or three applications that can be recommended without

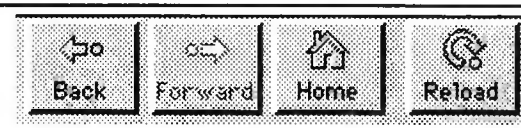




reservation, that have an established user-base and offer enough power and functionality for practically any business or arts organisation. When choosing any software application, beware of the tendency to be overawed by extraneous bells and whistles. As each new version of software is released, it tries to incorporate the features of its competitors and can lead to the inclusion of many new frills designed as much to differentiate a product as to provide useful capabilities.

A vast majority of software today is heavily over-specified for most general users and there's little point in paying a premium for an application with hundreds of features and functions when you know you'll only ever need or use around a dozen. Such feature-rich programs also require a lot of memory to run properly and can take up as much as 20Mbs of hard disk storage. If you've got RAM and hard disk space to burn, then you can afford to be greedy over features, but if you're running a fairly modest system with average RAM and storage, it pays to be rather more prudent.





Text processing here refers to word processing, outlining and desktop publishing (DTP) and the ability to produce well presented documentation, form letters, questionnaires, reports, personalised letters and publicity materials, etc, is one of the most essential elements of any arts computer system. Word processing is the basis for all of these and is probably the most common task you'll perform with a personal computer. Word processing or, perhaps more correctly, text processing includes the creation of letters, contracts, memos, forms, charts, lists, presentations, and practically everything that was previously produced on typewriters, plus a good deal of work that used to be done by typesetters and printers as well.

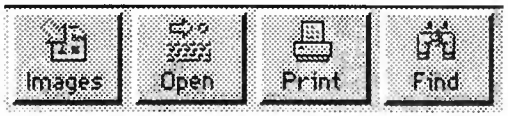
The text processing market is becoming increasingly crowded with a number of software developers aiming their products at more closely defined groups of users. For example, if you frequently send out large, personalised mailings, you will probably need a different range of facilities from, say, a journalist or scriptwriter. If, however, you only want to produce the occasional letter or memo, you probably need a simpler and more easily remembered package than a frequent

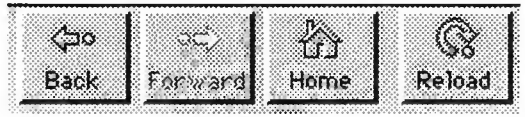
Buying tips

- **All three applications mentioned do more or less the same thing and there's little basis for choosing one over the other apart from personal preference.**
- **System requirements are almost always understated by dealers and suppliers. You should normally double the minimum requirements quoted to ensure that the software runs properly.**
- **Don't be overawed by long lists of impressive features. If you don't need them or never use them, their added value is zilch.**

business user doing more complicated tasks. Ideally, a word processor should allow you to switch on your PC and turn out a reasonable document in 15 minutes at the most, even if you have never used the package before. It should also enable you to produce complex work using most of the major features on an occasional basis, without taking a year-long training course. Most users prefer the *WYSIWYG (What You See Is What You Get)* approach, and nowadays, with the swing towards GUIs, most of the best packages offer this approach.

Current word processors add countless improvements to basic text-editing features and almost all include a thesaurus and spell-check; many include rudimentary page layout functionality and control over fonts, style and basic graphics. Word processors designed for Windows or Macintosh computers are capable of displaying words and pictures on screen almost exactly the way they will appear in print. The best allow you to see all of your formatting on screen and will also give you considerable typographic and layout capabilities, often rivalling the features found in desktop publishing applications. Page layout and design features, plus the ability to save and interchange files in a variety





Remember

- **use basic word processors for basic documents.**
- **do more sophisticated page layout on a more complex word processor or DTP package.**
- **mail merge requires links to a database.**
- **integrated software can make tasks easier.**

of formats, is extremely important for arts organisations; word processors should also include good capabilities for mail merge.

Although a few organisations still have creaking versions of WordStar, most have now standardised on either WordPerfect, Microsoft Word or AmiPro as their favoured word processor. The two industry standards, Word and WordPerfect, are available for both Windows and Macintosh computers. Upgrading to a newer word processor is not difficult to do now, since nearly all new full featured packages include filters, which allow them to read other word processing document formats. This means that if you decided to upgrade from, say, WordStar to WordPerfect, you could still open and use all of your old documents in your new application.

Software	Price	Contact Details
WordPerfect	£300	Novell: 01344-724000
Word 6	£300	Microsoft: 01734-270000
AmiPro	£99	Lotus: 01784-455445

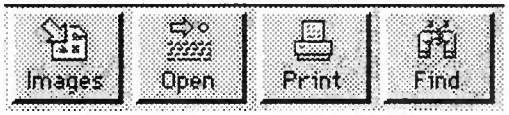
Pricing

Prices can vary wildly according to where and when you buy. Check adverts for both retail and direct outlets and remember, word processors, like most software, are frequently offered at promotional prices or on special offer. Prices quoted here are average recommended prices for Windows versions of each application.

Spreadsheets

While today's spreadsheets are powerful, multi-purpose tools for information, analysis and presentation, they all still work more or less the same. The fundamental purpose of a spreadsheet is to let you perform complex or cumbersome calculations repeatedly and accurately. All you need to do is to create a *master* or *template* within the spreadsheet grid that performs the tasks required and then simply enter new data whenever you need to. It's not much more complicated than dividing a piece of paper into a grid of rows and columns forming boxes or cells.

From a financial or marketing point of view, using a spreadsheet is a bit like being able to train a pocket calculator, pencil and a rubber to perform specified tasks. You start by writing out all the necessary calculations on a piece of paper, along with working figures. Then all you do is set the calculator, pencil and rubber to work and they run around by themselves and alter your writing to produce the answers required. Apart from being able to enter values, numbers and text, spreadsheets allow you to insert formulas that automatically work out new values from elsewhere on the sheet or relate totals and text



together in some useful way. Whenever you change a value, the spreadsheet automatically recalculates the entire sheet so that all values are updated. No matter how complex the relationships between different entries on the spreadsheet may be, the program will automatically and instantly show you how every value is affected. The real magic of spreadsheets is in their ability to recalculate quickly. Because they make it so easy, you feel you can freely experiment with figures and see how a change here or there affects the bottom line. This is particularly useful in arts marketing for charting trends and sales patterns and performing the famous *what if?* calculations, allowing the spreadsheet to act as a miniature model or crystal ball, reflecting what could happen.

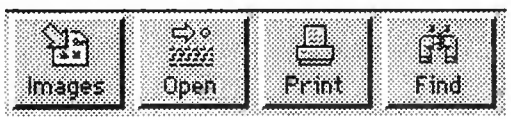
A typical example of a spreadsheet is a cashflow analysis, where income is entered in one section and expenditure in another. The spreadsheet does the calculations and the carrying forward of totals from one month to another and is able to work out the profit and loss for each month. Many arts organisations can also use spreadsheets in less money-minded ways and their huge grids are ideal for analysing market

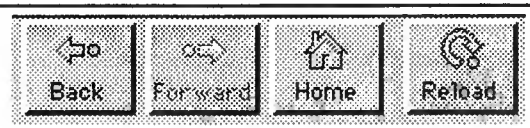
Remember

- **for serious financial applications, dedicated accounts packages are generally safer.**
- **spreadsheets with graphing, etc are more versatile.**
- **it's a good idea to run both paper and electronic systems for a while until you're sure everything works.**
- **check, periodically, the changes with legal authorities such as VAT, and update systems.**

research, particularly for storing, tabulating and processing results. Some of the newer spreadsheets, with extended graphical and charting capabilities, may even be suitable for constructing very basic box office systems. However, as they say on TV, for most arts organisations, don't try this at home. Although, like word processors, they can be used to manage small lists, this is not a function that is particularly effective or recommended. Today most spreadsheets can automatically produce graphs and charts, sort rows and columns alphabetically or numerically, produce fairly impressive tables, display charts and tables in the form of a rolling presentation and pass information to other programs running on your system. Packages such as Excel also easily integrate with popular word processors such as Word and WordPerfect.

Software	Price	Contact Details
Excel 5.0	£260	Microsoft: 01734-270000
Quattro Pro 6	£155	Novell: 01344-724000
Lotus 1-2-3	£365	Lotus: 01784-455445





Databases

Database managers come in all shapes and sizes ranging from personal organisers and mailing list managers to the powerful programmable and relational monsters for generating stand-alone applications. Some packages handle data more or less like a card index system, while others take a middle path between spreadsheet and data management, using tables throughout for data and instructions.

Databases on personal computers also vary substantially in the amount of control they give over the way they look and can be used. Simple systems can usually be controlled through menus for specifying choices and some allow responses or frequently used commands to be stored as *macros* to be recalled for future use. The most sophisticated databases available often provide more power than many dedicated programming languages, and more than the average arts user needs. And, while programmers and power users swear by database programming languages, most users simply end up swearing at them.

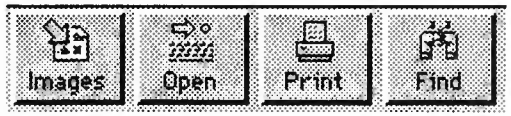
Many arts organisations still mistakenly think that they need a relational database when, in most cases, they could just as easily get by with one

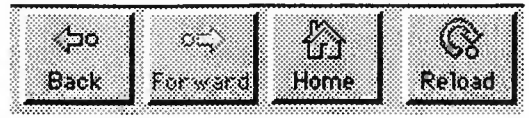
of the current sophisticated flat-file systems with clever look-ups. Essentially, a database is an organised and coherent collection of information, but since there is no point in having a collection of data simply for its own sake, it really has to be rather more than this. Since it must be possible to make some use of this information, the contents of a database must be organised so that we can access them in all the ways that we may need to. Operations that are typical of those that we may need to perform on a collection of data might include selecting particular items from it, searching it for any item or items that meet a specified condition, updating or appending items, or perhaps sorting items into a special order or report format.

PC-based database systems normally provide basic facilities for displaying information both on screen and in printed reports. However, some databases are weak on reporting and it may be necessary to pass information into another program to get the desired results.
A good database package must be able to handle large amounts of information in a flexible manner and be simple to modify. It must also allow the user to transfer data easily from one application to another.

Remember

- **a database represents reality and the names, categories, interests, etc recorded refer to things in the real world.**
- **such items in the database express facts about the real world and can be collected into relations.**
- **rules in the database software define what things and relations are permitted and should represent rules which apply in reality.**
- **the total collection of rules provides a logical structure for the stored information.**
- **a query retrieves selected information from the database according to a view of the logical structure.**





This facility may be particularly important to arts organisations, where information may need to be made available in several formats for analysis and also utilised in desktop publishing to provide printed matter.

For the arts, a database should be capable of being configured to perform all of the stipulated searches and sorts on any number of informational categories. The main thing to remember is that you need to know what you need to know and *if it ain't there, you can't use it.* Although personal computers and databases can expand your marketing and management horizons and give you the ability to do things you never dreamed possible, they also force you to rethink your entire marketing or information strategy and to be much more precise about what you really want.

Essential capabilities to look for in a database

- **data distribution functions.**
- **multiple operating systems.**
- **multiple hardware support.**
- **performance of batch and on-line processes.**
- **easy reporting tools.**

The three best database packages for the arts are FileMaker Pro, Borland Paradox and Lotus Approach. FileMaker Pro is available for Windows and Macintosh computers while Approach and Paradox are only available for Windows PCs. For the arts, FileMaker Pro is probably the best all around choice and can be used for everything from mailing

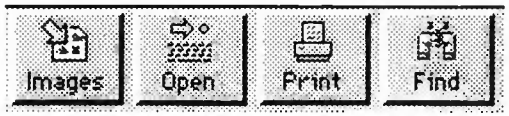
Remember

- **flat-file databases hold information like a card file**
- **relational databases allow more complex systems, but need programming**
- **always look carefully at sorting, searching and retrieval functions**
- **to avoid out-growing your original database, consider future requirements before choosing**
- **consider a PIM for simple address book or organiser functions**
- **most database applications and development require some degree of consultancy or developer input**

lists to full-scale business applications. Although the current version is technically only a flat-file database, it can look up data from one file to another and handle multiple line items with repeating fields. With FileMaker Pro, as soon as you create a database, you've got both input and output screens and entries are automatically saved and indexed. It also has a comprehensive scripting language and is ideal for creating push-button applications.

Approach is a similar package without, perhaps, the elegance of FileMaker, and Paradox, which is also the basis of DataBox, offers full relational capabilities plus object-oriented programming. Paradox has powerful query tools and excellent programmability, but for most arts organisations, it's overkill. Approach is relational, but as easy to use as any flat-file system and has an interface that takes most of the complexity out of linking files. A fully relational version of FileMaker Pro has recently been released.

For those who think Microsoft is the best option for everything, Access 2.0 for Windows is another option. Although it's a fairly late arrival to the



database table, it can be used by competent Windows users and includes comprehensive form and report design features and reasonable connectivity options.

Software	Price	Contact Details
FileMaker Pro 2.1	£260	Claris: 0181-756-0101
Paradox 5.0	£155	Borland: 01734-321150
Approach 3.0	£365	Lotus: 01784-455445

Note
Prices and versions quoted here are for Windows PCs. FileMaker Pro for the Macintosh costs around £99.

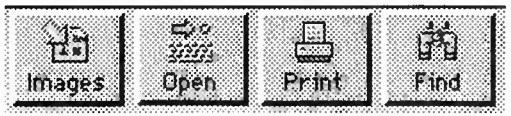
Integrated Software

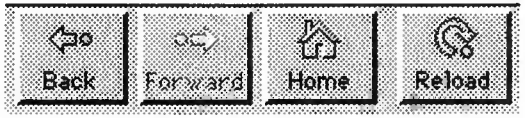
Integrated software is essentially one package that groups together a number of separate programs with a similar look and feel and can interact together in a more or less seamless manner. These packages usually combine a word processor, database, spreadsheet and often a draw/paint application and perhaps communications software into the bundle. Early integrated packages were usually cut-down versions of existing software with little real integration or power. Today, however, for the majority of arts and small business users, integrated *works-style* packages are usually all anyone really needs. Applications such as ClarisWorks, WordPerfect Works, Microsoft Works or IBM Works for

Software Integration

Windows & OS/2WARP are powerful, well integrated and can represent a particularly sensible choice for general office computerisation. ClarisWorks and Microsoft Works are available for both Windows and Macintosh computers and WordPerfect Works will have a Mac version soon. Of the lot, ClarisWorks still offers the best integration and version 3.0 adds macros, automation features and tools that rival many individual stand-alone applications.

Most of these applications provide tools similar to page layout systems and all include the ability to handle graphics, charts and illustrations. Eventually, this modular approach will develop further with things like OpenDoc and OLE, which allow you to work in a single document but include elements, tools and functionality from a whole range of other software such as DTP programs, graphics packages or spreadsheets. In this way, rather than having to pay for an array of features and functions in each package that you don't want or don't need, you can assemble what you need as and when you need it in what looks like the equivalent of a word processing page.





Software Integration

Note
Prices and versions quoted here are for Windows PCs. ClarisWorks 3 and Microsoft Works for the Macintosh costs can vary between £99 & £120.

Software	Price	Contact Details
ClarisWorks 3	£129	Microsoft: 01734-270000
WordPerfect Works	£100	Novell: 01344-724000
Microsoft Works	£99	Microsoft: 01734-270000

Conclusion

For general, everyday computing needs, most arts organisations would be able to function quite nicely with one of the aforementioned integrated applications. Despite their easy-to-use works approach, all have many advanced features and the integration is extremely intuitive. They also have graphics elements which are adequate for simple design and lay-out tasks without the expense or the time involved in mastering professional draw, paint or image manipulation software. Look at these first before deciding on a more expensive dedicated application.

Tips
- **always re-examine tasks and software in light of cost**
- **consider a phased introduction to spread cost**
- **look at integrated packages with a view to upgrading modules later.**
- **take advantage of office suite and bundle discounts**

Software Integration

Word processors at a glance

Application	Price	MaxDocSize	Spell Check	MailMerge	StyleSheets	Columns	Graphics	Memory	Supplier
WordPerfect Windows	£300	RAMsize	•	•	•	•	•	6Mb	Novell: 01344-724000
Word for Windows	£300	•	•	•	•	•	•	8Mb	Microsoft: 01734-270000
AmiPro for Windows	£99	no limit	•	•	•	•	•	4Mb	Lotus: 01784-455445
Word 6 (Mac)	£159	•	•	•	•	•	•	8Mb	Microsoft: 01734-270000
Q&A Write Windows	£59	no limit	•	•	•	•		2Mb	Symantec: 01628-592222
WordStar for Windows	£43	as disk	•	•	•	•	•	384K	Softkey: 0181-789-2000
MacWritePro	£175	no limit	•	•	•	•	•	1Mb	Frontline: 01256-463334

Recommended DTP packages

- **Aldus PageMaker**
- **Quark XPress**

Both are available for IBM-compatibles running Windows, or the Apple Macintosh

Software Integration

Spreadsheets at a glance

Product	Price	Worksheet Size	Graphics	Database	Open Windows	Macros	Functions	3D Worksheets	Memory	Contact
Excel Windows	£260	16,384x256	•	•	no limit	•	310	•	4Mb	Microsoft: 01734-270000
Lotus 1-2-3 *	£365	8192x256	•	•	no limit	•	107	•	3Mb	Lotus: 011784-455445
QuattroProWin	£155		•	•		•		•	8Mb	Novell: 01344-724000
AsEasyAs	£45	8192x256	•	•	6	•	86		384K	Atlantic Coast: 01297-552222

Potential uses

- record of sales and income
- financial control
- tracking expenditure
- forecasting
- 'What if' Calculations
- market research
- project planning
- payroll
- budgeting

Prices

From £150

Best buy

Although not the cheapest spreadsheet available, Microsoft's Excel is currently acknowledged as the best all around package in this field. Lotus 1-2-3 is a close second and more creative features are being added all the time.

Software Integration

Databases at a glance

		Relational	Max Records	Fields/Record	FreeText Fields	Screen Design	Report Design	Programming	Memory	GUI	Contact
Approach	£99	•	*no limit*	*255*	•	•	•		*4Mb*	•	Lotus: 01784-455445
CardBoxWindows	£239	•	*16mil*	*4000*	•	•	•		*3Mb*	•	BusinessSim: 0171-925-0636
DataEaseWindow	£239	•	*2 billion*	*255*	•	•	•	•	*4Mb*	•	DataEaseUK: 0181-554-0582
DataFlexWindows	£695	•	*no limit*	*255*		•	•	•	*2.5Mb*	•	DataAccess: 01923-242222
dBase for Window	£349	•	*1 billion*	*1024*	•	•	•	•	*6Mb*	•	Borland: 0734-321150
FoxPro Windows	£330	•	*1 billion*	*255*	•	•	•	•	*4Mb*	•	Microsoft: 01734-270000
Oracle Windows	£499	•	*no limit*	*254*	•	•	•	•	*12Mb*	•	Oracle: 0344-860066
Paradox Windows	£234	•	*2 billion*	*255*	•	•	•	•	*8Mb*	•	Borland: 01734-321150
SuperBase95	£149	•	*1 billion*	*RAM dep*	•	•	•	•	*4Mb*	•	Superbase: 01235-832494
Q&A Windows	£189			*999*	•	•	•		*4Mb*	•	Symantec: 01628-592222
FileMaker Pro	£260	•	*disk size*	*32000*	•	•	•	•	*1Mb*	•	Clarls: 0181-756-0101
4th Dimension	£795	•	*no limit*	*511*	•	•	•	•	*4Mb*	•	ACI: 01625-536178
Oracle 6Mac	£699	•	*no limit*	*no limit*	•	•	•	•	*3Mb*	•	Oracle: 01344-060066

Potential uses

- mailing lists
- subscribers
- party bookers
- record special interests,
- corporate/sponsorship data
- press & media lists
- management of bulk distribution & publicity
- market research
- form & questionnaire
- generation/analysis
- box office management & ticket selling
- financial systems
- personal & management
- information systems

Prices

£99 to £700 per package

Best buy

Databases need to be assessed on an individual basis. It is not possible to identify a single best buy which would be suitable for every eventuality. A consultant or developer is usually recommended.

