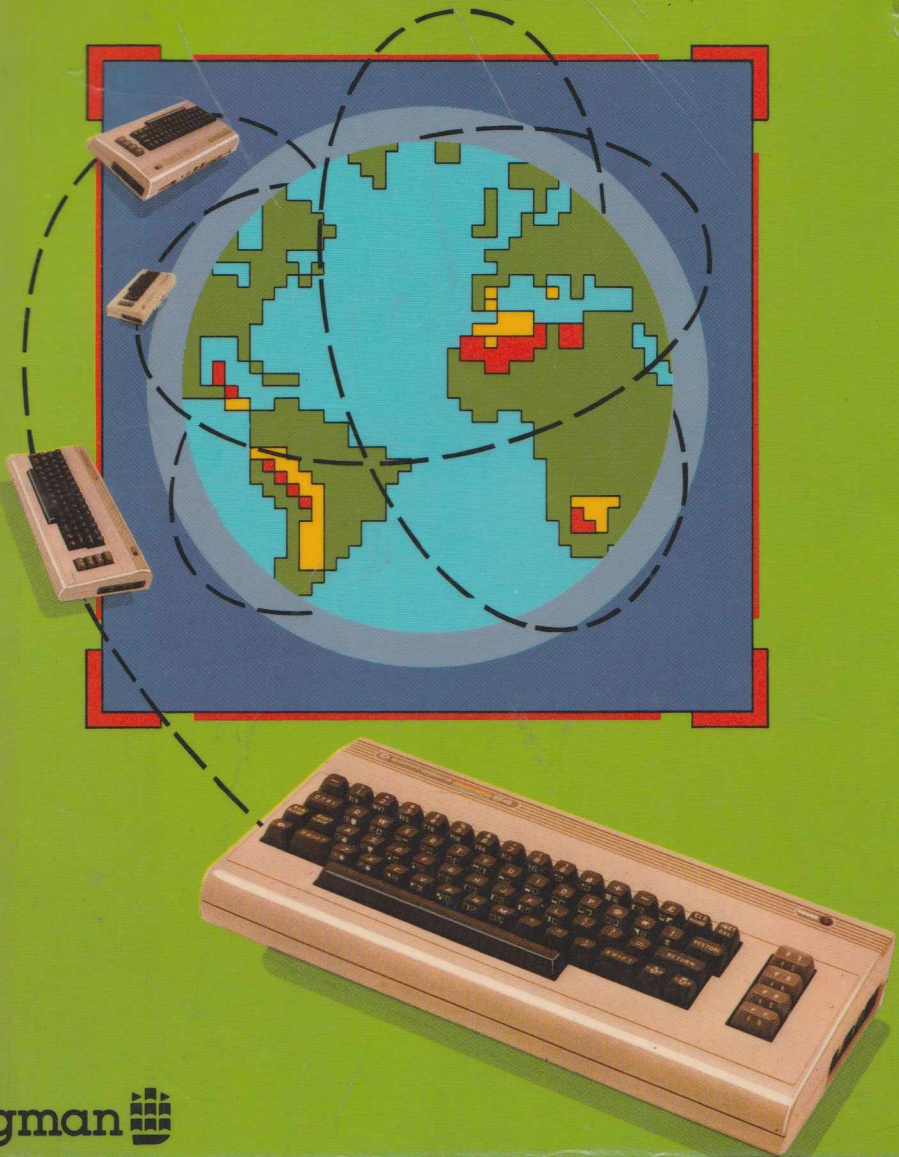
COMMODORE 64 COMMUNICATIONS GUIDE

THE HACKER'S HANDBOOK



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THE HACKER'S HANDBOOK - COMMODORE 64

Wheelwright
and Scales

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Geof Wheelwright & Ian Scales

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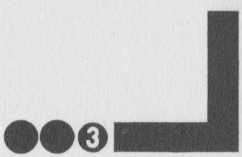

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WHY COMMUNICATE?

1.

Unlike the toaster, the car, the washing machine and the stereo, not all the uses of a home micro computer are immediately obvious.

You wouldn't, for example, necessarily think of running to your Commodore 64 to find out whether your grandmother's flight was going to be late or whether your bank balance had registered the cheque you put in two days ago. But those tasks - and many others - are easily accomplished using the communications facilities of a computer.

All a micro needs to be able to communicate with other computers down a telephone line is a serial interface*, a modem* and some software to use them. These will be explained in detail in the next two chapters. Suffice it to say that communicating via your 64 is well worth the time and trouble it takes. In this book we'll be looking at five major uses for communicating by computer.

A **serial interface** converts parallel computer data into a stream of bits. This serial data can then be exchanged with the outside world along a single cable. A serial interface is necessary before information can be sent down a telephone line.

A **modem** converts serial data into audio signals and decodes incoming signals into data so that it may be sent and received over telephone lines.

Information retrieval

This may sound pretty boring, but it amounts to having a tremendous store of knowledge at your fingertips. The kinds of information your communicating computer can retrieve from various sources include daily stock and bond movements, what's playing at which theatres, who's winning in which sport, what new software and peripherals are available for your micro and much more.

There is a growing number of information sources all over the world, often known as viewdata* systems, to which you can gain access using your computer and the telephone system. Some require you to take out a membership and pay a fee for the service, while others offer it for free as a way of advertising their wares. As more and more people acquire micro communication equipment, the kinds of information you can retrieve with your computer will broaden immensely.

Viewdata is the overall term used to describe a service sending data over the telephone lines as ready-made screens of information.

Already services such as Prestel in the UK, Telidon in Canada and Sietel in France give information on a huge spectrum of topics. And highly specific information systems - such as Lexus, which offers information on legal cases and precedents - are taking over the traditional functions of libraries and sagging bookshelves.

You are **on-line** when your computer is connected, via a modem, to another computer, and that computer is ready to receive your instructions.

The great thing about on-line* information retrieval systems is that you don't need vast amounts of floppy disk or cassette storage space to hold information you may want only occasionally. Instead you can phone up an information retrieval system and get the exact data you need right away - and it will be the latest, up-to-date version.

There is also a newspaper-like quality to many of the services. Prestel operates 'Viewtel', an area of the service known as an electronic daily newspaper, with its own national, international, sports and finance sections that are updated daily. This service has its own headlines and even 'pages'.

The degree of detail available from a screen is called its **resolution**. The greater the number of picture elements the system is able to manipulate to produce the picture, the greater its resolution.

Although Prestel is able to display colour graphics, the resolution* is not yet of a standard that would allow photographic-quality pictures to be displayed. The Canadian Telidon system, however, offers much higher resolution graphics and the potential of digitizing photographs and putting them up on the service in electronic form. A few new graphics-based bulletin boards for the IBM PC reportedly offer great-looking graphics - but they wouldn't run on your 64.

Unfortunately, the cost of new features such as high-resolution graphics is that they move communications services farther and farther away from a standard. If you want to offer information retrieval services to as wide an audience as possible, a standard is essential.

Although Prestel has established itself as a standard in the UK, the huge North American market is still floundering in its search for such a standard. Canada - as we mentioned above - has developed the Telidon system, but the US market has not seen fit to subscribe to it and Canadian support for the project has faltered. By the time you read this, a standard for US viewdata may have been established. Several large corporations - including AT&T - are presently attempting to define such a standard.

Even without a viewdata standard, non-graphic systems such as The Source and CompuServe have already achieved a great deal of popularity in the US. They offer much the same kinds of information as the Prestel system and combine it with an extensive electronic mailing facility (see chapter 7).

Messages and mail

Since the days of the pony express in the US and the express coach in the UK, people have been looking for faster ways to get their correspondence to each other. Communication via computer offers an almost instant way to do this. Instead of writing a letter, posting it and waiting for it to be delivered, electronic mail offers the option of transmitting a letter the moment you finish writing it.

If both you and the person you're corresponding with are registered with an electronic mail service, you need only pick up the phone and press a few buttons on your computer in order to send a letter. It will then immediately be stored on a large central computer under the heading of 'incoming mail' for the recipient. When they phone up the electronic mail service to check their mailbox, they will find a message saying a letter from you is waiting.

Some services - such as the British One-to-One and Telecom Gold operations - also give you the option of sending your computerized letter as either a telex or a 'telemessage'. If the recipient has a telex machine, he or she can read the message on that. Even if you're corresponding with someone who doesn't have a micro or telex, you can ask the service to print out your letter and post it for you. Either way, you never have to leave the house to get your message out.

Electronic mail can also be sent internationally through what is known as a packet-switching system (usually referred to as PSS). A PSS system allows you to write a message and send it through a local computer to someone on the other side of the world for the price of a call to the nearest PSS computer. (For more details on PSS, see chapter 7.) The person receiving the message will find it waiting in the mailbox when he or she next phones up the electronic mail service - and will also only have to pay a local charge for picking up the message.

Home banking and shopping

Experimental home banking systems have been in operation for some time now, offering facilities for checking your balance, ordering cheques and making inquiries to your bank through your micro. These systems are now becoming permanent as some large banks and building societies give users of services such as Prestel a chance to operate their accounts from home. Within the next few years these electronic home banking services could be integrated with what is known as the Electronic Funds Transfer System (EFTS).

Electronic Funds Transfer will work in conjunction with a system of debit cards, rather than credit cards. The debit card will be just like a cheque - except that when it's presented and accepted by a store, the money will be immediately debited from your account and credited to the store.

Holiday planning can also be made simpler by electronic information systems. You can dispense with visits to the travel agents by using your micro to call up the Prestel pages of all the major airlines, compare their rates and schedules and (on some airlines) even book, pay for (by credit card) and confirm your flight. The same goes for hotels in many parts of the world - there are listings of hotel locations, rates, addresses to write to for brochures and, again, the opportunity to book and pay by credit card.

The same service can be used before your departure to see if the flight is actually leaving on time. The data displayed on the main flight information boards of the major UK airports is also available on Prestel - and is updated whenever information on a flight arriving late or early comes in.

EFTS also allows you to order goods from your home. Instead of filling in a form from a catalogue, and posting it off with a cheque, you can phone up the electronic shopping service, punch in the items you want to order and authorize your bank to transfer the funds. The store can process your order immediately, but the goods will still have to be delivered by post or van - with all the delays implied by that.

There's nothing stopping you from doing a little electronic window-shopping. By looking at the various 'catalogues' from different companies on the home computer shopping service, you can find out who's got the best price for a given item. Some services offer a sort of 'exchange and mart' facility where people with things to sell or exchange can advertise them. Buyers give a 'search' command, such as 'Buy - 1963 Mini 1000' and the system will display all the 1963 Mini 1000s it has for sale with the relevant details.

Software downloading

Perhaps the most obvious use of communications is to help you make more effective use of your computer. Instead of having to pop down to the local software shop to try out and possibly buy some programs for your machine, you can use what are known as telesoftware services.

These services are, as usual, accessed by phone. When you've made contact you can try out some software by downloading* and running program demonstrations. If you like the software you simply place the order. This immediately generates a note for the company's accounts

When you receive and store data from another computer via a communications link (rather than just temporarily displaying characters sent) you have **downloaded** it.

department to issue you with a bill. You then download the software to your computer where you can save it to tape or disk.

The types of software available on such a system vary widely from simple arcade games through adventure games to serious small business packages. On larger software packages you may have to combine old and new technologies by getting the software over the telephone and receiving the documentation for it through the post. But most documentation can be sent over the telephone line. On the Compunet system, for example, documentation can be saved as frames, while programs are saved as ordinary program files.

Although you could download text files* containing the documentation over the phone, getting it on paper in the mail saves the trouble of having to print it all out. It also improves the quality of the documentation, because diagrams, pictures and screen dumps can be included.

A **text file** is a serial file of textual rather than numerical information.

You don't always have to pay for downloaded software, either. There are many enthusiast's communications services which allow users of various computers to exchange programs that they've written. Very often such services take the form of what are known as bulletin boards.

Bulletin boards

These are the citizen's band radio of micro computing. Bulletin boards are usually free (except for the telephone charges) and often very good fun. The boards are, as a rule, operated by enthusiasts who have taken it upon themselves to offer a free service on their own telephone lines.

Bulletin boards generally include some form of electronic mail so that people registered on a board can send messages to one another, general subject bulletin boards where anyone can put up a message and specific subject boards where boffins can exchange information on one bit of esoterica or another.

Some bulletin boards offer chat modes which let you have a conversation with whoever else is using the board at the same time as you, very much like the CB world. You can also chat with the Sysop or system operator (the person running the bulletin board) and ask questions about the system.

Most bulletin boards have a system configuration* menu to help you use your micro more effectively with it. If you don't configure yourself properly, you won't get the most out of the bulletin board service.

To **configure** is simply to arrange, connect or adapt a set of components in order to undertake some task.

The bulletin board can also act as timekeeper. If you're signing on to one for the first time, you will usually be given a time limit (something along the lines of 15 minutes visitor's access granted). But once you become a permanent listed member, you can give a single command which will tell you how long you've been logged-on* to the system.

Logging-on is akin to a worker punching his card when reporting to work. The system knows you've arrived, who you are and, eventually, how long you stay because you log off at the end of your session. A log-on procedure usually involves entering an ID number and a password for security purposes, or, if the system is free, entering your name. Once you have identified yourself, you are put in to the system.

Some bulletin boards have games areas where you are given the

chance to use the computer at the other end of the system to play an adventure game. These adventure games are often written by people who use the board, and sometimes are interactive adventures involving a number of members. Each player is assigned a character, and whenever players sign on to the game they will find that different things have been done to them.

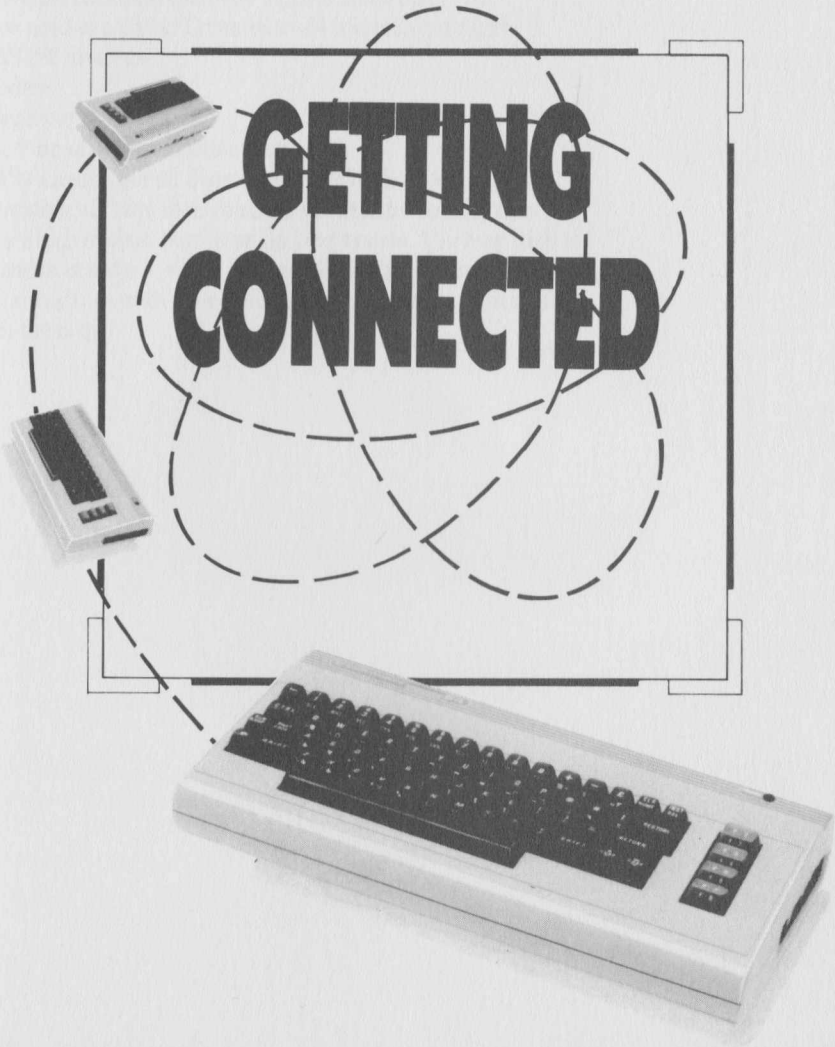
The opening hours of bulletin boards vary, but they are usually open in the evenings as during the daytime most operators are using their machines for other purposes. A few people, however, leave their machines accessible during the day while they're at work and then take them off-line at night when they come home. So although there's no consistency of hours, you should never find yourself without a bulletin board to phone up.

The other thing to remember about bulletin boards is that they're largely run by enthusiasts who - after all - are not making any money on providing the service and thus don't feel too guilty if they take it off the air once in a while. In some cases a person's interest in bulletin-boarding may wane after a short time, despite the fact that the board's phone number and hours may have already been published. In these cases, you may get a bewildered person's voice answering the telephone.

This is just a brief summary of the things you can do by communicating, via your 64. In the next eight chapters we'll take a look at each of them in depth as well as telling you everything you need to do to get your micro communicating. The next chapter explains how communications systems work and should give you as much theory as you're likely to need at this early stage. Then we'll give you a selection of hardware and software options for setting up your communications system.

Good luck and happy communicating!

SECTION ONE –



All the computer communications we shall be looking at (apart from teletext - see chapter 6) involve sending and receiving data over the telephone. This is achieved by the digital output of the computer being converted into audio tones which are then sent over the telephone lines and converted back into computer signals at the other end.

All you need to get your Commodore 64 communicating is:

1 an RS-232 interface
2 a modem
3 a telephone
4 some form of communications software

If you've already got all these things and have a working understanding of them, then you may not need to read the next two chapters which explain how to set up your system. You may wish to skip ahead to chapter 4, where we start describing the kind of things you can actually do with your communications system. If not, relax and turn the page.

2. THE HARDWARE

A **bit** is a single binary digit - a one or a nought.

A **byte** is an entity of eight bits (1s and 0s). An eight-bit byte gives a maximum of 255 (11111111), or 256 combinations (if you count 0), just as a three digit decimal number gives a maximum of 999. So there are enough numbers or combinations of eight-bit bytes to represent the alphabet in capitals and lower case, special characters like /,.]) etc., and numbers 1 to 9. This still leaves lots of room to assign control characters - bytes which don't represent data but tell the computer to perform a task.

Your computer understands data in eight-bit* chunks known as bytes.* Each bit has a value of 1 (for 'on') or 0 (for 'off'). The bits are not transmitted one after the other (serial fashion) within the computer, but are grouped in rows of eight and sent over the computer's bus.*

The bus is rather like an eight-lane motorway and it enables the computer to process information quickly and efficiently. Like the motorway system it all works well until the new meets the old. A bottleneck usually occurs when the eight-lane system hits the ancient single-lane road and this is what happens when the computer meets the telephone system.

The telephone system is incapable of handling eight bits at a time efficiently. You might think it would be possible to send bits simultaneously at different frequencies, but you'd be wrong. Each bit has to be sent one at a time, and at what are, in computer terms, extremely slow speeds. The task of turning the eight-bit (or parallel) bytes into single file falls to the serial or RS-type interface.

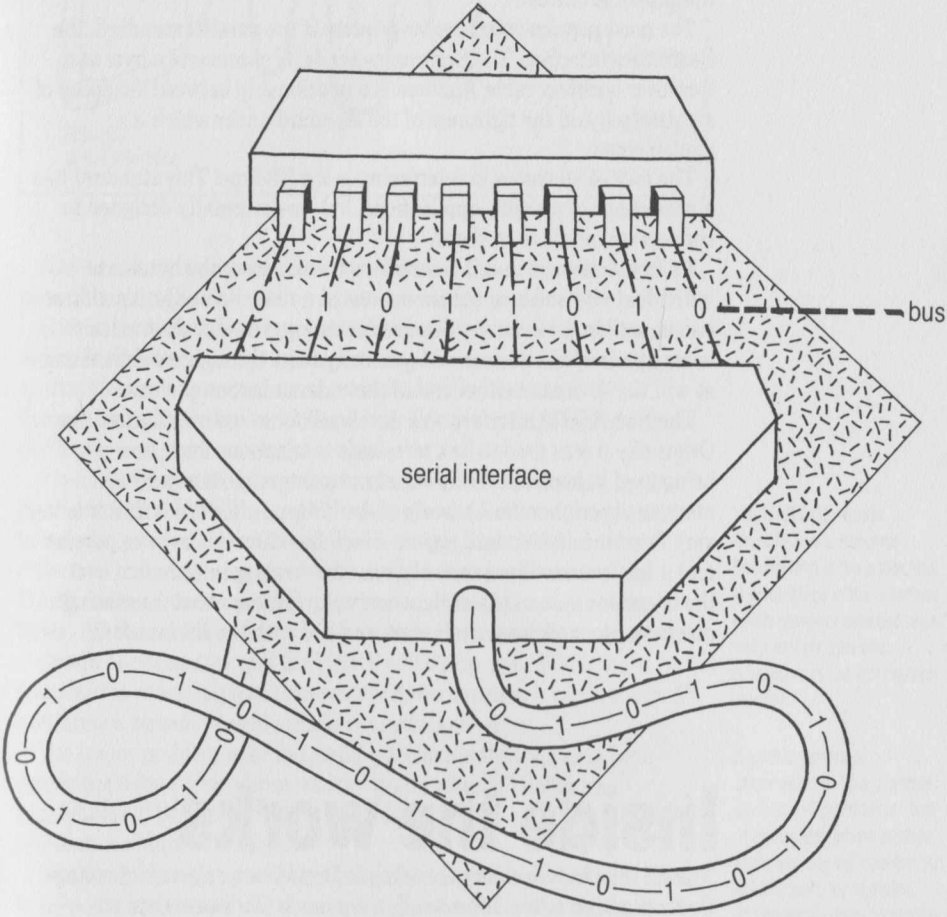
The **bus** is the multi-lane highway which carries data from component to component inside the computer. It manifests itself as all the lines etched on the computer's circuit board.

Digital information is a numerical representation of that information as opposed to Analog information. A mechanical arm clock is analog: a person has to look at the dial and interpret the face to arrive at the time. A digital clock works in numbers.

The serial interface

Problems are bound to occur if computers are linked up to devices which have not been designed to work directly with digital* equipment. Interfaces are there to provide a means of sending information between dissimilar devices.

