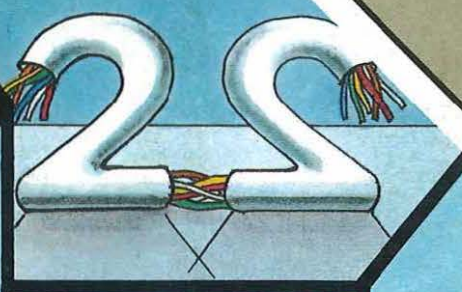


British Telecom  
Price to BT staff 49p  
Autumn 1986 Volume 7 Number 3

# JOURNALS



# PLESSEY INNOVATIONS FOR COMMUNICATIONS

## Now Plessey System 565 goes live at home and abroad.

It was in December, 1985, that Plessey Transmission installed its first 565 Mbit/s optical fibre system between Nottingham and Sheffield, a route length of 72 km. Early in the new year this system was cutover to normal traffic.

In March 1986, Plessey System 565 went live in the USA when the President of the United Telephone Company of Florida formally cutover the system installed by Stromberg-Carlson to link several of United's exchanges.

Each Plessey 565 Mbit/s optical fibre transmission system is capable of carrying 7680 or 8016 telephone channels, depending on the multiplexing arrangements, or the equivalent in video or data over a single fibre pair.

Today, Plessey System 565 is technologically right at the forefront of available and commercially viable production transmission systems, while even higher bit rates are being explored and developed for the future.

Plessey is one of the very very few manufacturers worldwide whose 565 Mbit/s optical fibre systems are carrying commercial traffic – right now!



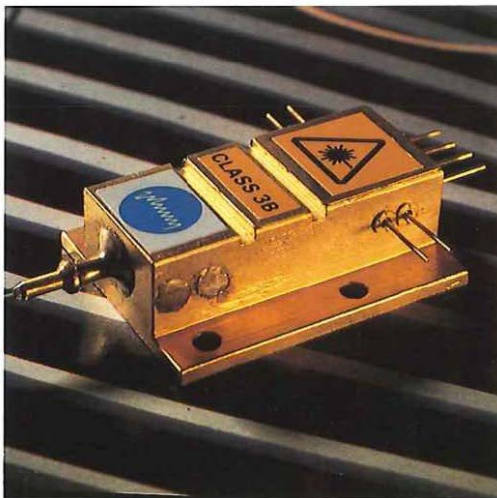
## And notches up a string of fibre optic firsts.

Providing for state-of-the-art telecommunications needs like these is how Plessey achieves and maintains its pole position in high-capacity optical fibre transmission systems.

Today, worldwide, over 15,000 km of optical fibre line systems using Plessey multiplexing, signalling, light sources, regenerators, sensors and connectors are already carrying voice, data and video traffic, under installation or on order.

In achieving this, Plessey has notched up a string of firsts.

They include one of the first optical fibre systems to carry normal traffic in the UK; the first long wavelength optical fibre system in normal



traffic service in the world; Britain's longest optical fibre link; at the time, the longest operational unrepeated optical fibre link in the world; and the world's first commercial contract for a 565 Mbit/s optical fibre highway carrying operational traffic.

For further information, contact Mike Hocking, Transmission Systems, Plessey Network & Office Systems Ltd, Beeston, Nottingham, United Kingdom NG9 1LA. Tel: Nottingham (0602) 254831, ext. 3542. International telephone: 44 602 254831. Telex: 37201.

 **PLESSEY**  
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# Politics and progress

**B**usiness and politics are interlinked, particularly in the case of British Telecom which became a private company as a result of a political decision.

But that decision was not made overnight and followed a decade of profound changes in technology and markets for telecommunications. These changes inspired the introduction of legislation in 1981 and 1984; created a new competitive environment and ultimately led to the company's privatisation.

Labour Party and TUC proposals for 'Social Ownership', or re-nationalisation are at the centre of a political storm which caused a wave of uncertainty and cast a cloud over share prices.

At the company's second annual meeting, shareholders were told a return to a State monopoly would be incompatible with continued progress in customer choice and a disincentive to improved efficiency. Chairman, Sir George Jefferson, went further to say that it would put at risk the outward looking ability of one of Britain's most important industrial sectors.