Research & Mapping

In broad terms, research and mapping refer to various non-ticket selling tasks employed for data capture, analysis, and various other types of marketing campaign strategies and implementations. PCs essentially provide help for both agencies and their clients in research in two ways:

- data capture, storage and distribution becomes faster, cheaper and more extensive
- analysis and interpretation become easier, faster, more flexible and require fewer technical skills

Not long ago, heavy duty, multivariate analysis could only be performed on mainframe or mini computers. Now it can be done on a reasonably standard PC using inexpensive, off-the-shelf software. Simple questionnaires and data manipulation can be done with packages such as *SNAP* or *Answers*, which can also be used in conjunction with spreadsheets, databases and other personal productivity tools. Open-ended questions can be grouped, analysed and printed out in the same way as other numerical information, and packages such as *SPSS*,

StatView and *SysStat* are available for more demanding statistical work. Dedicated marketing software has usually been developed primarily for the commercial sector and will, in most cases, require some modification for effective use in the arts. It can include any number of the commercially available, statistical, modelling, or geographical information systems packages, which are too numerous to examine individually or in great detail. This section does, however, attempt to provide a representative sample of the sort of application that is currently available.

Dedicated marketing tasks which can be carried out effectively by personal computers include:

- **market research**
- **questionnaire generation**
- **self-completion survey analysis**
- **sales and contact tracking**
- **mailing lists**
- **demographic targeting**
- **telephone marketing and analysis**
- **statistical analysis**
- **trends and forecasting**
- **mapping**
- **segmentation**
- **targeting leads**

Many manufacturers have begun to hype Marketing, Sales and Service (MSS) systems to the accompaniment of trendy management gurus preaching the cult of the customer. Products which help organisations gather, track and analyse sales and marketing data are being promoted just as industry and the arts are waking up to the value of information, and particularly customer information.

Unfortunately, one of the most difficult and controversial consequences of the digital age for arts organisations indoctrinated by what one might

loosely term the 'traditional' school of marketing, is the inevitable need to acknowledge and accept that everything you've been told could possibly be wrong. As Don Peppers and Martha Rogers point out in their book, *The One To One Future*, part of the problem with traditional mass marketing is that it thinks of customers and marketers as adversaries. The jargon of mass marketing itself is the language of war and the arts have, over the past decade, progressively embraced an approach which is rapidly falling out of favour in the outside commercial world.

Suggested statistical and survey analysis applications include:

- **SPSS**
- **SNAP**
- **66**

Arts marketers still *aim* at *target* markets and measure media effectiveness *against* the target which they *segment*. And, if they're not fighting with customers, they're fighting over them for market-share. Like it or not, while potential arts consumers are exposed to your marketing messages, all too often this exposure is actually completely independent of their own experience of whatever it is you're selling. Moreover, all the individual experiences that one customer has with your products or productions will actually appear to be independent and separate from one another, since despite computerisation, you are still never really in touch with your customers directly.

The terminology of statistical techniques can be excessively polysyllabic. Some of the more popular terms include:

• factor analysis, which attempts to find common characteristics of variables and summarise a mass of variables into a few key factors.

• cluster analysis, which is mainly concerned with the similarity of objects and their resemblance across a range of variables (also one of the main techniques used in developing well known geodemographic systems such as ACORN, MOSAIC and PINPOINT).

• discriminant analysis, an algebraic method of weighting data.

• regression analysis, which tackles the problem of predicting behaviour based on people's characteristic profiles.

The arts have learned through geodemographic analysis to identify particular postcodes, and even neighbourhoods where the members of their target markets are more likely to live and the events they are most likely to attend. Computers have given us the impression that statistically projected, psychographic and demographic data can identify the different types of people likely to visit venues or attend productions. The arts may need to view consumers not as on-off switches, but rather as volume controls.

Many of the techniques and assumptions about market research are changing dramatically and, in particular, there has been a shift from *strategic* research to *tactical* research. Strategic generalisations are becoming less and less important while detailed, action-oriented data are becoming more and more vital. Experts now suggest that as targeted marketing moves ever closer to the ultimate *market of one person,* so the 'facts' produced by older research methodology will be replaced by new 'models'. Remember that statistical models of individual customer lifetime values are only as good as the data and the analysis that go into them.

But even with perfect data, they can never provide perfect predictions. Instead of exact figures, what you need is a means of comparing the advantages of one marketing programme or strategy with another and figures that can provide usable information.

The main purpose of market research software packages is to turn research data into clear, comprehensible information that will inform decision making. They offer the possibility of consolidating all steps in the market research process by providing a single solution for the acquisition and definition of data, the process of analysis and the preparation of final reports and materials for presentation. Many of the available programmes can be used for questionnaire design, data entry and editing and frequency counts, as well as for tables and the conversion of tables to a suitable format for export into many well established spreadsheet, graphics and statistical packages. Some provide an *open system* which allows created files to be inspected and modified with a word processor and generated by or exported to other programs. At the end of the day, you have to decide what information is worth gathering and analysing, what real value it has, and what you

The main elements of an effective GIS package include:

- **facilities to create, store and manipulate maps, diagrams and drawings.**
- **the ability to link objects on maps, diagrams and drawings to database records, eg by postcode.**
- **built-in report writing facilities, which operate in either detailed or summary mode.**

Suggested GIS packages

(Windows PC)
Tactician
AutoRoute Plus
MapBase
(Macintosh)
MapGrafix
(Windows & Mac versions)
MapInfo

will do with it once you've got it. In the arts, with its particular fascination for demographic marketing, the joke about lies, damn lies and statistics is no laughing matter. Given the hype and the amount of detail apparently available on individuals, households, even differentiating customers by the kinds of neighbourhoods they live in, it's easy to believe that we have an actual picture of individual consumers. Unfortunately, much of this information is flawed and easily suspect for a number of reasons.

To begin with, almost all of it comes from statistical inference rather than from actual, household-by-household knowledge. Even a statistic as simple as median income can be deceptive and misleading. Contrary to popular belief, it is impossible to collect unbiased data from individual research subjects in the immense volumes necessary to support accurate results. Data also tends to stem from a basic flaw in the methodology itself. No matter how unbiased a sampling procedure can be made and no matter how sophisticated the statistical analysis, all sampling and projection research is based on predicting actual customer behaviour from attitudes and stated intentions. And, as we

Remember

Unplanned or ill-conceived deployment of marketing information assets or research wastes time and money and that effective information management is a skilled task. Large databases or mailing lists are only productive if they are manageable and cost effective. As the old saying goes, size isn't everything and an extremely important task in database management is deciding what information to retain and what information can be dumped. And don't forget that computer technology in the wrong hands can also make you very adept at transmitting the wrong messages.

know, what people say they do and what they actually do are often two entirely different things, despite elaborate statistical inference models with sophisticated analytical tools that try to link the two. For example, 20 years ago, market research proved categorically that Tricia Nixon Cox, the former US president's daughter, and Grace Slick, lead singer for the Jefferson Airplane, were essentially the same person. Statistically, both were urban, working women, college graduates, aged between 25 and 35, at similar income levels, from a household of three including one child, etc. So, no matter how good your computer-assisted statistics might be, the only reliable predictor of actual future behaviour is actual past behaviour.

Geographic Information Systems

Geographic Information Systems (GIS) or *mapping* packages, are increasingly becoming flavour of the month in the arts and appear to be changing the way marketing professionals are able to manage spatial information. Mapping systems can be adapted to suit a wide variety of applications and 'intelligent' mapping provides a dynamic and efficient method of capturing, managing and analysing geographical data typically used by arts venues, local authorities,

development agencies and health authorities. In the commercial world, GIS systems are now being integrated into the work of market researchers, distribution managers and corporate planning departments. GIS systems, which combine digital mapping with multi-layered database information, provide a powerful and effective means of dealing with complex data. Historically, however, GIS systems have traditionally been limited to mainframes or high-powered workstations, which tend to be both expensive and cumbersome. But with the emergence of powerful, easy-to-use, PC-based packages, the use of GIS systems is becoming nearly as accessible as the use of word processors or databases.

Unlike many graphics packages that provide basic decorative maps, personal computer-based packages such as *MapGrafix, Tactician, AutoRoute Plus,* and *MapInfo* offer a comprehensive and flexible GIS application with all the necessary tools for creating, editing, displaying and outputting fully functional maps integrating visuals with database management systems. This means that descriptive data can be related to specific geographic locations and the intelligence can be derived

from a simple flat file such as a spreadsheet or from a more sophisticated relational database management system. PC-based GIS systems aim to be easy to use and are relatively low in cost compared to similar systems running on mainframes or workstations. And with more powerful processors such as Pentium and Power PC emerging all the time, functionality is no longer restricted.

GIS systems are being used by marketing and research units to perform socio-economic assessments, or to analyse census, political or market demographics. They can also be used to overlay postcode information about specified areas of the country on to a map and plot all the points within a certain driving distance to a venue. All postcode regions which fall within this area can then be overlaid, giving an instant picture of likely sales or marketing territory.

GIS systems offer enormous opportunities in marketing, particularly in the arts, where the crucial task is to target markets effectively. GIS systems used in conjunction with other databases and marketing systems can provide users with the ability to target accurately specific sectors of

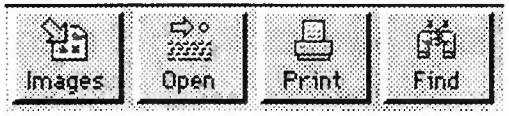
MapInfo is aimed at users who need to perform geographic data analysis. The latest version includes better data visualisation characteristics, expanded data analysis capabilities and an improved interface. For instance, raster image files, such as satellite images and aerial photographs, can now be incorporated into MapInfo files. MapInfo's methods for representing data with multiple variables has also improved. Developers can perform remote database query and update operations, and link multiple MapInfo modules. MapInfo's SQL DataLink module lets users connect to and access data on Oracle or Sybase databases and use that information in MapInfo applications.

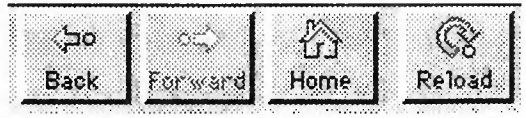
the population on the basis of their age, employment status, average earnings, artistic preferences, and so on and then to illustrate the results graphically on a computer as a basis for qualitative and quantitative analysis.

CACI provide a range of services, products and systems linking geographic information on people, markets and locations, integrated with sophisticated mapping capabilities for creating thematic maps. Data which can be mapped include:

- demographic, sales or marketing data
- customer or competitor locations
- boundaries such as TV regions, postal districts and sales territories
- features such as town names, roads, rivers, coastlines, etc

Information for mapping can come from CACI's own database, from files that you provide or from data captured at source. The InSite maps provided are based on MapInfo2 for Windows and combine CACI's ACORN targeting classifications with up-to-date demographics and





consumer market information. MapInfo, which is also available for Macintosh computers, is currently the best choice for mapping activities for arts organisations. A variety of bolt-on information modules are also available.

Although these packages can be extremely useful, the most important aspect of any geo-demographic analysis is to capture accurate information and addresses about those showing a genuine interest in the first place, at the least possible cost. Without the ability to analyse, your prospect or customer base is prejudiced before you start. The PAD address file for a particular area can be purchased cheaply and have value added to it in terms of ACORN codes, drive-time, etc through agencies such as QuickAddress. In many cases, this could be significantly more valuable than purchasing your own GIS. Like many areas of marketing and management, agencies can often be better employed for specific or detailed analysis that is only required occasionally.

Prices

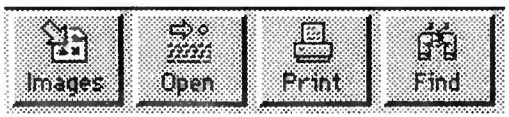
Software	Price	Supplier
MapInfo	£1000+	MapInfo UK: 01332-824781
MapGraphix	£3000+	Admiral Computing: 01276-692269
Tactician	£900-£9000	TacticianUK: 01424-560064
AtlasPro	£795/£1495	Adept Scientific Software: 01462-480055
Answers	£395-£795	Argent Computer Services: 0181-207-1929
SNAP	£500+	Mercator Computer Systems: 01454-281211
PinPoint	£499	Longman Logotron: 01223-425558
SPSS	£695	SPSS UK Ltd: 01932-566262
StatView	£455	Cherwell Scientific: 01865-784800
QuickAddress	agency	0171-498-7777

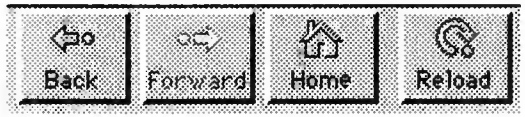
Note
All prices quoted are merely guidelines to be used only as estimates. Prices change almost daily and distributors always offer a range of special deals.

Second Opinion
Shirley Stone, AMCO

Many of us believe deeply in the social interaction of live performance and physical consumption. We now have to convince all those potential arts users with whom we seem to be having only perfunctory conversations. TGI tells us that 34% of the population attend theatres, but we do not know what that represents in terms of frequency of visit or social spread. At present, many of us use ACORN to target audiences. Is it truly effective in the arts or has constant targeting of the same group created a self-fulfilling prophecy? Equally, are there lots of potential attenders out there who we are not reaching and will not reach until we develop work which will attract them?

David Fishel has defined arts marketing as finding the right audience for the right product and creating a process of matching. I would not deny this. But how do we do it? In order to fulfil our remit, we also have to accept that seduction of new audiences is necessary through carefully planned and targeted work. Are we increasing the current level of attendance purely by increasing frequency of visits rather than by attracting first time attenders?





Research & Mapping

At AMCO, we are working with mapping, census data, drive times and analysis systems, such as CHAID, to measure just what percentage of which section of the population represents our audience. If you measure current attenders against TGI and ACORN, life looks reasonable, if not comfortable, but if you move outside that clear definition, then the gaps are stark.

We have been working on stage two of a research project into the attendance patterns of young people. The first stage, commissioned by Theatres South Consortium, looked at creating work specifically to attract younger audiences. Following this up, we chose to look at groups that participate, but do not attend. There is a constant strand to the groups' response. They feel the larger venues don't care about them, tickets are often too expensive, they feel marginalised and consider themselves unwanted. So what has happened to personalised selling? If we have sufficient young people interested in participation, why are we not encouraging them on the next step of the ladder? This is, after all, our future audience.

Direct marketing within the arts is still performing at 'mewling infant' level. We rarely monitor response to direct mail. Bulk distribution is almost addictive. We monitored bulk distribution for three consecutive years and found only 0.03% of our samples purchased a ticket because they had picked up print in any given outlet, with the exception of libraries. Even in libraries, the conversion to sale was only, at best, 3%.

Distribution does have a contribution to make to awareness and should be part of a public relations programme, but it should not be seen as a primary tool, particularly with the advent of on-line services and the Internet. At AMCO, we now want to use mapping, census data, drive times and intuitive analysis software to try to create behavioural profiles for arts attenders. We feel it is an essential development. Socio-geodemographic profiling tells us what we can expect of people who have a certain income and live in specific areas. These systems are excellent when it comes to buying insurance and lawn mowers, but do they work when we are dealing with ephemeral experiences such as drama, dance or contemporary art?

If we can create systems to identify potential attenders (soft targets) which are precise and effective, surely that will create time and surpluses to begin an in-depth process of developing new audiences (hard targets). On the one hand, we have the precise targeting, monitored direct marketing, expansion of existing audiences and appropriate programming, much of which focuses on middle or large-scale work. On the other hand, we have education, outreach and community work leading to participation and small-scale performance and attendance. The bigger the overlap, the better the job.

The other area that concerns us is how technology can increase the number of ways of reserving a ticket. A constant national concern is that advance booking is decreasing and is no longer a barometer of audience size. This especially affects small and middle scale. At AMCO, we are experimenting with interactive telephone, fax and Internet booking. Imagine if we could free up the time of box office staff sufficiently so they became a personal sales team acting as the venue's representatives? This is, in part, the benefit of technology in clearing routine out of the way. The arts, after all, is a people

business. It might be nice to use a range of interactive booking systems to create the best human systems - whether they are comprised of outreach workers or box office staff — which are about one-to-one marketing.

We operate in a noisy marketing environment which, with the advent of local and national radio stations, cable and satellite television and broadband services on the Internet, is only going to get noisier. The competitive environment is also more crowded. The increasing range of sports facilities, personal fitness centres, multiplex cinemas, theme parks, home entertainment, set-top boxes and CD-ROM is all going to increase competition and erode market share. Although the use of multimedia and the Internet is beginning in the funded arts sector, the availability of the best drama, and other art forms, on CD-ROM and other multimedia is already planned and, in some cases, available in the commercial sector. What price the school trip when you can see the very best performances in a classroom, or even at home, at a tenth of the price?

Scanning and OCR

Digital scanning has come of age and has successfully out-grown its graphics-only straitjacket. Prices have fallen and the quality of the technology has improved to such an extent that it is difficult to think of an application field that could not make valuable use of it. Technologies such as *Optical Character Recognition (OCR)* and *Optical Mark Readers (OMR)*, once only available through expensive, dedicated hardware systems, have become more or less mainstream, with software running on a broad range of flat-bed and hand-held scanners capable of recognising virtually any font in any combination of page layout and orientation. Obviously, this time-saving technology has implications for a variety of arts marketing activities, particularly in areas such as survey design and processing, and should at least be explored by all arts organisations and support agencies.

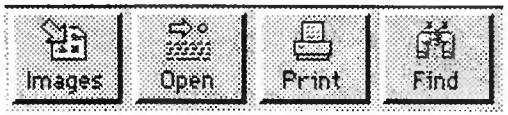
Ever since people started using computers, they have dreamed of a painless and effective way of putting useful bits of printed text into word processors without having to wrestle with a standard *qwerty* keyboard. As mentioned earlier, optical scanners have evolved to the extent that it is now feasible to input images in a variety of formats. Many of the

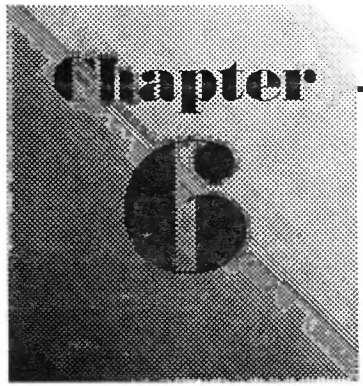
more successful scanner companies offer OCR software as well, which allows text to be scanned into a computer. Scanners behave like a 'morphemic hoover' capable of sucking up printed text from books, magazines and documents, then neatly depositing it into the computer application of your choice. The most commonly used scanners for image or OCR work are flat bed or full page scanners which resemble small photocopiers. These produce excellent results and can be purchased with full colour-image scanning capabilities for under £600.