Interfaces also bring together manufacturers of different items of equipment. A printer manufacturer knows that a standard interface on the equipment will enable it to be connected to a wide variety of computers, while a computer manufacturer knows the inclusion of the standard interface will enhance the appeal of the computer by allowing the customer to connect the peripherals of his or her choice.



The serial RS-232 interface converts parallel data from the bus to an indian file of bits.

Interface types vary according to their usage. The connection of disk drives requires an interface fast enough to do justice to the speed of the drive. Disk drives are therefore carefully designed to work with high-speed interfaces and the relationship between the two items of equipment is critical.

The most popular interface for printers is the parallel standard, the Centronics interface. The Centronics sends its characters a byte at a time over a ribbon cable. So there is a relationship between the speed of an interface and the tightness of the standard under which it's implemented.

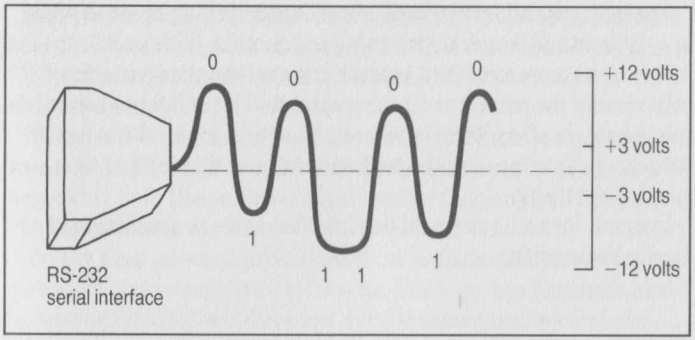
The jack-of-all-trades in interfacing is the RS-type. This standard has a wide range of possible applications, but was originally designed to connect terminals to modems.

Its first feature is that it is serial - it breaks down the bytes into individual bits and sends them out one at a time. Secondly, it's almost indestructible. You can get the circuits wrong, you can short circuit wires, but the RS interface will generally come through unscathed and so will the devices at either end of the communication process.

The first RS-232 interface was developed for a less complicated age. Originally it was used to link terminals to telephone lines; now it's being used to hook up a wide variety of printers, plotters and all manner of peripherals. An irony of the RS-type interface is that it is its very flexible non-standard nature which has caused it to be so popular and it has become the standard device for sending information over the telephone system. As such, when we're talking about interfacing computers to modems we can start and end with the RS interface.

Inside the works

The RS interface works by encoding information as a series of voltage fluctuations on a line. It's actually very much like morse code telegraphy. The sending interface generates the voltage changes. The receiving device samples its incoming data line at regular intervals to detect the status of the voltage on the line. Let's suppose that a bit has been decoded as a 1. If the interface detects a change in the voltage, the next bit will be a 0. If, over an expected period of time it doesn't note a change, it will decode the bit being sent as another 1.



The serial RS-232 interface generates and understands data as voltage fluctuations between +3 and +12 volts for 0 and -3 and -12 volts for 1.

Any system with a serial interface therefore has to have a way of assembling and disassembling bytes - processor power.

Remember that in the communication process the all-important modems sit between these two interfaces, one modulating the voltages so that they can be sent down the telephone line, the other demodulating the information back into RS-type voltage signals again (we'll get on to modems in a moment).

Fortunately, much of the programming work is taken away by the provision of the UART* - a ready-made piece of electronics dedicated to handling the interface. To explain it simply, the UART, or a collection of devices or special software which does the work of the UART, does all the decompiling and recompiling of the individual bytes. All the computer has to do is provide the interface channel with a stream of characters and the UART will do the rest. When the computer is expecting some characters down the line, it reads the port* and finds a stream of ready-made characters there.

The **UART** (Universal Asynchronous Receiver Transmitter) is the collection of electronics in the interface which converts data between serial and parallel and synchronizes the information transfer.

The major problem with the serial interface is that the standard prescribes a lot of extra lines which handle what is known as handshaking. But before we get on to that, let's try and illustrate the interface and how it works.

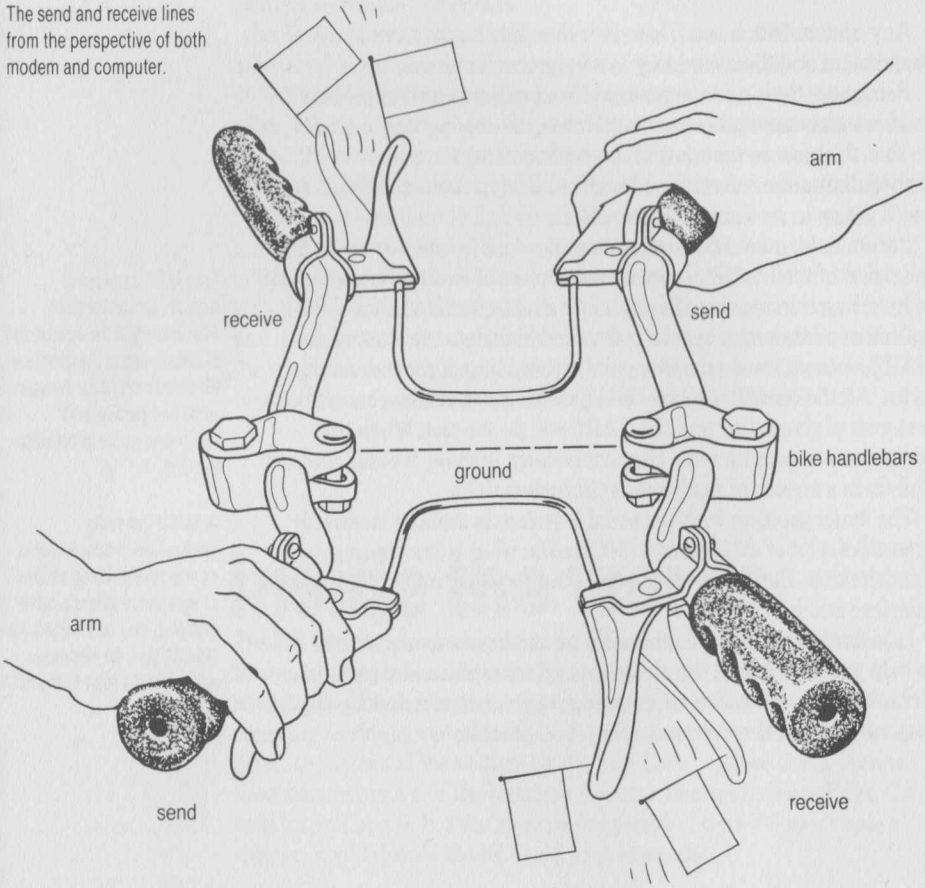
A **port** is generally understood to be a physical connection-point on an item of equipment where a cable and plug may be inserted. An RS-232 port, for instance, will generally refer to the RS-232's socket.

Like most of us, you probably hold an analogous model in your head to help you understand the processes and concepts in any particular technical topic. This is an attempt to give you a model that's going to stay useful right through the explanation process.

The most natural way to think about data travelling about on wires is as little 1s and 0s quickly following one another. With an RS interface it's more consistent to think of signals as changes in the behaviour of the entire line for the instant that bit of information is transferred. In effect, there is only one bit active on any single line between the interface and the modem at any one time, such is the speed of electricity.

Imagine, instead, your multi-line interface cable as a collection of bicycle brake cables.

The send and receive lines from the perspective of both modem and computer.



The bicycle brake is analog.* That's to say the bicyclist has a degree of control over the tension of the cable to affect the degree of braking. Slight tension to slow down, all out adrenalin-driven clench to avoid a 40 ton lorry.

With our RS interface/brake cable model each cable in the sheath tenses and untenses to indicate one of two states - on or off, positive or negative, 1 or 0. The process is binary rather than analog - limited to two logical states.

All the lines (as we should call each cable) fluctuate between two states, positive or negative 3 to 12 volts. There are two lines dedicated to sending information. These two data lines (one sending and one receiving) handle data by rapidly changing their states. The other lines are control lines - instead of rapidly fluctuating voltages, they actually hold a voltage either high (+3 to +12 volts) or low (-3 to -12 volts) to indicate a logical state to the other interface.

There is also a line called Clear to Send (CTS). If an interface holds its CTS high it indicates to the other interface that it is indeed ready to send data; holding the line low means it isn't.

To confuse matters a 0 is positive while a 1 is negative. This is a legacy from the days of punched tape where a hole was a 1 and the lack of a hole was a 0.

For our purposes, let's think of the interface's lines indicating -3 to -12 volts when not tensed, 0 volts when tightened just enough to ready the mechanism for instant braking, and +3 to +12 volts when pulled fairly hard.

The other lines in the interface not dedicated to sending data were originally involved in very detailed control of the communication process (handshaking) and this is where the confusion with RS-type interfacing usually comes in. These days a lot of these functions are not necessary. The RS-232 was designed to connect simple terminals (a screen and a keyboard) to modems; because the terminals had no intelligence the interface had to have dedicated lines to tell the modem what to do and when to do it.

Also dating from this time is the DTE*, DCE* delineation. Devices using an RS-type interface to pass information between them are conventionally designated as either a DTE or DCE. For our purposes the DTE is the computer interface and the DCE represents the modem interface.

The information is sent out on line 2 from the computer and accepted on line 2 of the modem interface as received data.

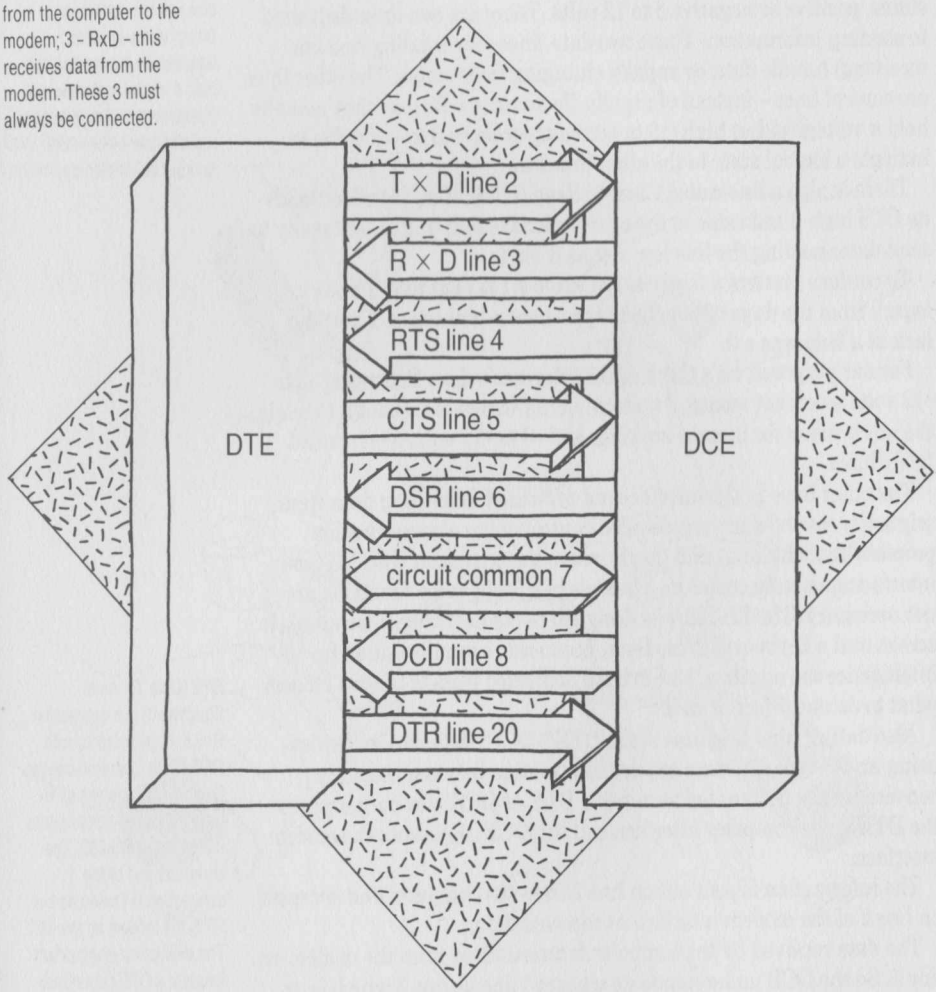
The data received by the computer is transmitted from the modem on line 3. So the DCE understands its transmit line as line 3 which is, in turn, understood as received data by the computer.

Analog information is concrete information as opposed to digital information which has been converted into a numerical abstract. An analog voltmeter, for instance, represents current directly - the current causes the needle to move around the dial and the user must interpret the numeric information by reading the dial. A digital voltmeter will interpret the voltage as a number and present the number on its display.

DTE (Data Terminal Equipment) is a delineation which, in partnership with **DCE** (Data Communications Equipment), enables us to distinguish two components linked by an RS-232. The computer end of the connection is known as the DTE, the modem as the DCE. The distinction is important because a DTE connection must work with a DCE; they are mirror images, just as a wall socket is a mirror image of a power plug.

The lines (represented by the pins on your interface socket) can be divided into two categories. The data lines - transmit and receive lines - and the handshaking lines. Handshaking lines are there to control the flow of data between two interfaces and most of them can be ignored. However, it's useful to know what they are and what they do.

The common RS-232 lines: 7 - circuit common or ground; 2 - TxD - this line sends data from the computer to the modem; 3 - RxD - this receives data from the modem. These 3 must always be connected.



The most important lines are always 7, 2 and 3.

On the next level are the general purpose inputs and outputs. For each line whose voltage level is regulated by the computer's interface (our reference point), there is a corresponding line monitoring the voltage levels put out by the modem's interface.

4 - RTS - Request to Send basically does what it says. When enabled it indicates the readiness of the modem to send data to the computer. As far as the computer's concerned, it's an input line; the computer interface monitors the status on the line, rather than generating a voltage.

5 - CTS - Clear to Send is the required response to RTS. The computer interface replies to the modem's enabling of RTS by enabling its CTS. So CTS is a line whose voltage is generated by the computer interface (the DTE) and monitored by the modem (DCE).

6 - DSR - Data Set Ready really means modem ready. This is a general purpose line which has no automatic effect on the behaviour of the interface. It is usually sent out by the modem to indicate that it's powered up and ready to go.

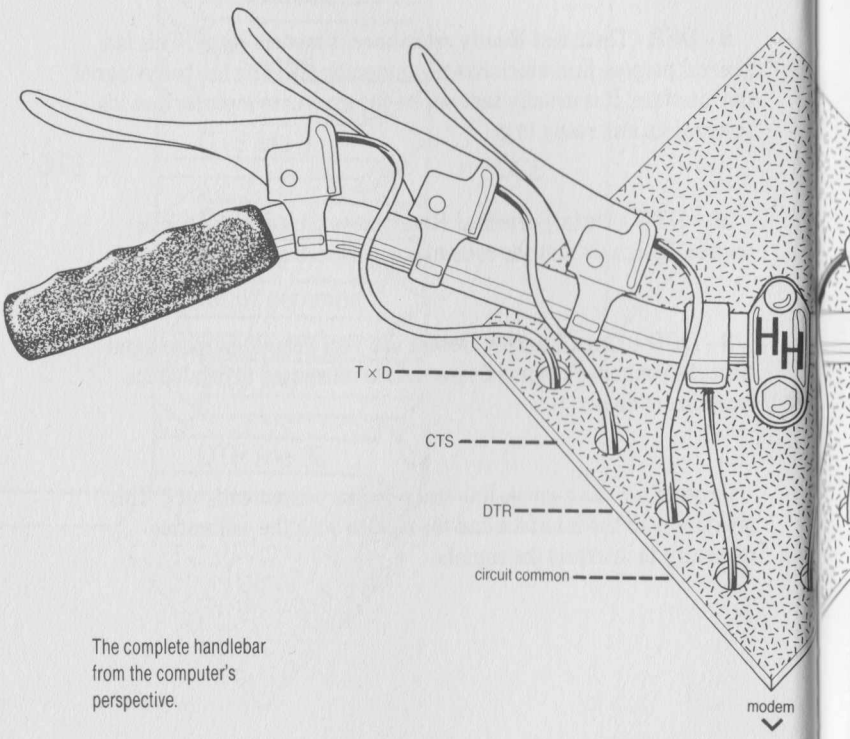
20 - DTR - Data Terminal Ready does the same as DSR in reverse. It signals that the computer is powered up and ready to go.

8 - DCD - Data Carrier Detect is a very general purpose input from the computer's point of view, and is often used to disable the reception of data.

Ground acts as a gauge line and remains permanently at 0. This provides both the interface and the modem with the calibration necessary to interpret the signals.

To develop your understanding of the present model a little further, try to think about the data send and receive lines. When data is sent over one of these lines the brake handles are being quickly manipulated between slack -3 to -12 volts (1) and tight +3 to +12 volts (0). With a bike cable there is a finite amount of slack in the cable - the longer the cable, the less accurate and immediate a tensing or untensing effect is likely to be at the other end. This is because any cable will flex a certain amount for every foot of length. This is also true of serial interface communications. The longer the signal has to travel, the less sharp the fluctuation between its two states.

The signal, having travelled a fair distance, is likely to curve up or down slowly from one state to the next rather than jump, and this

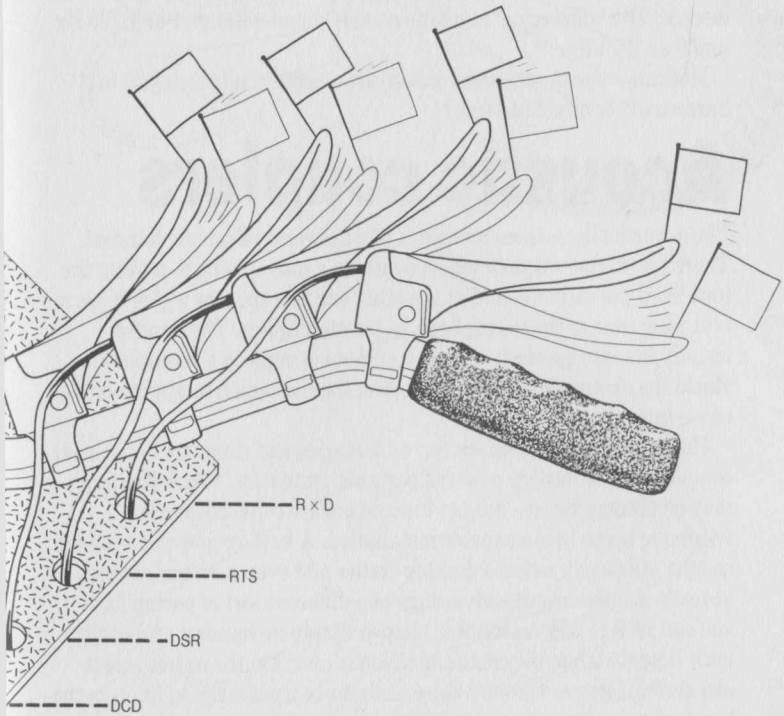


The complete handlebar from the computer's perspective.

process could cause problems for the receiving UART at the other end sampling the voltage. There is therefore a relationship between the speed of the sent data and the distance the data has to travel. Too much of both distance and speed and errors are likely to occur.

Over a long distance, the parameters of the communication process must be adjusted to take account of this factor. The usual way is to slow down the speed at which data is sent. The same principle applies with modulated signals being exchanged between two modems, but we'll get on to that later.

Now you should have a basic understanding of how a serial interface works in theory.



Modems

The key component in communicating between computers is the MODEM - which stands for MODulator DEModulator. The modem takes the digital serial signals generated by the interface, modulates them into an acoustic signal and sends them down the telephone line to a receiving modem at the other end.

A continuous tone (the carrier signal) is set up by the modem. The frequency of this tone is rapidly altered between two states or, in musical terms, notes. Normally the binary 1 is set at 2,225 Hz while the 0 is set at 2,025 Hz. The result is a watery warbling sound. The receiving modem uses another pair of frequencies for its communication so that misunderstandings don't arise between the two devices. The 'answering' machine normally understands 1 as 1,270 Hz and 0 as 1070 Hz.

Modems come in two broad categories - acoustically coupled* and hardwired* or direct-connect.*

An **acoustic coupler** marries with a telephone handset to generate and pick up tones on the line. The microphone sits opposite the earpiece and a small speaker sits opposite the mouthpiece.

Hardwired or **direct-connect** modems tap directly into the telephone line without the intervention of the telephone set.

Acoustic couplers

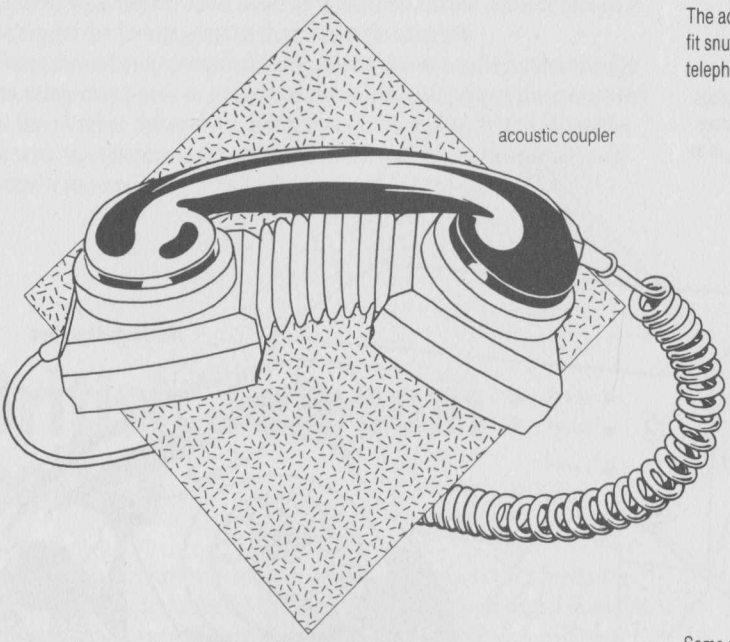
The acoustically coupled modem is like a reverse telephone handset. There's a reverse earpiece which contains a microphone to pick up the tone from the earpiece, and at the other end is a speaker which feeds a returning tone to the microphone in the mouthpiece. The handset usually fits into specially designed sockets or cups on the coupler to shield the arrangement from background noise which might otherwise cause interference.