In this issue, British Telecom Journal begins an occasional series of articles on the effects that privatised BT is having on outside companies and features STC, Thorn-Ericsson and Kyle Stewart.

STC has suffered a major upheaval but BT contracts help to keep 1,500 people in work in trouble-torn Belfast. Swedish-based Thorn Ericsson has created hundreds of new jobs at Scunthorpe as a result of BT's exchange modernisation programme, and design and construction company Kyle Stewart has benefitted from BT's research needs and a recent tie-up with Du Pont — one of many joint ventures which would have been unthinkable before.

Naturally there are bound to be some who disagree with BT's competitive buying methods and its commercial attitude. But the results are plainly visible.

The latest figures show that BT's pre-tax profit was £502 million for the first quarter ended June 30 — an increase of 12 per cent over last year.

At the same time, the company pays Government £1,000 million a year excluding VAT, in the form of tax and dividends and continues to meet its widespread social obligations to its customers as well as provide inherently profitable services.

The telecommunications world is now entirely different to its State monopoly origins and, as Sir George has said, the proposals for Social Ownership are not likely to be in anyone's real interests.



**Cover:** Cellnet's honeycomb logo is synonymous with instant communication anywhere, anytime. But until recently it was impossible to dial the 50 year-old 999 service on cellular equipment. The honeycomb is also familiar with the money men on the Stock Exchange who are relying on BT know-how for post 'Big Bang' success. The days of poor communication are numbered and BT aims to be 'number one' in the field. Cover design and illustration by Raygraphics.

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*British Telecom Journal* is published by British Telecommunications plc to promote and extend knowledge of the operation and management of telecommunications. The magazine costs 48p per issue for staff. External subscribers pay £15 for two years including post and packaging. Full details on page 87.

# OUR TESTERS GET FULL MARKS

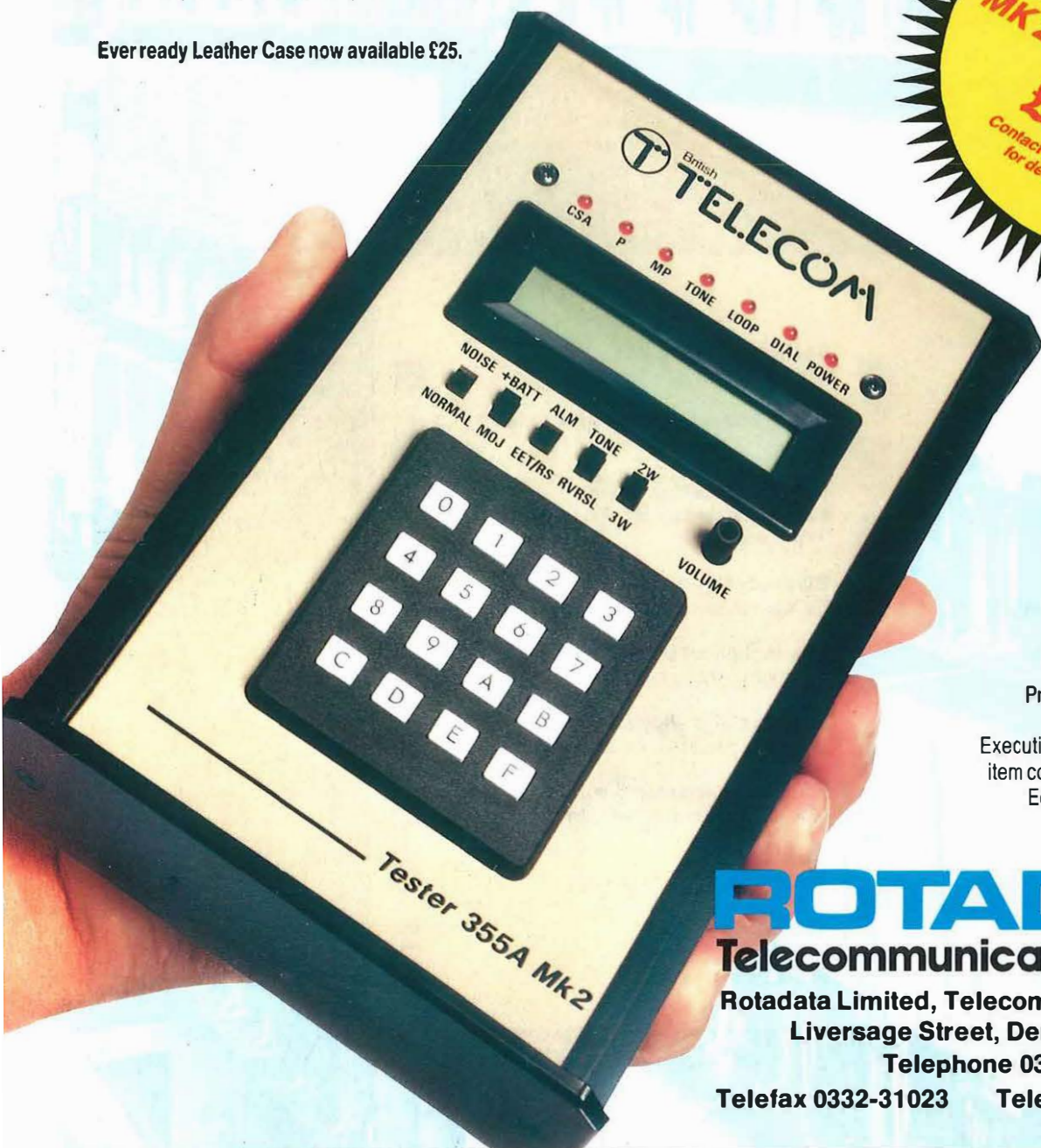
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- Equipment usage and maintenance scheduling – alongside AMPERE.
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- Security of buildings – and the network.
- Card access systems.