Dedicated marketing & statistical applications

Dedicated marketing applications, like the computerised box office, are far more effective in arts marketing if they are viewed as a complete set of tools, allowing for the strategic use of data. While each tool has its own specific usefulness, they should ideally be capable of integration, so that as users move from one application to another, the data can move along with them. All marketing team members, should be able to share electronically, not just the final results of their analysis, but the individual steps in the process itself, so that everyone is able to work from the same set of assumptions.

One of the most useful and most reasonably priced scanning and OCR products available is PaperPort. It's a small desktop scanner that provides perhaps the fastest way to get paper documents into your PC. It can scan everything from business cards to newspaper page length items, including photos and illustrations, and automatically files them on your PC or Macintosh. It includes a built-in OCR which allows you to convert any text item into an editable form for your favourite word processor and documents can even be stored in Adobe's standard PDF file format. On top of all that, you can even use PaperPort as a fax or photocopier or for pushing paper bits round an e-mail system or network. Also works for scanning maps.
Contact: Computers Unlimited 0181-200-8282
Price: under £300





Marketing By Modem

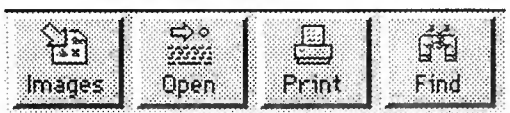
In a digital age, marketing electronically can be a valuable tool and should begin to figure more prominently in any comprehensive arts marketing campaign. The trajectory and timing of multimedia and on-line systems will transform not only technology providers, but an increasingly broad range of other industries as well, including retailing, advertising, financial services and the arts and entertainment fields.

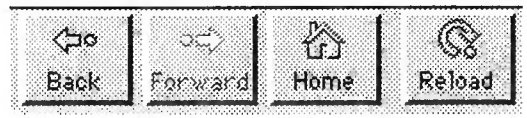
If you think about the dial tone you hear when you pick up a phone and the number you enter on a telephone keypad, what you have are elements of a simple but powerful gateway to the telephone network. Similarly, the on-screen programme guides starting to appear on cable networks represent a gateway to the universe of cable. In the not so distant future, as the diversity of electronic networks and the resources they offer grow exponentially, so will the navigational value of a gateway service such as CompuServe or the Internet. The much vaunted kennels on a full-service broadband network for instance, would be practically useless without effective navigation and assistance.

The challenge for the arts, therefore, like many other businesses, is to understand the range of possible outcomes and assess the implications of each one for its particular sphere of interest.

Essentially, there are two possible roads this sort of enterprise could travel. One is the highly integrated, user friendly environments of gateways such as CompuServe, Delphi and Prodig, that are centrally organised and managed. The other is the Internet - a highly decentralised network of networks providing open access to anyone who observes certain basic protocols that usually merely ensure connectivity.

Traditional media suppliers such as magazines, newspapers and even film and video makers are already being approached to adapt their content for specific on-line gateways. Other areas of the arts will follow. Here, the arts could have a decided advantage, since many observers of the chaotic multimedia and on-line landscape believe that the owners and producers of unique and engaging content will capture significant value. Intriguing movies, experimental plays, distinctive



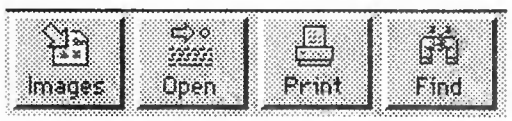


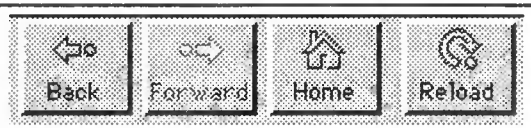
editorial content, hot musicians, digitised visual art, and instant access ticketing, promotional and information kiosks are the kinds of assets that nearly everyone assumes will capture value, no matter what else happens. In the emerging digital world, the key to winning consumer allegiance will be unique and engaging content.

Although revenues from video rental and cinema tickets in the US are substantial, they pale in comparison to the $200bn spent on consumer advertising and point-of-sale promotion. The real issue is less about consumer willingness to spend on interactive services and more about advertising and marketing readiness to shift from traditional media to new networks.

Much of this scenario begins with the assumption that consumers want the convenience of a highly bundled gateway service, or the proverbial *one-stop shop*, so badly that they will pay a premium for it. If this does turn out to be the case, broad-based gateways with financial transactions and movies on demand are likely to prevail over those that are narrow in focus. Such broad-based gateways will gradually consolidate into a limited number of national or even global, full-service 'mega-gateways'.

All these factors are important when considering where and when you should begin to think about on-line marketing and advertising. Dial-up services, such as CompuServe, have millions of subscribers worldwide and many become so attached to their e-mail addresses, particularly





after they've shared them widely, that they resist switching gateways if doing so entails a change of address. While e-mail is now more or less accessible to and from any gateway via the Internet, once a subscriber becomes a participant in a community of interest, it is very difficult to get them to switch to a competing gateway.

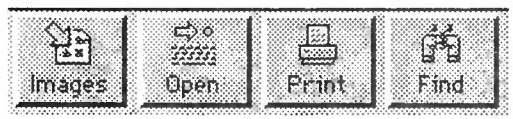
Given their multi-faceted relationship with each subscriber, broad-based gateways will be able to develop a deeper understanding of their subscribers' information needs, the interest groups they frequent, the transaction services they use, the entertainment they prefer and how they have reacted to advertising and marketing programs in the past. Such gateways could then use this information to offer precisely targeted advertising and marketing with a high degree of interactivity. On seeing an ad or promotion, a viewer would be able to press an icon or on-screen button to request more information or to order the product or service. And even better, the gateways could monitor all such activity to assess which kinds of advertising and marketing in which kinds of venues work best with which kinds of subscribers.

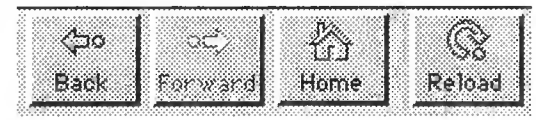
On-line marketing etiquette

- **respect the rules against solicitation, but learn how to market on-line within these limits.**
- **offer constructive and substantive information in accessible and readable chunks.**
- **develop a friendly and outgoing on-line personality. Be polite and pleasant and don't 'flame'.**
- **there are a lot of people on-line simply 'lurking', who could also be interested in what you're marketing, without you realising it.**
- **remember, marketing experts say that people need to hear about a product or service seven times before they feel comfortable about taking action.**
- **don't blatantly solicit or advertise in a forum or other inappropriate message site.**

If content and service providers become sufficiently concerned about the power that mega-gateways could develop, they may turn to the Internet as their primary platform for delivering interactive services. If they did, given the openness of the Internet and the relatively low cost of setting up on it, there could be a wild proliferation of content and services. As more and more resources become available, the economic incentives for making the Internet even more secure and user friendly increase. And, the more secure and user friendly it becomes, the greater the incentive for content and service providers to offer their products on it.

Content and services that have been successful on traditional platforms cannot just be mechanically shifted to a new one. They must be adapted to exploit all the advantages, while also understanding the limitations of any new media. Unlike current broadcast television and narrowband on-line or CD-ROM, interactive broadband will facilitate the high speed transmission of interactive, video-based marketing and shopping services directly to consumer households. This means that consumers will be able to select products or services of interest from





Get connected

Establishing your own Web site can cost less than £1000 per year, including design and links to other related sites. Remember to include some degree of interactivity, such as a response form, order form, a section for answering queries, etc. Immediate interactivity is one of the main features of on-line marketing and advertising and a key feature that differentiates it from all other traditional forms.

attractive, informative and targeted demonstrations. This improved convenience, information content and presentation quality will lure a new class of merchandise and merchants to home shopping and stimulate demand.

It will take some time for interactive broadband services to emerge as a significant mass market channel, largely due to the slow build-out of nationwide broadband networks and the gradual deployment of sophisticated, inexpensive set-top boxes. But the arts, like any other industry, needs to start thinking about the opportunities and threats that this digital shift will present, and to begin building an infrastructure that will allow them access to the emerging information superhighway.

Initially, informational services for the arts will probably take the form of stand-alone, interactive advertising. Solicited advertising will be used to sell complex, infrequent, high commitment purchases such as tickets or subscriptions for the theatre, concerts, dance programmes or exhibitions. Longer-term, digital advertising will almost certainly be bundled into every element of interactive home shopping, but there

can be no `one size fits all' approach to the development of an arts strategy for electronic shopping.

Conclusion

If we accept the fact that marketing and information is essentially information, the Internet could present a terrific opportunity for the arts. However, defining that opportunity and its potential requires a degree of clarity and understanding that few possess at the moment. Technology is increasingly putting power into the hands of the user or consumer. Power is being dissolved, across borders and continents.

An interesting aspect of the Internet is that it's rather like an electronic version of word-of-mouth. People 'talk' on the Internet and the question anyone interested in marketing or advertising on the Net needs to ask is, how do I get people to talk about what it is I'm promoting?

Traditionally, advertising and marketing work by nagging their way into your brain and often boring you into submission. With the Internet, this approach is reversed and your customers are going to have to buy into your marketing or advertising. It will therefore have to be something they want to watch and not something they have to watch simply because it's there. This will change the very nature of how we approach advertising and marketing. In a digital world, advertising and marketing will have to be more oriented towards programme making and more stimulating and informative. At the moment, the Internet is

seductive and engaging, but perhaps rather too 'cool'. Without emotion, information is lifeless and advertising and marketing professionals will need to learn to understand the medium enough to make its information sexy. In a sense, for these activities to succeed on the Internet, it must develop 'attitude'. On the Net, the messenger is almost as important as the message.

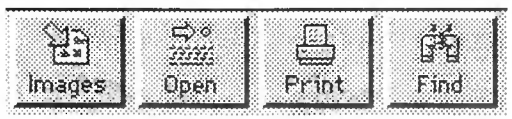
The Internet is interactive and what interactivity offers marketing and advertising professionals is the opportunity to involve consumers in their product, brand, image and status. But to succeed, the Net will have to generate a substantial enough audience to make it worthwhile, and the audience will have to have a profile which can be measured fairly and accurately. Most of all, advertising and marketing professionals will have to generate information that uses the medium creatively.

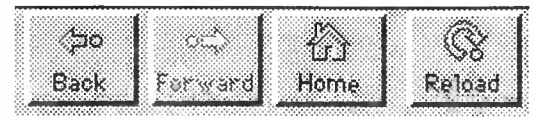
Simply getting an e-mail address or creating a home page on the World Wide Web will not, necessarily, help you improve your marketing, but all arts organisations must start to explore the options and opportunities offered.

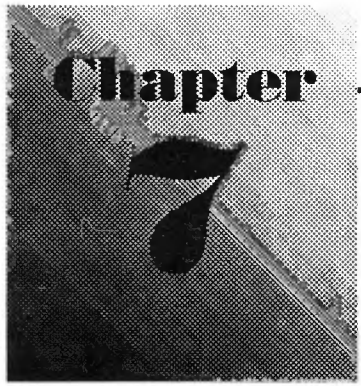
Marketing By Modem

Getting on-line is easy. Deciding what to do once you're there is more problematic. In the 21st century, the World Wide Web will be the new market place and arts producers, managers and organisations that don't realise this may find themselves in trouble. What is clear is that as we harness technology to market the arts, using digital technology to reinforce our message carefully and more effectively, we also have to be aware that although we are all dedicated to a belief in the value of the arts, our message has to be communicated far more effectively.

The digital world is a noisy place and if the arts wants to survive, they will need to learn to use the emerging tools to their best advantage. The future of the arts, and marketing the arts, lies in harnessing technology and in bold, positive, professional communication. But while marketing electronically can be a valuable tool and should figure prominently in any arts marketing strategy, success depends not on what or how you market or sell, but on what your customers actually buy.







Arts On The Road

The evolution of personal computing is really about computers getting progressively smaller, lighter, more powerful and easier to carry around. Notebooks and sub-notebooks now represent the fastest growing computer market sector, and already over 40% of the global workforce is nomadic, whether simply within a building, a city, a country or on a jet-setting international level. Most of these people want their electronic tools, including notebook computers, PDAs (Personal Digital Assistants) and cellular phones to be as mobile as they are, because they need to communicate with each other and with their 'home base'.

Today, one in six computers in the world is portable and in the next few years that figure will probably rise to one in two. Miniaturisation has contributed much to the extension of the notion of mobile computing, but, until very recently, most computer manufacturers were content simply to shrink the desktop in an effort to allow you to do on the road what you already do at home. What genuine mobile computing is all about is what the personal computer was really intended to be in the

first place – a ubiquitous tool, that you carry with you all the time. To do that, they need to be small, powerful, transparent and shouldn't impose on you and your behaviour when you carry them around. They have to come in different models with 'engine sizes' and 'frames' that lend themselves to personalisation; they have be affordable enough to become pervasive and they have to be 'appliance-like' to enable you to use them for practically anything. The exciting thing is, that once you can have a computer with you wherever you go, you will inevitably start to use it differently from the way you use a desktop computer. And when you finally have a computer that's clever enough not to behave like a traditional computer and appliance-like enough so that even people who don't normally use a computer feel they have to have one, well, that's when the magic and creativity really start.

Manufacturers are now beginning to speculate on the possible destiny of personal computing itself or what Alan Kay perhaps more accurately refers to as 'intimate computing'. Some of these visionary concepts involve smaller, even more portable devices that are extremely comfortable to carry with you at all times and are available to respond

to your every request. This new generation of intimate computing devices also need to display some real intelligence and provide assistance, not just additional tools for organising and synchronising with information and systems we've already got back at our desk or computer network. They also have to move beyond mere computing and begin to venture into the realms of communication.

A recent Banner Computer Readership Survey showed that the most popular portable computers are Toshiba (7%), Compaq (4%) and Apple (3%). Nowadays, the best thing about portable computers is that they are usually just as powerful as a desktop machine but come in a package that is roughly the same dimensions as a sheet of A4 paper and around two to three inches thick. Notebook or subnotebook computers are ideal for computing on the move, because of their light weight and socket-free batteries, but they are also worth considering if space is limited in the office or at home, or if you work between different sites. A notebook PC can be stored away on a bookshelf or in a cupboard whereas a desktop PC literally takes up an entire desktop. Notebooks work with all the usual peripherals such as printers, hard disks,

modems, scanners and even CD-ROM drives, but like desktop models, you shouldn't consider anything less than a 25MHz 486 with 4Mb of RAM and at least a 150Mb hard disk.

The other two main things to look at, when choosing a notebook, are screen and battery type. All notebooks use rechargeable batteries but some have a longer life than others. Nickel Cadmium (Nicad) batteries are the cheapest but have largely been superseded by nickel metal hydride (NiMH) batteries which last longer, have more power, and are more expensive. A new Type III NiMH battery has 15% more capacity than a Type II and a Type II can offer 50% more capacity than a Type I. The most expensive batteries are lithium ion; they are lighter and last longer than either of the other types. Many current PC-compatible notebooks, such as IBM's ThinkPad 750, can run for five hours with a colour active matrix screen and eight hours with a black and white screen. Hewlett-Packard's OmniBook 300 pushes your on-road mileage even further, using an advanced design to work for eight to ten hours or so between charges, and Toshiba has been boasting similar battery life for its range of notebooks.

Notebooks usually have one of three main types of screens:

- mono LCD
- passive matrix colour
- active matrix colour

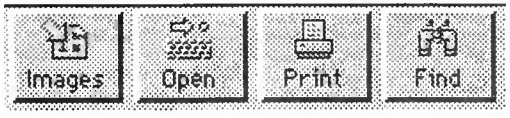
In general, active matrix screens provide a crisper, clearer image than passive matrix displays and are more or less on a par with normal desktop system monitors in terms of brightness, contrast, and colour saturation. Passive matrix LCD screens often display a variety of image defects that active matrix screens avoid, such as ghosting or submarining when the cursor is moved too rapidly. Shadows, most easily seen against a light background, can also distort colours, which is why designers frequently divide passive matrix displays into two independent panels to minimise shadows and to improve contrast. Colour filters in passive matrix screens can also reduce overall brightness.

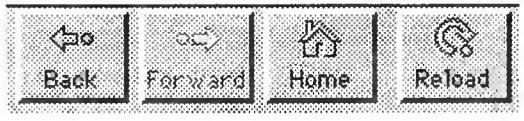
The main advantage of passive matrix screens is that they require less power and don't run down your batteries quite so quickly. They're also cheaper to produce, so the overall cost of a notebook with a passive

display should be considerably less. Passive matrix screens are still quite good for most mobile applications and the newer, dual-scan passive matrix displays are more responsive than earlier single-scan displays because the screen is electronically divided into upper and lower regions, cutting in half the distance each scan must cover. Dual-scan displays also allow for higher contrast settings, enhancing clarity while still drawing less power. It is important to remember that a notebook's display is always a compromise between portability, price and quality.

A truly mobile or intimate computer is one that is always available and ready for heavy duty road work. While the ultimate goal of mobile computing is not solely to shrink the desktop, there is no doubt that miniaturisation and mobility go hand in hand. Size and weight are important factors in determining if and when you use a notebook or personal digital assistant (PDA). If a notebook weighs as much as a breeze block, then you won't carry it around with you all the time, no matter how much power and functionality it has. So, with any existing mobile solution, different compromises need to be considered depending on the specific uses and journeys involved.

Unlike our traditional mains-based PCs, which are comfortably tethered to the wall with any number of massive hard drives, monitors and printers hanging off the back, road trips force us to confront the whole issue of availability. How long does it take to kick start them? How much of what I use already will run on them? What's the mileage like and how long will those batteries last? Durability is also important. Desktop systems don't require high-impact plastics and are less likely to be dropped. Do you need a proper keyboard or can you get by with a pen-based system? If you use something like the MessagePad, what happens if you lose your pen or damage the screen? How big are the various accessories you might need while on the road? Will they fit into your briefcase or rucksack? How heavy are extra batteries? How much memory do you need for the software you want to run? Most notebooks do allow you to connect a large desktop monitor and some, like the PowerBook Duos, can be used with a 'docking station' which gives you the convenience of a notebook when roving, with all the facilities of a desktop system when you're back at base. Above all, do try out a notebook before you buy it, to see if you can live with the screen, keyboard, size and so on.





Arts On The Road

PCMCIA cards

Most notebooks these days support slots for things called PCMCIA cards. These are credit card sized devices that can be modems, hard disks, memory upgrades, etc. PCMCIA cards* come in two sizes:

- **Type II slots, which are 3-4mm thick and are used for things like memory and modems**
- **Type III slots, which are bulkier, are used for things like mini-hard disks.**

For those who are really interested, PCMCIA stands for Personal Computer Memory Card International Association.

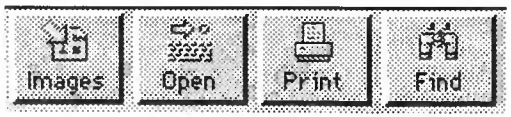
***PCMCIA Cards are now referred to as PC Cards.**

Besides notebook PCs, there are also various hand-held devices available, which provide a range of functionality from simply managing your address book to providing intelligent personal assistance. The highest profile of these PDAs is the Newton MessagePad from Apple. Although its much vaunted handwriting recognition still leaves much to be desired, the MessagePad is worth considering for many arts organisations simply for its form-filling and data-capture capabilities. The MessagePad communicates easily with any Macintosh or Intel PC and has been adopted by a large number of corporate users for marketing, data entry and other paper form applications. For arts organisations involved in market research and audience data collection, the MessagePad and an application such as OmniForm could prove extremely useful.