The best of this species are run on batteries and therefore make ideal companions for battery powered portable computers. 'Clark Kenting' may be accomplished - mild-mannered hacker converts public telephone booth into computer installation. A battery-powered acoustic coupler effectively reduces desktop clutter and even a mains-powered acoustic coupler has the advantage of a different sort of portability - you can fit it to any reasonably shaped telephone handset and easily unfit it again when the communication is over. On the minus side it can suffer from background noise and can be a nuisance to fit on to the handset every time you want to dial up another computer.

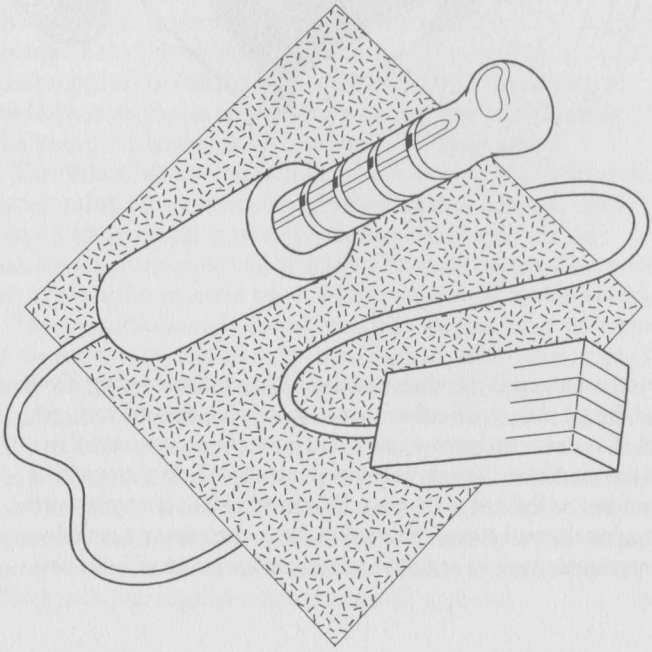
Direct-connect modems

The direct-connect modem bypasses the handset and taps directly into the telephone line. It usually takes the form of a small box with the

cable from the RS-232 port on the computer going in one side and a twisted-pair wire with a British Telecom jack for the wall socket coming from the other.



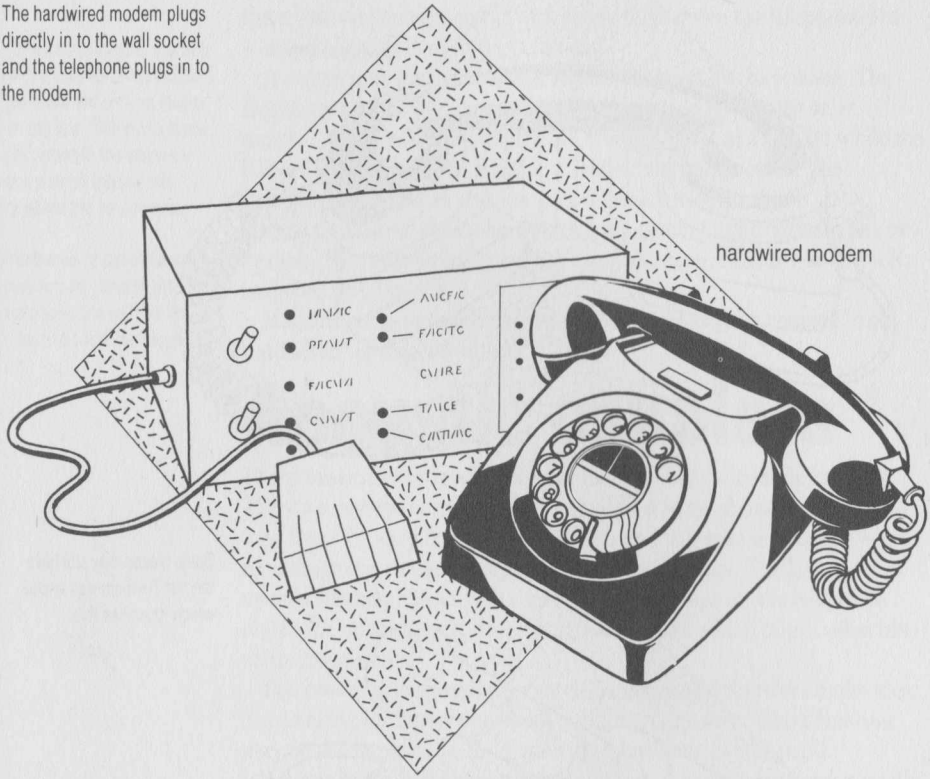
The acoustic coupler should fit snugly over the standard telephone handset.



Some places may still have the old Telecom wall socket which looks like this.

The standard British Telecom plug these days is a small square white one and many domestic phones use the standard wall socket already. If you don't have one, you'll have to call British Telecom and have one installed.

The hardwired modem plugs directly in to the wall socket and the telephone plugs in to the modem.



Most commercially available modems feature the new plug. If you need the old plug, you'll either have to specify it before delivery, get hold of one and configure it yourself to the modem cable, or call in Telecom and have the new wall socket installed. Your choice will be dependent on the cost of the plug. Bear in mind that it may be worth changing the wall socket - this will make your modem reasonably transportable as more and more telephones are set up with the new plug.

The advantages of the direct-connect or hardwired modem are many, especially if you plan to use it frequently and you don't move your computer around much. It is easier to set up a call and there are fewer problems with background noise or vibration. Direct-connect modems also tend to be less expensive than acoustic couplers.

Some direct-connect modems are able to answer calls automatically from other computers or (when fed the information from the computer) dial the number themselves. Even though they plug in and share the line with the telephone set, modems in no way affect the telephone's normal voice operation.

British Telecom policy

One over-riding concern in modem design is to isolate electrically the computer system from the telephone system. Telephone authorities are understandably wary of electronic devices feeding off high voltage from the mains power supply being directly hooked into the telephone system. In the US (which actually only has to worry about 110 volts in comparison to our 240) the right of the Bell Telephone company to control just who hooks up what to a telephone line was effectively challenged in a landmark legal decision a few years ago.

The British Telecom rationale in the UK for exercising tight control remains that a freak short circuit in the modem or computer could cause a spike or surge of power on the line which would not only damage telephone switching equipment but could conceivably cause injury to another innocent telephone user somewhere on the network.

This problem obviously doesn't arise with the acoustic coupler which is one reason why, until recently, these were the most common type for micro computers - their manufacturers seemed able to gain Telecom approval easily while direct-connect modem manufacturers had more difficulty. However, semi-conductor technology has marched on and the costs associated with providing an effective form of isolation to meet the criteria are being offset as the components involved are squeezed on to less and less silicon. There is currently a wide variety of direct-connect modems available for most makes of micro computer. Check with your supplier which ones are BT-approved.

Working together

There are three hardware components in the communication process: the serial interface, the modem and the telephone system. To get all these to work together requires an understanding of the parameters or settings which must be specified for particular facets of an operation. These settings include the number of bits being sent for each character, the speed of the transmission, the type of error-checking employed and so on.

Before any communication takes place these parameters have to be set, either by a program or by the user. There is no one set standard in communications so it is essential that you have a broad understanding of the tools of the communications trade.

The main problem is the uncertain fidelity of the telephone line. To deal with the likelihood of errors over a certain line, it's possible to trade off some of these parameters in return for more certain transmission. Finding a good balance between transmission speed, cost and reliability (the responsibility of those running the bulletin boards) has lead to just enough variation between services to make their use less than straightforward.

Fortunately, here in the UK, there are just two common standards. Most of the bulletin boards work to one common set of specifications based on a 300 baud rate (see below) while Prestel has a separate 1200 baud receive and 75 baud send rate. Most of the time you'll be dealing with just these two quasi-standards, but there will be occasions when a working knowledge of communications standards and processes will be valuable to deal with the odd rogue.

Baud This determines the speed of communication. It measures the number of modulations generated or expected by the modem per second. These modulations include the data bits and the extra bits added to each byte to control and check the communication process (see parity). Single characters of information are usually sent as eight-bit bytes. In most cases you'll be able to divide the number by ten to give you an idea of the speed at which the characters are being sent or received. The most common baud rates in micro communication are 75, 300, 600 and 1200 baud.

Parity This acts as a check on the integrity of each byte of serial data. The 8-bit character is sent off with an extra bit. This extra bit (obviously either a 1 or a 0) is inserted to make the sum of the character bits come out as an even number. This way the receiving system can determine whether the data has been interpreted correctly after its

voyage down the telephone line. For instance the letter 'a' will be sent as 1100001 in binary. Add these bits together and you get the number 3 which is odd. If the system were set to even parity the parity bit would be a 1, making the byte 1100001 +1, to bring the sum up to 4. If any one of these bits is changed during transmission (including the parity bit itself) the sum will be odd so the system will know the character is incorrect.

Unfortunately the parity convention can specify either odd or even parity - just to add confusion. In the above example the parity bit for an 'a' under odd parity would be 0 to retain the sum of the byte at 3. As well as specifying to the system that the receiving system requires a parity bit, you also have to tell it whether the parity expected is odd or even.

Half and Full Duplex Duplex basically means two way. A full duplex operation is when data is echoed back down the line to the sending machine as a check on data integrity. Half duplex means communications can only carry on in one direction at a time. This differentiates it from simplex which is strictly one way.

As we've seen, the telephone system is a fairly unsuitable network for the high-speed computer, but until alternatives arrive we're stuck with it and have to make the best we can. On the near horizon are British Telecom's plans to further develop its digital network for use with the new System X exchange technology, but it's unclear at this stage how beneficial this is likely to be for the micro communicator.

Getting your 64 on-line

What we'll be talking about first is interfacing - getting your computer to talk to the modem which you need for communicating. Almost all general-purpose modems are designed to work through a serial RS-type interface (RS being the RS-232C and RS-423 serial communications standard). RS interfaces use a number of different lines - or wires within the main co-axial cable - to convey various signals.

Different modems will put these signals on different pins, so when you start interfacing, make sure you are given a cable made up specifically for your machine and look at the diagram later on in this chapter to make sure you've got things connected up properly.

If you look at the back of your Commodore 64, you'll see a variety of ports or connectors that let the machine talk to the outside world. Unfortunately, Commodore designed the 64 so that these ports don't comply to any computer industry standard (except the ones set by Commodore) and so to get an RS-232C communications interface on the machine, you have to add some bits on the back. As explained above, you'll need an RS type interface to use any standard communications equipment - although if you use Commodore's own modem you can get by without it.

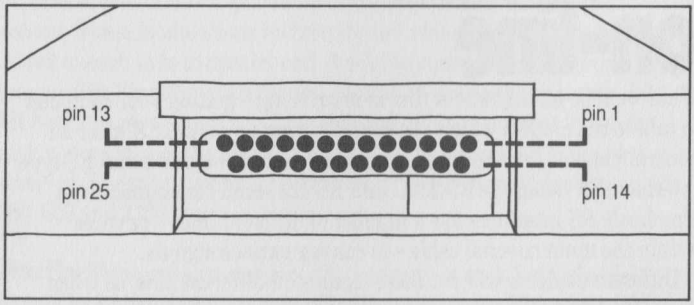
There are a number of RS-232 interfaces currently available for the 64. One of the easiest to use is Commodore's own, which slots in to the 'user port' at the far left of the back of the machine. When you plug this in, you have immediate access to a full standard-specification RS-232 serial communications interface and can start hooking up non-Commodore modems - and even printers - through it.

If you don't opt for the Commodore interface, make sure that the interface you get is capable of two-way communication. There are a number of one-way RS-232 interfaces designed solely for sending information to printers which don't have the facility for receiving any information.

This chapter - and indeed the rest of this book - will assume that you're using Commodore's own RS-232 interface.

The Commodore 64's RS-232 offers a full 25-pin female socket plug, but only a few of these lines are used. In fact, you can put together an RS-232 cable for the Commodore that uses only three lines - one each of data input and output and one for ground. The 'Ready to Send' (RTS) and 'Clear to Send' (CTS) lines are not usually needed and can often tie up the system.

The Commodore 64 RS-232 interface.



You might find counting the pins on this interface a little confusing. The important thing to remember is the assignment of pins in the three wire hook-up which you'll need to run the 64 with most popular makes of modem. The three pins in this configuration are Pins 2, 3 and 7, designated transmit data, receive data and ground respectively.

Pin 2 (one position to the left of Pin 1) handles all the transmission of data from the 64 to the outside world. It's often abbreviated as TX and is in charge of sending out information to everything from modems to printers.

Pin 3 (two positions to the left of pin 1) takes care of receiving all the information sent to your 64 through the RS-232. It's abbreviated as TV and is vital if you're going to use your Commodore with printers as well as modems (some printers require only a TX signal from the computer).

Pin 7 (six positions to the left of Pin 1) is the grounding line and must be included if communication is to proceed. It's abbreviated as GRND or GND.

All you need to do to hook up your modem properly is make sure the wires going in to each of these three pins go in the corresponding place on your modem. Modems usually include their own cable, but if yours doesn't, you only need to get an RS-232 25-pin plug to handle the Commodore end of things and whatever plug your modem needs at the other end. You can then connect the three appropriate lines to the plug yourself. Alternatively you can buy a cable, although you should make sure the cables have Pin 2 set up as transmit and Pin 3 set up as receive - these are often switched round.

With your RS-type communications interface in place, you're now ready to start looking at modems.

If you end up having to solder the connections on the plugs between the computer and the modem yourself, you will have to expose the coloured wires and use your deductive powers to work out which wires go to which plug. You'll need your modem manual, your interface manual and chapter 2 of this book. Keep trying different combinations of wire-ups until you get it right - don't worry about damaging anything. Finally, don't be afraid to call the modem or interface supplier with your problems.

Always remember 'perspective'. Data out from the modem is data in for the computer and vice versa.

As well as choosing between an acoustically coupled and hardwired modem, you also have to decide on the baud rate characteristics you want, whether you will be encountering different international standards and what answering and dialling configurations it should have.

Although most modems in the UK use only the CCITT telephone standard, there are an increasing number of world-standard modems which can also communicate on systems using the American Bell standard. British Telecom has now decided to remove approval for Bell tone modems, although this decision could be reversed. This would mean that US information services such as The Source and CompuServe could be directly accessed from a UK telephone, although with the advent of PSS (see chapter 7) this isn't entirely necessary.

Auto-answer and auto-dial modems are relatively recent innovations in the UK and allow you to have your computer on-line all the time. Often only one button need be pressed to initiate dialling and log-on procedures to a database or similar service and the modem will automatically answer computer-generated calls.

Non-specific modems

Below is a list of modems which can be used with most computers with an RS-type interface and the terminal program in chapter 3 (with the exception of the Tandata TM200, which will require the purchase of the manufacturer's own software). Several of the modems listed are available from specialist shops; the manufacturers should be able to direct you to the nearest stockists.

Nightingale

One of a new breed of inexpensive hardwired modems, this multi-standard job will handle most common communications requirements. The modem, manufactured and distributed by Pace, offers the Prestel/Viewdata standard 1200/75 or 75/1200 baud rate and the bulletin board and electronic mail standard 300/300 baud rate. Pace is presently also offering discounts on enrolment fees in the Knowledge Index and One-to-One electronic information services. The Nightingale can be ordered from Pace on 0274-729306, or by writing to Pace Software Ltd., 92 New Cross St., Bradford BD5 8BS, and costs around £136.

WS2000

This was the first widely publicized world-standard hardwired modem to appear in the UK and has the ability to respond to both US and UK telephone signal tones and can therefore be used internationally. The modem offers 1200/1200, 1200/75, 75/1200 and 300/300 baud communication using either the CCITT or Bell standard phone systems. At present it is available at £152.50 (including post, packaging and VAT) and can be ordered from Miracle Technology (UK) Ltd., 10/12 St Peters St., Ipswich, Suffolk IP1 1XB, or by phoning 0473-50304.

Buzzbox

One of the cheapest hardwired modems on the market, the Buzzbox is also one of the smallest. It's slightly smaller than most books and offers 300/300 baud communication at a low price. It is sold for between £80 and £85 and can be ordered from Dacom Systems on 0908-311885, Scicon on 0908-585858, or Michael Gurr Associates on 05806-4278.

Sendata 700B

This is the authors' favourite 300 baud acoustic modem and was one of the first affordable portable acoustic modems. It costs about £200, includes its own rechargeable batteries and can be used on almost any telephone provided the acoustic cups will fit around the receiver and earpiece. The articulated middle makes the modem more flexible and allows it to be used with a wider range of equipment. It is available from Bencom Sendata on 01-387-7792 at around £230.

Telemod 3

A multi-baud-rate hardwired modem from OEL which also features auto-answer. The speeds include 1200/75, 75/1200, 300/300 and 1200/1200 baud, and the price is £175. It can be ordered directly from OEL on 0768-66748, or purchased from retail outlets.

Chipchat

A multi-rate modem from Digisolve which offers auto-answer and optional auto-dial. The modem comes with the usual range of baud rates (300/300, 1200/75, 1200/1200) and in its basic configuration (at £149.90 including VAT) includes auto-answer. The modem will run on either Bell (US) or CCITT (UK) standard telephone systems. Another £40 will add auto-dialling facilities to the modem. Chipchat's modem can be ordered from Digisolve Ltd., Aire and Calder Works, Cinder Lane, Castleford, West Yorks WF10 1LU, or by calling 0977-513141.

Tandata TM 200

This is an auto-dial, auto-recall model which operates at 300/300 baud and costs £217. The auto-recall facility of the modem will remember up to eight telephone numbers along with appropriate identification procedures. The modem can be ordered from Tandata Marketing, Albert Road North, Malvern, Worcs WR14 2TL, or by calling 06845-68421.

MS 21/23

A multi-baud-rate hardwired modem which prides itself on being small and discreet. It weighs only 1 kilogram and will slide easily under a telephone. It supports both the 1200/75 and 300/300 baud rates and sells for £199. It can be ordered from Master Systems (Data Products), 100 Park Street, Camberley, Surrey, or by calling 0276-685385.

Commodore-specific modems

Aside from 'general purpose' modems which can be used with the Commodore 64 RS-232 interface and our terminal program, there are some modems which have been developed specifically for the 64 and which don't work with the RS-232 interface.

Protek 1200

Protek, the company which manufactures this relatively new acoustic modem, gained a name for itself manufacturing peripherals for the Sinclair ZX-81 and Spectrum. The company's peripherals have now been developed for a wide range of machines - and the Protek 1200 is no exception. The basic acoustic 1200/75 baud modem starts at £59.95, with the associated software costing £14.95 for the Commodore 64. Software and attachments are also being developed so the Protek 1200 can be used with the Oric Atmos, Electron, QL, Amstrad and MSX machines. Inquiries can be made through Protek Computing, Young Square, Brucefield Industrial Park, Livingston, West Lothian, or by calling 0506-415353.

Commodore's Compunet modem

This is an auto-dial hardwired modem which sells for £99.99 and includes a one year membership to the Compunet information service (see chapter 7). For an additional £5, software to dial up the Prestel service can be purchased. Commodore's own serial interface is built in to the modem. It can be ordered from Commodore UK, 1 Hunters Way, Weldon, Corby, Northants NN17 1QX, or through Compunet on 01-637-0942.

Micronet modem

At present this modem was still under development, but is expected to run only the Prestel baud rate (1200/75) and to sell at a competitive price compared with the Compunet modem with software included.

3. THE SOFTWARE

Communications software is essentially the set of instructions your computer needs to be able to communicate with the modem and the telephone. It ranges from the very simple to the very complex. At its heart is a method for getting information from the RS-type serial port, transmitting information back out to the RS interface and displaying the whole process on the screen.

This means that for example when you're signed on to Prestel (see chapter 7), the communications software reads the characters which make up the pages as they come in through the modem and displays them on the screen in the appropriate order. When a given page has come through it then allows you to transmit your response back to the Prestel computer.

If you don't want to use the program included in this chapter, you'll have to consider buying some pre-written terminal software, but there isn't much commercial software available for use with the RS-232 port.

The alternative is a hardware/software combination such as the Commodore Compunet modem software, which runs with Commodore's own auto-dial hardwired 1200/75 baud modem. The software built into ROM can only be used with Compunet, although the Viewdata software, which can be downloaded over Compunet for £5, allows the use of Prestel and Micronet. Both the Compunet and Viewdata software are an excellent buy and well worth the initial cost.

Software has a purpose

Communications software controls the speed and format of information by regulating the baud rate, number of stop bits, number of data bits and parity. You could say that the communications software is the 'traffic cop' of a micro communications system, the modem is something of a bridge and your micro is a big car park full of characters.

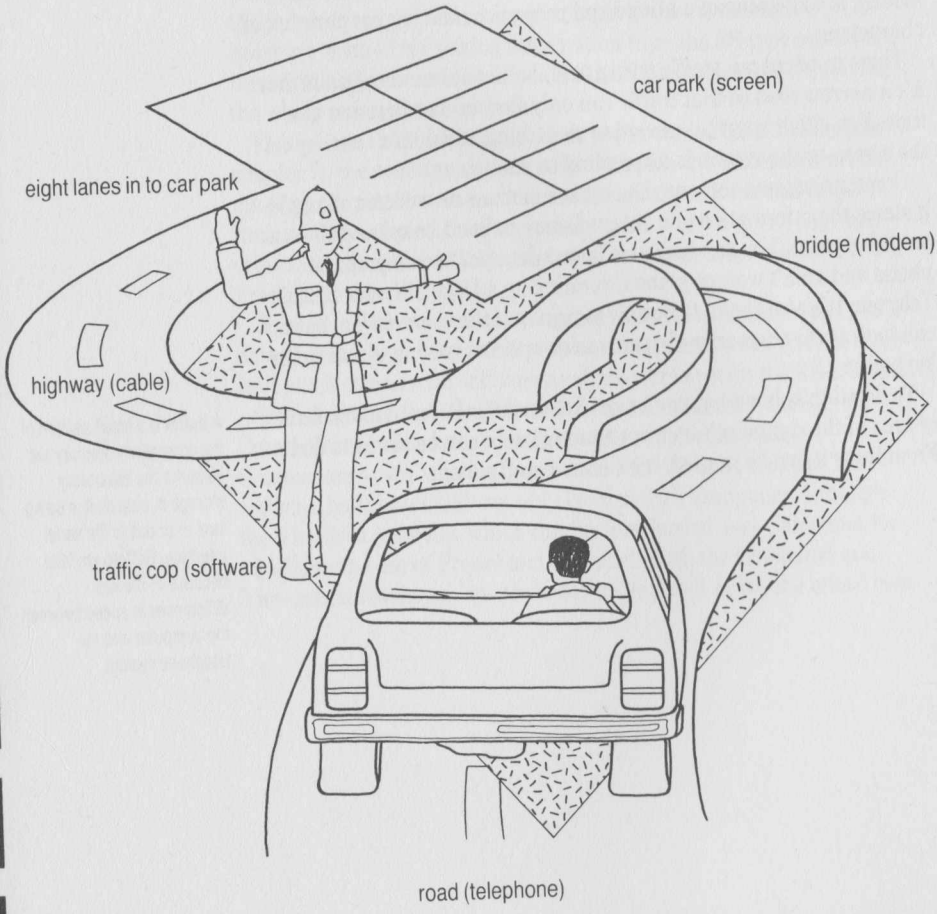
There is, of course, traffic trying to go both ways on the system, but it's a narrow road so that traffic can only flow in one direction at a time. You either want to respond to something which has come up on the screen or the system is responding to you.