Turn the page to find out more about how the Margaux partnership with British Telecom is working...



Remote unit

A typical Fault Control station



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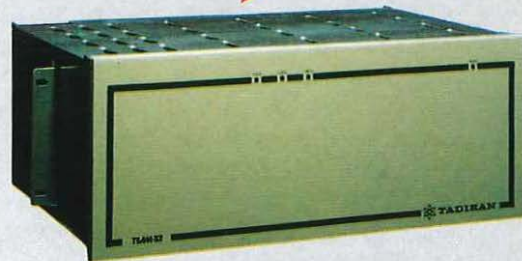
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The partnership of Margaux and British Telecom is already working to solve Power and Building Services problems – by making Telecom buildings “smarter”.

There are Margaux systems operating in British Telecom sites in London, Manchester, Sheffield, Leeds, Preston, Liverpool Solent and Newcastle. And at the time of writing dozens of other plans are being developed by Margaux's specialist team with Telecom Engineers.

Here are just a few of the ways Margaux is making Telecom buildings smarter...

The system can work to pre-set maintenance intervals to trigger maintenance visit requests, scheduled through AMPERE.

Breakdown and failures are immediately reported to a District Central Control Station.

## 4 Security

Margaux systems can also incorporate a “Man in the Can” – 24-hours-a-day surveillance of the premises to ensure no unauthorised entry. The network and the equipment are both protected.



## 5 Network Protection

Surveillance can be extended even to normally unguarded spaces within buildings. Electrically locked doors can be fitted and automatically controlled.

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Access can be limited – through the card reader – to specific doors, specific times, specific periods. With card access integrated into the building management system, you have high flexibility and adaptability.

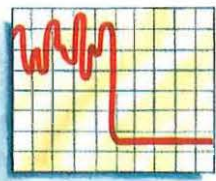


## 6 Economic Benefits

Margaux Building Automation reduces your Current Account costs – cuts your Capital Expenditure – tightens up budget control.

Find out how Margaux can help you. Ask us for a presentation and progress report on how Margaux are making British Telecom buildings smarter.

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The Margaux system has at its heart standalone networked micro-computers, each with an array of sensors to report and act on many different energy functions in the building.