OmniForm is a software application that overcomes the limitations of normal OMR/OCR technology and manual proprietary data collection. It uses a Newton MessagePad PDA (Apple or Sharp) to fill out intelligent forms created with either a Macintosh or Windows PC. The process is simple and direct. Forms are created as a series of fields, each

containing a question or prompt and the type of input to accept, for example, multiple choice, text or numbers. Each field also contains a script written in a powerful yet simple scripting language. Form designers can use these scripts to implement data validation, form navigation, alert sounds, dialogue boxes and so on, creating intelligent forms that cannot be completed incorrectly.

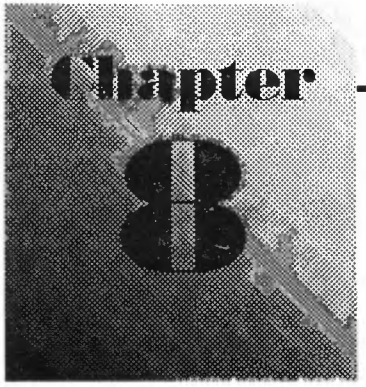
Once created, the form is loaded onto the PDA electronically, where it resides in permanent memory ready for instant use. After completing a form, you can transfer the data back to the host PC where it can be used with spreadsheets, databases or dedicated marketing and tabulation packages. All data is stored in a digital format and the whole system is simple and inexpensive to use. There is virtually no learning curve for data collectors using OmniForm and users filling out complex forms for the first time will be just as productive as more experienced users. You can even include open-ended data which is collected and entered via a virtual keyboard appearing on the PDA screen.



Conclusion

Mobile solutions, including notebooks, subnotebooks and PDAs will become cheaper, more powerful and more accessible every year and in the future, many organisations and professions will probably not even bother with desktop systems. For the arts, particularly for artists and smaller organisations, notebooks provide an ideal solution where space is a premium and staff need to work in more than one location. For larger organisations, portable computers can enhance existing office systems and allow greater mobility for members of staff.

Portable computers and PDA will also play a greater role in areas such as market research, data capture and also provide a mobile means of logging on to on-line information systems or sending touring information back to base. You can get a very cheap notebook PC for under £700. For a complete desktop replacement, expect to pay between £900 and £1500. For a heavy-duty publishing/multimedia-capable notebook, you'll still pay around £3000 to £5000, depending on extras.



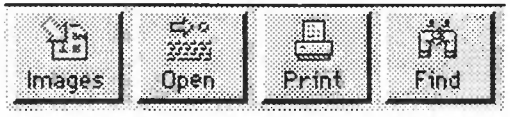
Information Superhighway

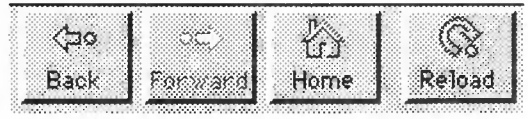
In the 80s, the ultimate high-tech fashion statement was the mobile phone. In the 90s, it will probably be an e-mail address. Why? Because everyone thinks an e-mail address is the key to the 'information superhighway' or 'Infobahn' and pervasive networks, like Internet, that will digitally link the world and everyone in it.

According to current media hype, the information superhighway will create a single computing and communicating global village with access to every conceivable form of information from daily news to daily gossip, technical, financial and statistical information, and even the latest information on what's happening in the music, theatre and film industry. Any type of information you could possibly imagine, and a lot that you probably couldn't, will be at your fingertips somewhere out there in cyberspace. All you need to play is a telephone line, a modem and a personal computer. At least that's the theory. In practice, most of today's so-called 'Infonet' is a wasteland of random data inhabited by sad propeller-heads in search of an e-life and most of it simply isn't fit for genuine human consumption. At least not yet.

Information Superhighway

Despite all the hype, what currently passes for the information superhighway looks more like a digital dirt track and choosing the right on-line or Internet service or service provider involves careful navigation through a virtual minefield of info speed bumps, connectivity cone zones and cyber potholes. Today's Infobahn means the Internet. This is the common term for a global network of networks originally made up of academic, research, military and government users. It is mainly a rather primitive and unfriendly text-based system, but almost any PC can access it. Over the years the Internet has grown to include commercial sites and services and currently has an estimated 20-40 million users in over 50 countries. The World Wide Web (WWW) is the collective name for information services on the Internet. These are based around on-line, hypertext documents and are accessible via a Web browser. Despite its primarily primitive text-based nature, the Internet has more users than the population of seven of the European Community's 12 member states, with a new computer connected every 27seconds. Certain conferencing systems such as the Well and Delphi also offer terminal-based access to Internet services.





Information Superhighway

Before looking at what the Internet is today, a brief look back at how it started might be helpful. The Internet originated in 1969 as an experimental network by the Advanced Research Projects Agency (ARPA) of the US Department of Defence. The network (originally called ARPANET) was designed to enable scientists to communicate among themselves. ARPANET originally consisted of four computers, but by 1972, 50 universities and military research sites had ARPANET access.

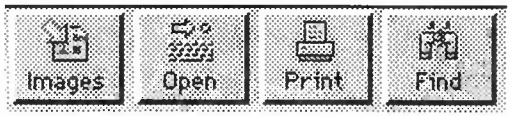
One notable theme of the early planners was fault tolerance and reliability. As a result, ARPANET was designed to allow many routes among the computers so that a message could arrive at its destination using any possible route, not a single fixed path. If a computer went down, others could move around it and continue to talk. With all of the computers being interconnected, designers had to develop a means by which these various computers could speak the same language. Their solution was to develop a communications protocol, which eventually became know as Transmission Control Protocol/Internet Protocol (TCP/IP). TCP/IP became the standard protocol used by the Internet in 1983 and remains the standard to this day.

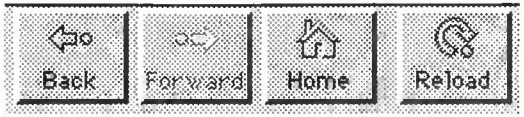
The Internet is a global network that offers services such as electronic mail, on-line news and weather, file transfer via FTP, computer conferences, bulletin boards, remote log-in to thousands of databases and innovative search services like WAIS, Gopher and the World Wide Web

During the 1980s, several other networks (including a National Science Foundation network of five supercomputers) sprang up. Eventually, all of these public and private networks were interconnected to enable any computer on one of the subnetworks to access computers anywhere in the entire internetwork. Today, the Internet combines networks of academic, military, government, and commercial entities from the United States and over 40 countries.

Essentially, the Internet is a kind of *Babylon 5* of cyberspace; a port of call that's an information resource, an electronic meeting place and a message centre all rolled into one. But since it's much bigger and far less structured than even the largest on-line service or BBS, exploring the Internet can be rather like going on a bad package holiday: it always costs more than you expected, you can't find your way around, nothing works properly and you can't speak the language. Obviously, the faster your modem, the less time you spend on-line, but the thing to remember about the information superhighway is that you still pay phone charges for the amount of time you spend net-surfing, even if it's a local rate. One of the reasons why the idea of an Infobahn is so much more

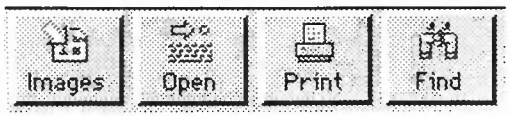
Unlike other networks, the Internet is not managed by a single organisation, with a single access point and a single set of rules. It is a 'network of networks' made up of hundreds of cooperating organisations.

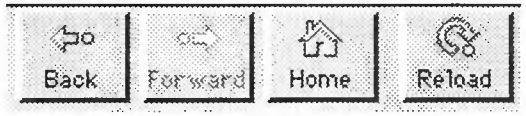




popular and pervasive in the USA is that local phone calls there are still free. If you become seriously addicted, in the UK, it's best to have a really fast modem and to log on during off-peak periods.

Getting connected to the Internet is relatively easy. You need an account with an Internet provider, a PC, a modem and communications software. The scope of your Internet access will vary according to the type of account you have. At the moment, the simplest way to connect to the Internet is via a BBS or conferencing system such as Cix or Delphi. You can also access certain parts of the Infobahn through more sophisticated dial-up services such as CompuServe, AppleLink or eWorld and once you begin surfing the Net, you will encounter a wealth of resources apart from basic e-mail services. For example, there are over 5000 newsgroups, which are rather like electronic village halls, covering a multitude of topics ranging from bicycle repair and comics to applied linguistics and quantum physics. You can also access mailing lists, FTP (File Transfer Protocol)functionality, search engines and browsers and Telnet, which allows you to log on to one computer from another. But before you





decide to dive in and try some gnarly net-surfing, it might be more sensible to ease yourself in gently with a bit of BBS body-boarding with a dial-up service such as Cix or CompuServe.

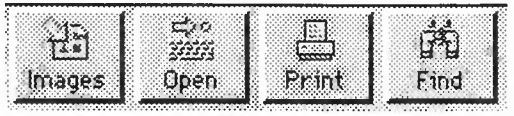
Most dial-up services provide off-line readers/composers, which users will find essential for reducing time on-line and for keeping phone bills down. You can read or prepare items before actually logging on or down-load chunks of information to read or respond to later.

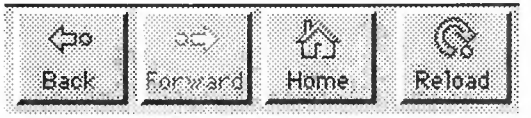
Key Internet Concepts

By now, most prospective users have at least some understanding of the Internet as a whole, but it is useful to explore further some of the terms used in the Internet.

• *Electronic mail:* One of the greatest benefits of the Internet may be something you already take for granted: email. Using the Internet as a gateway, you can send email to the political science department at the University of Iowa, researcher at Stanford University, America On-line, CompuServe, GreenNet, Genie, Prodigy, and a host of other on-line services or Internet sites.

• *USENET Newsgroups:* Newsgroups are discussion groups of people which focus on a specific subject. Newsgroups are Internet's equivalent to CompuServe forums.





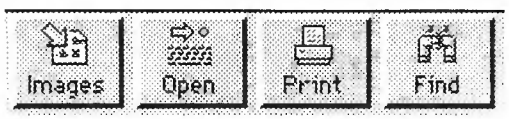
• *ListServ mailing lists:* Mailing lists are e-mail-based discussion groups. Instead of being sent to a specific individual on the list, messages are sent to a ListServ address so they can be distributed to everyone who subscribes to the list.

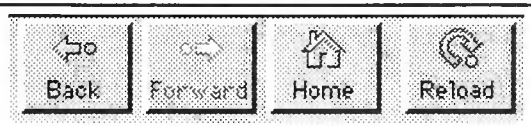
• *FTP:* FTP (File Transfer Protocol) is a tool for transferring files between computers on the Internet. You can use FTP to receive files from a remote host computer.

• *Telnet:* Telnet allows you to log on to remote computers, access public files and databases, and run applications on the remote host.

• *Gopher:* Gopher is a tool to enable you to browse Internet resources. Typically, you can navigate the Internet using Gopher by selecting the desired item from a series of lists. You can then continue through a series of lists until you locate the information you are seeking.

• *World Wide Web (WWW):* While Gopher is a menu-based approach to browsing the Internet, the World Wide Web offers an innovative



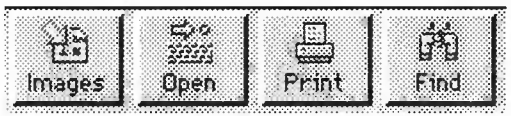


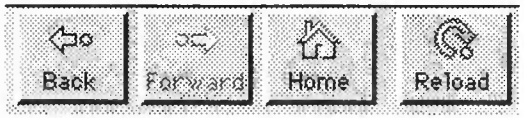
alternative. WWW enables you to browse, using a hypertext series of links (like a Windows Help file). When you select a hypertext link, you may move to another place within the same location or to another computer thousands of miles away to browse that information. Popular browsers such as Mosaic and Netscape provide easy Web access.

• *Archie:* Archie is an index to help you find files in over 1,000 FTP sites based upon the filename you specify. In practical terms, you could think of Archie as something like a CompuServe File Finder, such as IBM Filer Finder. The IBMFF accesses the libraries of hundreds of different forums to provide a database by which you can search for files.

• *Veronica:* Veronica is a tool to help you find the Gopher server(s) containing information that you need. You can browse a Veronica menu just like you would a Gopher menu.

• *Wide Area Information Server (WAIS):* WAIS is a system to search Internet databases. You can do a keyword search using WAIS to retrieve all of the matching documents and then read them.





Dial-up Services

CompuServe is one of the leading on-line information services for personal computers with over three million users linked into a growing global community. In the UK alone there are 48,000 users and apart from the usual e-mail and conferencing type stuff, it also provides access to nearly 2000 databases and services.

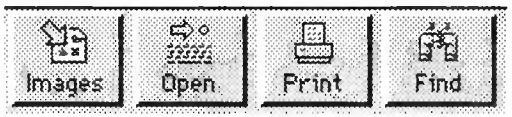
While most of the Internet still sports rather a primitive and unattractive text-based interface, CompuServe offers friendly graphical information manager front-ends for Macintoshes or Windows PCs and apart from being able to send and receive messages anywhere in the world in complete privacy, it also links to any MCI Mail, Telex, Internet, AppleLink, AT&T mail or fax address. You can even send and receive graphics, sound and video files. CompuServe members pay around £6 per month for unlimited connect time to use 70 of the most popular services. The 2000 or more extended services are available for about £3.20 per hour.

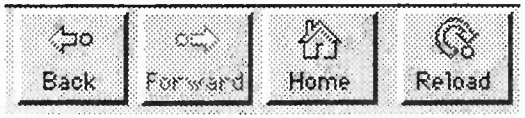
Whether you're looking for Internet access or yourself or your organisation, the choice of service provider is important. Since service providers' charges for Internet access vary considerably, it pays to shop

around to find the best deal, but don't be fooled into expecting an easy ride. Despite the hype and wishful thinking, the information superhighway that you may have read about is still a long way off. What's really out there is more akin to a digital M25 with even more roadworks and despite the occasional bouts of panic or excitement, you travel at your own risk.

On-Ramps, B-Roads & Dual CarriageWays...the indirect routes to the Internet

Most commercial on-line services offer limited access to the Internet through some sort of e-mail gateway. Most of these programs are interesting to explore in their own right and can also be a useful option if you are primarily interested in exchanging mail with other Internet users.





Information Superhighway

What is ISDN?

The telecomms companies offer two public telephone switching services - the familiar voice network (PSTN) and ISDN (Integrated Services Digital Network). ISDN is all digital and hence offers superior reliability compared with the voice network (which is part analogue and part digital). The minimum offering is currently ISDN2 which actually delivers two 64 Kbps channels. This compares with the fastest modem speed of 28.8 (although the majority of users are on 14.4).
(continued opposite)

Service	*Internet Services*	*MaxSpeed*	*Contact*
CompuServe	e-mail gateway, Internet forum	14,400	0800-289378
Cix	e-mail gateway	28,800	0181-390-8446
Delphi	e-mail gateway, Usenet newsgroups, Internet forum, WAIS GOPHER search, FTP, IRC	14,400	0171-715-7080
eWorld	Internet e-mail gateway	14,400	0800-127753
Demon	Internet access	14,400	0181-3490063

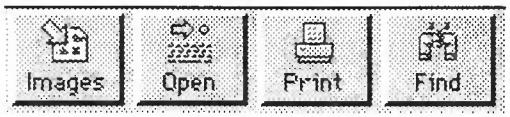
(additional Internet providers are listed in the Appendix)

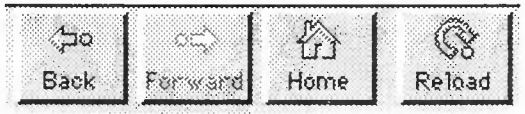
A single PC would connect with a Terminal adapter (TA) which plugs into the serial port of the PC and replaces the modem. A small LAN will require a bridge/router to take the TCP/IP (Internet traffic) off the local network and send to the Internet via ISDN to U-NET. The TA would cost in the region of £400 - £600 and the bridge/router around £1500. This means that the costs of connecting a small network, per PC, can well be less than the cost of individual modem connections. EasyThreeIP is being launched with a capacity of 30 lines based on a single PRI (Primary Rate ISDN) connection provided to U-NET by Nynex. The total capacity of the PRI is 2 Mbs and Nynex has installed 34Mbs to the U-NET site with fibre optic cabling so allowing for considerable further expansion.

Information Superhighway

A recent NCC workshop on the Internet suggested that the take-up by commercial and other non-academic organisations in the UK is by no means as great as one might imagine from coverage in the press. Evidence suggests that currently, only a minority of non-academic users in the UK access the Internet from a corporate network. The situation is different in the US and despite persistent claims that the Internet is a global network, the vast majority of users are American, the vast majority of message content is American and the vast majority of traffic is from or to America. While the Internet does open up a vast array of opportunities to arts producers, managers and marketers, in order to assess its relevance to you or your organisation, you should look at the ways in which it can be used.

E-mail can be extremely useful, but should be evaluated in terms of whether it reaches the people you want to communicate with easily enough. The Internet could be more than is necessary and a lot more hassle than other dial-up systems offering e-mail services. It's also worth remembering that *all* e-mail systems do, or can be made to, communicate with almost all other systems. At the moment, most

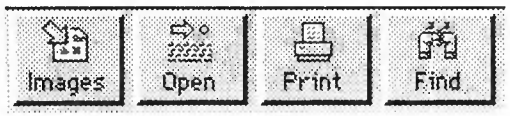


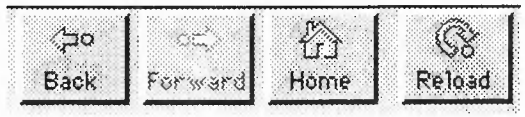


Internet mail doesn't provide guaranteed delivery and messages may be lost in cyberspace without the sender being notified.

File transfer is useful, but only to the extent to which the files themselves are useful. As mentioned earlier, most files on the Internet are American. This isn't a problem if you're downloading software, although such 'free' software is rarely easy to use, up to date or of particularly good quality. In the end, it can actually cost you a great deal of money. The US bias can be more of a problem if you want information. Businesses with an Internet profile, for the moment at least, tend to be American. Corporate information services are also already migrating to the US, thanks to the Internet which means that those who boast about the UK's skills in sales and marketing and the quality of our PR professionals might be in for a rude awakening.

Telnet is useful and allows you to access information retrieval tools operating on remote systems such as Archie, Gopher, directory services and the World Wide Web. It can be a good way of ordering services and products via the Net and it is also possible to use Telnet to access a

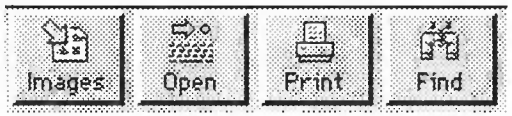




remote corporate system. This will become increasingly important for mobile and teleworking.

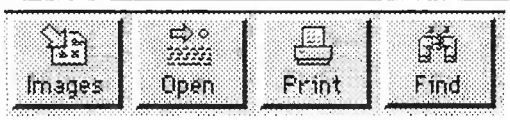
Usenet newsgroups are high profile and infamous and tend to be the bits of the Net that the media uses when it wants to panic over sex and pornography. While offering literally thousands of topics, most postings on these groups are basically worthless and, yes, many are pornographic, idiotic or otherwise offensive.