Communications software has other functions as well: for example, it stores the information you obtain from a bulletin board or database on disk or tape. You can look at it later, when you've hung up the phone and aren't worrying about running up a large bill with British Telecom. It's also useful to be able to print out the information, so you can look at the transcript of your session without having to run to the keyboard.

To do all this, however, you have to store the information in a buffer* or area of the computer's memory from where it can be saved to disk. From there it can be printed, re-examined and edited.

A **buffer** is a small section of the computer's memory set aside for the temporary storage of data as it is being sent in or out to the serial interface. Buffers are vital because of the vast differences in speed between the computer and the telephone system.

An overall view of the communication process.



The terminal program

All the above features have been incorporated in the free terminal program listing included with this book. You probably want to get typing right away, but before you do, let us explain a little about how it's used.

When you first run the program - provided you've made no errors in typing in the listing and that you've got your RS-232 interface already plugged into the back of the 64 - you'll get an introductory menu which invites you to 'press any key to continue'. Movement around the program is controlled entirely by the function keys. Once you've pressed a key, you start off at the main menu - where you can accomplish one of five tasks: get help, put the 64 into 'capture' mode, invoke the default settings for a bulletin board, write captured text or quit.

This program is designed for use with disk drives, but it can still be used just as it is for a Commodore 64 without a drive. The only option you don't have is the ability to store data. If you hit this option by mistake and the screen asks you for a file name, just hit **Return**. This will put you safely back into the program.

- "**F1**...HELP"
- "**F2**...CAPTURE & MIXED CASE"
- "**F3**...BULLETIN BOARD DEFAULT"
- "**F4**...WRITE CAPTURED TEXT"
- "**F5**...QUIT"

F1 causes help information to be displayed - pressing **F4** brings you back to the main menu.

F2 puts you in capture/mixed case and Prestel 300/300 mode. (You can test this by calling Prestel in London on 01-248-5747 and using the demonstration ID 4444444444 with the password 4444.) In this mode all the data is being stored in the 64's memory buffer, which is very large so don't worry about it running out. Upper and lower case ASCII characters are displayed on screen and information is saveable to the disk drive. (Cassette users take note - the save option in this program is only for disk drives.) Saved information can later be loaded into Easyscript for editing or printing. To escape from the capture mode or return to the main menu to write the file, press **F7**. Things move a little slower in this mode than in the bulletin board mode, so don't be disappointed if your commands don't respond immediately when you press **F2**.

F3 - bulletin board default - sets your 64 up to use standard bulletin board protocols of 300 baud, 8 data bits, 1 stop bit, 1 start bit and no parity. This mode is upper case only and does not do an ASCII conversion, but it's fast and offers all you need for communicating to bulletin boards.

F4 - write captured text - stores captured text on a sequential disk file of your choosing. You can download information, save it to disk and read it later. The Commodore Easyscript program will read these types of text files and so can edit them later for printing out, saving or formatting. When saving is finished, buffered memory will be cleared and the screen will clear for you to continue with capture and mixed/case mode.

F5 - quit - leaves the program.

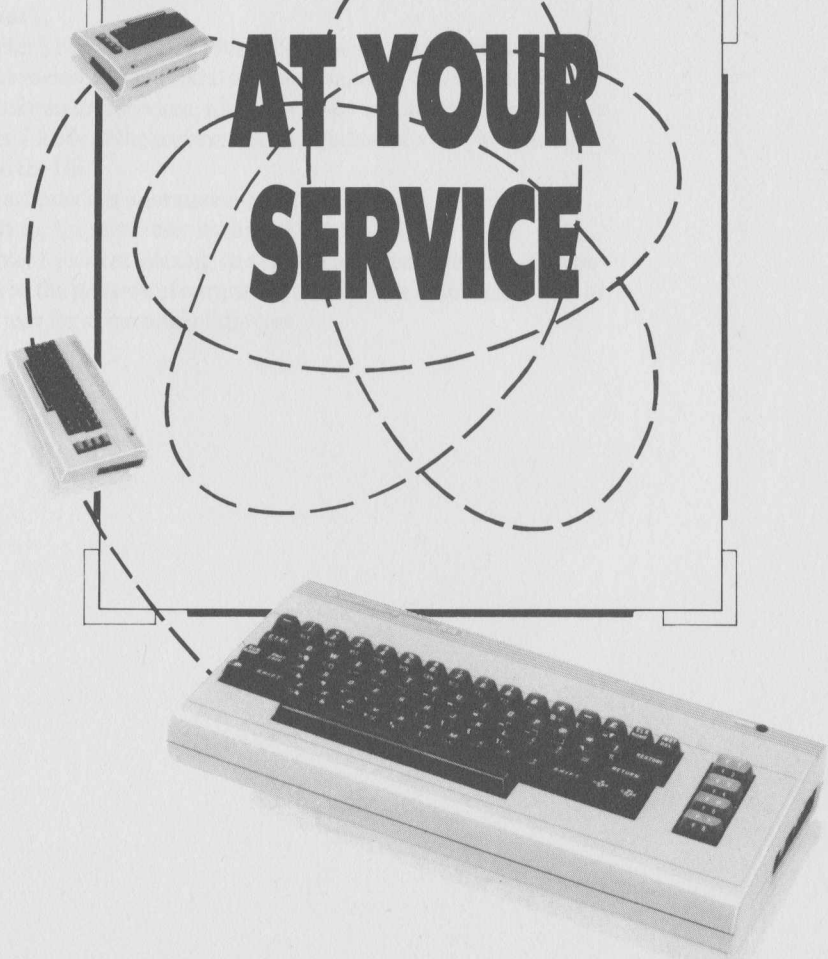
The listing

```
1 PRINT CHR$(5):PRINT CHR$(147)
  2 PRINT:PRINT:PRINT:PRINT:PRINT:PRINT:PRINT"              COMMCI-COMMSA"
  3 PRINT:PRINT"              VERSION 1.0  "
  4 PRINT:PRINT"          GREENLEAF-SOFT 1984"
  5 PRINT:PRINT:PRINT: PRINT "         PRESS ANY KEY TO START"
  6 GET J$:IF J$="" THEN 6
  7 PRINT CHR$(147)
  8 GOTO 4100
  10 PRINT CHR$(147)
  30 OPEN 2,2,3,CHR$(6+32)+CHR$(28+132)
  50 GET H$
  60 IF H$=CHR$(136) THEN CLOSE 2:GOTO 4100
  65 IF H$<>"" THEN PRINT#2,H$;
  70 GET#2,C$
  80 PRINT C$;
  90 SR=ST:IF SR=0 OR SR=8 THEN 50
  120 CLOSE 2:GOTO 30
  197 PRINT CHR$(147)
  198 OPEN2,2,2,CHR$(38)+CHR$(224)
  199 DIMF%(255),T%(255),A$(255)
  200 FORJ=32TO64:T%(J)=J:NEXT
  210 T%(13)=13:T%(20)=8:RV=18:CT=0
  220 FORJ=65TO90:K=J+32:T%(J)=K:NEXT
  230 FORJ=91TO95:T%(J)=J:NEXT
  240 FORJ=193 TO 218:K=J-128:T%(J)=K:NEXT
  250 T%(146)=16:T%(133)=16
  260 FORJ=0TO255
  270 K=T%(J)
  280 IFK<>0THENF%(K)=J:F%(K+128)=J
  290 NEXT
  295 :
  299 :
  300 PRINT" "CHR$(147)CHR$(14)
  1010 GET#2,A$:REM GET A CHAR FROM BUFFER
  1011 IFA$=""THEN GOSUB 5000:GOTO 1010
  1012 IFA$=""THEN GOTO 1010
  1014 A$=CHR$(F%(ASC(A$))):PRINTA$;
  1030 A$(T)=A$(T)+A$:PO=PO+1
  1040 IFPO=255THENPO=0:T=T+1
  1050 GOTO1010:REM GET ANOTHER CHAR
  2000 REM STORE DATA ON DISC.
  2005 PRINT CHR$(147):PRINT CHR$(14)
  2010 INPUT"FILE NAME ";FI$
  2015 IF FI$="" THEN GOTO 4100
  2020 OPEN8,8,8,FI$+",S,W"
  2030 FORL=0TOT
  2040 PRINT#8,A$(L);
  2050 NEXTL
  2060 PRINT#8
  2070 CLOSE8
  3010 OPEN8,8,8,FI$+",S,R"
  3020 FORL=0TOT
  3025 L$=""
  3030 FORW=0TO254
```

```
3040 GET#8,LL$
3050 L$=L$+LL$
3060 NEXTW
3070 IFL$<>A$(L)THENPRINT"SAVING...."
3080 NEXTL
3090 OPEN1,8,15
3100 INPUT#1,A,B$,C,D
3200 PRINTA,B$,C,D
3300 CLOSE1
3900 OPEN1,8,15
3910 INPUT#1,A,B$,C,D
3930 PRINTA,B$,C,D
3940 CLOSE1
3950 CLOSE 2:CLOSE8:GOTO 197
4010 INPUT#1,A,B$,C,D
4100 PRINTCHR$(147);CHR$(142):PRINT:PRINT:
4150 PRINT:PRINT"                    MENU"
4200 PRINT:PRINT "     F1.........HELP            "
4300 PRINT:PRINT "     F2.........CAPTURE & MIXED CASE"
4400 PRINT:PRINT "     F3.........BULLETIN BOARD DEFAULT"
4500 PRINT:PRINT "     F4.........WRITE CAPTURED TEXT"
4600 PRINT:PRINT "     F5.........QUIT"
4700 GET H$:IF H$="" THEN 4700
4710 IF ASC(H$)=133 THEN GOSUB 6000
4720 IF ASC(H$)=137 THEN CLOSE2:GOTO 197
4730 IF ASC(H$)=134 THEN CLOSE2:GOTO 10
4740 IF ASC(H$)=138 THEN GOTO 2000
4750 IF ASC(H$)=135 THEN END
4780 GOTO 4700
5000 GET PL$:IF PL$<>"" AND     PL$=CHR$(136) THEN GOTO 4100
5005 IF PL$<>CHR$(136) THEN PRINT#2,PL$;
5010 RETURN
6000 PRINT CHR$(147)
6100 PRINT:PRINT:PRINT:PRINT:PRINT"          HELP INFORMATION"
6200 PRINT:PRINT:PRINT " BULLETIN BOARD DEFAULT GETS YOU ONTO  "
6300 PRINT " ALL COMMON UK BULLETIN BOARDS IN UPPER"
6400 PRINT " CASE. CAPTURE AND MIXED CASE IS WHAT"
6500 PRINT " YOU NEED FOR PRESTEL ACCESS.       "
6600 PRINT:PRINT "   PRESS F4 TO RETURN TO MAIN MENU   "
6700 GET H$:IF H$="" THEN 6700
6740 IF ASC(H$)=138 THEN GOTO 4100
6750 GOTO 6700
```

SECTION TWO –

AT YOUR SERVICE



Now that we've identified the crucial components in the communication process and armed you with the tools of the trade, you'll want to know just who you can ring up and communicate with. The remaining chapters itemize many of the services available in the UK.

In chapter 4 we have a look at electronic mail and how it is becoming a viable means of communication both in business and for private individuals.

Chapter 5 concerns itself with bulletin boards - the most numerous (and the easiest and cheapest) services available. The bulletin boards are to information services, what ham radio is to broadcast radio. Chapter 7 looks at the commercial information services, in both the UK and the US.

Teletext provides information over the airwaves - we review its viability for the micro user in chapter 6.

Chapter 8 looks at telexing on your micro. Expensive telex stations used to be the preserve of companies; now anyone with a micro can be a telex user for surprisingly little cost.

4. ELECTRONIC MAIL: THE POSTAL SYSTEM OF THE FUTURE

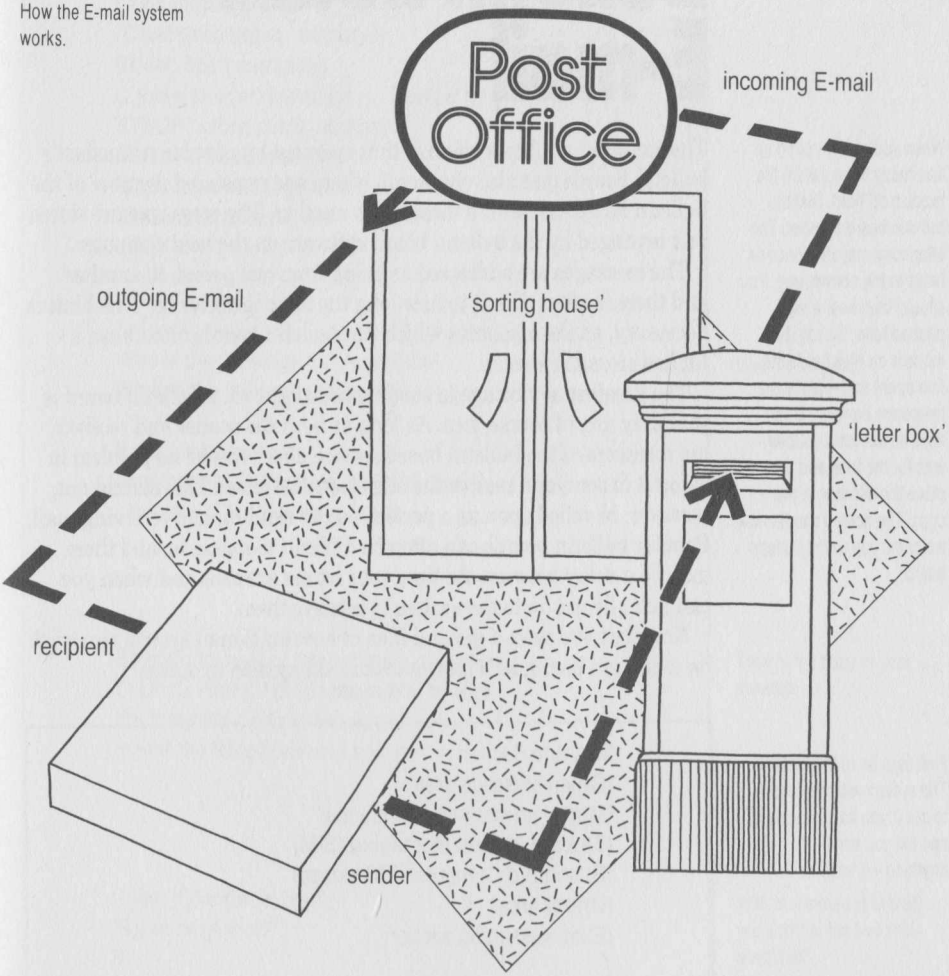
Although electronic message-sending services are known as electronic mail (or E-mail), they probably have more in common with the telex system than with the postal system.

E-mail is comprised of private, non-standard, closed systems. You can't stick a 'stamp' on to a piece of electronic mail and have it delivered anywhere in the world (with one exception which we'll come to later); both the sender and receiver must be members of the same E-mail service for the system to work, just as companies communicating by telex can only do so when both parties have telex machines.

Given these limitations, electronic mail is still powerful. It's the quickest way to get computer-generated text from one person to another in a hurry and provides the recipient with the greatest flexibility in handling the message - for instance printing it out, saving it to disk, modifying it in a word-processor or sending it on elsewhere (as explained in chapter 3).

The E-mail computer runs a program which allows it to talk to your computer by telephone. When you call up the E-mail computer, it answers the telephone and prepares either to deliver mail that's waiting for you or take in the mail you want to deliver to someone else.

How the E-mail system works.



E-mail is really nothing more than creative sharing of a central computer with the computer acting as postbox, sorting office and postman. How extensive that mail system is depends largely on the computer that's running it. These can range in size from the rapidly growing user base of Telecom Gold to the relatively small membership of a local bulletin board.

Bulletin board E-mail

When you're all hooked up and ready to go switch the modem off hold. Dial the bulletin board number. The telephone may ring once or twice in the normal way. You should then hear a high pitched tone. Switch the modem on (this holds the line open) and replace the telephone handset. If you have an acoustic coupler wait for the tone and then place the handset in the cups. The screen should now welcome you to the bulletin board.

The simplest mailbox system is that operated by popular enthusiast's bulletin boards (see also chapter 5) where one registered member of the bulletin board can send a message to another. The messages are stored and arranged by the bulletin board software on the host computer.

The messages are addressed as being from one person to another and there is often a limit to how long the messages can be. This limit is necessary, as the machines which run bulletin boards often have a limited storage capacity.

The greatest advantage to sending messages via a bulletin board is that they are, of course, free. As long as both the sender and receiver are members of the bulletin board service, there will be no problem in using it to send and receive the odd electronic letter. This should not, however, be relied upon as a perfect way of sending and receiving mail. Popular bulletin boards can often be difficult to log-on to, and there may be a delay between the time your letters are sent and when you can actually get on to the system to retrieve them.

Now that you have a general idea of how an E-mail system can work on a bulletin board, let's have a look at the system in action.

First sign on to the system. The system will then check to see if you have any mail and tell you what - if anything - it finds:

```
Message Section
(O)pen Message area
(M)ail - private and confidential
(S)pecial interest messaging (SIM)
(B)landford Computer (OS House)
(U)tility area
(E)xit messaging section
```

Choose the E-mail option from the menu.

```
M
Confidential Electronic Mail
(Q)uick-scan of your mail
(R)ead your mail
(O)pen message area
(E)xit mail area
(G)oodbye to terminate
```

```
O
Open message area
(Q)uick-scan open messages
(R)ead open messages
(L)eave an open message . . . (review by
SYSOP before public access)
(M)ail - private and conf
(E)xit open message area
(G)oodbye to terminate
```

```
Who is the message to? Aunt Ethel
What is the subject? Uncle Harry

Enter message text.
Maximum of 2048 chars total 132 max/line
Line with (CR) only ends input
```

Give the address.

```
So sorry to hear of the untimely departure
of Uncle Harry. I didn't mean him to wire
the interface cable to the power socket - I
meant the telephone wall socket.
```

Type in the body of your message.

```
(L)ist, (C)ontinue, (E)dit
(S)ave or (A)bort?
S
Saving Message to disk . . .
```

With that message in place, you confirm the text and send it off.

The message will now be stored as a file on the bulletin board system. When the target recipient logs on the message will be passed on.

Prestel and Micronet E-mail

The Prestel service (covered in detail in chapter 7) has its own built-in mailboxing facility which overcomes most of the disadvantages of the bulletin board E-mail systems, although you pay for the extra facilities. Micronet has its own E-mail service within Prestel.

The Prestel mailboxing system is a good compromise between expensive business-oriented mailboxing systems and the limitations imposed on E-mail by a bulletin board. Because Prestel is a comparatively widely-used system and because it has telephone lines throughout the country, sending E-mail via a Prestel mailbox means you can send messages for the price of little more than a local call. The lines will very rarely be busy as they work on a switching system which allows many calls on the system at one time.

If someone has sent you a message, you'll be notified by a flashing signal at the top of the screen when you sign on. The message will read 'NEW MESSAGES FOR YOU - KEY 0' and you should press the **0** key to see the message.

To send a message on Prestel you first go to page 6 on the system by pressing *6£ if you're using a Compunet modem or *6◄— if you're using our terminal program. You'll be presented with the message menu. The first option on that menu is to get into the mailbox.

```
P R E S T E L              6a              ◇p
Message, Booking & Ordering Services

1 MAILBOX  Exchange messages with any
  Prestel user - no extra charges
2 TELEX LINK  Send UK telexes
3 SIMPATICO  Public noticeboard service

4 ORDER VIA PRESTEL Subscriptions,clubs
  holiday brochures, catalogues
5 BOOK VIA PRESTEL  Hotels, holidays,
  flights, cars, coaches, theatre seats
6 SHOP VIA PRESTEL  Wide range of goods

7 INFORMATION PROVIDERS How to contact
  the suppliers of Prestel information
8 WRONG ROUTES? COMPLAINTS? PROBLEMS?
  Tell us, & we'll sort it out for you
9 MESSAGES TO PRESTEL Route requests,
  directory updates,contact Information
  management        ◇ YOUR MAIN INDEX
```

```
P R E S T E L                 7a                 ◊p
  Prestel MAILBOX          Instructions #
  Main Index               National Service

  1 Send a message  Remember *77#

  2 Other blank message pages

  3 Standard messages  eg 'Thank you'

  4 Greetings cards  A wide selection

  5 Directory of users 55 Request entry

  6 Simpatico & noticeboards

  7 Problems? Comments? Tell us

H a v e  y o u  s e e n...

  8 Christmas cards

  9 Mailbox A-Z          ◊ Message Services
```

Having obtained the main mailbox menu, you can either customize your message or send a standard message form. It's probably best to start with the standard message form and pick the first option. This will take you to page 77. At the top of the form is your ID number and your name.

To test the mailing facility, try typing your own ID number into the address space and then write a short message.

```
P R E S T E L                 77a                ◊p

From DIMENSION GRAPHICS
     280812037  FRI 07 DEC 1984 14:45

To   280812037#
     DIMENSION GRAPHICS

We confirm receipt of your order:
Part No. 662b/3809
Qty. 6

Please allow 7 days for delivery.

                                                #
```

You send messages a frame at a time, so you must format the text first so that it breaks at a sensible point on each line e.g. press **Return** when it looks like you're getting close to the edge of the screen).