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## 2 Monitoring

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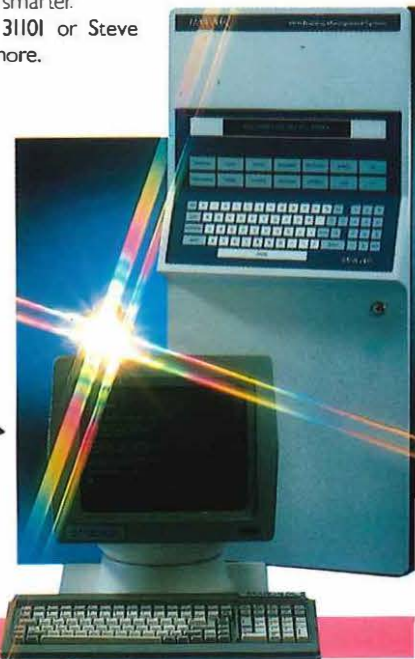


## 3 Maintenance Management

Margaux systems can work alongside AMPERE to record every minute's usage of every item of equipment.

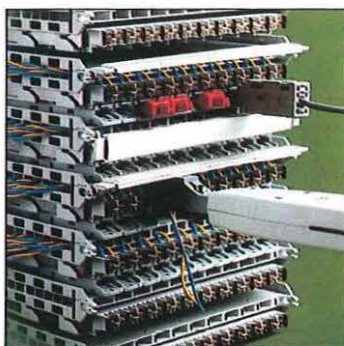
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## ESTATES MANAGEMENT SOLUTIONS





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# Half a century of saving lives

Neil Johannessen

**T**he first uses of the electric telegraph had more to do with safety than with the transmission of messages and the early advertising for the telephone included its value in times of emergency amongst its advantages.

But the introduction of the 999 service many years later, was the result of a number of factors, not least the dramatic increase in the number of Britain's telephones at the time. The number of telephones in private homes had almost trebled in the ten years between 1925 and 1935, whilst the number of street kiosks had risen from 1,000 to nearly 20,000 so that the telephone had become an accepted part of everyday life.

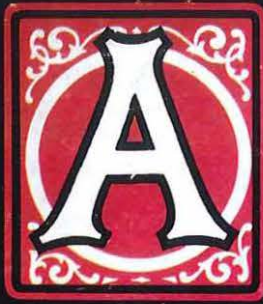
The actual catalyst for the introduction of an emergency service was a serious fire at a doctor's house in London's Wimpole Street, one night in November 1935. Five women died in the fire and afterwards a great deal of publicity was given to a complaint by a neighbour who dialled the operator to summon the Fire Brigade only to find that the fire engines arrived before the operator answered.

An inquiry found that the small number of night operators on duty had been busy answering other calls about the fire and had

**Countless lives have been saved by the 999 emergency service which celebrates its 50th anniversary next year. This article traces the history of the service and looks at the latest in a long line of improvements — 999 on cellular radio which will make help even more accessible for those in need.**

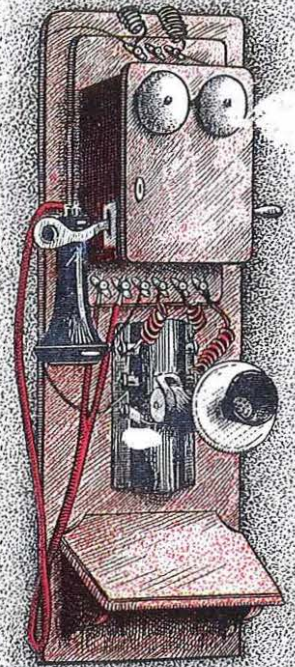
A fire in London's Wimpole Street led to the birth of the 999 service and today cellular radio users can dial the same number to summon help.





# ACCIDENTS WILL HAPPEN

Then minutes, yes  
seconds may save  
LIFE PROPERTY  
MONEY



already called the Fire Brigade. But one fundamental problem was clear — an operator had no way of knowing how urgent a call was before answering it and there was no way for an emergency call to ‘jump the queue’. The answer was the 999 service — the first service of its type in the world.

The idea was that a call made using the special code would appear in the exchange accompanied by flashing lights and the sounding of an alarm, and that it would be handled by an operator who was specially briefed to drop everything and respond to that call.

They would immediately connect the caller to the service needed, monitor the call throughout, and hold calls for tracing back should the line go dead.

The launch in July 1937 in London was accompanied by widespread press interest and all manner of incidents were reported. Even so in the first week less than half the emergency callers used the new service and most called the operator in the usual way. Another 171 people tried to use 999 simply as a way of jumping the queue for the operator.