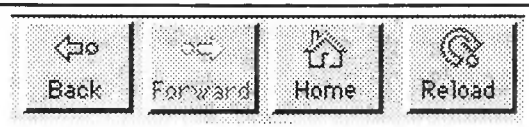
In practice, apart from straight e-mail usage, the Internet has become a collection of forums and information resources of variable quality and utility intended to help you find and communicate information on a wide range of topics. The arts should be interested in establishing bulletin boards and mailing lists which allow groups of people to communicate more or less directly. Mailing lists are probably more useful since, instead of merely posting comments to a bulletin board and hoping that you happen to be logged on when a response arrives, mailing lists invite users to subscribe and all comments and responses are mailed directly to them. This means you're less likely to miss anything.



A company called Illuminations, which also produces a television programme called the Net for BBC2, provides Internet services for arts organisations and galleries. Projects have included putting the Turner Prize on the Internet, setting up home pages for artists and musicians such as Evelyn Glennie, multimedia systems for the Scottish Arts Council, etc. Illuminations has demonstrated Web facilities to the Barbican Centre and is currently working with a number of arts organisations to help them get the most out of potential Internet services.

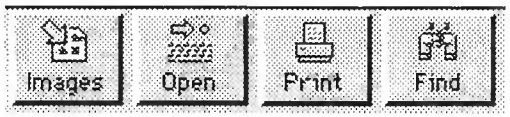
Through partnerships with companies such as Apple, Macromedia, Netscape and Adobe, the Net can be used for music, sound, digital video, animation and general multimedia applications. Mainstream business has been more cautious, primarily out of fear instilled by various vendors over a lack of security. Large companies fear that security issues aren't resolved yet, although financial transactions are now much better, efficient and more secure. But the very nature of the Internet means that it will never be absolutely predictable or dependable. Also, until the EC agrees on a high bandwidth infrastructure, speed, or the lack of it, will continue to dog European communications. Generally, the

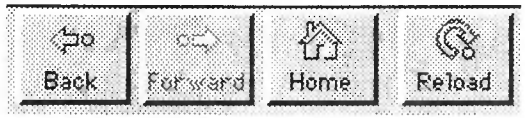




trend on the Internet is for more 'hand-holding' software to be introduced and more value-added service providers to emerge who will make the Internet not just easier, but more useful.

The growth in usage of access tools such as the World Wide Web, Netscape and Gopher has been extraordinary, serving to demonstrate the belief expressed by Nicholas Negroponte that what we really want is less bandwidth, not more. Rather than floods of uncoordinated and largely useless data that increased bandwidth seems to imply, users would prefer a stream of coherent and useful information. Particularly for users in the arts, data needs to be structured and its flow controlled and what we really need are tools to navigate our way through the information and ways to judge what's useful and what isn't.

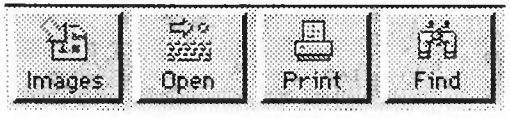




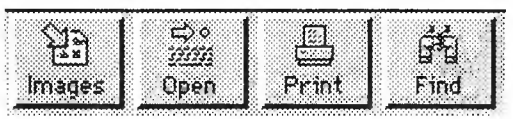
Second opinion
Stephan Stockton

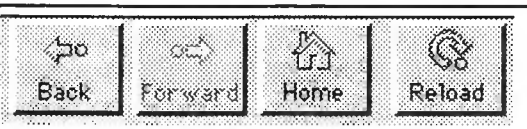
Beyond the Border is an International Storytelling Festival that takes place in the grounds of a 14th-century castle in the Vale of Glamorgan, South Wales. As part of the marketing strategy for this event, I decided to explore the marketing opportunities open to me on the Internet. I was very cautious about using this type of direct marketing due to horror stories I had heard about previous marketing attempts...the marketeer was 'spammed'...'flamed'...horrible things had happened to his host site...

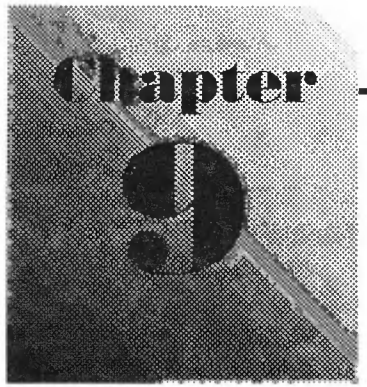
I came across a news group called *alt.arts.storytelling* and decided that it may be as good a place as any to place details about the festival. So, using the title International Storytelling Festival, my posting just said that the event was happening, who was going to be there and included a bit of PR hype. I finished by saying that if anyone wanted further details about this year's festival, or wanted to be put on the 'snail-mail' list for next year, they should contact me via e-mail. I received 136 replies – all of them positive – within the first 24 hours, requesting further details.



We get a large number of foreign visitors to the festival and in 1995 we had three coach loads of Americans. So, even though 70% of the responses were from abroad, I felt that it was an exercise worth doing. If only 5% of them come next year it would still have been worth it. All this little exercise cost was the local phone call to post the message, and the local calls to retrieve the e-mail. Altogether, about £1.50 for a total of around 200 positive direct leads for the event next year.







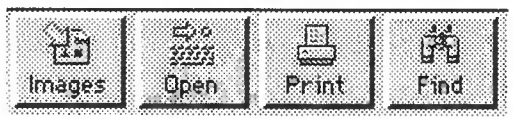
Digital Media Convergence

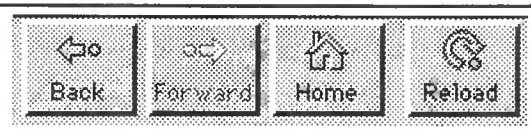
Rewind a decade or so to when the first generation of desktop publishing products hit the street, and you'll have a good feel for today's desktop video markets. Just as desktop publishing let users bring document production in-house, the latest generation of Mac-based products brings desktop digital video editing within economical reach of most small and mid-size companies. More companies in a wide variety of industries are realising the potential of desktop video. For the arts, it can open new markets, create better advertising, information or marketing material, or better serve in-house needs, such as creating training videos.

Whenever anyone starts to talk about digital media, there's usually a blurring of terms such as multimedia and digital video. Though a somewhat confusing term, multimedia can essentially be thought of as an application or series of components that bring together multiple types of media such as text, photos, sound, voice animation and video. A combination of three or more of these with some degree of user interactivity is usually considered multimedia computing. Multimedia

systems based on personal computers now allow for user interaction, which in turn increases attention, understanding and retention of the information being communicated. Multimedia is a useful information and selling tool and, as part of any well defined marketing strategy, can be used for a variety of tasks including image creation, PR, product awareness and education. Multimedia combines words, sounds and images to communicate in a more persuasive way than any single method can achieve and can also provide a unique opportunity to learn by doing. Such systems can be delivered or accessed either directly from a desktop computer or from a public-access kiosk via a touch-screen, keyboard or mouse.

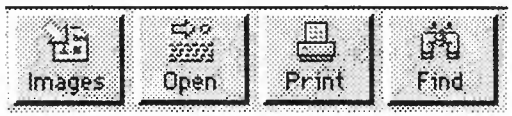
Multimedia combines diverse elements such as text, graphics, photos, video and sound recordings into a single source media, which allows users to interact or join in with a simple click of a mouse or the touch of a screen. All information necessary for creating a multimedia presentation or title can be stored on CD-ROM (Compact Disk Read-Only Memory). Although CD-ROMs look like normal music CDs, they can store huge amounts of digital information (up to 650Mb) and this





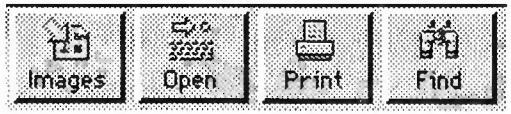
information can be easily accessed, cross referenced, viewed and printed in a variety of different ways. For example, visitors to a gallery or theatre could access a simple guided tour which would simply take them through the building, provide some historical background or perhaps show some more popular video clips of current attractions. Users could access the same system at a different level and call up more detailed information, clips of previous productions or booking information. CD-ROM and kiosk projects can offer fantastically detailed and colourful visuals, informative text and facsimile archive material, and even 'live' interviews and recordings. Many arts organisations could find that CD-ROMs could provide a commercially marketable product similar in nature to the Microsoft MicroGallery featuring the collection of the National Gallery, or dozens of other emerging electronic titles from publishers such as Dorling Kindersly and First Information Group.

Anyone with a Windows PC or an Apple Macintosh computer and CD-ROM player would have direct access to such applications. This would make it an ideal reference, marketing tool or medium for previews of



productions. Increasingly, multimedia titles or projects form the centrepiece of a visitors' multimedia kiosk at venues and arts-related systems could easily be accessed from a reasonably priced computer system with a touch-screen. Organisations such as English Heritage, tourism offices, museums and others may also find a use for such interactive visitor information kiosks running multimedia titles.

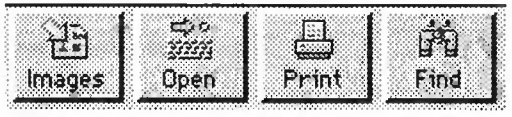
Digital video is perhaps the most exciting area of multimedia and could revolutionise the film and video industry in much the same way desktop publishing revolutionised the print business. Professional quality, non-linear on-line video production allows producers to digitise video on to a hard disk, edit in the computer using digital video effects processing and audio soundtrack tools and then output the result to traditional VHS video tape. Non-linear refers to the random access to video clips provided by hard disk storage as opposed to linear tape; and on-line means that final edits are performed with the computer rather than at an expensive video service bureau. Digital video can be used to produce traditional video cassettes for use with standard VCRs or, integrated within larger, computer-based multimedia systems.

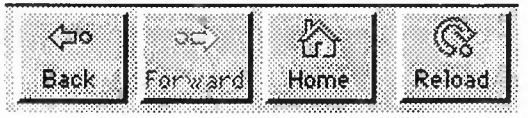


Digital Media Convergence

If a week is a long time in politics, a year can seem like lifetime in the emerging world of non-linear video editing systems. Just over a year ago, computer-based editing systems from companies such as Avid, Data Translation and ImMIX were heralding a new revolution in the industry by offering 'on-line quality' PAL and NTSC images at low bargain prices of between £20,000 to £60,000. And while compression artifacts often made the quality of such systems appear slightly inferior when viewed meticulously alongside more expensive traditional on-line editing suites, and hardcore users moaned incessantly about how long it took to process effects and transitions, all of these systems came pretty close to providing all the functionality of facility house suites, and more.

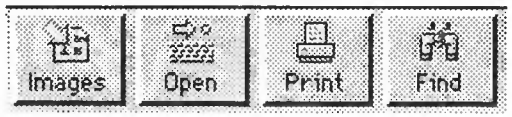
A year later, even the most sceptical production companies, which were particularly keen to protect their investments in traditional editing technologies, are beginning to buy digital systems in serious numbers. Prices have come down, new players have entered the market, functionality and ease of use have increased and overall picture quality and editability are now practically indistinguishable from traditional linear systems. Even newcomers like Radius, which made a not insignificant

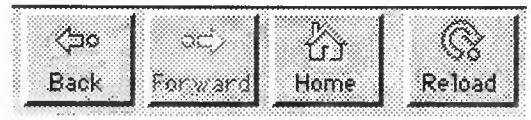




impact in the desktop video market with VideoVision Studio, now confidently maintains that its new Telecast system will deliver impeccable, full on-line quality.

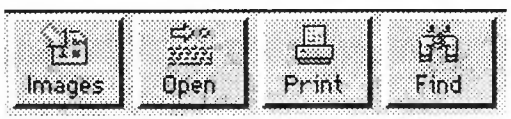
But in the world of video, the concept of standards can be confusing. Electronic broadcast standards vary between PAL, NTSC and SECAM, while production standards encompass a plethora of formats including BetacamSP, S-VHS, Hi-8, U-matic and VHS. Traditionally, this diversity required transferring source tapes to a common format for editing, causing repeated loss of quality. Non-linear, digital video-editing systems such as Avid, Media100 and even Radius VideoVision Studio, turned the Macintosh into a universal translator capable of inputting and outputting signals compatible with most traditional analogue video formats. And, since it was all done digitally, you could add layers of video, special effects and titling without loss of quality and without a bank of tape decks. However, while these systems could deliver broadcast-quality output in PAL and NTSC timings, recording full-screen, 60 field-per-second digital video input and output to and from a hard disk array, many professionals within the broadcast industry remained sceptical.





Just as some years ago desktop publishing sparked fierce debate and rivalry in the print trade, non-linear digital video continues to raise the hackles in an equally entrenched profession where one person's on-line is still another's off-line and where editors and engineers at many facilities houses are trying desperately to hold on to a lucrative business that is rapidly being hijacked by producers and directors with all-in-one digital systems providing unprecedented artistic and hands-on control. Since entrenched attitudes and restrictive practices can be hard to shift and since no one actually agrees just what exactly constitutes broadcast quality, it hasn't been too difficult for certain pundits to claim that digital editing is good, but still not ready for prime time.

Before these desktop systems were bold enough to claim on-line quality, non-linear digital editing was used primarily for off-line work and for the creation of EDLs with in/out time codes and recommended transitions at each edit point. Editors at expensive facilities houses would then make a final cut on an even more expensive on-line suite using the original source footage. The emergence of computer-based media integration tools such as Apple's QuickTime and video editing software



such as Adobe Premiere helped create the foundation for change which has now allowed companies to produce computer-based digital systems capable of peforming 'finished' or on-line work. But just as QuarkXPress and PageMaker couldn't turn visually challenged desktop publishers into designers, desktop video editing systems also place the full burden of visual aesthetics on the user. However, as mentioned earlier, producers, directors and even camera operators who are willing to rely on their own talents will reap huge benefits from digital systems which can actually pay for themselves after a few hundred on-line hours.

Building a video-editing system from the hardware perspective typically involves selecting a video capture and playback system, assembling a suite of video and audio hardware, ensuring that there is adequate storage, and performing a good deal of performance tuning on whatever personal computer the system is built around. Like the publishing and design world, digital video is done nearly 100% on the Macintosh rather than any other PC platform. For artists or arts managers that want to begin working with video, at least half a dozen

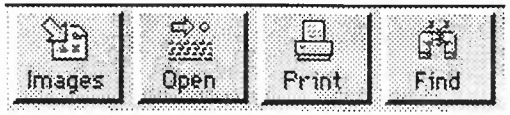
Macintosh-based products with near broadcast quality output have emerged in the past year and a half.

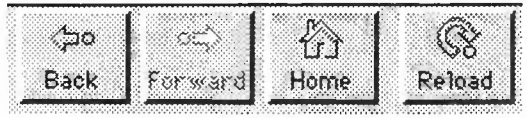
Typically based on high-end 68040 or Power PC machines with Fast and Wide SCSI controllers and 40 Mb or more of RAM, these systems range widely in price. There are two basic categories including the 'prosumer' systems, which start at around £15,000, including the computer and other peripherals, and the high-end professional systems, which start at £30,000. For those organisations planning to bring video in-house, hardware products such as Media Suite Pro from Avid, Media 100 from Data Translation, VideoVision from Radius and Targa 2000 from Truevision offer near broadcast quality output in a variety of video formats, including QuickTime.

Of the current players in the market, Avid has the largest installed base and perhaps the most mature software of any non-linear digital editor. Although still comparably idiosyncratic to learn and use, Avid offers a full range of video solutions, from VideoShop, an on-line QuickTime video editor all the way up to MediaComposer 8000, a Betacam-quality RTFX,

DVE suite worth nearly £90,000. At the high-end, other £30,000 plus systems include Accom's RAVE delivering D1 and D2 quality, ImMix VideoCube and VideoCubePlus, Heavyworks One and Lightworks Editor from Lightworks and the Sabre system from Grass Valley. But it's down at the under £30,000 mark that the competition is really hotting up. Even the most conservative of facilities houses does not seem to mind parting with around £20,000 to dip a toe into the digital editing pool, and for producers, directors and even camera operators who have no existing investments in editing equipment, the prospect of acquiring an affordable on-line system is too seductive to ignore.

Companies such as Matrox, Eidos, DataTranslation and Radius have all targeted products at this emerging market. Of these sub-£20,000 offerings, DataTranslation's version 2.0 of Media100 currently seems to be providing the stiffest competition on both features and price with a workable non-linear finishing system costing well under £10,000. Media100 even stands up well against high-end Avid suites and features more accessible interconnectivity with built-in QuickTime codec allowing easier interchange of files and clips between other popular





Macintosh imaging packages such as Premiere, AfterEffects and PhotoShop. However, version 3.0 of Avid's VideoShop will also run native on Power Macintoshes and is fully compatible with QuickTime 2.0 as well. Radius will be trying to grab a piece of this market when Telecast becomes available here although, unless they decide to cut the current suggested price of £15,000 by at least 25%, reception could be cool. Although Telecast has all the advantages and disadvantages associated with a QuickTime-dependent system, which will always leave it at a disadvantage next to systems like Media100, more aggressive pricing could ensure it a large chunk of the multimedia production market. Other developments, such as Pinnacle Systems' Aladdin video printer and Abekas' new plug-in for Adobe Premiere, will also help further narrow the perceived gap between desktop video editing and the high-end broadcast editing of facilities houses.

The editing software of choice to accompany the less-expensive products is usually Adobe Premiere from Adobe Systems. High-end systems, such as VideoCube and TurboCube from ImMIX and Media Composer from Avid, offer turnkey solutions and tend to be used more

by post-production houses. But choosing the right video capture and playback system is only the first of a number of decisions required to build a complete video and multimedia production facility. Video generates tremendous amounts of data, and selecting CPU, memory, disk arrays and tape backup systems, that provide the necessary performance, is critical. At best, lower data rates require higher compression ratios, which result in lower image quality. Worse, performance bottlenecks can result in dropped frames. When choosing a digital video system, you should always consider:

• CPU and memory. Because much of the video processing is done on dedicated boards, users may think raw CPU power is all they need, but it's not that simple. While having lots of memory is important – 40 Mb seems to be a typical minimum – many video producers often do most of their fine-tuning on hard disk arrays.

• Storage. A growing number of storage products are aimed squarely at the video market, including FWB's SledgeHammer FT array, Seagate Technology's Barracuda and Elite drives, MicroNet's Raven arrays,

Micropolis' WAV drives, Mirror Technologies' Precision arrays, Radius' StudioArray, and Mega Drive Systems' Seagate-based arrays.

These Fast and Wide SCSI disk arrays are considerably more expensive than plain vanilla SCSI drives, with prices climbing into the £2 per megabyte range. However, they offer sustained transfer rates in excess of 6Mb per second. The data transfer rate on most Macintosh SCSI ports tops out at about 4Mb per second, so getting the most out of the new drives requires adding a SCSI accelerator card. Prices on these accelerators, such as the FWB PCI SCSI JackHammer storage accelerator and the Atto Silicon Express IV SCSI accelerator have dropped into the £500 to £900 range.

Some users take a hierarchical storage management approach, using Fast and Wide SCSI drives for real work and then offloading clips, which will be used again soon, to plain SCSI drives and archiving on tape. Users who plan to put together their own systems should buy disk cabinets with lots of fans. Video production also requires high-end tape backup systems.