When you have finished typing six or seven lines of message (about two-thirds of the screen, just press the **£** key if you're using the Compunet software or the **←** key if you're using our terminal program.

Pressing **1** sends the message and you can then either continue sending further frames, address a message to someone else, or go back to the main Prestel menu.

One-to-One

Wrap-around is where a program automatically moves a word which will not fit at the end of a line on screen as text is being received, to the first word position in the line below. This increases readability by preventing the breaking of words in awkward places.

One-to-One is a communications service run by Kensington Datacom and tailored for the business user. Along with other full-blown business E-mail systems it offers quite sophisticated message-sending services that do not have the accessibility problems of bulletin boards or the constricting frame-by-frame environment of Prestel's mailbox.

Sending E-mail via One-to-One (which calls its service 'instant mail') is best described by the system's own help file. Remember when you type the text of your message, you don't get automatic wrap-around*, so you'll have to hit the **Return** key every time your message looks like it could hit the edge of the screen.

HOW TO SEND AN INSTANT MAIL MESSAGE.	UPDATE 04 OCT 84
«CR» DENOTES A CARRIAGE RETURN.	
«SP» DENOTES A SPACE.	
BEGIN BY ENTERING	SEND «CR»
THE SERVICE WILL RESPOND	+++ DESTINATIONS:
ENTER THE ACCOUNT/USER NUMBER OF THE ADDRESSEE.	12345001«CR»
IF SENDING TO MORE THAN ONE ADDRESS, ENTER THE RELEVANT ACCOUNT/USER NUMBERS AS FOLLOWS, LEAVING SPACES AS INDICATED. A "DASH" IS USED TO INDICATE CONTINUATION IF THE LIST OF DESTINATIONS EXCEEDS MORE THAN ONE LINE.	12345001«SP» 24686420«SP» —00543674
WHEN YOU HAVE ENTERED ALL DESTINATIONS ENTER A FULL STOP ON THE NEXT LINE.	.«CR»
THE SERVICE WILL RESPOND:	+++ TEXT:
NOW ENTER THE TEXT OF YOUR MESSAGE	_____ _____

(Remember the RETURN each time you're about to hit the right edge of the screen)

WHEN MESSAGE TEXT IS COMPLETE
ENTER ON A NEW LINE NNNN«CR»

THE SERVICE WILL NOW RESPOND BY QUOTING A MESSAGE REFERENCE NUMBER, THE DATE AND TIME. YOUR INSTANT MAIL MESSAGES HAVE NOW BEEN SENT AND WILL BE IN THE RECIPIENTS' MAILBOXES AWAITING COLLECTION.

And that's about the size of it.Charges are made up of a connect-time charge plus a rate for the words per message. For more information on One-to-One, contact John Warwicker, One-to-One Sales Manager, 52 Ebury St., London SW1W OLU, or on 01-730-8911

Telemessaging

In addition to E-mail, One-to-One's telemessaging service can be used to send computer-generated mail through the postal system. The system is described by the company's help file below, and remember that you'll have to press **Return** every time you're about to hit the edge of the screen.

HOW TO SEND A PRIORITY LETTER — UPDATE 04 OCT 84

NOTE

«CR» DENOTES A CARRIAGE RETURN.
(Hitting the RETURN key)

«SP» DENOTES A SPACE.

PRIORITY LETTERS ARE PRINTED OUT BY ONE-TO-ONE, PUT INTO DISTINCTIVE YELLOW ENVELOPES AND DESPATCHED BY FIRST-CLASS POST.

BEGIN BY ENTERING	SEND «CR»
THE SERVICE WILL RESPOND	+++ DESTINATIONS:
NOW ENTER	LTR«CR»
FOLLOWED BY A FULL STOP	.«CR»
THE SERVICE WILL RESPOND	+++ LETTER:
NOW ENTER	*«CR»
THEN THE FIRST LINE OF THE ADDRESS	EG: MR J SMITH«CR»
THEN THE NEXT LINE	ABC LTD «CR»

THEN THE NEXT LINE AND SO ON UNTIL THE ADDRESS IS COMPLETE.	ETCETERA«CR»
PLEASE NOTE THAT A MAXIMUM OF SIX LINES MAY BE USED FOR THE ADDRESS	
IF SENDING TO MORE THAN ONE ADDRESS ENTER BETWEEN EACH ADDRESS	*«CR»
IF THE SAME MESSAGE IS TO BE SENT TO A NUMBER OF DIFFERENT PEOPLE EACH MESSAGE CAN BE PERSONALIZED BY INCLUDING A SALUTATION AS THE LAST LINE OF THE ADDRESS. THE SALUTATION MUST BE ENCLOSED IN SINGLE QUOTES, E.G.	'DEAR JOHN SMITH'.
WHEN ALL ADDRESSES HAVE BEEN COMPLETED, ENTER	*«CR»
THEN ENTER A FULL STOP	.«CR»
THE SERVICE WILL RESPOND	+++ TEXT:
NOW ENTER THE TEXT OF YOUR MESSAGE. . . .	_____ _____
WHEN MESSAGE TEXT IS COMPLETE, ENTER ON A NEW LINE	NNNN«CR»
THE SERVICE WILL NOW RESPOND BY QUOTING A MESSAGE REFERENCE NUMBER, THE DATE AND TIME. YOUR ONE-TO-ONE PRIORITY LETTER(S) WILL NOW BE PRINTED OUT AND DESPATCHED.	

Telecom Gold

Telecom Gold is very much a business-orientated service. This is not to say that it cannot be valuable to individuals, but it is definitely not an enthusiast's plaything. As well as straightforward E-mail, there is a telexing facility (more people have telex machines than E-mail facilities).

Telecom Gold also acts as a gateway to Telecom's electronic paging system and allows you to store information (there's a charge for storage). The software, called Dialcom, was bought from and is compatible with a similar service operating in the US, so UK users can send telexes and electronic messages there as well. For more information contact Telecom Gold, 42 Weston St., London SE1, or call 01-403-6777.

An interesting aside - Clause 2, Condition 2 in the standard Telecom Gold customer agreement states: 'Service is not fault free and the customer shall be entitled to no better quality of service than that normally provided by BT from time to time.'

With the knowledge of how to use electronic mail firmly installed in your RAM, get ready to tackle bulletin boards.

5. BULLETIN BOARDS: THE CB OF THE EIGHTIES

Like CB radio and ham radio before it, computer bulletin boards are a fun and easy way of communicating with other people you may never even meet.

You can 'talk' to people in other towns and countries by leaving public or private messages on the bulletin board systems as well as get information on a wide variety of topics. And if you're looking for true certification as a hacker, you'll very often find clues, phone numbers and other hints on getting in to other systems in the message section of bulletin boards.

You'll find that the bulletin board community is very tightly-knit and a lot of bulletin boards will be developed around a common interest in a machine - although in North America, where bulletin boards have taken off in a big way, there are bulletin boards for everything from gay rights groups to political parties.

In the UK, however, bulletin boards are still pretty much a general interest hobby. There are Special Interest Groups or SIGs within many bulletin boards, but it's up to you which of those you want to look at.

The important thing to remember about bulletin boards is that they're run by enthusiastic individuals, not big companies out to make money. So if the bulletin board you like is constantly engaged, or the system operator goes on holiday occasionally and takes the board off-line - be patient. It's just as much a hobby for him as it is for you.

The 'editorial direction' of the board will very much depend on the operator. Different boards will, for example, allow first-time users varying lengths of time on the system. There can also often be great differences between the password-registration systems - there are some

boards which will send you the registration in the mail while others will allow you to register on-line.

The boards in this chapter are non-profit-making systems. Commercially run services, such as Prestel and One-to-One, also offer bulletin boards but since they are part of a larger fee-paying services, they are included in chapter 7.

Most bulletin boards are accessed using a 300/300 baud modem. This seems to be the modem standard on both sides of the Atlantic, and many cheap 300/300 baud modems are available. The details of baud rates and how they work are explained in chapter 2. The transmission speed for bulletin boards isn't as fast as for Prestel, but it is generally more reliable and easier to use.

What's on a bulletin board?

A bulletin board is just a piece of software running on someone else's micro. Anyone with an auto-answering telephone modem and the appropriate software can start up a bulletin board on a variety of disk-based micros. You also usually need some form of disk-type storage on which the micro will store information such as the names and addresses of people registered on the board, the text of the messages and the various pieces of electronic mail. A good bulletin board operator keeps the board accessible at regular hours and 'cleans' the disks containing the stored information every once in a while so that they don't crash because they have been overfilled.

Although it would theoretically be possible to run bulletin boards on micros intended only for home use, few people do. Most people don't want their machines tied up answering the phone and may not want to fork out the money necessary to get the disk drives, memory and software necessary.

The machines commonly used for bulletin boards include Apple II computers, TRS-80 Model II and III business machines and CP/M-style business machines. Some modem manufacturers are planning bulletin board software for micros, but at present the only board running on a home micro is the South BBS using an Atari computer and user-written software.

Although boards are run on business machines, many thrive and rely on their Special Interest Groups, based on home machines. To give you an idea of the range of interests on a SIG menu, look at a typical example:

«W». Wrong choice
«B». TRS-80
«C». BBC
«D». Apple
«E». Atari
«F». Commodore '64
«G». Newbrain
«M». Modems/Communications
«S». Sinclair
«U». Unspecified above
«X». Express Combined SI messaging
«W». Wrong choice

That's only the SIG list on one comparatively small bulletin board system and finding out more about your micro is only one of a vast array of activities available. You can also:

- **Read and write electronic mail**
- **Play games**
- **Swop software**
- **Start your own on-line club**
- **Get bulletin board 'news', often written in a highly idiosyncratic and entertaining fashion**
- **Use some utility software - alternative languages, business packages, etc**
- **Even arrange a blind date!**

The last option isn't as crazy as it seems. It was very recently in the US that electronic courtship resulted in matrimony. A November issue of *Newsweek* magazine described the romance between two young Americans. Dawn Debbe of Ohio and Tom Johnson from Wisconsin were married after a courtship that began with the exchange of electronic messages via their micros. Both subscribed to The Source, a popular information service in the US. He listed himself on the 'Dial-a-Date' service, but she wasn't impressed. They eventually got 'talking' during a rap session on The Source's teleconferencing system.

The story goes on to say how a large number of the wedding guests were 'bulletin-board buddies' and how communications had carved out a new life for this thoroughly modern couple. It just goes to prove how useful such services can be - in communications of all types!

On a more mundane note, bulletin boards also let you send 'general' messages to anyone who signs on to the board. If you wanted to get

information on using high-resolution graphics with your machine, for example, you could leave a message asking anyone who could provide that information either to phone you or leave a message on the system.

The bulletin board also provides a method of exchanging 'sell or swap' messages that promote minor commerce and trade in computer bits and pieces. It's a good idea to leave a phone number in addition to your mailbox name if you want a quick response to this type of message.

Bulletin board etiquette

Just as there are rules for appropriate social conduct between people who meet one another in person, there are also certain rules of behaviour when dealing with people on bulletin boards.

- Do not use a fake name when signing on to the system - when you dial up a bulletin board, the first thing you'll be asked for is your name and where you're calling from. If you answer with some silly name, you stand the risk of actually having to pretend you're 'Joe Bloggs PLC' (or whatever other joke name you might choose) if it turns out there really is someone of that name already logged in as a system user. If that's the case, you could well be asked for a password and get kicked off the system for not knowing it. If you've lost or forgotten your password (see below), you can always sign in as 'LOST PASSWORD' and then leave a message for the Sysop to phone you and tell you what your password is. Chances are this will make the Sysop much happier than finding silly names throughout the log-on files.

You should decide before you log-on to a given bulletin board for the first time just what name it is that you would like to be known under for that board. If you sign on with an even very slightly different name, you won't be offered any electronic mail that's waiting for you and you will also clog up the system operator's valuable disk space. Remember, there's all the difference in the world between signing in as 'James Huntington' and 'Jim Huntington'.

- Write down your password and don't lose it - many bulletin board systems will allow you to assign yourself a password after your first use of the board, so that you and you alone can sign in on your ID. But if you lose your password, you may find yourself trying to log on under a different name just to get in to the system (see above for the disadvantages of this course of action).

- Remember that in many ways bulletin boards are a form of publishing - by leaving a general message on a given bulletin board - a message which can be read by anyone who dials the board up - you are publishing. There are certain rules and regulations to observe in doing so which are backed up by legislation on libel and obscenity.

- Try not to hog system time - many bulletin boards have initial sign on times of about 15 minutes. If a board has even a 12-hour access time in a given day and everyone uses up their full 15-minute quota, only four people an hour or 48 people a day can get on to the system. Even with a 24-hour service, only 96 would get through. The better an idea you have of what you want to do before you get on to the system, the more efficient you're likely to be with your time while you're on it. Plan ahead so you can be brief and to the point and you'll leave more time for others (and save a little money on your phone bill).

Hacking

One of the most notorious activities commonly associated with bulletin boards and communications in general is what's known as 'hacking'. Hacking used just to refer to people who stole as much time as possible on big mainframe computers at universities by staying in the university computer rooms at all kinds of unsociable hours, just to get more computer time. These days, however, it refers to people who crack or 'hack' their way through the security codes of computer communications systems.

It's the latter kind of hacking that's gained national media coverage, particularly in cases where young teenagers have managed to break in to top defence security systems and hospital record files. It even inspired a very successful film, *Wargames*, based on the premise that a high-school student with a modem could help spark off World War III.

For most people, hacking is probably more bother than it's worth. It involves long hours of phoning up computer systems, whose phone number you find in some obscure corner of an even more obscure bulletin board, and then trying to guess at the password and security code that might be used.

Hacking is not for the faint of heart, nor the legal-minded. In a technical sense, hacking is undoubtedly fraud. You are pretending to be someone else and by doing so gaining entry to both information and computer time that doesn't belong to you. After the scare inspired by *Wargames* (and several real-life incidents which followed the plot far too closely for comfort), authorities have both tightened up security systems and cracked down on hacking. It's becoming increasingly a sport for professionals - professional crooks - and less a harmless bit of electronic intrigue.

There are exceptions, of course. We recently heard the story of someone who gained access to a system operator's password and ID on the Prestel system and was able to get on to every page, excluding the home banking services, and change anything he liked. He was even able to get into Prince Philip's personal electronic mailbox and read the 'royal mail' (we understand it was pretty boring).

The oversight which allowed the fellow to hack his way into Prestel was merely someone leaving a number and password where they shouldn't, not the result of any massive amounts of hacking on his part. Prestel is, in fact, a pretty secure system, requiring both a correct password and ID before you can get access to it.

Bulletin board types

Having realized the value of bulletin boards, you might start shopping around for the ones nearest you. But the real place to start is by looking at the bulletin board types. Bulletin boards are run by software - and that's also how they are categorized.

There are three main bulletin board types that are worth knowing about:

- **The TBBS system**
- **The CBBS system**
- **The Forum-80 system**

They all operate in a somewhat similar fashion, but in order to make clear the differences, we'll run through the facilities offered by each.

The TBBS system

TBBS stands for The Bread Board System. It's a piece of bulletin board software developed by one Phil Becker and it has captured the hearts (and many spare hours) of bulletin board operators all over the country. The TBBS system competes with CBBS as the premier bulletin board system software. It is used by popular bulletin board systems such as that run by Tony Dennis of *Computer Answers* magazine.

The CBBS system

CBBS is said to stand for many things, the simplest of which is Computer Bulletin Board System. It's a very popular bulletin board system and is widely used all over the world. One of the system's big attractions is its flexibility - there are more options on the main menu than in TBBS, where you are sometimes required to go to 'sub-menus' to find things. For example, you can change the 'video-backspace' character from the main menu on most CBBS systems, while you can't

on the popular TBBS systems. This is useful because you can define which key you want to use for editing messages prepared while on-line.

The Forum-80 system

It was a Forum-80 system, run by Fred Brown in Hull, which pioneered bulletin boards in the UK. 'Forum' indicates the nature of the system, i.e. chatty, and the 80 refers to the Tandy TRS-80 computers it was originally designed to run on. Although Forum-80 is not the most popular system it's one of the most persistent and offers a credible alternative to CBBS and TBBS.

Getting on a bulletin board

Here's an idea of how a typical session on a bulletin board might look. This session was conducted on the *Computer Answers* bulletin board. Remember, most commands should be followed by pressing the **Return** key.

First dial up and get the welcome frame.

```
COMPUTER ANSWERS BULLETIN
BOARD

    USING TBBS + TANDY MODEL IV
      DACOM DSL2123 MODEM
      CUMANA DISK DRIVES
      INMAC PLUS FLOPPY DISKS
  * NOTE: USERLOG NOW VERY SLOW*
```

You'll be prompted for your name and your location.

```
FIRST NAME?                    GEOFFREY
LAST NAME?                     WHEELWRIGHT
CALLING FROM TOWN/COUNTRY?     LONDON
```

CABB WELCOMES GEOFFREY
WHEELWRIGHT
CALLING FROM LONDON
IS THIS CORRECT? Y

The system will check that it's got your name right and will ask you to confirm.

TERMINAL WIDTH (10-132)? 40

«A»TRS-80 1/3 «B»APPLE II
«C»ATARI «D»IBM PC «E»BBC
«F»DRAGON «G»OSBORNE
«H»TANDY M100 «I»VIC 20 «J»TI99/4A
«K»ZX SPECTRUM «L»QL

ENTER LETTER OF YOUR TERMINAL,
«CR»IF NOT LISTED: «CR»

It then goes through a series of questions to determine what type of machine you've got and how you want the system to respond to your commands.

Please Enter a 1-8 character password to be used for future log-ons. This password may have any printable characters you wish. Lower case is considered different from upper case and imbedded blanks are legal. REMEMBER THIS PASSWORD. You will need it to log-on again.

The system may ask you if you want to provide yourself with a password, so that no one else can try to log-on with your name and leave messages supposedly signed by you.

Your password? DEMOBOOK

Last message on your last call was 0

Current last message is 5231

You are caller number 10746

You are authorized 15 mins this call

You're now on the system and can take advantage of a wide range of menu options which appear almost immediately.

This board (CABB) is designed to provide a variety of services. There are three main boards:
They are:

«O»pen message section. Intended for messages for everybody to read.

«Q»uestions. Separate area for those wishing to leave a question for the magazine to answer.

«E»mail. For private messages to other users.

There are also hidden boards eg «*»Special interest groups (SiGs) which include Acorn users, Commodore users, CP/M users and Sinclair users. Access is by request to Sysop but you must have installed a password yourself.

Use «Q» to scan the messages on the desired board, and mark the messages that look interesting.

Then «R»ead the messages you have marked. Don't be fooled by the large number of missing messages. They have been deleted as out of date or irrelevant. However the numbers remain so cross references still hold true.

Problems with this board can be left for the Sysop. Should you wish to keep your problems quiet, select «E» mail and leave a private message.

The free software is in the «D»ownload section. Help with protocols is under system information. «I».

Finally if you get stuck «G» will get you out of the system. Or you could simply break the line . . . unlike commercial systems there is no charge for access time if you fail to log-off formally. For those ardent speed freaks, auto log-ons can be

achieved by using a string such as: - Fred; Bloggs. More information on this is again found using «I».

You can now insert a password by going to the system utilities «X».

Use «P» to insert any 5 characters.

This message is repeated under option 5 of the «I»nformation section.

CABB Top Level Menu

«O»pen Message section

«Q»uestions . . . Questions to Computer Answers

«E»mail . . . Electronic Mail section

«I»nformation . . . System Information

«B»ulletin boards

«D»ownload section

«U»serlog . . . List of Users

«P»roducts & Micromart

«X»change . . . Change System settings

«S»urvey . . . of New Users

«G»oodbye . . . Terminate Session

«*»Special Interest Groups

«&»CABB . . . Lonely Hearts Club

To give you an idea of the interests catered for on a Special Interests Group board, take a look at what you get if you pick the SIG option on the *Computer Answers* system.

```
Command:

«V»acancy . . . Jobs going

«L»eisure . . . game addicts

«E»xit back to CABB

«G»oodbye to terminate session

Command:
```

By pressing **E**, you go back to the main menu which is pretty much the same on all TBBS systems. Once you have memorized the menu and know how to get round the system, you can change your system settings so you don't have the main menu displayed every time you finish an activity.

Pressing **G** for Goodbye takes you off-line and out of the bulletin board, making room for another eager user.

Numbers

Here's a selection of popular UK bulletin board phone numbers. Don't get depressed if you often find them engaged - keep trying. To keep a constantly updated list of numbers, get hold of either *Tele-Link, Personal Computer World* or *Computer Answers* magazines. They all publish bulletin board phone numbers on a regular basis.

All listed bulletin boards operate on 300 baud, with either 1 start bit, 8 data bits, 1 stop bit and no parity or 300 baud with 1 start bit, 7 data bits, 1 stop bit and even parity. All are 24-hour systems except where marked 'Ask', in which case the hours tend to change. You then need to phone the number given, and if the system isn't on-line ask for the latest hours.

CBBS systems

CBBS South-West	0626-890014	24 hours
CBBS Surrey	04862-25174	24 hours
CBBS MG-Net	01-339-2136	Ask

TBBS systems

TBBS London	01-348-9400	24 hours
Mailbox-80	051-428-8924	24 hours
Blandford	0258-54494	24 hours
Southampton	0703-437200	24 hours
TBBS London Metro	01-341-7840	24 hours
CNOL	0524-60399	Ask
Microweb	061-456-4157	24 hours
CABB	01-631-3076	24 hours
BASUG	0742-667983	24 hours
NBBBS	0827-288810	24 hours

Forum-80 systems

Forum-80 Hull	0482-859169	24 hours
Forum-80 Wembley	01-902-2546	24 hours

Others

South BBS	0243-511077	24 hours
Remote CP/M Stoke	0782-265078	24 hours

6. TELETEXT: TV'S ALTERNATIVE

Teletext is a technology which sends digital information over the airwaves in spare parts of the conventional television channel bandwave. A teletext adaptor can unscramble the signals and display the data as text on a television screen.

Most people are probably vaguely aware of teletext*. It's the technology behind the oft-mentioned Ceefax and Oracle services on the BBC and ITV television networks.