Early advertising widely used in books and magazines showed that the telephone could be a lifesaver.

Despite such teething troubles, the service soon proved to be a great success, with 13,000 genuine calls logged by the end of the month. It was extended to Glasgow in 1938 and, with progress halted by the war, all the larger towns with automatic exchanges had the service by 1948. Meanwhile, kiosks in manual areas had been fitted with alarm buttons, although there was nothing that could be done for private or business exchange lines in such areas.

But this does not explain why the numbers 999 were chosen as the dialling code and, given that people still keep proposing 'better' codes or, more usually, questioning the wisdom of the existing code, maybe the golden anniversary of the service is the chance to put the record straight.

The number had to be one that could be easily remembered and standard throughout the system. To work in London, it needed to consist of three digits and identical digits were thought easier to remember. The operator code at the time was a single '0' so '000' could not be used. Although there were arguments against using most of the other digits from 1 to 8, the choice of '999' was in fact forced on the designers.

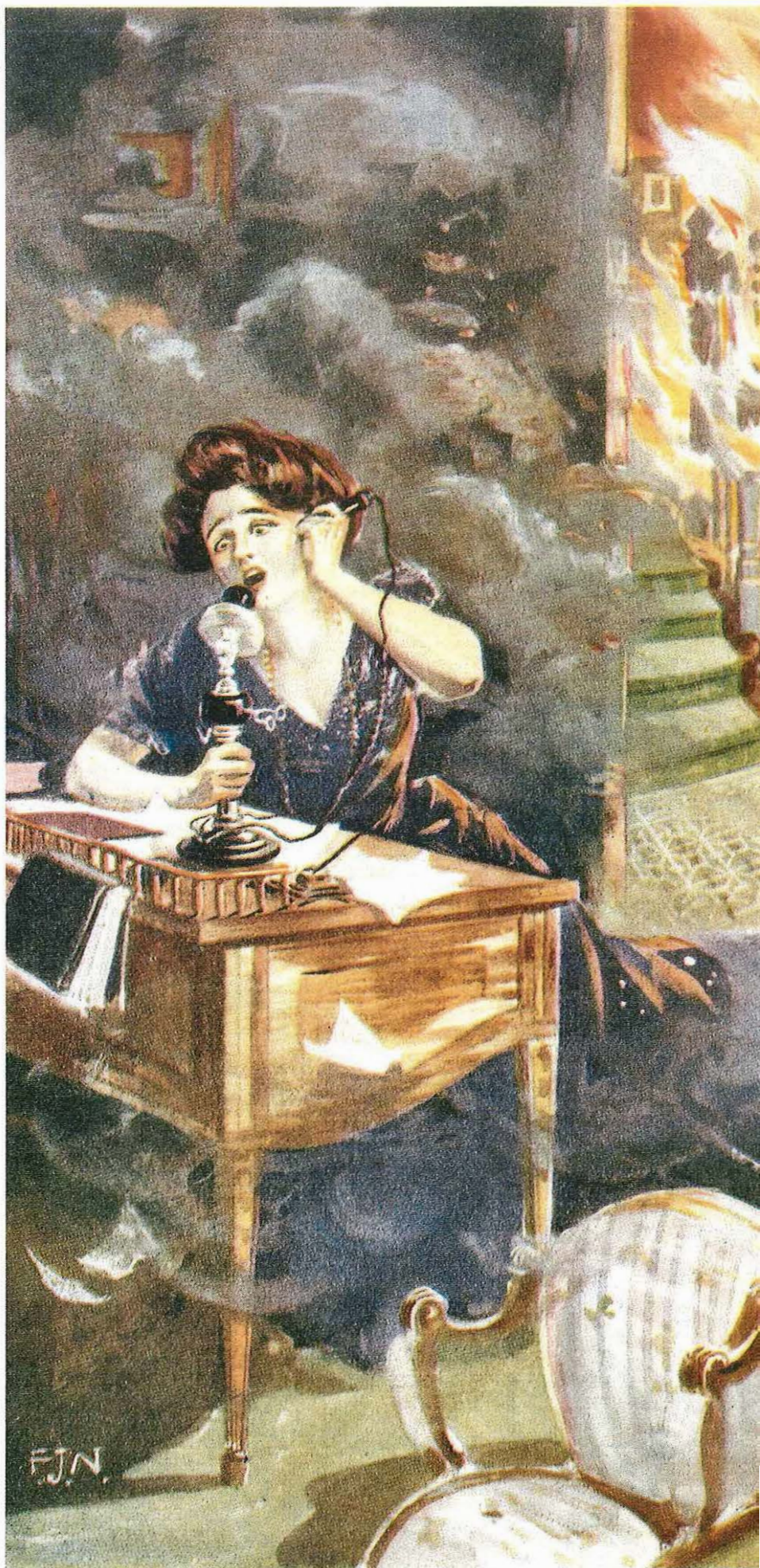
### Modification

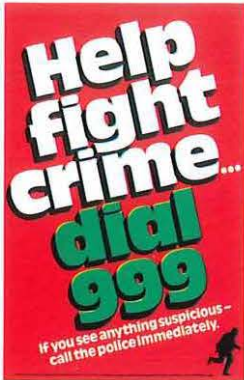
The need for people to be able to make emergency calls from kiosks was acknowledged from the outset and it was also clear that it would have to be possible to make such calls without first inserting money. With the A + B coinboxes then in use, the mechanics of the payphones were constructed so that it was impossible to dial any number other than '0' without first putting coins in. A simple modification to the dial was all that was required to extend this facility to include the digit '9', so the choice was made — '999'. Although this particular justification has now disappeared, it would probably be dangerous to change it now in view of the general awareness of the code.

But the choice of code was not the only technical challenge that faced the engineers involved. The tension amongst the operators when the service was launched can now only be imagined, but it was reported that some of the staff fainted when the first calls came in. This was in no small way due to the extremely loud horns that had been installed as the alarm sounders and these merited a newspaper comment that they 'would do justice to the Queen Mary or any other liner in distress'. It was also suggested that the noise disturbed people living near the exchanges!