Mastering the various Mac-related aspects of desktop video editing is trivial compared to the arcana of video production. Even the most capable in-house production teams will find it worthwhile to use video professionals at various stages in their production. Similarly, the use of professional video equipment can make a huge difference in the editing process and in the final product. For example, camera noise -- dancing pixels - on a plain colour field can add several megabits per second to a video stream.

Switching from lower end composite video equipment, which uses only a single video signal, to component video equipment, which splits the video signal into several independently adjustable signals, dramatically reduces the noise in video signals, thereby reducing bandwidth requirements by about 1 Mb per second. Renting a broadcast quality Betacam SP deck on the day you digitise will improve the signal to noise ratio by more than 50 percent, and that improves compression.

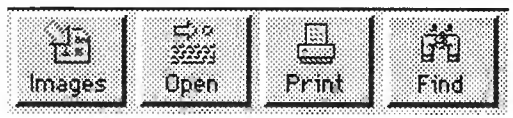
While analogue cameras continue to improve, digital cameras are now becoming available. For example, Avid recently began shipping

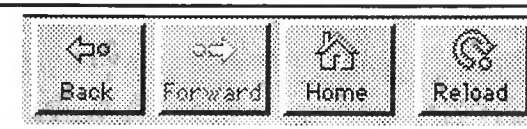
CamCutter, essentially an Ikegami Tsushinkia video camera that records directly on to removable hard disks. In addition, Matsushita recently announced a camcorder that uses the Digital Video Cassette standard, which relies on digital tape, and other video camera manufacturers are planning similar products.

On the editing and output side, there is a growing variety of options that control video hardware directly from the Mac. Sony, for example, offers for some time a proprietary solution called VISCA (Video System Control Architecture) that allows direct control of decks using Adobe Premiere. Abbate Video offers plug-ins for Premiere to control VISCA decks.

Perhaps the most vexing problem for would-be desktop video editors is rapid obsolescence. Sinking £35,000 into a system that could be obsolete in two years is bad enough, and the uncertainty surrounding future technologies and standards makes it hard to plan migration paths intelligently. While today's products are attractive for many users, the next generation of Power Macs with PCI buses provide some incentive to wait.

As in the early days of desktop publishing, with most of the emerging digital video systems, only a trained or obsessive eye is likely to spot the subtle differences between the images they produce and those produced by traditional systems. And as compression techniques improve, even the more subtle artifacts will disappear from final cuts ensuring that in the future, all on-line quality, non-linear digital video systems will produce excellent picture quality. What is important is that like desktop publishing, desktop video is putting powerful tools into new hands and in many respects, extending the creative process. And for an industry that relies on creativity for its survival, that can't be bad.





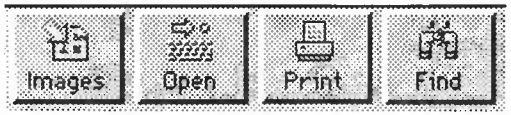
Hardware & Operating Systems

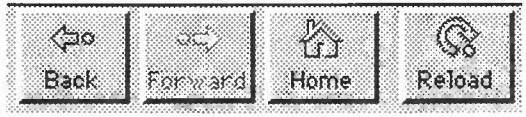
Personal computers have changed all of our lives and enable millions of individuals and organisations to be more productive and competitive. And while today's systems are advanced when compared to those of just a few years ago, tomorrow's systems will be vastly superior in power, sophistication and ease of use. Despite all the marketing hype surrounding particular platforms and operating systems, personal computer systems should always be chosen to match the way you work and your individual requirements, not some vague notion of industry standard or manufacturer-fuelled concern for some misleading notion of compatibility.

But while the infrastructure that is needed in the 1990s is significantly different from that which sufficed in the early 1980s, getting rid of outdated technology and replacing it with facilities that will survive the rest of the 90s is still a tricky and frustrating challenge for most arts organisations. In an increasing number of cases, the most difficult thing for most arts organisation will be admitting that they got it wrong, or even that they've out-grown their existing systems. Like it or not, the only

solution in such cases is to throw the whole lot out and start again, even though such drastic actions may be unpleasant, costly and traumatic. With the rapid change in technology, particularly the ratio between price and performance, in the long run, such action will inevitably turn out to be a blessing in disguise. Particularly with the advent of multimedia and on-line applications, the actual potential of equipment will rapidly become more important in the arts and investing in bottom-end computer systems, or even slightly outdated processors will prove to be extremely short-sighted and more of a long-term liability than in the past.

Fortunately, with a bit of planning and forethought, the decisions you make regarding any system specification don't have to be irrevocable, providing each component can be upgraded later. But even by ensuring upgradability, you will inevitably incur more costs than by buying the right kit in the first place. You will also probably be left with odd items of equipment such as old printers, monitors, and even modems, that you no longer need and are of no significant value even on the second-hand market.





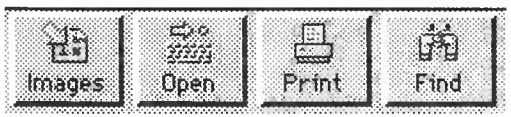
The most significant variables in specifying a PC system are:

• type of processor...the component that actually does the computing. Always buy the fastest you can afford.
• hard disk size...used to store programs and data, capacity is measured in megabytes(Mb) and it's not worth buying anything smaller than 200Mb. With new programs often occupying 20Mb of disk space, always go for the largest drive you can afford.
• memory...RAM, or Random Access Memory, determines what you can run and how you can run it. Minimum today is 4Mb but realistically you will probably need 8-12Mb or more to work smoothly.
• display controller...a kind of card fitted in you PC which determines how many colours and how much resolution you can have on your monitor.
• monitor...look for high refresh rate. For Intel PCs, don't settle for less than VGA. For Macs, always go for Trinitrons.

How well any PC system works depends on the way the individual components are matched to each other. Fast processors, for example, can be held back by slow display control or too little memory. Beware of box-shifters putting together so-called bargain systems with out-of-date processors, small hard disks and inadequate memory.

Like it or not, there is never a right time to buy a personal computer system. Newer, faster and cheaper models appear with frightening regularity but if you wait, there will still be something better just about to be released the week after you've finally bought something anyway. The lesson here, again, is simply ensure that whatever you buy is at least capable of running the software you intend to use and that it has as much extra capacity as possible to cope with possible future demands.

Perhaps one of the most important changes in the computer industry over the past few years, apart from the price/performance improvements in processor technology, has been the replacement of the old-style command/character-based operating environment with newer, friendlier and more consistent Graphic User Interfaces or GUIs.

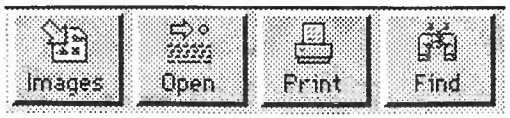


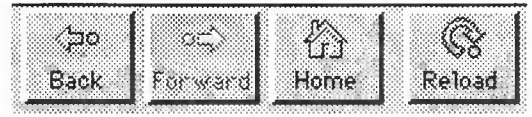
Apple was the first to use this concept successfully on the Macintosh and its success and effect on market share has caused IBM and the clone manufacturers to take GUIs very seriously. With the arrival of Windows and the later OS/2, there remains little doubt that the whole industry has finally moved to the graphical approach, and the commitment to the WIMP approach using windows, icons, mice and pull-down menus is pretty well total. The few remaining reluctant MS-DOS-users will be able to stick with the old text-based command-line interface, if they stick with their old hardware, but Windows has already been shipping with most 486 and Pentium machines and Windows 95 is now bundled with most new hardware, providing an even stronger incentive to move, especially since most of their existing software won't run on the new system.

Apple is strengthening its own position with the launch of System 7.5, now bundled to other suppliers and licensed for other platforms as MacOS. Microsoft's 'improved' Windows 95 operating system has not lived up to its promises and there are currently a lot of disgruntled users out there. As I wrote in a magazine column shortly after the launch of

Other considerations

- **all PCs are relatively expensive to buy.**
- **staff need training to learn to use them effectively and that takes time and money.**
- **PCs do break down and become obsolete.**
- **PCs need to be insured often separately.**
- **computer theft is a growth industry.**
- **maintenance contracts cost around 15% of the total system price per annum.**
- **proper ergonomic desks and furniture are now required by EC law.**
- **you'll have on-going costs for disposables and new software.**
- **if your manual system doesn't work...don't expect your computerised system to either.**





Windows 95, quoting Brad Silverberg, one of Microsoft's senior vice presidents: 'It's clear that the hype about Windows95 got out of hand. We (Microsoft) take our share of the responsibility for creating unreasonable expectations.'

Despite some of the more dramatic marketing ploys indulged in by Microsoft, such as buying an entire print run of the *Times* for the launch of Windows 95, or the unsubstantiated claims for ease-of-use and productivity, once people got it home, Microsoft's new clothes became increasingly transparent. Windows 95 can take over two hours to install and doesn't work well on anything less than a 16Mb Pentium machine with between 40-60Mb of free hard disk. Given the variety of PCs, graphics cards, sound cards, CD-ROM drives and monitors out there in Wintel land, it's little wonder that the mood soon turned ugly. Since the launch of Windows 95, Microsoft's hotline has become increasingly lukewarm, inundated with complaints from users unable to set up their systems or experiencing dramatic or violent crash and burn scenarios. So much for the operating system that was supposed to make computing as easy as riding a bicycle.

Despite the massive uptake of Windows and the $150m spent on its launch, the Apple Macintosh remains the easiest personal computer to use and the consensus among hardware and software companies is that the Macintosh-style GUI still offers more power, consistency and value for money than Windows 3.5.

Platforms

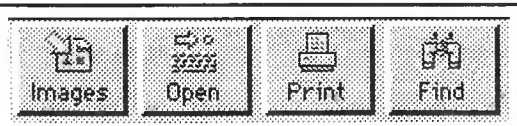
Today, your choice in the personal computer world essentially boils down to one of two hardware platforms and one of three operating systems. You can either choose a personal computer with an Intel processor running Windows or OS/2WARP, or, you can choose a Motorola/Power PC processor running Macintosh OS.

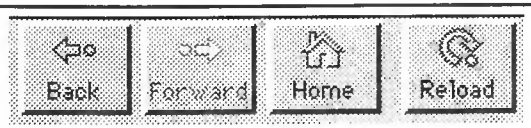
So-called IBM-compatibles share a common processor family designed by Intel, but now also available from other manufacturers. These chips are identified by numbers ending in *86*, eg 80286, 80386, 80486. If you choose to buy a Wintel PC (an Intel processor running Microsoft Windows), don't consider anything less than an 80486 or Pentium (the 80586). This is absolutely vital if you have any intention of trying to run Windows 95. Unfortunately, knowing a 486's processor speed isn't

always sufficient since, like all IBM-compatibles, there will always be slight variations in the way the chips operate and work with other components. That's why instead of just 486, you'll see 486-SX, SX-2, DX, DX-2, or even DX-4.

Rather than confuse yourself further, simply look at the processor speed in MHz (megahertz). Pentium chip run faster than 486 chips and despite the fact that Intel still hasn't moved to the RISC platform, tend to be a more future-proof investment. However, pricing of Pentium PCs will be several hundred pounds more than 486 PCs of similar speed. It's also worth noting that, unlike the Power PC platform which has several hundred native applications which actually can use the full potential of the chip, there are only a dozen or so software applications optimised to take full advantage of Pentium's added speed and performance.

Confidence in the Pentium chip was damaged considerably when it first appeared. Early chips had a serious flaw which meant they were 'numerically challenged' and would give inaccurate calculations in serious finance and accounting applications. Intel assures us that all





current Pentiums do add up properly. Intel is currently working on a new version of Pentium called P6 which they've been touting as 'more RISC than RISC', even though it's still a CISC processor. This is essentially what differentiates Intel from its Motorola/IBM competition, the Power PC. One interesting left-field factoid is the authoritative rumour that the P6 will not run 16-bit code much, if at all, faster than a Pentium at the same clock speed. Apparently Intel believed that most code would have migrated to 32 bits by now, and made no effort to optimise 16-bit operations. This would help to explain why the P6 is being promoted as a server rather than desktop product and why Microsoft is twisting developers' arms to port to NT if they want to keep using the Windows logo. It would not be a wild supposition to guess that there's so much 16-bit code in Windows 95 that neither it nor the current crop of applications would avoid embarrassment on a P6 box. In other words, it will be dead slow.

As CISC (complex instruction set computing) technology has aged, processor designers have found it increasingly difficult to achieve significant performance gains at reasonable costs. RISC (reduced

instruction set computing) offers a better foundation for achieving the needs demanded by users and developers in several respects. RISC technology makes possible major leaps in performance at very competitive costs, is smaller and less expensive than CISC processors like Pentium, and produces less heat.

This is important because cooler processors need less space and power. The Power PC chip is a RISC processor and today's range of Power PCs and PowerMacs is the direct result of a joint venture between IBM, Apple and Motorola, launched in 1991. Compared with the current Intel range, the Power PC design benefits are obvious. With its scalable architecture, Power PC provides a full array of chips that can be deployed across many platforms from notebooks systems right up to high-end workstations and servers. It can also support a wide variety of operating systems including MacOS, AIX Unix, Windows NT, NetWare and Solaris. In the case of the Macintosh, Apple has successfully ported the operating system to the Power PC platform and nearly all current Macintoshes are Power PC based. Unlike migration to Windows on the Intel platform, the latest version of the Macintosh

system allows virtually *all* existing Mac applications to run on PowerMac computer, in addition to the several hundred *native* applications accelerated specifically for the Power PC processor. And for those of you who are still bamboozled by the old compatibility argument, all current Macintoshes can also run MS-DOS and windows programs. As a matter of fact, you can even buy a Power PC Macintosh with an Intel processor on board as well so you can run Windows or Mac software on the same machine.

Intel PCs and MS-DOS became successful because clone manufacturers produced a vast range of cheap IBM-compatibles. Apple tried to keep its system proprietary and for a number of years, always looked expensive by comparison. Although the Macintosh pioneered the graphic user interface (GUI), and has always been more sophisticated and easier to use than a DOS-PC, it was Windows which finally brought GUIs to the PC masses. Some years ago, Apple finally cut its prices and has held its lead in creative applications such as publishing, design, multimedia and video. But its recent decision to license its operating system, albeit rather late in the day, was one of the

most sensible the company has ever made. Now, it will be possible to buy Mac clones more or less the same way one can buy a Wintel clone. And, Apple's initiative to create a clone industry was given a boost recently when IBM confirmed that it will license the MacOS and offer it as an option when it produces CHRP-compliant Power PCs. IBM's professed strategy is to fend off Microsoft by offering its own 'universal client' to corporate customers. This means that IBM will supply any of the range of operating systems for its Power PC machines including MacOS, WindowsNT, Sun Solaris and NetWare as well as its own OS/2 and AIX offerings.

As a bit of a turn-about, Apple is expected to offer IBM's OS/2 as an option on its own CHRP-versions of the PowerMac. Since the Mac is familiar to users as a friendly, easy-to-use machine, both companies are hoping that the Power PCs with MacOS will give Windows 95 a run for its money. When someone says you must buy a Windows PC because 'there are thousands of applications available', simply ask yourself, 'How many do I need and how many will I actually use?' Every major application that an arts organisation needs or thinks it needs can

probably run on either a Windows PC or a Macintosh. In larger organisations there is no reason not to have PCs and Macs running on the same network, particularly since all Macs come with built-in networking where PCs have required the purchase of add-on cards and so on. I don't subscribe to the philosophy that if you don't buy everything Wintel or Microsoft you're bucking the trend. There are over 20 million Macintoshes out there and considerably more Wintel PCs, but we all know that the best technology isn't always the best selling technology.

Operating Systems

Today, for most personal computers, you have the choice of three main operating systems:

- Windows 3.5/WindowsNT/Windows95
- MacOS
- IBM OS/2WARP

Windows 95

It always fascinates me how in one breath, article after article in the computing press describes the latest version of the nine year-old Microsoft Windows as 'Mac-like', while in the next, they take pot-shots at

Apple for not being mainstream enough. Let's face it, *every* version of Windows has been labelled 'Mac-like', but Windows 95 actually brings many of the best features of the Macintosh to the Intel PC. With outstanding legal actions about look and feel over and done with, Microsoft has borrowed wholeheartedly not only from the Macintosh interface, but also from IBM's innovative but ungainly OS/2. However, Windows 95 is still merely a GUI kludge sitting on top of DOS, unlike the MacOS or OS/2, which are full-blown, stand-alone operating systems.

There is no longer a division between File Manager and Program Manager and you can choose to use Mac-like folders or hierarchical menus. DOS is gone, but you can still use some DOS commands for certain tasks and if your hardware is up to it, Windows 95 offers nearly Mac-like 'plug-and-play' capabilities. Compared with Windows 3.1, Windows 95 looks to be a real improvement, although not without some cost to software compatibility, memory requirements and overall hardware platform. Some developers have also grizzled about the significant amount of 16-bit code in what is purportedly a 32-bit operating system and early beta-testers have said that the whole

implementation still feels klunky and 'very toy-like'. Many changes to Windows 95 are cosmetic while others go well beyond anything currently offered by the Macintosh's System 7.5. All in all, Windows 95 does pose a serious challenge to the Macintosh and for most people, ie probably all existing Windows users, Windows 95 will seem as good as the Mac, though different. Apple and IBM, of course, hope that while current Windows users will become blind adopters, perhaps new users will still find the MacOS more compelling and easier to grasp.

MacOS

The Macintosh operating system, currently being licensed to other vendors as MacOS, is based around the most recent version of System 7.5. While making sure that new Macintosh technologies provide upward compatibility for the installed base, Apple has also recognised the need for compatibility with the rest of the computing world, introducing dozens of products and technologies that support industry standards and cross-platform computing. This means that Apple offers a range of solutions for Macintosh, MS-DOS, Windows, Unix and OS/2 users. The new Power PC RISC Macintosh will actually run most MS-DOS and Windows applications at speeds comparable to that of Intel 486

systems. Despite the hype around the launch of Windows 95, independent surveys still show that Macintosh users complete more tasks in 44% less time than Windows users and also 85% complete them correctly compared to only 58% of Windows users.

Generally, Mac users are more productive, require less training and because of Apple's licensing and pricing policies, are no more expensive to equip than their Wintel brethren. In fact, when you take into account all the built-in facilities of the Macintosh such as networking, sound, video display, multimedia, and plug-and-play peripherals, it can be a cheaper option than many Windows alternatives. The current MacOS will be replaced by an even more sophisticated system, code-named Copeland, featuring intelligent assistance, increased access to on-line systems and telephony and, unlike Windows software and Windows 95, all previous and existing Mac applications will still run.

OS/2 WARP

OS/2 Warp was IBM's attempt to break the stranglehold Microsoft had on the company with both DOS and Windows. OS/2 is, in many ways, a

lot better than Windows and recently had the coolest series of TV commercials this industry has seen for some years. However, for most single users and small businesses, there's little reason to choose OS/2 over either the MacOS or Windows. Few software applications have been developed or optimised particularly for it and even IBM is now firmly putting its Power PC future in the direction of the MacOS because of its wider user base and level of acceptance.

It is becoming increasingly difficult to suggest a single computing solution for the arts. How organisations choose to use technology varies so much and the possibilities for system configurations to perform almost any task is probably within the grasp of any medium to large-scale organisation. Networking, both locally and over a wide area, is much more of a consideration in the arts now than it was a few years ago and generally, pricing makes choosing a system essentially a buyers' market.