Both services broadcast digital information on what are best described as spare parts of the channel. The signals arrive via the airwaves, are demodulated by a teletext adaptor, decoded into characters of information and then displayed on the television set.

Teletext is a medium that has yet really to find a profitable niche in which to operate. It's a classic case of a technology-driven service. So far it concentrates on providing news, weather, limited general information and subtitles to television programmes for the deaf. In an attempt to find more ways to apply the technology, there is a limited telesoftware facility - mostly for the BBC micro. Like Prestel (see chapter 7), the micro boom caused the services to look at micro users as a possible source of subscribers.

The technology

The first point to make about teletext is that it is essentially a broadcast medium. There is a limit to the amount of information that any single channel can broadcast. The user can pick a page or a series of chained pages on a single topic from a collection of constantly broadcast pages sent out in a cycle. They are broadcast from, say, 100 to 300 and then start back at 100 again.

Unlike the telephone-based information systems, teletext pages are broadcast at a very fast rate - several pages every second - and this in turn offers the user a pseudo interactivity with the system. As the pages are cycled over the airwaves, the user selects the page he or she wants to view and the adaptor waits until the right page arrives, decodes it and displays it on the screen.

Obviously the more information there is available for accessing on the system the longer it takes for each page to arrive, so there is an inherent limit to the amount of information the system can handle. This, in fact, may be no bad thing as the medium actually fits the broadcasting ethos of concise, quality information as compared to its converse in the print medium - bulk, range and choice. In effect teletext does the selection - the controllers of the medium choose topical items and broadcast them.

The micro user

So how does teletext shape up as a medium for micros? The one immediate advantage is that it's free. There is an initial cost involved in buying the teletext adaptor for the computer but, unlike Prestel, there are no access charges and, just as importantly, no telephone charges.

At present in the UK each television channel has an attendant teletext facility. There are two Ceefax and two Oracle channels. While Oracle and Ceefax are competing and obviously overlap, some attempt has been made to rationalize information between the two channels on each service. BBC1 and BBC2 have complementary information as do the services on ITV and Channel 4.

On the minus side the limitation of information makes it annoyingly shallow in its appeal - it attempts to please all and satisfies few. Add to this the fact that it is non-interactive - you can't leave messages, send electronic mail or telexes or order goods - and many may consider it not worth the expense.

However, for the computer buff who has everything, it does have the convenience factor. Teletext is instant - much more so than Prestel, say, which does require an initial minute or so to establish a connection, enter an ID number and password just to find the latest weather report. If this sounds like coming down firmly on both sides of the fence then you're right, it is. If we had a few hundred pounds, a Commodore 64 and wanted to get in to communications for the first time, we'd buy a modem, not a teletext adaptor. But, make up your own minds.

Information available

P777 CEEFAX 777 Mon 12 Sep 15:29/25
2/3

2 FRIDAY

6.25am-3.10pm OPEN UNIVERSITY

3.15 FILM: BING CROSBY DOUBLE BILL
PARIS HONEYMOON
Bing has to choose between a steel heiress and a peasant girl
4.35 FILM: WE'RE NOT DRESSING
Bing stars as a would-be architect working on a palatial yacht

5.50 EVENTING The Burghley Horse Trials
6.40 THE SKY AT NIGHT
7.00 GRAND SLAM New series Birmingham v Southampton
7.25 NEWS AND SPORT; weather

Later programmes follow

racing

RESULTS FROM WINDSOR

Going: Good

2.15 ROUND HILL 9/4f Passing Storm 6/1
Portlaw 6/1 (15 ran)
2.45 TRAKADY 9/2
Gay Lemur 1/2f (5)
3.15 LEAR FAN 1/4f
Kalim 9/2 (4)
3.45 MODAKA 9/4f Iowa 11/1
Brockley Belle 20/1 Eyelight 13/2
(18)
4.15 OPALE 5/1 Gillie's Prince 16/1
Putney Bridge 8/1 (9)
4.45 ROYAL TROUPER 9/1 Danish Express
11/1 Winter Words 33/1 Ka Bu Nor
7/2f (16)

BBC Headlines

*CAT Program index

TELESOFTWARE

Teletext equipment

OEL produces its own teletext offering for the Commodore 64 called the CBM TTX. At present this is the only way a 64 user can use the service. Connection is very easy. The unit fits in to the Commodore cartridge port and the display is modulated via the 64 to the TV in the normal way on channel 36.

Once connected, the adaptor only requires correct tuning to be ready to go at all times.

In our experience the only difficulty is the quality of the reception which is very critical. You find that you either get an entire page transmitted and accepted free of mistakes or you get nothing at all (so fast is the transmission). If you rely on *Coronation Street* arriving via rabbit ears on top of the telly, don't be so cavalier about teletext. While you can get used to less than perfect reception, the decoder can't. The thing to remember before you buy is that if you haven't already got one, an external TV aerial is likely to be required. Once these problems have been ironed out operation requires switching on the telly, the 64 and the adaptor and you're dumped in the middle of a page cycle.

Teletext is very simple to use and this is reflected in the commands. You select a page number by typing **p** and three numbers. You don't even have to press **Return** as numbers run from 100 up and therefore all consist of three digits. The system accepts **p** and any desired page number.

Telesoftware is the draw card for the micro user; however, at present there is little in the way of useful software on the service. After all, if a game is really good the author is going to be selling it in shops on tape, not distributing it free as telesoftware.

What does have scope is the try-before-you-buy facility. Here scenes or demonstration modules of games can be downloaded and saved to show off features and help the recipient make a purchase decision.

We believe that teletext has a place in the overall scheme of things - eventually. But, judging from the price of adaptors for other micros, the information available will hardly warrant the cost. All the information on Ceefax or Oracle can be found on Prestel which does offer more besides, notwithstanding the running costs. The TTX is available from OEL on 0768-66748.

7. INFORMATION, PLEASE

In this chapter, we feature and rate each of the major computer-based information services you're likely to encounter. We'll spend more time on the services that are most relevant and useful and less on those of more limited and esoteric interest.

The important thing to remember about the services featured in this chapter is that they all cost money to join and to stay joined. If you sign up to one of these information services, you should have a pretty good idea of what you're getting and what you want to use the service for.

The first of these services is the one that's most likely to be useful to you.

Prestel

Videotex is an overall classification for services (both telephone based and teletext broadcasts) which send information for displaying on a television screen.

Prestel was just about the first service of its type in the world. It's a videotex* service which means it transmits textual information over the telephone lines in an interactive fashion. When you ask for something you will get it. The information is transmitted, not so much as a stream of information, but as a series of precisely designed screens. There is no scrolling - all the information is broken down into the screen page format.

Prestel is a general-purpose system aiming at a very broad range of interests. It includes everything from weather, news, train and flight timetable information to stock market reports, competitions, puzzles and so on.

Prestel also features a wide variety of fun features like Chatline, or adventure games. Anyone with the equipment can get on to a free tour of Prestel. Dial 618. When the user number prompt appears just type a series of '4's until the password prompt appears. Now type four more '4's. You can have a free tour of the system.

Although Prestel is run by British Telecom, the actual information is provided by separate companies and organizations called Information Providers (IPs). The Information Providers rent storage space on the Prestel computers.

The information provided on the Prestel pages can be either free or 'pay as you view' - you are advised of the charge for each page by a note in the top right-hand corner. Obviously, some IPs are using their presence on the system both to gain valuable experience and understanding of a media like Prestel and also to promote their organization's products or public profile. Many of them simply provide free information, e.g. British Airways, British Rail and so on.

You can join Prestel through some of the Information Providers like Micronet 800 or Homelink, or you can get a general membership from Prestel itself (dial 100 and ask for Freephone 2043).

Costs

Prestel is fairly cheap compared with other information services. For private users the charge is £5 per quarter, £15 for businesses.

A connect time charge is only in operation during the weekdays (between 9am and 6pm) and on Saturday mornings (8am to 1pm). This costs 5p per minute, so the most sensible thing to do is use the service in the evening or on weekends. Remember though, that some pages (not many in the general interest area) will carry a charge.

The other cost to bear in mind is the standard telephone charge. By making the calls during off-peak times, you will only be paying about 1p per minute.

Several IPs are on Prestel to run a business relying on the service as the primary means of reaching, enticing, selling to and billing their customers. These IPs may charge users for viewing their pages or require that the user joins their service as a sort of sub-membership.

Using Prestel

This is simplicity itself. You establish contact with any one of a number of Prestel computers scattered about the UK. When you subscribe to Prestel you will be provided with a list of the telephone numbers and your subscriber number. Although the Prestel standard specifies 1200/75 baud, there is a 300/300 baud gateway available on a London number. This service is designed for conventional monochrome computers which are not, of course, capable of interpreting the colour graphics codes normally generated by Prestel. These are instead filtered by the 300 baud host system and transmitted as stars.

At 300 baud, Prestel is much less engaging to use - you don't get colour and you spend a lot of time waiting as the star graphics are printed on the screen. However, if you prefer to stick with a 300 baud modem, it's probably not worth the cost of the extra modem just to access Prestel occasionally.

Over 50 per cent of the UK population are within local-call distance of a Prestel gateway. The computers which actually store the Prestel information are located in London and Birmingham, but access can be gained through 'nodes' (entrances) in various parts of the country.

Access to the system is obtained by dialling a variety of computers, all with literary names like Dryden, Kipling, etc.

Each Prestel subscriber has a subscriber number which must be keyed in on a prompt from the host system once contact has been made. As extra security, the subscriber must set and change his or her password.

```
GOOD AFTERNOON
DIMENSION GRAPHICS

        P
      P R E
    P R E S T
  P R E S T E L
    E S T E L
      T E L
        L

Microcomputing

Incorporating MICRONET 800
Alleged security breach - see p5832

DICKENS COMPUTER
Last used FRI 07 DEC 14:27    Key #
```

Once your subscriber number has been entered, the relevant password is asked for. If you respond correctly, you are logged-on to the system (if you make a mistake keying the password, you're allowed 3 goes at it before you're disconnected). At this point the menu screen is presented and you select an option and work through the system to the information required.

```
P R E S T E L                 1a                0p
Main Index

1 SPECIAL FEATURE            MICRO BOOKS
  Order micro books for Christmas from
  Booklink's special list

2 INFORMATION News,Weather,Travel,Sport
  Advice,What's On,Ads,Local,Amusements
3 PRESTEL CITISERVICE & OTHER BUSINESS
  INFORMATION
4 ALPHABETIC INDEXES to subjects & IPs
5 WHAT'S NEW                 DECEMBER 4th
6 MESSAGE, BOOKING & ORDERING SERVICES
  Mailbox,Telex & Teleordering
7 ALL ABOUT PRESTEL Customer Guide

9 PRESTEL MICROCOMPUTING incorporating
  Micronet 800 services for micro users
0 HOMELINK Interactive homebanking &
  Teleshopping services
```

```
P R E S T E L                11a          0p
News & Weather

1 NATIONAL & INTERNATIONAL NEWS News
  headlines & stories regularly updated
2 UK WEATHER Actual weather,reports &
  forecasts,coastal reports
3 SPORTS NEWS Headlines,results &
  fixtures
4 TRAVELLERS NEWS Road & rail commuter
  news,motorway report & weather cond-
  itions,air travel info,ferries
5 VIEWDATA NEWS Videotex news
6 BACKGROUND TO NEWS Comment,opinion
  polls
7 WEATHER ABROAD

9 BUSINESS & SPECIALIST NEWS
0 GENERAL INTEREST
```

```
P R E S T E L                111a         0p
National & International News

1 PRESTEL CITISERVICE 0→ 10p National
  & International general,company,
  financial & commodity news updated
  continually from ICV
2 NEWS STORIES National & International
  business,financial & company news
  updated frequently

0 NEWS & WEATHER INDEX
```

2020a 0p

VIEWTEL 202

THE WORLD'S FIRST DAILY ELECTRONIC NEWSPAPER

DECEMBER 7, 1984

12 NEWS INDEX
13 BUSINESS
14 SPORT
15 TRAVEL
16 HOROSCOPES
17 WEATHER
18 MAGAZINE
19 FITNESS TIPS
20 FREE FUN
21 MAILBOX
22 CLUB 403
23 MOTOR VIEW
0 VIEWTEL

NEWSFLASHES

Gas leak firm's boss released. 3

Hijackers' demand agreed..... 4

Prisoners hold hostage..... 5

Spurs fan killer is jailed..... 6

Once familiar with the system, you can use various short-cuts by jumping directly to a desired page of information (train timetables, for instance) simply by keying the number of the page required. To quit the system go back to the main menu and choose the exit option.

20200a 0p

Latest news 1

from Viewtel

1 PRISONERS TAKE A HOSTAGE AT SCRUBS
2 DECISION DAY IN NUM CASH WRANGLE
3 LABOUR RIFT OVER SUPPORT FOR MINERS

4 POLICE COMPLAINT OVER KIDNAP STORY
5 EEC AGREES LEAD-FREE PETROL DATE
6 LAWSON SAYS TAX CUTS "FOR THE MANY"

7 IRAN AGREES TO HIJACKERS' DEMAND
8 GAS LEAK FIRM'S BOSS RELEASED
9 FRIDAY'S WEATHER FROM VIEWTEL

0 MORE NEWS HEADLINES

```
                                202001a        0p
  LATEST NEWS from Viewtel

  PRISONERS TAKE HOSTAGE AT SCRUBS
  TWO prisoners are holding a fellow
inmate hostage at Wormwood Scrubs
prison, the Home Office says.

  The prisoner have barricaded them-
selves in a cell in the West London
jail's "B" Wing.

  Prison officers were said to be in
contact with the hostage-takers. Police
and an ambulance have been called to
the jail.

  0 Headlines 1 Next item 9 News index
                2 Adflash
   A UNIQUE COLLECTION FROM TELEDISC
```

Interactivity opens exciting possibilities - it's possible to leave information on the system as well as retrieve or view it. So there are many services on Prestel involved in ordering goods.

In this regard, Prestel does have a disadvantage, however. The 75 baud send speed is frustratingly slow. In normal circumstances this does not matter as you are sending fairly simple one or two character commands or numbers. However, sending a lengthy text file to Prestel can take a long time (approximately 1½ minutes for 100 words). An example would be sending telexes (more of telex later).

Micronet

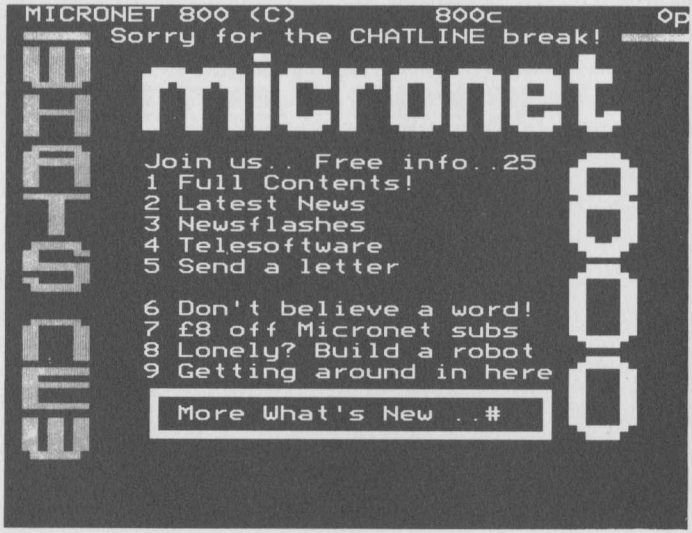
One of the most successful areas of Prestel is undoubtedly Micronet 800, started to cater specifically for the micro user. Micronet has done much to rejuvenate the Prestel service and now has a quarter of the Prestel audience. It is classified as a closed user group.

A Micronet subscriber also has access to the overall Prestel system, except, of course, to closed pages on other services or to other closed user groups.

News

The Micronet subscriber enters the Prestel system at the Micronet sub-index. The first impression is very 'newsy'. Micronet sees its role mainly as an electronic micro computer magazine.

The stories tend to be written in a languid, chummy fashion which I'm not sure suits the medium very well - you often find yourself having to wade through page after page of chat, with the factual material some way off. However, Micronet is well placed to get the latest developments as they happen, and it often does.



The index page is likely to send you after the latest news story. There are often news flashes (which actually flash on the screen) in the initial index.

```
MICRONET 800 (C)          60000b        0p
   FAST GUIDE TO MICRONET 800 CONTENTS
  10 MICRO MAGAZINE
  11 What's New today     Reach this
  12 Daily News            fast Index
  13 Software reviews     at any time..
  14 Special Features      Just press
  15 Other features       01 anywhere!!
  20 TELESOFTWARE
  21 BBC programs
  22 Spectrum programs
  23 Software feedback
  24 Other programs - Apple,Pet,C64
  30 COMMUNICATIONS
  31 Electronic mail,telex & directory
  32 Contact: your own bulletin service
  33 Talkback to Micronet 800
  40 COMPUTERMART
  41 Advertisers by subject and A-Z
  42 Swap Shop - classified area
  43 Major Sub Information Providers
  8  FULL A-Z GUIDE       9 MAIN MENU
```

```
MICRONET 800 (C)          800110a       0p
<  FEATURES  >
 Fabulous features at your fingertips
Adventure Comp...11 5th Generation..31
Agony Aunt.......12 Filmnet '84.....32
Beeb Peripherals 13 Letters.........33
Beeb Machine Code   Micromouse......34
 Monitor.........14 Midnight
Book Reviews.....15  Micronetters...35
Chatline.........16 Musicnet........36
ClubSpot.........17 News............37
InfoBeeb.........18 QNET............38
Computer            68000 Chip......41
 Languages.......21 Starnet.........42
Contact..........22 Swap Shop.......43
Decision Data....■■ Top 10
Diary............24  Telesoftware...44
Download Help....25 Wired Society...45
          9 - Micronet A-Z
```

Messages

Micronet also contains an E-mail system (see chapter 4) which allows you to leave and receive messages. The screen will tell you if there are any messages waiting for you when you log on.

Leaving a message, like all the other Prestel procedures, is very straightforward.

```
MICRONET 800 (C)          6006015a      Op
MICRONET MAILBOX
EXCLUSIVE MICRONET DIRECTORY

1 NEWCOMERS - 'how to' hints & tips
3 LOOK at our MAILBOX DIRECTORY - You
  can send messages to other Micronet
  members (members only)
4 Register on Micronet Mailbox
5 Prestel MAILBOX - large choice of
  message frames and user directory
6 To SEND a Telex message
7 To JOIN the TELEX service

  GOTO 8 Micronet Full Features Menu
  GOTO 9 Comunications Index
```

```
MICRONET 800 (C)          6006061a      Op
MICRONET MAILBOX
Please register me on your mailbox
directory. I understand you will use my
account number as displayed below and
that it may take up to 4 weeks to be
registered - This does not affect your
ability to send & receive messages.

Which Micro? BBC B                  #
NAME TO APPEAR: PAUL WYNDER           #
DIMENSION GRAPHICS
MAIN STREET
CHACKMORE
BUCKINGHAM
MK18 5JF

FRI 07 DEC 1984 14:
Account Number:  280812037
```

Software

There is a lot of free software available on Prestel, but of course it isn't very good or it would be selling in the shops. These free programs can be downloaded as a series of frames. Software may also be bought via Prestel and the price of the program is automatically added to your bill. Documentation has to be downloaded and printed.

```
MICRONET 800 (C)          60061a          0p

SOFTWARE
SUPERMARKET

WHERE GOOD SOFTWARE COSTS LESS

 11 BBC                          Software
 12 SPECTRUM                      Charts
 13 APPLE                         GOTO 2
 14 PET
 15 CBM 64                       Programs
  4 Program Feedback             Reviewed
  5 Help and Advice               GOTO 3
  9 Micronet Main Menu

  7 CBM 64 Users Send us your software
```

```
MICRONET 800 (C)          600617a         0p

commodore 64

PLEASE NOTE THAT ONLY OWNERS OF THE
OEL COMMS CARTRIDGE CAN DOWNLOAD
THESE PROGRAMS

 1 NEW PROGRAMS          COMMODORE 64
 2 GAMES                 SOFTFLASH
 3 UTILITIES             Suicide Pilot
 4 BUSINESS
                         KEY 6

 7 Downloading advice
 8 Commodore 64 Microbase
 9 Micronet Full Features
```

Homelink

This section of Prestel provides a wide range of services including a grocery ordering facility. You place your order over the system and the service delivers - apparently at competitive prices.

However, perhaps the most interesting facet of Homelink is its financial services - stockbroking and banking. The first is a minority interest, but it gives an indication of the potential of the service.

Stocks and shares

Strange and new things have started to happen in the City of London in the wake of government pressure to liberalize stock and share dealings and open up the market to the small investor.

A Prestel-based service provided by stockbrokers Vickers da Costa has been launched. The enlargement of the service, or the addition of competing ones, seems certain to follow and more may have appeared by the time you read this. At the moment the scheme is being pilot tested with selected Homelink customers, so the final shape of the service is likely to differ in minor respects. The pilot scheme enables customers to send buying or selling instructions directly to the stockbroker for action the same day or as soon as dealing reopens on the next day.

Payment of the shares is made by Electronic Funds Transfer from the customer's Nottingham Building Society account to the broker and, of course, any gains made by selling shares flow back into the account. Security is ensured by customer reference numbers and through the broker's telephoning the customer to confirm the share transaction.

To help you make the vital share buying decisions, Vickers da Costa also provides on-screen share prices which are continually updated. There is also a weekly on-screen newsletter with the normal market trend and tip information.

If you are, or fancy yourself as, a stock market dabbler, this Homelink service seems to provide a cost and time-effective entrance to the field, especially for the small investor, who, because of the fixed costs associated with a traditional share transaction, is usually of less interest to the conventional broker than the investor investing thousands of pounds. If you already have the technology, why not use it? Stock market services could be one of the most exciting uses for interactive services like Prestel.