The technical boffins soon found the answer. Pending development of a buzzer whose volume could be adjusted to suit the room it was in, the local managers were instructed by Headquarters to go out and buy a tennis ball . . . and stuff it in the mouth of the hooter!

Today, the system is nationwide and handles over 30,000 calls each day. Paid for entirely by British Telecom, the 999 service has a history of which the company can be proud and has become literally 'a way of life' for the people it serves. ▷





## Cellular boost for 999 service

**E**arlier this year, cellular radio users throughout England and Wales were able to make emergency calls by dialling 999.

When the Cellnet service was started, the numbers 995, 996 and 997 were used for cellular access to the fire, police and ambulance services and the facility was only available in London. Quick and easy access to emergency help is obviously highly useful to cellular subscribers who, because of their mobility, can report incidents more quickly.

The 999 facility was also a licence requirement for both cellular operators, Cellnet and Racal Vodafone, who worked together to develop a system which enables an emergency caller on cellular to contact the nearest branch of the fire brigade, ambulance, police force, coast guard or mountain rescue.

Technology has been incorporated into the two networks to allow an emergency operator to identify the cell transmitter from which a call originates giving the caller's approximate position.

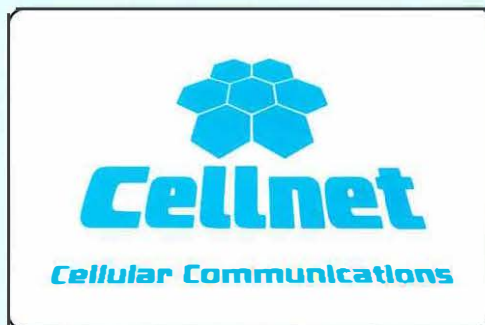
The cellular operators have obtained a special and unique number for emergency services in each area and this is used by the emergency operators to connect a caller to the most

appropriate and closest form of help.

Since each of the emergency services has its own different national structure, it was necessary to ascertain which area of each emergency service corresponded to the area covered by each cell. The information is now encompassed on a look-up chart which the emergency operators use.

In some cases, the cell contacted by an emergency caller may not be the one nearest to the incident reported, and if this occurs, the call is transferred to the correct area.