When choosing a personal computer system, I can only suggest, as I did in *Computers For Arts Marketing,* that people consider the advice given by John Ruskin over 100 years ago, when he said: 'It is unwise to

pay too much, but it's worse to pay too little. When you pay too much, you lose a little money - that's all. When you pay too little you sometimes lose everything, because the thing you bought is incapable of doing the thing it was bought to do. The common law of business balance prohibits paying a little and getting a lot -it can't be done. If you deal with the lowest bidder, it is well to add something for the risk you run. And if you do that, you will have enough to pay for something better.'

The 1990s will certainly see an unprecedented number of new digital technologies and new uses of existing technologies for arts producers, managers and marketing professionals. As mentioned previously, notebooks, Personal Digital Assistants, wireless communicators, telecommuting, teleconferencing, multimedia marketing and the extension of the Information Superhighway are just some of the developing areas arts managers will have to consider in the future.

On-line services such as CompuServe and the Internet will become increasingly important to arts organisations and practitioners alike and will eventually, perhaps, replace conventional post and fax

communication. Interactive multimedia technology will also have an impact on performance, venues, marketing, information provision and direct sales of tickets and other areas. However, despite the rapid pace of development and innovation, arts mangers simply need to remember that the really important changes in personal computing won't necessarily involve hardware, the evolution of which is easier to discern, but rather how real people actually choose to use it.

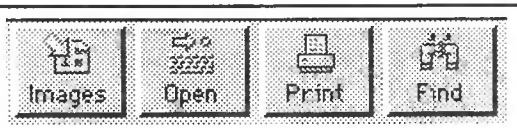
Surfing The Net

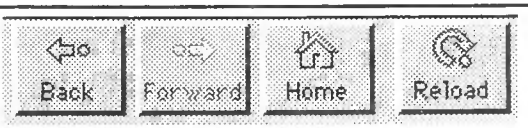
In many respects, the World Wide Web is rather like the biggest newsagent in the world, tucked away inside your PC. Over 30,000 publications/sites are available for you to browse with hundreds of subjects covered, from computing to the arts, from politics to the perverse, and anyone with the right equipment can access sites, design pages and place them on the Web. But like CD-ROM, there's more to the Web than words and pictures. You can now use video, sound or complete programs from the Web on your own computer, either in real time, or downloaded to your hard disk for use later. The Web is growing fast, it looks attractive and professional and it's the easiest part of the Internet to use.

Getting Connected

Getting yourself connected to the Internet is relatively simple, assuming that you already have a PC, a modem and a telephone. Next you need to find a *service provider*, a company that can provide you with an Internet connection. Service providers come in four main flavours:

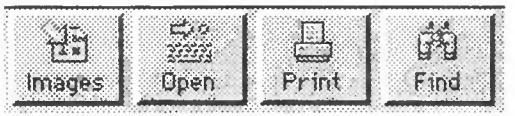
- dedicated connection
- dial-in or SLIP/PPP connection

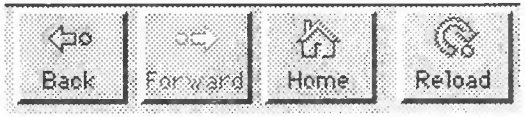




- dial-up or terminal connection
- mail-only connection

Dedicated connections are expensive, permanent direct links to the Internet which are usually found at universities or in large businesses and are probably impractical for most arts organisations, apart from perhaps the Arts Council itself. Dial-in connections give you access to a company that has a direct connection to the Internet and enables subscribers to dial in and use its special connection. Users get an individual host name, can download files directly to their PCs and can use popular graphical browsers on the Web. Dial-up connections are the kind of services offered by commercial, on-line providers such as CompuServe, Delphi and CompuLink. These, too, are subscription systems which provide a range of value-added services such as conferencing, databases and forums and then provide indirect access to the Internet. Mail-only connections are usually bulletin boards offering Internet e-mail as part of their service, and little else. The only real advantage of these sort of services is that they are generally free or very cheap.





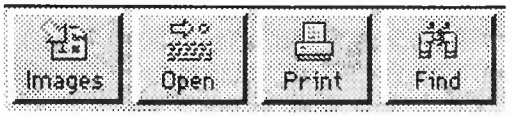
Getting there

Getting a Windows PC on the Internet, as with all things PC, is a bit more involved than doing the equivalent with a Macintosh. Whatever your PC, don't try to surf the Net with anything less than a 14400bps modem. You can get one for around £200 or less and companies such as US Robotics or Global Village are a good choice. Decide on the level of service you want or need, eg full Net access, simple e-mail, mail-forwarding, your own Web page, and remember: there's no point in getting a full-service provider if all you want to do is send e-mail.

If you don't need full Internet access, services such as CompuServe are more orderly and easier to use. Once you've decided what level of service you need, then, you have to find a service provider. There are over a dozen service providers at the moment and more coming on-line every week. While nearly all of these grant Net access, rates vary, depending on the level of support offered.

Before you actually venture into the realms of cyberspace, you could visit somewhere like Cyberia, the UK's first cybercafe, located behind Goodge Street tube off Tottenham Court road. You can have a coffee

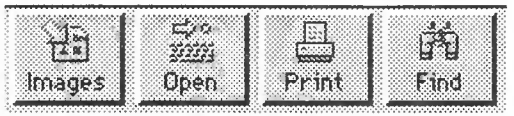
The French Comité Consultatif International Telegraphique (CCITT) is responsible for the current set of V-signs for modems. All you have to remember is the higher the number, the better the modem, especially if it's followed by the word 'bis'.
V.22bis: standard 2400bps modem
V.32: standard 9600bps modem
V.32bis: standard 14400bps modem
V.42: additional hardware compression standard for improving transmission
V.42bis: another special hardware compression standard
MNP: not a V-sign, but a series of error-correction protocols

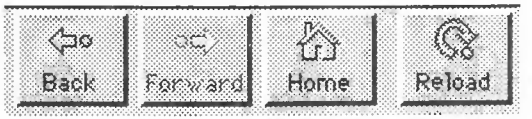


and try out the Internet using one of the half dozen or so PCs provided to see what's out there before you buy into a system of your own. Usage charges are £2.50 per half hour, and coffee and cakes are extra. The whole cybercafe concept is growing and similar installations are now found in pubs, galleries and other venues. For arts organisations, particularly arts centres and mixed programme venues, installing a cybercafe facility could be a particularly shrewd long-term investment and a way of staying in touch with the growing digital revolution.

Internet service providers

Service Provider	Registration	UsageCharges	MaxSpeed	ModemUser Ratio	Contact
Demon	£12.50	£10/month	14400	1:40	0181-371-1234
EasyNet	£25	£9.90/month	28800	1:8	0171-209-0990
RedNet	£25	£15/month	14400	1:30	01494-513333
Delphi	none	£10-£20/month	14400	unavailable	01171-757-7150
CompuServe	£24.95	£6/month	14400	unavailable	01734-567400
GreenNet	£15	£5/month	28800	1:125	0171-713-1941
CityScape	£50	£180/year	14400	1:30	01223-566950





Surfing The Net

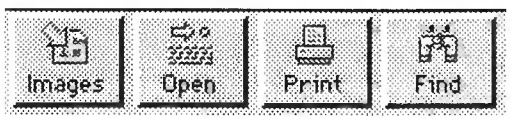
To get the most out of the World Wide Web, you need a Web browser. Essentially, this is a bit of graphical software that gives you access to Web pages, newsgroups, FTP sites and so on. The two most popular browsers are Netscape Navigator and NCSA Mosaic. Currently, Netscape is the all-time favourite and is probably the fastest browser you can use on either the Macintosh or Windows PC and you'll find that pages load nearly twice as fast as any other browser.

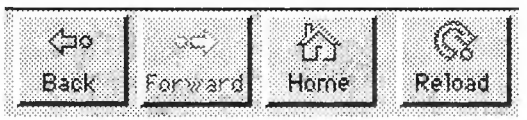
Web Browsers

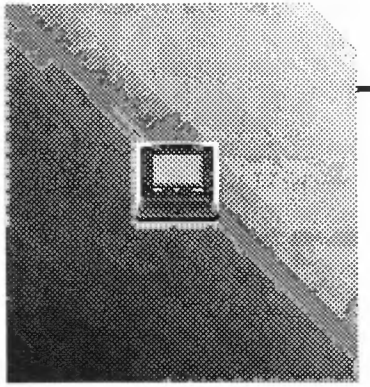
Browser	Price	Contact
Netscape Navigator	$30*	001-415-528-2555
Mosaic	£25.85*	0171-497-1422
TCP/Connect 2	£139	01223-250120
WebSurf	£163.33	01483-302333
IBM Web Explorer	£85	01329-242728

*** Both Netscape and Mosaic can be downloaded from the Internet free, for either personal or educational usage**

As a final note, while the Internet may not be everything the media hype suggests it is, it is still an important aspect of the digital age. The arts cannot afford to ignore it and the sooner organisations begin to explore its potential and get themselves wired in, the better.







About The Author...

Michael Prochak is a freelance writer, journalist and multimedia producer who has worked in various aspects of publishing, radio and TV, music, PR/marketing, education and the arts. He's a columnist for *MacWorld*, writes books for Addison-Wesley and is a regular contributor to a variety of national newspapers and magazines, including *MacWorld, Creative Review, ComputerLife, Computer Weekly, PC Dealer, PostUpdate, the Guardian, Daily Telegraph, Evening Standard, Daily Mail, the Times, Times Education Supplement* and the *FT*. Non-computer activities have included running an arts centre, working for a Regional Arts Board, editing two anthologies of British poetry and fiction, writing and producing several stage plays/ musicals, writing and directing for film and video and cutting a rather mediocre record album. He holds a BSc and an MA and is a Fellow of the Royal Society of Arts. His most recent book, on mobile computing, published by Addison-Wesley, is entitled *On The Road...Pervasive Portable Computing With PowerBooks, PDAs and Beyond*. He is currently launch editor for *CGI*, a magazine on computer-generated imaging.

Glossary

Accelerator card
A hardware add-on that wil speed up the original microprocessor by plugging into o PC's expansion slot. It doesn't reolly work all thot well with very old PCs or XTs, but can be a reasonable upgrade for converting 286s or 386sxs or even full 386s.

Access time
This is the omount of time it takes for a PC to find and display a piece of information you've requested. It also refers to the omount of time required to transfer on item of data between storage medium eg floppy disk, hard drive, etc and the main computer memory. As a measure of speed of operation, it usually relates to the type of processor used, eg 80386, 80486, 68000, 68030, etc., and can vary between seconds and several minutes depending on type of operation. Even on a fairly fast PC, searching and sorting a lorge database can take quite some time .

Acoustic coupler
An older, less reliable method of attaching a modem to o telephone. Provides cups which physically attach to phone handset so modems can be used in hotels or from public phones with notebook PCs.

Application
Usually refers to those software packages that make the PC do all those wonderful things like process text and crunch numbers. An application can also simply be the generic use to which o computer is put.

Archiving
Essentially, the process of periodically removing old or little used data from a database or filing system and transferring it to another medium for long-term storage eg tape streamer, optical disk, removable hard drive etc.

ASCII
American Standard Code for Information Interchange or, more simply, a standardised code to symbolise common characters on the computer keyboard and communications instructions. A sort of computerised lingua franca facilitating the transfer of data from one system to onother, including completely different systems.

Authoring
A process or environment for developing or assembling interoctive multimedia opplications. Authoring longuages can be used to produce public access systems, training materials, presentations, multimedia productions, etc.

Auto-answer
A feature supported by most modems which allows them to automatically onswer calls from remote machines.

BABT
British Approvals Board for Telecommunications which makes sure that equipment connected to the public telephone network is safe. Modems and other approved kit are morked with a green circle and it's illegal to connect up non-approved equipment ... even if it hoppens to be approved and in use elsewhere in the world.

Back-Up
This is most simply a second copy of o computer application or file taken as a precaution against loss or damage to the original. Despite the reliability of most modern PCs, hardware, software and particularly people, remain fallible. Although this is one of the most important housekeeping routines for any computer system, it is olso one of the most neglected. A number of users never take back-ups until they have a mossive disk foilure and lose six months worth of work.

Bad Sector
An areo of a storage disk that has become unusable because of corruption or a fault in the recording media surface. Data stored to bad sectors may become unreadable or unrecoverable. Problems can be minimised by optimising and de-frogmenting hard disks regularly with programs such as Norton Utilities.

Batch Processing
A throw-back to old mainframe operation, this is o technique on old DOS PCs that allows a group of commands to be listed together in o single 'botch'. Processing does not begin until all the input, including data and/or programs, have been collected together.

Baud
The term used in PC communications to meosure the signalling rate on a data channel. Baud Rate indicates the speed at which data can be sent or received or the speed at which communications (comms) link can transfer computer information.

BBS
A simple communications system (Bulletin Board System) often run on a PC as a hobby or general service. Operates like o communal notice board on which electronic messages, advertisements, conferences, etc can be left for others to reod. Can also provide e-moil services, news, etc

Benchmark
A measure used to measure computer hardware or software performance. Used by 'lab' units of popular PC magazines, these measurements are most reliably based on set timing tests of real application programs performing tasks. Some magazines tend to use artificial benchmork programs intended to simulate real-use situations. Unfortunately these can be notoriously unreliable.

Glossary

Best So Far Version (BSFV)
Often used to describe a particular level of an incomplete application such as a database management system which contains all information captured to date.

Binary File
A file containing information other than normal ASCII characters, i.e. any file which isn't a plain text file.

BIOS
Stands for Basic Input/Output Subsystem. Essentially, it's software that provides fundamental input and output capabilities for other software to use and is customised for particular hardware. Usually refers to software built into every IBM-compatible PC which provides basic functions such as keyboard, screen, printer, disk and serial interface control.

Bit
The smallest piece of information that a PC can deal with. Comes from the term Binary Digit and is therefore either 1 or 0.

Bitmap
Data represented by individual bits or dots within a block of memory and usually refers to graphics where the value of particular pixels in an image are held in particular bits.

Black Hole
In database terms, where information you once had, or at least, knew how to get, disappears into what you can no longer access. May contain a lot of useful information, but is so disorganised and chaotic, you can never hope to find anything lost there.

Board
Shortened version of 'printed circuit board' often used as another name for an expansion card.

Bomb
Slang used to describe when a program terminates prematurely because of an exceptional error. When a system 'bombs' or 'falls over', chances are that at the least, you'll lose any un-saved work, and at the worst ...well, it's not worth thinking about.

Boot
Not those things that everyone were in Blazing Saddles but rather computer slang for 'boot-strap' ... or to start a program by loading the main set of instructions into the computer's short-term memory.

Buffer
A storage area where data is put while it's waiting to be passed on to another part of the system. Useful when processing large mailing lists since if you have a big enough buffer, you can go on using your PC for other activities while the printer is working on your list in the background.

Bugs
Slang for faults in the logic or design of a program which can cause it to go wrong. The term is a carry-over from the days of valve-driven mainframes when real 'bugs' used to be attracted by the heat and fly into the works causing burn-outs.

Bus
A pathway for data moving around a computer system that's shared between several devices... rather like public transport for data.

Byte
A group of usually 8 bits treated as a whole. Bits are grouped together to form characters which represent ordinary letters, numbers etc. PCs which have more bits in each byte, eg 16 or 32 bits, are potentially quicker and more powerful. Memory size, eg 612K, 640K, etc is measured in KiloBytes (K) which represents 1024 bytes each. A MegaByte (Mb) equals 1 million bytes.

C/PM
An early PC operating system produced by Digital Research. Mostly found an obsolete pre-DOS, 8-bit computers, although it is still used in the Amstrad PCW series.

CBT
Computer Based Training. CBT is often used to teach the operation of application software or operating systems and will often use simulations, self-running demos, animated sequences, and repetitive drills. Can provide effective low-budget training.

CD-ROM
Stands for Compact Disk Read-Only Memory and provides a mass storage medium based on the same technology as music CDs. Each CD-ROM can hold masses of data, typically around 550Mb in a low-cost, virtually indestructible form. CD-ROM is particularly suited for storing visual imagery, video and sound and has became an essential element in multimedia productions.

Centronics
A standard parallel-style interface used to connect PCs to printers, etc. Faster and generally more trouble-free than serial connections.

Glossary

CGA
Colour Graphics Adaptor, or the oldest PC standard display to provide some degree of colour and graphics. Now considered low-resolution and fairly poor quality for text display.

Chip
A tiny piece of silicon onto which circuits and transistors are etched. Usually encased in black plastic, these come in a variety of different types and perform anything from simple functions replacing a few electronic components or providing simple logic abilities, to memory storage and complete computer processors. Microprocessor chips such as Intel's 80286/386/486 etc or the Motorola 68000/020/030/040 etc are part of the working heart of a PC and carry out a range of tasks, determine speed of operation, etc.

CISC
Complex Instruction Set Computer, or the opposite of RISC. These are found in most standard PCs today and essentially provide a computer design philosophy where processors understand a large range of instructions.

Classification Scheme
Produced as an important preliminary exercise in any database or management information system construction. Basically, it's a method of associating designated levels of importance with the information held by an organisation.

Client
A programme that accesses information across a network, such a Web browser or newsreader.

Clock Speed
This is simply the operating speed of a PC processor in megahertz (MHz). It provides an idea of relative processing speed but should only be used as a guide. Occasionally, apparently slower clock speeds actually turn in better performance.

Clone
A copy of another PC design or software product. Most IBM-compatible clones today offer better value for money than genuine IBM machines. Clones have become so popular that even companies like IBM and Compaq are manufacturing their own clones.

Co-Processor
A specialist chip dedicated to some particular task used to improve performance by taking some of the workload off the PC's main processor. Eg, a maths co-processor.

Compatibility
Simply, the ability of various parts of a computer system to work together. This can mean different hardware systems being able to use the same software or peripherals or, more importantly, to be able to pass data outputs to and from each other. Today, most PCs are either MS DOS compatible or Apple Macintosh compatible. All Macintosh computers can read and write MS-DOS disks and files and can even run MS-DOS programs. Most of the useful industry standard applications such as WordPerfect, Excel, Lotus 1-2-3, PageMaker, Word, etc, are available in versions for both platforms and can easily exchange files between systems or over a network. Most applications now provide 'patches' or filters which allow them to translate other file formats and all will save to standard text or ASCII formats which can be read by all PCs.

Concurrent Access
A mode of accessing a database in which two or more users are able to perform operations within a given interval of time. Available via multi-user systems.

CPS
Characters Per Second. A measurement to indicate the speed of a printer, usually representing the number of letters or characters it can print per page, per second. Usually grossly over-estimated in adverts.

CPU
Central Processing Unit, or the heart of any computer. Often includes the arithmetic unit, control unit and immediate access store, peripherals must contain main dynamic memory, but not disk storage memory.

Cursor
This is that blinking point on your screen which indicates where your next character will appear when you type from the keyboard. The shape and format of the cursor often varies on different machines and within different software applications.

Data
Just treat the word as if it were 'information' and everything else will fall into place. Raw information processed, hopefully, into useful information by the computer.

Data Capture
The process of identifying, isolating and gathering data to be stored and analysed by an application such as a database, spreadsheet, statistics package, etc.

Glossary

Data Dictionary
A centralised repository of information describing the logical structure of a database, such as categories of data, rules, data item formats, and so on. Usually an important item of system documentation and can either be stored separately or integrated into the database itself.