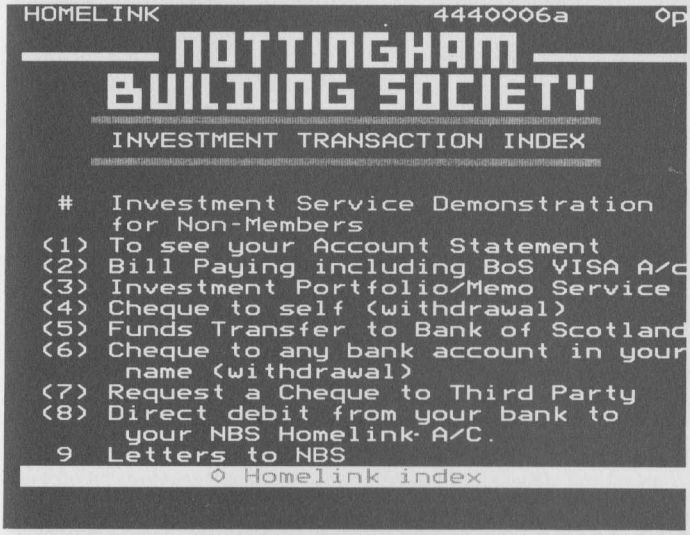
Banking services

The Nottingham Building Society and the Bank of Scotland are both represented on Prestel's Homelink service. If, like us, you find the banking system more a hindrance than a help in your day-to-day

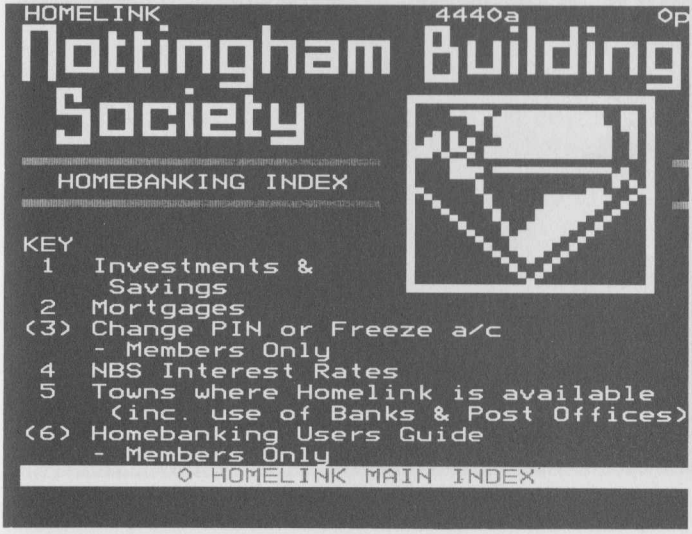
financial activities, then the idea of making transactions from home is attractive.

Bear in mind that the banks regard the technology as still being in its formative stages. The services that exist so far are research oriented - the banks are closely monitoring customer behaviour, transaction levels, usage and so on, to determine how to develop the area in their best interests.

However, if you already have the technology, it can be both interesting and useful to put it to work. For most people, however, we suspect the high deposit terms will be prohibitive - you are required to



The Nottingham Building Society allows you to check your balance, order direct bill payments, and transfer money between accounts.



If you're a real purist you can even apply for a mortgage or loan using the system. You can check the interest rates and how much tax you'll have to pay. All this is rigorously protected by security codes.

have £2000 in your account before you can use the Homelink facility. Hopefully these restrictions will soon be lifted.

The Bank of Scotland allows you to run a current account through Homelink. You can look at your balance and a statement of your transactions since the last statement was sent out. You can also transfer funds to and from your Nottingham Building Society account.

HOMELINK 4440068b 0p

NBS STATEMENT OF ACCOUNT

Account No 99888777766 Page No 1
MR A A SMITH

Date	Code	Dr/Cr	Balance
28.04.83	CQ	45.65	2,375.79
28.04.83	CASH	124.21	2,500.00
29.04.83	CQ	14.65	2,485.35
29.04.83	CQ	56.78	2,428.57
29.04.83	CQ	12.63	2,415.94
29.04.83	CQ	789.23	1,626.71
29.04.83	CASH	873.29	2,500.00
05.05.83	CQ	100.32	2,399.68
05.05.83	CASH	100.32	2,500.00
09.06.83	INT	26.45	2,500.00

Please key # to continue this sequence
1 Codes Explanation 0 HL Index

HOMELINK 4440070b 0p

NBS BANK OF SCOTLAND VISA PAYMENT

SECURITY PROCEDURES OMITTED HERE

Amount :£ 55 .35p#

Date: 10/06/83#

Please key # to continue this sequence
0 Homelink Index

The Bank of Scotland has an arrangement with Barclays Bank, so you can use your Bank of Scotland cash card with Barclays' dispensing machines.

The Visa card, available with the current account, also enables you to use the Homelink teleshopping service to order goods. You give the card number just as you would when ordering over the telephone.

So far there are restrictions on the usefulness of the banking service. You are limited to viewing your bank statement, ordering new cheque books and accessing general promotional information. Genuine transactions are not really available except in moving money between accounts. You still have to go to the bank to deposit cheques or obtain cash. There's no way round this, of course, until every home goes on-line and a communications terminal is as common as a telephone. Homelink can be contacted on 0602-414343.

Verdict

Prestel can become frustrating to use and the information provided is often a bit patchy. On the one rare occasion when we attempted to track down a really useful piece of information, to wit where we could catch a night bus at 2 am, we were informed that London Transport has an extensive night bus service covering most of London (or words to that effect). Needless to say we called a minicab.

Not only is concrete information not there, it can be a time-consuming business tracking it down. Prestel is obviously due for an enhancement in the form of an optional 'keyword search' facility which would let you find any pages on a specific subject.

However, there are a grand total of 350,000 pages of information on the system. Although the contents may not always be up to scratch there are enough features to make it a worthwhile investment.

Compunet

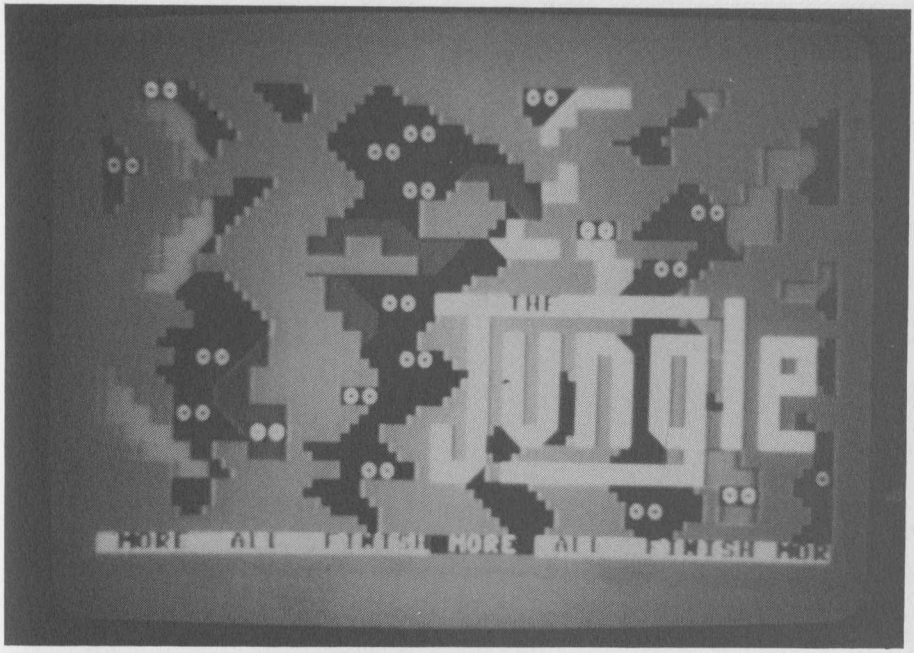
Compunet started life at the Personal Computer World Show in London in mid-September 1984. It was designed as the first Commodore 64-only interactive database service in the UK.

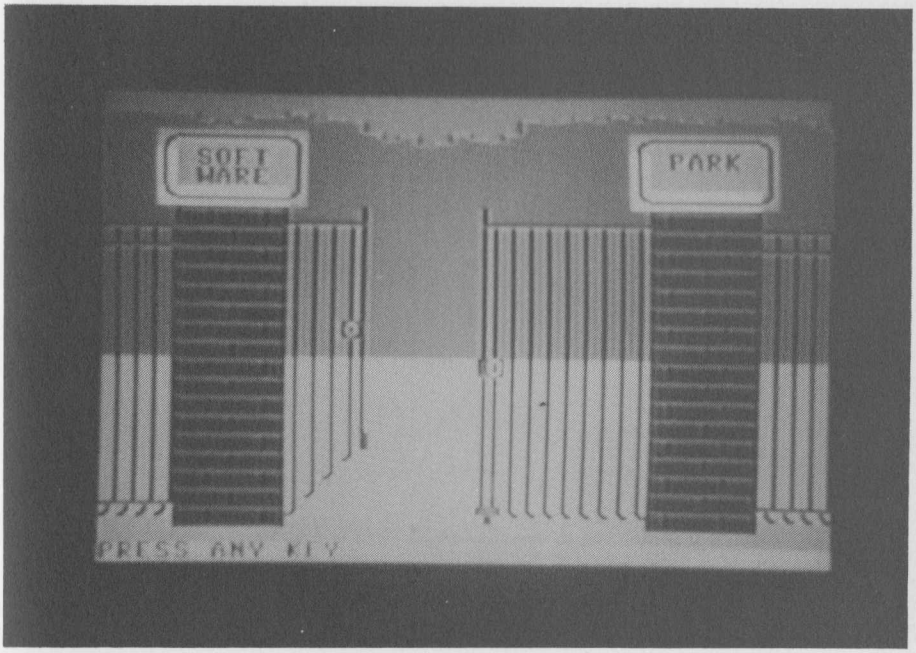
For an annual subscription of £30, it offers software downloading (both free and commercial programs), news about the 64, an on-line adventure game called MUD (Multiple User Dungeon) at £3 an hour, and a user bulletin board system called The Jungle. The system can only be used with the Commodore 64 modem and built-in software. At present the price of the modem includes a year's free subscription to Compunet.

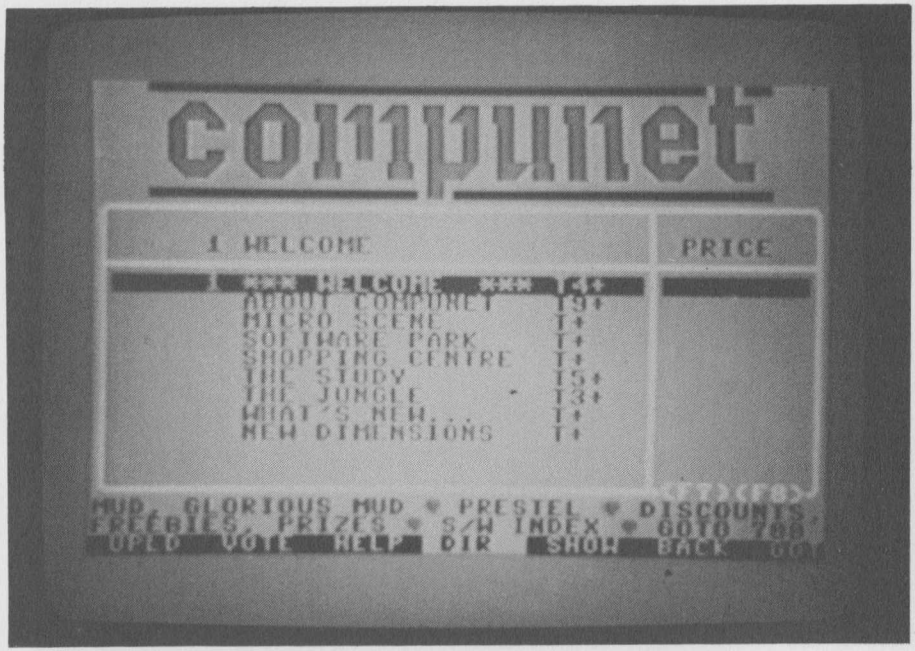
Getting hooked up to Compunet is easy. Once you've bought the modem and filled in the registration card you'll be issued with a password and an ID number and are then ready to use the system. The modem is of the auto-dial type, so you just type **CONNECT**, fill in your local Compunet computer's phone number and the software inside will do the rest.

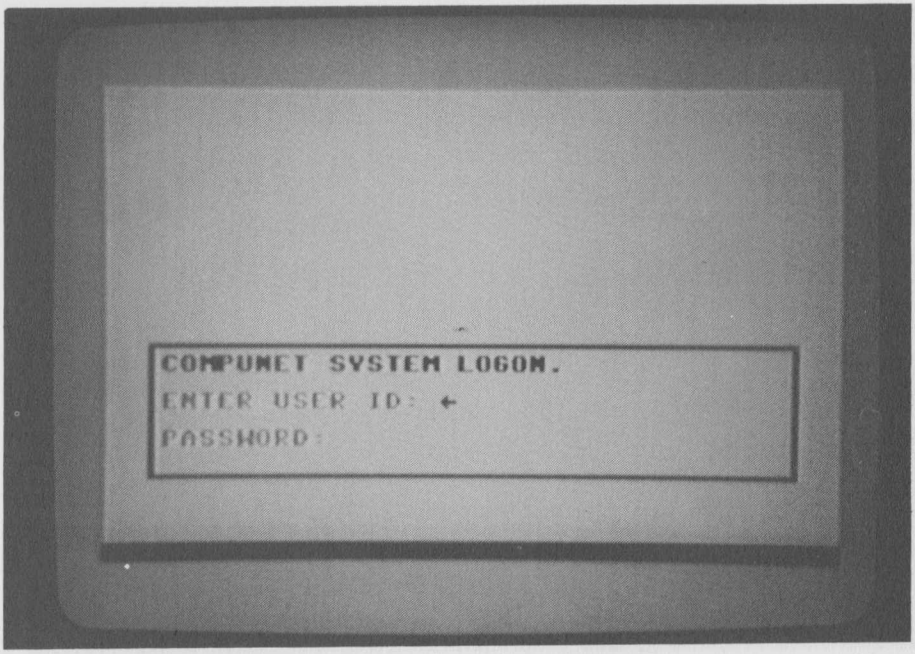
Perhaps the best thing about the Compunet service is that it's easy to use. However, it is nowhere near as comprehensive as Prestel, so it's a good thing that Commodore offers an excellent viewdata program which can be downloaded to allow you to use the Commodore modem with Prestel.

The system is off to a good start. With the price of a year's subscription included in the already low price of Commodore's auto-dial modem, it can't be a bad deal.


THE
Jungle
MORE ALL FRIENDS MORE ALL FRIENDS MOR


SOFT WARE
PARK
PRESS ANY KEY


compunet
1 WELCOME
PRICE
ABOUT COMPUNET T9+
MICRO SCENE T+
SOFTWARE PARK T+
SHOPPING CENTRE T+
THE STUDY T5+
THE JUNGLE T3+
WHAT'S NEW... T+
NEW DIMENSIONS T+
MUD, GLORIOUS MUD * PRESTEL * DISCOUNTS,
FREEBIES, PRIZES * S/W INDEX * GOTO 700
UPLD VOTE HELP DIR SHOW BACK


COMPUNET SYSTEM LOGON.
ENTER USER ID: ←
PASSWORD:

PSS

For most Commodore 64 users the idea of dialling up foreign, especially US, information services from home will seem a little on the extravagant side. The mere thought of the telephone bills is probably enough to put the idea out of all consideration. Then, of course, there is the difficulty of writing to the service, applying, arranging subscription payments and so on.

The economics have been improved considerably since the introduction of British Telecom's Packet Switching Service (PSS) and its companion International Packet Switching Service (IPSS). It is now possible to access the wealth of US on-line information services at surprisingly cheap rates. On a minute by minute basis the costs work out about the same as going to the theatre or occupying a stand seat at a football match.

PSS rationalizes the costs of international data lines. These lines are capable of transferring data at kilobits per second, as opposed to normal modem-based transfer rates. When on-line to a conventional service, up to 90% of the computer's time is spent waiting while you decide what service to select. Meanwhile the line is open and accumulating telephone charges. Packet switching allows dozens of users to optimize the available lines (see glossary). A word of warning: although the cost of using this futuristic dimension of computer communications has become dramatically cheaper over the past couple of years, we're not talking pocket money. The following pages comprise only a brief discussion of what's available.

These information services are really cost-effective for information workers - researchers, writers, journalists, students, etc. For those prepared to take their interest further, Ray Hammond's *On-Line Handbook* (Fontana, £4.95) provides an excellent detailed account of foreign and UK data networks and on-line services from the British end of the telephone bill.

The Source

The Source is probably the micro enthusiast's premier service in the US. Like all US-based services it's not everybody's cup of tea simply because the costs are likely to be prohibitive for most of us. The service costs $100 to join (once off) and a minimum fee of $10 per month. This increases in relation to how much time you spend on the service.

The Source is like a super Prestel with a lot more features. Launched in 1979 to cater for micro users, it quickly grew in both users and features. Unlike Prestel, it was designed for computer users, so it has a more computer-oriented feel. You can actually use keyword searches to track down information. This is fortunate, because the database on The Source is huge.

The bulletin board section is split up into dozens of sections dedicated to special interests - everything from a dating board and soap opera board to the more familiar Apple or BASIC interest areas. There is an electronic mail facility, a shop from home facility, you can buy or exchange software and you can even write programs on the system.

One of the most popular features is CHAT. This is the electronic version of CB radio and you can find yourself typing to people from all over the world. In fact, Ian first used The Source in Australia in 1981 and chatted with someone from Basingstoke.

More information can be obtained from Source Telecomputing Corp., 1616 Anderson Rd., McLean, Virginia 22120, USA.

CompuServe

CompuServe is a close relative of The Source with similar facilities and, compared with Prestel, its breadth is staggering. It covers much the same areas and seems to aim at attracting the same membership as The Source. CompuServe costs $30 to join and the hourly charge at 300/300 baud is $22.50.

More information can be obtained from CompuServe Information Service, 5000 Arlington Centre Blvd., Columbus, Ohio 43220, USA.

Specialist Information

There are a surprisingly diverse range of 'special interest databases' operating in the UK and US, but it is beyond the scope of this book to deal with them in depth. For the aspiring information worker, however, they provide powerful new tools. The following services may be accessed through British Telecom's PSS.

BLAISE

(British Library Automated Information Service)

The British Library is an incredible storehouse of UK-printed material courtesy of legislation which compels publishers to lodge a copy of every item published with the library.

Blaise-Line gives access to the catalogue. All the records contain fields with title, author and so on plus keywords. Some have summaries of the information contained in the publication. The researcher uses a fairly sophisticated set of procedures to search the database for publications. The result of a search will indicate what's available and where and how it can be obtained. Blaise-Line does not provide the substance of the publication itself.

For more information contact The British Library, 2 Sheraton St., London W1V 4BH.

DIALOG

By common consent this is the king of information services with close to 100 million items of information. Dialog is not for the novice or browser. It costs nothing to join the service, all the charges are made up of time on the system, and these charges vary according to the price placed on the information by the various specialist Information Providers. Dialog is available through PSS.

There is also a cheaper subset of the service called the Knowledge Index set up to cater for the micro user. This service has the more popular files from Dialog and is available at a relatively low cost from the UK - $24 per hour.

For more information contact DIALOG Information Services, PO Box 8, Abingdon OX13 6EG.

8. INSTANT TELEXING

Computer-based telexing is another example of overlapping technology where an old communications system (telex) is merged with a new one (computer-based electronic mail) to yield a highly efficient hybrid technology.

To appreciate the power and nature of the world-wide telex system - to which your micro can give you immediate access - it's worth looking at a little of the system's history and background. Telex is essentially a private telephone system that is dedicated to the transmission of text rather than speech.

The telex system was first set up in Europe after World War II by the European telecommunications utilities. It then moved to Canada and the US in the 1950s. The system operates at 66 words per minute and 50 baud.

You can use telexing as an effective method of communicating with people around the world. Although computer communication systems - or the modems used to achieve them - are by no means standard, telex systems are. Plugging your micro into the telex system gives you a relatively cheap and effective way of getting information around the world, and you can reach anyone with a telex machine.

The typical old-style telex system consisted of a teletype line-printer combined with a keyboard and a telephone dial. You dialled the telex number of the person to whom you wanted to send the message and then started typing that message. It would appear on the other end as you were typing it.

Later telex systems allowed some form of pre-sending preparation of messages, although editing capabilities were minimal. Despite the crude technology, the undisputed power and appeal of telex systems made them ideal for sending/receiving urgent business messages or news stories to newspapers. In recent years, the systems have been also used widely by the travel industry to make and confirm bookings worldwide.

How it works

When you send a message, you send it to a specific telex number – often with what's known as an 'answerback' and a country-code designator. The answerback is an optional designation following the actual telex number which just confirms the identity of the party holding the number: e.g. 264971 TIMES G is the telex number for *The Times* newspaper in London, where 'TIMES' is the answerback and 'G' designates Great Britain. If you were sending a message from anywhere in the UK you wouldn't have to include the 'G' designator.

The real difference between a telex and a telephone message is in its preparation and presentation. With a computer-based telex system, you can prepare your message before you send it with the computer's word-processing software or within the editor offered by the electronic telex system. When you send it you also have a hard copy of the message for later reference.

Unfortunately, you can't always be sure how your message will look when it comes out at the other end because different telex systems print things out in different ways. Some print out messages sheet by sheet so a long message may get broken up, while others print them out continuously. Some don't offer upper and lower case character displays making acronymns and initials look like misspelled words.

Using telex with One-to-One

One-to-One is a private subscriber-based electronic communications system (see chapter 4) offered by a company called Kensington Datacom. What concerns us here is the international telex send and receive service it offers.

Once you've become a subscriber to the system (at a comparatively cheap price of £50 per year), you can dial up the system on its 300/300 baud number using our terminal listing (listed in chapter 3) or your own. When you've logged-on by typing in your ID and password, you can send a telex following the steps detailed in One-to-One's help file listed below:

HELP TELEX

HOW TO SEND A TELEX MESSAGE.	UPDATE 04 OCT 84

NOTE

«CR» DENOTES A CARRIAGE RETURN.

«SP» DENOTES A SPACE.