Cellnet already knows of many cases in which the service has saved lives and without doubt it will save many more. ■

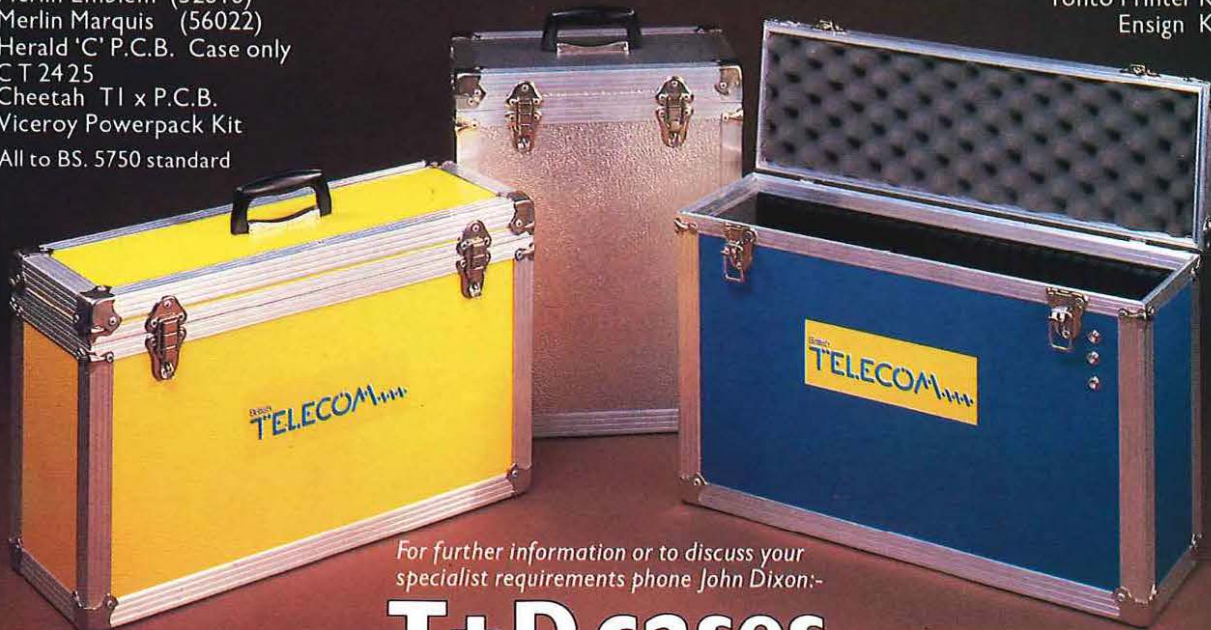


Mr N Johannessen is manager of British Telecom Showcase.