Database
A collection of data relating to a particular subject or a kind of filing program for storing, sorting and retrieving information. (Included in the filing programme is the database management system, not the database). The main advantage of a computerised database is that it should allow you to easily and flexibly access and analyse the current state of your data and produce very detailed and selective reports. Nowadays, databases typically divide into four categories:

- free-form or 'text' databases capable of storing information in a relatively unstructured way
- flat-file databases capable of handling one type of record at once, or even looking-up information held in other files
- hierarchical databases which arrange their records in a pyramid like structure are still also used
- relational databases comprised of various types of records which can be linked and 'related' to other records. Newer multimedia databases can also contain pictures, graphics, video clips and sound.

Database Administrator
The person who is ultimately responsible for a database; particularly for defining the rules by which data is accessed and stored. Usually responsibe for database integrity, security, performance, housekeeping and recovery.

Database Manager
Not a person, but in this case, a software system facilitating the creation and maintenance of a database and the execution of computer programs using that database.

Database Publishing
Producing high quality documents, directories, etc directly from information held in a database. Facilitated by a number of specialist programs which allow data to be ported into DTP packages such as PageMaker or QuarkExpress.

Datel
BT's name for its various data services covering both the equipment and the type of line used.

DBMS
Database Management System. Refers to a computer system which organises a database structure and provides access to information on it.

DCE
Data Circuit-terminating Equipment... or computer-ese for Modems.

De-Duplication
An important form of input validation in which the input value is automatically compared with values already stored in the database to determine whether it is already phonetically similar to any of those values. Basically it keeps you from recording the same information about the same person or thing more than once. More commonly used to describe the process of eliminating records from a file that already includes duplicates.

Dedicated
Refers to a system or software application which is designed for just one specific job, eg Dedicated Marketing Software.

Disk
The main media for storing data and programs for PCs. Traditional floppy disks were the 5.25" variety, but these have been all but replaced by the more robust 3.5" disks which also provide greater storage capacity. Hard disks are bigger and more costly but can store considerably more information in a much more secure fashion. Both floppy and hard disks record information on a magnetic surface. If you don't want to blow your credibility, the spelling 'disc' is generally to be avoided.

DOS
Disk Operating System. This is the software that makes PCs work by providing an operating system which controls the flow of data to and from a disk. DOS will look after space allocation on the disk and execute simple commands for file management. Although a generic term, it is now more commonly associated with MS-DOS, the Microsoft version which runs on all IBM-compatible PCs.

DTP
Desk Top Publishing, or the process of producing type-set quality print, design work and publications in-house or for direct input to a printer or bureau service using a PC, specialist software and a laser printer. DTP was more or less invented by Apple Computer with the Macintosh, the LaserWriter PostScript printer and the introduction of Aldus PageMaker. While users still need to learn abaut design and typography to produce reasonable results, DTP has managed to remove the need for a range of art studio equipment and skills and has allowed many to produce their own professional looking documents for the first time.

Most commercial printers and bureaux will accept disks or files compiled in popular DTP applications such as PageMaker or QuarkExpress.

Dumb Terminal

Rather like a computer with no brain, this is a device that can send and receive data but has limited or no facilities for storing or processing it.

E-Mail

Electronic Mail, or a means of sending and receiving messages and documents from computer to computer. Users log-on with a modem and send messages to others, and pick up and read any mail that has been sent to them. An effective way for different types of computers in different locations to communicate and share data.

EGA

Enhanced Graphics Adaptor. Used to be IBM's top monitor display standard, capable of emulating CGA colour standards while adding extra graphic modes. Not as flexible or capable as VGA and not particularly cheaper.

EISA

Extended Industry Standard Architecture, or a new type of expansion slot provided in some high performance PCs as an alternative to IBM's Micro Channel Architecture system for enhancing conventional ATs for use with more powerful CPUs.

Expert System

This definition can vary tremendously depending on context and to whom you are speaking. Essentially, it's a software system programmed to emulate the activity of a human expert in interpreting specialised information within his or her field of expertise.

Field

A basic item area or section of a database used to hold one of the pieces of information in a record. Like a box, it can hold information such as a name, artform, interest area, etc. Fields used specifically to distinguish one record from another are called key or index fields.

Field Length

The maximum amount of storage which may be allocated to a data item in a specified field. Fields may be of a fixed length where maximum storage is always allocated, or varying length where the amount of storage allocated is determined by the data item itself.

File

As in traditional paper systems, a file is a collection of related records grouped into, handled, and stored as a single unit.

Flat-File Database

Analogous to a card index, all information is entered via one 'card' or screen. Newer versions can perform 'look-ups' of information held in other files.

Functional Requirements

Usually a planning-style document describing what a proposed application is intended to perform including descriptions of commonly used transactions, screen presentations and report layouts.

Gateway

Provides a link between one large computer system and another allowing a user to enter the first computer in the normal manner and when desired, obtain information or services available on a second.

GEM

Graphic Environment Manager, or Digital Research's early attempt at a GUI using icons, menus and mice. Now overshadowed by Microsoft Windows.

Gigabyte

Quantity of memory or storage equal to around 1024Mb or 1048576K. Roughly equivalent to an American billion.

GUI

Graphic User Interface. A major step towards making computers more consistent, intuitive and easy to use. GUIs essentially try to emulate objects we already know about like desktops and files and provide users witha graphical way of interacting with their PC by using WIMPS... windows, icons, mice, pull-down menus. Although first used effectively for the consumer market on the Apple Macintosh, GUIs actually have their roots in early research done by Xerox at PARC in California in the early 70s.

Hard Disk

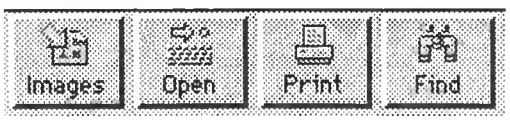
High-capacity, high speed type of disk device now used as the main storage on most business PCs, consisting of a spinning metal platter on which data is stored and a moving read-write head rather like the tone arm of a stereo record player. The platter itself is laid out in concentric circles, rather like a dart board, and each track is divided radially into a number of sectors like a pie.

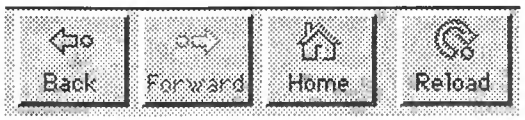
Hardware

The pieces of kit that make up the computer system, eg keyboard, screen, disk drives, printers, expansion cards etc.

Hayes

Manufacturer of modems; has led to a similar standard to the IBM standard in PCs; their protocols set a *de facto*





standard of commands for intelligent modems often used by comms software packages.

Hierarchical Database
A throwback to mainframe days, this is a method of organising a database where there are fixed links defined between related information that structure it into pre-defined organisation.

Housekeeping
A most neglected operation in nearly all PC installations. Involves everything from backing up data to cleaning your keyboard and screen, updating software, de-duping lists, etc. Many software applications now provide housekeeping routines which help users tidy up after working. But good management and consistent attention is still required.

HyperCard
A multimedia authoring system incorporating elements of hypertext and hypermedia with traditional database-style functionality. Provides the average user with much of the power of object orientated programming via nearly plain-English command language and is an ideal media for multimedia applications or driving CD-ROM drives. Can also be used as a 'front-end' for larger more complex systems. Similar packages include Plus and SuperCard.

Hypertext
A term used to describe an approach to storing, sorting and accessing data coined by Ted Nelson. The way a PC stores data allows access and association of information in almost unlimited ways. The user or the reader can navigate through this information in non-linear, associative ways.

Icon
An image that graphically represents an object, a concept or a message, usually used in a PC's GUI.

IEEE
Institute of Electrical and Electronic Engineers. Also refers to the parallel interface standard found on most PCs.

Image Processing
Software-based enhancement and manipulation of digitised images with packages such as PhotoShop. Has now eliminated a considerable amount of photo retouching and pre-press work in print and design.

Index
A database index is a component of the physical organisation of a file which indicates an ordering of its records according to data values in specified fields in each record. An index is usually organised in such a way as to permit rapid searching on its associated field.

Ink Jet
A printer technology that forms characters by squirting jets of ink through nozzles onto a piece of paper. Newer bubble-jet varieties are extremely good and provide near-laser quality. Very quiet, high quality printing, but often rather slow.

Input
Information given to a PC via a keyboard, mouse, touch-screen, light-pen, OCR, scanner, etc for further processing.

Input Validation
A control technique, like de-duplication, used to detect input data which is inaccurate, incomplete or unreasonable.

Intel
The ploneering microprocessor manufacturer that designed and produced the chips that drive IBM-compatible PCs.

Interface
The link between any computer and its peripherals or another computers. Includes how a PC interacts with other equipment such as modems, printers, etc or how it interacts with its user.

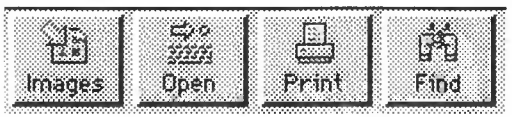
IT
Information Technology... which broadly includes all the techniques and devices used to store and manipulate information.

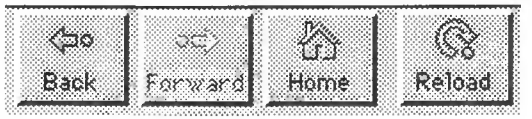
Kermit
Not the Jim Henson frog but a communication software package containing an error correction protocol for comms widely installed on a large number of computers

Key Field
A specially designated field, or fields, located in the same position in each record of a file which is used to identify a record and define its order with respect to the rest of the records used for detailed searching and sorting.

Keyboard
Still the standard means of inputting data into PCs. Most are most still based on the traditional typewriter-style QWERTY layout with additional numerical/function keys.

LAN
Local Area Network, or a system in which all stations are located on a single site and linked by dedicated cables.





Glossary

Laser Printers
Not as high-tech as the name implies, these popular printers have more in common with photocoplers than with the star wars defence initiative. Also called page printers, these assemble the whole page of text and graphics into memory before printing and provide extremely flexible and high quality typography and presentation.

LCD
Liquid Crystal Display... now commonly found in portable and notebook PCs. Offers the advantage of flatness and low power consumption. Newer 'super twist' LCDs offer a greater range of viewing angles and better contrast. Most are now back-lit as well.

List Manager
A low-end database system for PCs essentially operating like a spreadsheet with information set out in rows and columns. Mainly found on older integrated packages and not all that useful in the light of current products available.

Logical Structure
Another important aspect of database planning to provide a collection of rules defining what data may be stored in a specific database. This logical structure may be thought of as a template and is often expressed as a diagram.

Macro
A short-hand method of describing a task or series of tasks, often automating it into a single key-stroke activity. Macro languages included in spreadsheets and other programs allow users to automate repetitive procedures or simply customise their software.

Mail-Merge
The facility to automatically produce form letters and mailshots, printing multiple copies of a standard document which is 'personalised' by inserting name, address, etc at specific points. Now commonly included as a feature of most word processors and even some databases, allowing nearly anyone to send out their very own Readers Digest-style mailshot.

Main Frame
An extremely large high capability computer, generally used as the principle processor for a wide number of users. Capable of massive data storage and in many cases, extremely fast processing power, main frames are now generally found in large corporations , local authorities etc. In many respects, main frame technology that has been in use for some time will inevitably lag behind advances in the PC world.

MCA
Micro Channel Architecture, or the type of expansion slots introduced by IBM for the PS/2 range of PCs. This 16- or 32-bit design provides a number of advantages over old systems but it is not compatible with standard PC and AT plug-in cards. So much for IBM compatibility.

Media Failure
Amalfunction of the physical storage medium such as floppy disks, hard drives, tape streamers, etc. Usually results in a catastrophic loss of data.

Minitel
The highly successful videotex system that has revolutionised telecommunications in France. Minitel has over 5000 services and is used by over 5 million people. Available to users in the US and the UK.

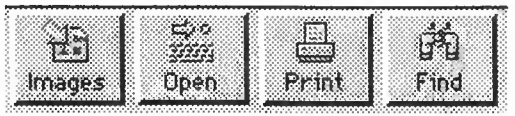
Modem
Computer jargon for Modulator-demodulator. Or more simply, that bit of kit that you connect between your phone and your PC to go on-line to various e-mail, conferencing or other services... or simply to send data from one computer to another.

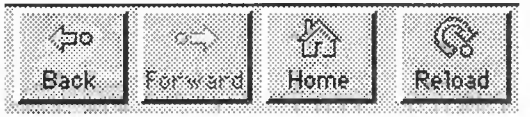
Mouse
A hand-operated pointing device used with GUI PCs, in addition to the keyboard, for moving the cursor around the screen and entering menu or other choices by clicking a button.

MS-DOS
Microsoft Disk Operating System, developed for the IBM PC by Bill Gates. Unfriendly and unforgiving, this is still the standard operating system on most IBM compatibles... even the ones with Windows bolted on the front.

Multi-File Database
Often mistakenly marketed in the PC world as a relational database, these simply add to the facilities of a flat-file database and provide the ability for one file to draw information from a related file and also to write information to another file. Basic information therefore needs only to be entered once.

Multi-Tasking
The ability to have a number of applications loaded and running on a PC at the same time. True multi-tasking would allow you to, soy, continue to work on a document while a spreadsheet was performing calculations and a comms package was logging onto your e-mail system automatically in the background.





Glossary

Multi-User
A computer system or software application capable of being used by more than one user at the same time. Essential for marketing databases, box office systems, etc.

MultiMedia
The convegence and inter-mingling of a variety of digital and related technologies such as PCs, video CD-ROM, sound, graphics, animation, text, etc. Interesting examples of mutimedia in the arts include the Design Museum and the MicroGallery at the Sainsbury Wing of the National Gallery.

Network
A means of connecting a number of computers together so that they can share hardware perlpherals such as printers, disk drives, etc, and also to allow a number of users to access the same files remotely.

Notebook
The new range of portable computers which is smaller than traditional lap-tops and usually has as much or more power than a standard desktop PC.

OS/2
IBM's chosen replacement for MS-DOS and a direct contender for the emerging Windows market. Has taken on greater significance since the IBM-Apple alliance; however, still has problems and hasn't taken off as well as expected.

Ouput
Information sent out by the PC or any computer to any one of a number of devices such as the screen, printer, disk drive, etc.

Palmtop
Generally refers to a computer that is small enough to use balanced in the hand. Most of these so-called 'pocket-computers' were more like extended organisers, eg Psion, Agenda, Sharp etc. A new generation of palmtops called PDAs or Personal Digital Assistants, such as Apple's Newton, is bringing the first truly hand-held computers to the market place... some of which will have more power and intelligence than the average desk-top PC.

Password
A unique string of characters that a program or PC operator must supply to meet security requirements before gaining access to systems facilities or data. Used for security and to prevent piracy, unauthorised access, etc.

PC
Generically, this now stands for personal computers including IBM-compatibles, Macintoshes, Amigas, Ataris, NeXT machines, etc. However, many trade publication still only use PC when referring to IBM- compatible machines.

PostScript
The leading page-description language (PDL) developed by Adobe Systems, designed especially for representing formatted pages, documents drawings, etc. and widely used to control laser printers. PDLs are used internally by most DTP and graphics systems and PostScript provides packages running on PCs with a powerful and device-independent way of describing the page it wants to output to a printer, imagesetter, etc.

Protocol
An agreement of set conventions governing the exchange of information. Usually refers to communications and in particular file transfer protocols or the method used to move data reliably from one computer to another.

RAM
Not an astrological sign, but rather Random Access Memory which represents the working space a computer uses when it's performing tasks. RAM is essentially short-term memory and is used to store and manipulate both commands and data. Information manipulated in RAM is lost, if not saved, when the computer is switched off.

Record
Simply a collection of related data fields treated as a unit. A particular entry within a database.

Relational Database
Describes a formal theory or model for database management that is intended to allow almost any form of data to be stored efficiently and accessed in an infinite variety of ways. Few packages actually meet the criteria of a relational database but most do allow for sophisticated links or 'relationships' between files specified by the use of data values which appear in two or more files.

RISC
Reduced Instruction Set Computer. A newly emerging , super-powerful and super-fast processor that will drive the next generation of PCs. An important aspect of the emerging PowerPC standard currently being developed by the IBM-Apple alliance.

ROM
Read Only Memory, or the Yin to RAM's Yang. Part of the computer's internal memory store which has specific instructions indelibly etched onto it.

RS232C
The standard type of serial interface used on many computers...which has a numbers of variables... used to

Glossary

connect modems, printers etc. Can be found in 9-pin or 25-pin D-shoped connectors.

Scanner
An input device for converting photographs or other artwork on paper into a machine-readable form. Current scanners produce excellent half-tones, colours, etc and with OCR software, can be used to read text or numbers in from printed pages without re-keying.

SCSI
Small Computer System Inteface pronounced scuzzy. A high-performance interfoce used to connect multiple devices to PCs. Comes as standard on the Macintosh.

Server
Usually refers to a computer which provides a service to other computers on a network. Also referred to as a 'host'.

Spooling
A feature that provides the ability to carry on working while say, your printer, gets on with printing out o load of previously prepared documents.

SQL
Structured Query Language... sometimes prounounced sequel. A set of industry standard instructions, ond the rules for using them, now incorporated in many database applications. Now 'the' languoge for manipulating relational databoses and being sufficiently powerful enough to require an ANSI standard, it is for too complex to try to describe fully in a small parogroph.

Tape Streamer
A storoge device usuolly used for backing up hard disks. Uses small cortridges of magnetic tape.

Transaction
In database terms this is the sequence of updates which must be performed as a unit. In other wordds, all updates must be performed or none of them, in which case the database reverts to its state before the transaction was started.

TTY
Short-hond for the most basic form of print or display control printing in only one typeface, line-by -line. Teletype disploys continuously scroll and cannot move the cursor off the bottom line.

Unix
A powerful milti-user , muti-tasking operating system developed originally by Bell Labaratories. There are many versions of flavours of Unix abaut at the moment, but the two to wotch ore AIX andAUX which are port of the Power PC/Pink development platform currently underwoy os part of the IBM-Apple olliance.

VAX
Trade name of the super-mini fomily of computers mode by DEC using VMS or Unix.

VDU
The part of a PC thot looks like o TV - Visual Disploy Unit.

VGA
Video Graphic Arroy ... or the display system introduced with the IBM PS/w series. Now a wide-spread standard ond strongly recommended for any new PC.

Virus
A rogue program or piece of code that attaches itself to onother program or data file without the user's knowledge. Like a human based virus, it can then either spreod by copying itself or 'Infect' other applicotions sometimes cousing serious damage or disruption. Some virus programs are intended simply as pranks and are relatively harmless. Others are down right malicious. To avoid them, beware of public domain software, or users bringing in copies of their own programs to install on the system. And use a virus checking programme.

WBLI
A facetious ocronym for "Wouldn't it be lovely if..." Refers to what is often said when nobody has any clear idea of how the resources involved in doing something would ever be justified by the results.

Windows
Microsoft's software front-end which provides a GUI for standard DOS PCs. Contrary to the hype, it is not an operating system itself ond won't run without DOS.

WORM
Write Once Reod Mony... an optical mass storage medium which uses the some technology as CD-ROM with storoge capacities of over 1000MB. Will probably be passed over in favour of emerging reod/write optical drives.

WYSIWYG
Whot You See Is What You Get...or much over-worked computer jorgon used when describing work processors, grophics or some DTP and design packages, and generally means that what is presented on screen is identical to how the printed output will appear. Often heavily exaggerated unless running with a GUI.