BEGIN BY ENTERING	SEND«CR»
THE SERVICE WILL RESPOND	+++ DESTINATIONS:
NOW ENTER	TLX«CR»
FOLLOWED BY A FULL STOP	.«CR»
THE SERVICE WILL RESPOND:	+++ TELEX

NOW ENTER THE TELEX NUMBER AND ANSWERBACK FOLLOWED BY A FULL STOP	885412«SP» DATCOM«SP»G«CR» .«CR»
NOTE: IF YOU DO NOT KNOW THE ANSWERBACK ENTER ? IN ITS PLACE	
THE SERVICE WILL RESPOND:	+++ TEXT:
ON THE FIRST LINE OF TEXT TYPE	8950511ONEONE«SP»G«CR»
ON THE NEXT LINE TYPE	PLEASE QUOTE (ACCOUNT/ USER NUMBER)«CR»
WHERE (ACCOUNT/USER NUMBER) IS YOUR OWN ONE-TO-ONE NUMBER	
NOW ENTER THE TEXT OF YOUR MESSAGE	_____ _____
WHEN THE MESSAGE TEXT IS COMPLETE ENTER ON A NEW LINE	NNNN«CR»
THE SERVICE WILL NOW RESPOND BY QUOTING A MESSAGE REFERENCE NUMBER, THE DATE AND TIME.	
IF YOU ARE SENDING THE SAME MESSAGE TO MORE THAN ONE TELEX ADDRESS, THE SECOND AND SUBSEQUENT TELEX ADDRESS - NUMBER AND ANSWERBACK - SHOULD BE ENTERED AFTER THE FIRST (AS ABOVE) AND BEFORE ENTERING THE FULL STOP. EACH ADDRESS SHOULD BE ON A NEW LINE E.G.	
	8950511ONEONE«SP»G«CR» 885412«SP»DATCOM«SP»G«CR» .«CR»

Sending international telexes is a little more complicated, but the method is very similar, as described in this portion of the help file:

HELP INT-TELEX

HOW TO SEND AN INTERNATIONAL TELEX VIA THE ONE-TO-ONE SERVICE.

NOTE. UPDATE 04 OCT 84

«CR» DENOTES A CARRIAGE RETURN.

«SP» DENOTES A SPACE.

THERE ARE TWO CATEGORIES OF INTERNATIONAL TELEX. THEY ARE:

1» TO COUNTRIES WITH DIAL AND COUNTRY CODES.

EXAMPLE FOR DIAL AND COUNTRY CODE.«U.S.A.»

BEGIN IN THE SAME WAY AS SENDING A U.K. TELEX UNTIL YOU SEE THE SERVICE RESPONSE	+++ TELEX:
NOW ENTER COUNTRY CODE, TELEX NUMBER, PLUS SIGN AND ANSWERBACK E.G.	007,23234567+«SP» ANSWERBACK«CR»
FOLLOWED BY A FULL STOP.	.«CR»
IF YOU DO NOT KNOW THE ANSWERBACK THEN YOU SHOULD ENTER ? IN ITS PLACE.	
THE SERVICE WILL RESPOND	+++ TEXT
ON THE FIRST LINE OF TEXT TYPE	8950511ONEONE«SP»G«CR»
ON THE NEXT LINE TYPE WHERE (ACCOUNT/USER NUMBER) IS YOUR OWN ONE-TO-ONE NUMBER	PLEASE QUOTE (ACCOUNT/ USER NUMBER)«CR»

NOW ENTER TEXT OF MESSAGE
WHEN COMPLETE, ENTER ON NEW LINE NNNN«CR»*

2» TO COUNTRIES WITH DIAL CODES ONLY.

EXAMPLE FOR DIAL CODE ONLY.	«BELGIUM»
BEGIN IN THE SAME WAY AS SENDING A U.K. TELEX UNTIL YOU SEE THE SERVICE RESPONSE:	+++ TELEX
NOW ENTER FOLLOWED BY A FULL STOP.	0026123456«SP»ANSWERBACK«CR» .«CR»
IF YOU DO NOT KNOW THE ANSWERBACK THEN YOU SHOULD ENTER ? IN ITS PLACE.	
THE SERVICE WILL RESPOND	+++ TEXT
ON THE FIRST LINE OF TEXT TYPE	8950511ONEONE«SP»G«CR»
ON THE NEXT LINE TYPE	PLEASE QUOTE (ACCOUNT/USER) NUMBER)«CR»
WHERE (ACCOUNT/USER NUMBER) IS YOUR OWN ONE-TO-ONE NUMBER.*	
NOW ENTER TEXT OF MESSAGE	
WHEN COMPLETE, ENTER ON NEW LINE	NNNN«CR»*

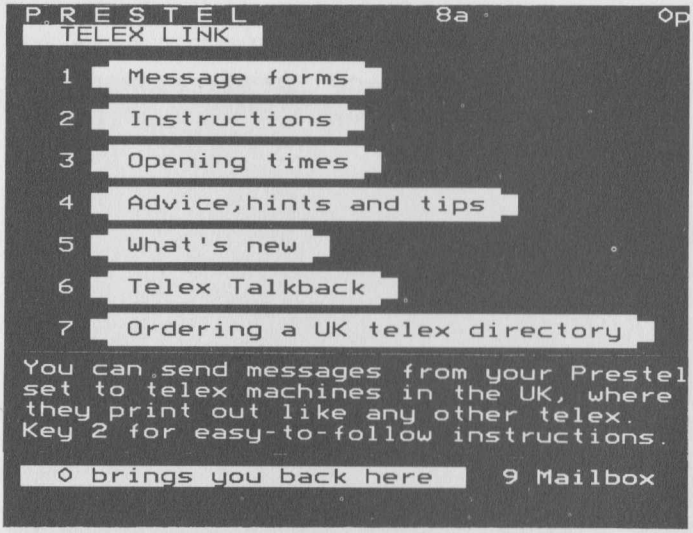
If at any time you get confused about sending a telex message, call the One-to-One helpline which is staffed by people we've always found to be extremely helpful.

The other thing worth remembering is that you can also receive telex messages on the system from anywhere in the world. You can tell people your telex number is 8950511 ONEONE G followed in the first line of the telex message by your own One-to-One electronic mailbox ID (the usual eight-digit number you sign on to the system with). We have used this system effectively for months and have found it to be a reliable and inexpensive method of worldwide communication. E-mail may be cheaper but many more people can be reached via telex.

Using telex with Prestel

You can also send telexes with the Prestel system by being a member of Micronet (see chapter 7). At the moment these messages can only be sent nationally and none can be received, although Prestel eventually does plan to offer both national and international telex send and receive services.

To get to the telexing section, first go to Prestel page number 1 (refer to chapter 7) and choose the message option, then follow the menus to Prestel page 8.



This is the 'telex link' front page. Pick option 1 for a blank message form and you'll get to the message form menu.

Then, unless you have any special requirements, pick option 1 for a standard blank telex form.

```
Prestel   TELEX LINK   60188a        0p
 Telex message forms   UK at present

 Blank
   1 Standard form  2 Lines ending in #
   3 With space for a preferred name
   4 With sender's address included

 Bureau
   5 Fletel subscribers  52 details
 Special
   6 Hello
 0 Telex Link index   8 Instructions
```

Press the '£' key if you're using a Compunet modem or the '←' key if you're using our terminal program. You'll get your blank form - with your name at the top and your Prestel Mailbox identity.

```
 TELEX LINK MESSAGE   7778b          0p
From   280812037
       DIMENSION GRAPHICS

To (telex)                    #

Message

                                     #

Date  FRI 07 DEC 1984 15:03
```

```
TELEX LINK MESSAGE        7778b        0p

From   280812037
       DIMENSION GRAPHICS

To (telex)   825554DATEFFG #

Message
Would you please confirm our order for
electronic components, placed on 02.12.
84.

                                        #

Date   FRI 07 DEC 1984 15:06
```

At the cursor, type in the telex number of your recipient and then hit the '£' or '◄—' key again. Your cursor will now be brought down to the point at which you can start typing text. Fill out the form with whatever your message is and then press # to confirm that you've finished.

Hitting the **1** key will obviously send the message. If you have a long message you can send a series of one frame telexes by pressing the '*' key and then the '£' or '◄—' key after you've sent your message and repeat the sending procedure as often as necessary.

9. LOOKING AHEAD

It's easy to become rapturous about the potential of communications in the computer field. It takes little imagination to envisage a time when a large base of communications users, in turn creating a viable market for a wide range of information services, will have created a major new mainstream information medium. The key is interaction. The ability to send instructions to an information source in response to prompts. Coupled with speed and almost no unit cost (unlike a newspaper where someone has to pay for paper, ink, printing, transportation, etc) it gives this new medium almost unlimited scope for expansion.

Already services like Homelink on Prestel and the independent One-to-One service for business users are pointing the way. Even more exciting is the potential of packet switching services. The cost of these services is likely to continue to drop dramatically, putting gigantic volumes of information at the fingertips of anyone with a micro.

The implications of the nature of the services are also profound. The characteristics of the new medium will change the way people do business and the relationships between different types of businesses.

With Homelink, for instance, the Building Societies' antipathy towards their natural competitors for the long term savers' pounds, the stockbrokers, has been resolved in a coincidence of interest. The Nottingham Building Society is being used as a gateway between the stockbroker and the customer and as such is banking on picking up more deposit money flowing to and from the broker than it is likely to lose from Building Society customers deciding to manage their own investment portfolios.

A less appealing feature of interactive services, however, is the degree of control and monitoring the IP is able to exercise over the customer. For many this will appear as a more sinister side of the information revolution. Direct debiting of accounts, and the ability to offer more services without expensive promotions like mail shots, are an extremely attractive proposition to many companies, but could be viewed as an annoyance to the customer.

Those running the services will also have access to hitherto unheard of categories of customer data. Customer behaviour can be monitored in detail: not just buying patterns statistically compiled for various

socio-economic groups, but the buying patterns of each customer using the service.

Current and future data laws may place strict limitations on what may and may not be held on computers. Whether these will prove beneficial to the maintenance of individual liberty or detrimental to the growth of the industry are just some of the issues the next ten years are likely to clarify. Current legislation demonstrates all too clearly how technology has been leap-frogging the legislators' ability to control it.

On the bonus side, the electronic medium has a great potential to democratize the dissemination of information. The conventional Orwellian vision of the computer network is of dangerously increased government or big business control of information sources and the consequent manipulation of Joe Public. 'They', it is often felt, have simply been presented with more tools and scope to engineer and control 'us' socially, because 'they' have the resources. Not any more: the micro/modem combination has the potential at least to broaden the input as well as the output side of the information process.

How quickly all this is likely to develop is uncertain. As we've seen, an important factor in hooking micros up to telephone lines is the technology clash, the problems which arise when one technology has to work effectively with another.

Another is the policy and performance of a privatized British Telecom. In the past British Telecom has been criticized for being too protective of its network. The time taken by the approval process for new modems was particularly unsuited for the micro peripherals market where viable product life is measured in months. Although things have improved lately due to a new approval process, the resultant lag has undoubtedly affected the vibrancy of the budding communications industry.

Most pundits agree that greater competition and privatization should inject a dose of much needed adrenalin in the sluggish business surrounding the provision and management of the telephone network and its related services.

In the short term things look bright. Information services won't take off overnight, but the pace is certainly quickening. Until recently, micro communications could only be viewed as a hobby with the odd practical benefit to rationalize the expense. The balance is slowly but surely tipping the other way. It is just reaching the stage where, for many people, it can show practical benefit and be fun at the same time. We hope this book has shown you how.

10. GLOSSARY OF TERMS

acoustic coupler - the apparatus which enables a modem to connect to a telephone handset

action message - a prompt sent by the host system asking you to perform an action or indicate a choice of some sort:

1/log on 2/exit Press 1 or 2

actual data transfer rate - the number of bits of information, including redundant bits, transferred over time.

analog transmission - as opposed to **digital transmission**. In communications an analog transmission usually takes the form of a modulated carrier signal. The changes in the 'tone' of the signal are sampled by the receiving device to extract the coded information.

ASCII - the accepted standard format for the transmission of letters and numbers. The ASCII standard is vitally important allowing, as it does, for computers of different makes to communicate.

answer back - where a receiving machine replies to the sending machine to establish the validity of the connection or to indicate it's ready to receive information.

asynchronous - where the timing between the sending and receiving machine is set at the start of each character. This differentiates it from synchronous operation where the timing is set and a whole stream of information is sent. With asynchronous communications the receiving

machine receives a **start bit** before each character. It then receives the following 7 bits from which it identifies the character. Then it waits for the next start bit from which it starts timing again. This allows a greater margin of error between the timings of the sending and receiving machines - obviously if the timing is slightly out a long stream of data will eventually corrupt as the receiving machine loses track of which bit it's supposed to be receiving at a certain time.

authorization - the right to access usually restricted parts of a service or bulletin board. Authorization is usually gained by the holding of an authorization code by which you become an authorized user.

auto-answer - where a communications hardware and software configuration is capable of receiving or sending information without direct operator control. Very handy for electronic mail or telexing, but not cheaply available yet.

autodial - where a modem can automatically dial a number and establish a link with another computer.

baud - measures the speed of transmission. 300 baud means 300 modulations are sent or received every second. The baud rate counts all the bits, including the start, stop and parity bits so it is not an accurate guide to the speed with which characters appear on the screen. If you divide the baud by ten, you'll get a rough figure for the characters per second.

baseband - narrow, low-frequency communications where only one message may be transmitted at a time.

bit - a single binary digit - a one or a nought.

broadband - where the cabling system allows high-frequency transmission of several different messages at the one time - each message occupying a different frequency range.

buffer - a small section of the computer's memory set aside for temporary storage of data as it is being sent in or out to the serial interface for transmission. Buffers are very necessary because of the vast differences in speed between the computer and the telephone system.

bus - the multi-lane highway which carries data from component to component inside the computer. It manifests itself as all the lines etched on the computer's circuit board.

byte - an entity of eight bits (1s and 0s). An eight-bit byte gives a maximum of 255 (11111111), or 256 combinations (if you count 0), just as a three digit decimal number gives a maximum of 999. So there are enough numbers or combinations of eight-bit bytes to represent the alphabet in capitals and lower case, special characters like /,.]) etc., and numbers 1 to 9. This still leaves lots of room to assign control characters - bytes which don't represent data but tell the computer to perform a task.

carrier (or **carrier tone**) - a continuous voltage or tone which can be modulated or varied in such a way that the changes contain information.

channel - a route along which information can be sent.

check bit - a bit sent as part of an error-checking process (see **parity**)

checksum - a way of checking the integrity of a block of data by carrying out a mathematical operation on the block and comparing the result with a figure associated with the sent data. If the two are the same, the block is error-free.

closed user group - where a club of users occupy space on a public information service. Only members are able to access the relevant closed pages by means of access codes etc.

configure - to arrange, connect or adapt a set of components in order to undertake some task.

connect time - the time you spend on a service or bulletin board.

corruption - where data is garbled during a transmission process, usually by line interference.

cross talk - where data from one channel escapes into another and garbles the communication process.

database - a (usually large) store of information held and organized on a computer.

dial pulse - where the electric pulses produced by the rotary dialler on a telephone are replicated by an electronic device so you can use the telephone system without actually having to resort to the old-fashioned technology (technology clash).

digital - see **analog transmission**

disconnect signal - the telephone tone that tells you you aren't connected to a receiving device.

direct-connect modem or hardwired modem - taps directly into the telephone line without the intervention of the telephone set.

download - when you receive and store data from another computer via a communications link (rather than just temporarily display characters sent) you have downloaded it.

DTE/DCE (Data Terminal Equipment/Data Communications Equipment) - is a delineation which, in partnership, enables us to distinguish two components linked by an RS 232. The computer end of the connection is known as the DTE, the modem end is DCE. The distinction is important because a DTE connection must work with a DCE; they are mirror images, just as a wall socket is a mirror image of a power plug.

duplex - simultaneous two-way communication where two devices each use a different pair of frequencies. Both streams of communication take place on the same line. Often called **full duplex**. **Half duplex** is where communication is two-way, but each machine takes turns at either receiving or sending data. **Simplex** comes at the bottom of the range. Here communication may go in one direction only.

echo - where information sent to another computer is sent back again and displayed on the screen of the sending machine to act as a visual check on integrity. Echo is valuable when data is being sent as it's typed.

electronic mail (E-mail) - a service which enables subscribers to send and receive messages to other users of the same system (see **mail box**).

to format - to rearrange data to meet a set of requirements e.g. text on the screen can be formatted to run across so many columns, be indented by so much, etc.

frame - a block of text sized to occupy a screen.

half duplex - see **duplex**.

hamming code - a code associated with transmitted data which enables the receiving computer automatically to correct any transmission errors (see **checksum**).

handshaking - where a set of signals are automatically exchanged between two computers as a prelude to communication. This makes sure everything is set up for successful communication.

hardwired modem - see **direct-connect modem**.

header - information preceding a message or packet which defines its destination.

host computer - the computer with which you communicate and instruct through the communication process is your host. You're the guest.

Information provider - individual or organization which provides information to a section of an information service on a regular basis.

integrated modem - where the electronic components which comprise a modem are built into the computer rather than being attached as a peripheral device.

intelligent terminal - an even smarter **smart terminal**.

interactive - where the user is able to interrogate a system. Instead of being a passive recipient of information he or she is able to send instructions to the host and react to prompts. To carry on a dialogue with the system.

interface - a piece of electronic equipment which enables one device to exchange information with another.

logging-on - akin to a worker punching his card when reporting to work. The system knows you've arrived, who you are and, eventually, how long you stay because you log-off at the end of your session. A log-on procedure usually involves entering an ID number and a password for security purposes, or, if the system is free, entering your name. Once you have identified yourself, you are put into the system.

mail box - a conceptual facility on a computer system which stores messages for sending or receiving.

modem - MODulator DEModulator: the device which converts digital data into a form suitable for sending down the telephone line. Also converts modulated incoming data back into digital form.

modulation - where information is encoded on a carrier signal.

multiplexing - optimizes the use of expensive telecommunications lines by merging entities of data for simultaneous transmission. A multiplexer does the merging, a **demultiplexer** separates the data at the other end and converts them back into entities.

odd parity - see **parity**.

odd-even check - see **parity**.

off-line/on-line - in communications you're on-line when the keyboard instructions you give your computer are transferred and executed by the host computer. When on-line, your computer acts as a terminal for the other computer. Normal or off-line operations could include saving data to your storage system, or printing a screen-load of information.

packet/packet switching - a technique for optimizing communications, especially over long distances. A packet switching service handles a large volume of messages and electronic mail from a large number of users. Each message is converted into one or more packets of information. Each packet is sent as a self-contained entity complete with its own control and identification data and the message is re-assembled from its constituent packets at the destination point.

Think of a railway network where long trains are shunted into a number of separate trains, the trains are sent off individually (they may take different routes on the rail network), eventually arrive at the destination station and are shunted back into the original train again.

PSS (Packet Switch Stream) - a global service utilizing the **packet switching** technique.

parameters - a range of alterable settings within which a program or process operates. Parameters can be thought of as choices which may be taken by the operator to define the behaviour of a program.

parity - simple error checking (parity checking) where a series of 1 bits are counted over a checking range. The parity bit (at the end of the bits to be checked) will be either a 1 or 0 to make the sum of the bits odd or even. If there's been a corruption during transmission, the parity will be wrong and the error detected.

port - generally understood to mean a physical connection-point on an item of equipment where a cable and plug may be inserted. An RS-232 port, for instance, will generally refer to the RS-232's socket.

public switch network - a service which handles the routeing of

messages over a network for its customers.

pulse modulation/amplitude/duration - a pulse is a change in voltage and the manipulation of pulses plays an important part in communication. Pulse modulation enables binary information to be sent by switching the amplitude, the duration, or pulse position between two states.

redundancy/redundancy checking - the bits in the communication process dedicated to providing error checking or control functions are redundant bits which are discarded when data is assembled by the receiving computer. Redundancy checking is the operations performed on these extra bits to detect transmission errors (see **error checking**).

resolution - the degree of detail available from a screen. The greater the number of picture elements the system is able to manipulate to produce the picture, the greater its resolution.

serial interface - sends and receives binary information as a single serial stream of data bits. The alternative is the parallel interface which transfers information a byte at a time, usually through a ribbon cable. The standard serial interface is the RS-232.

Sietel - the French version of Prestel.

simplex - see **duplex**.

smart terminal - a terminal which possesses some degree of local intelligence, i.e. it is able to perform a number of off-line tasks as well as send and receive data to a host computer. When micro computers are used as terminals the communications software should give it the attributes of a smart terminal.

start of header - the character which delineates the first of a sequence of destination characters for a message (see **header**).

synchronous - see **asynchronous**

teletex - a business correspondence service for communicating office equipment.

teletext - a technique where information is broadcast as data in conjunction with television programmes, unscrambled and displayed on a domestic television set.

teletype - the technology or range of equipment which enables text

and numbers to be sent over a communications network to or from a printing device.

terminal - a hardware item, either a full-featured computer or a specialized screen and keyboard which may receive and transmit data over a communication line. A computer hooked up to an information service like Prestel in effect becomes a terminal to the Prestel computer.

text file - a serial file or textual rather than numerical information.

UART - Universal Asynchronous Receiver/Transmitter. The collection of electronics in the interface unit which controls the transmitting and receiving of data.

videotex - a generic term to cover all the technologies involved in providing textual information for display on a screen, including **teletext** and **viewdata**.

videotext - the actual displaying of textual information on a screen. Videotext is usually used to refer to the actual stuff of the information service, i.e. a **viewdata** service displays videotext.

viewdata - another generic term, but, unlike **videotex**, viewdata applies to interactive, telephone-based information systems.

wrap-around - where a program automatically moves a word which will not fit at the end of a line on screen as text is being received to the first word position in the line below. This increases readability by preventing the breaking of words in awkward places.

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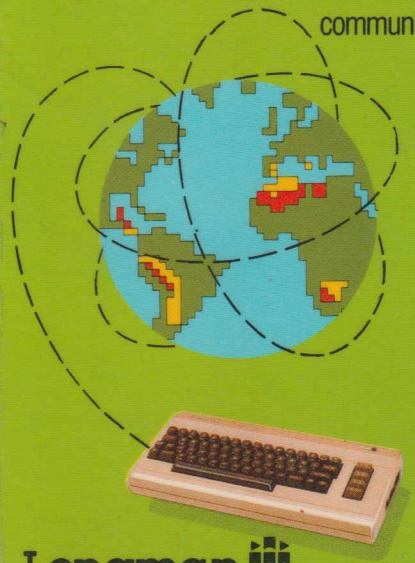

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