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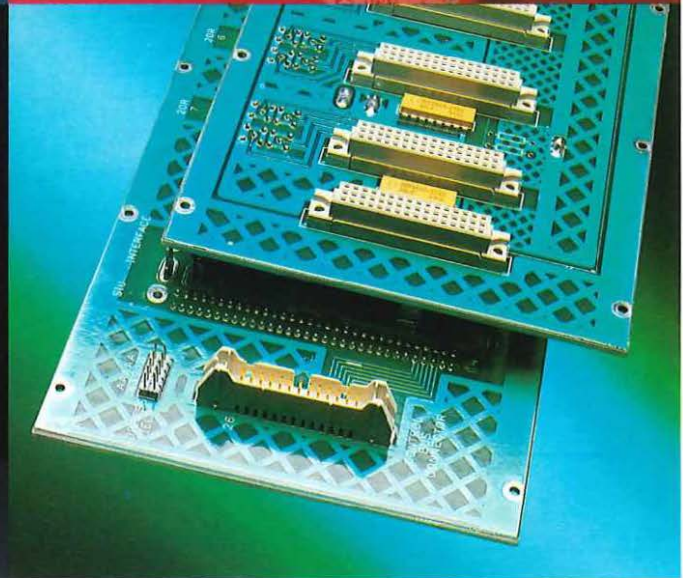
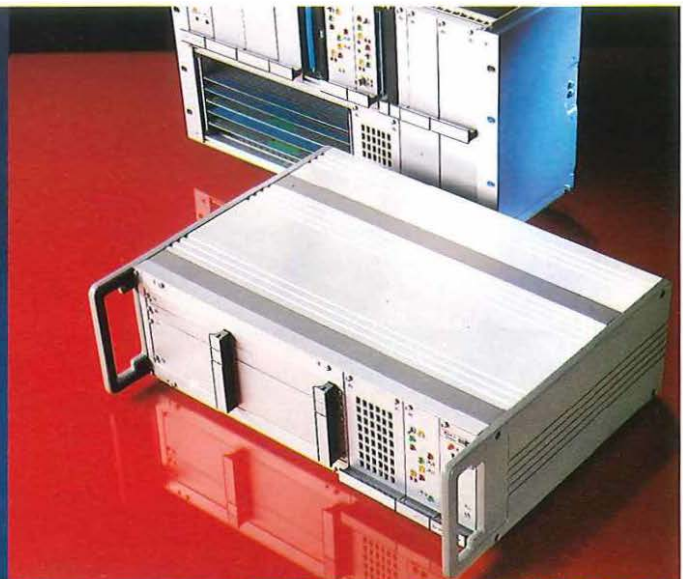
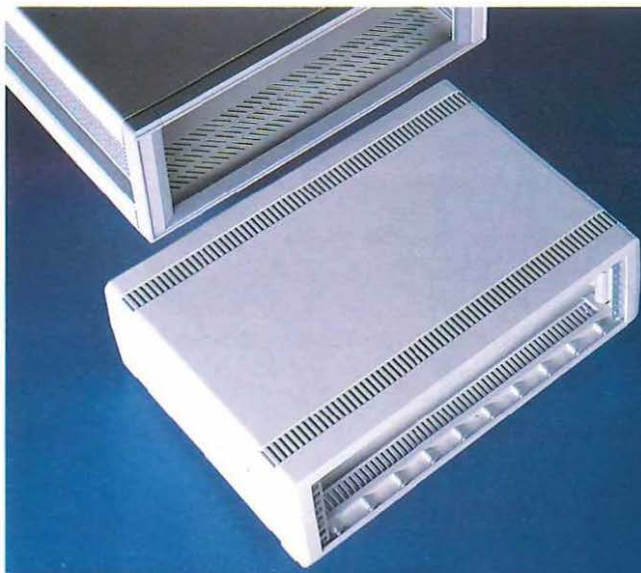
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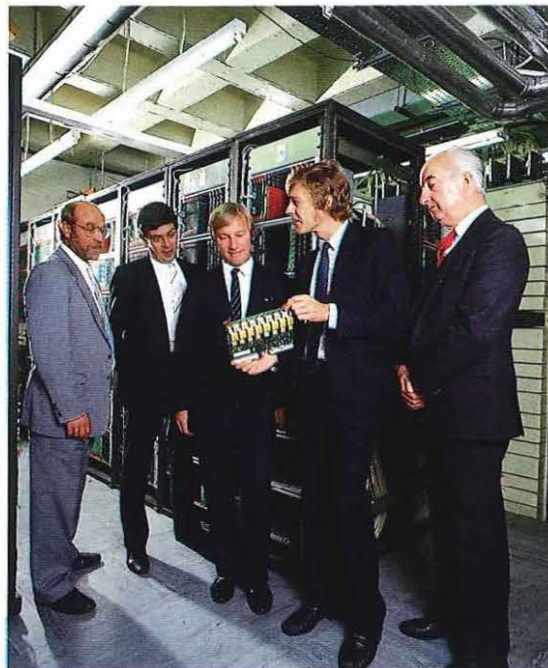
Monday 27 October saw the last phase in the liberalisation of the Stock Exchange, popularly called the 'Big Bang' which finally abolished a trading system with a 216-year tradition. In the new environment companies which have the best communications systems will have the competitive edge and British Telecom has pulled out all the stops to cater for their needs.

# BT and the 'Big Bang'



The Stock Exchange 'Big Bang' has rocked dealings in the City of London.

British Telecom City District's senior management team inspect one of the 350 line cards in the KBS system used by market floor dealers. From the left are: Mike Butt, head of business systems (Guildhall); Barry Bailey, head of major business operations; Bob Semaine, Major Account Manager for the Stock Exchange; Graham Bolitho, General Manager (Inland Communications) for City District; and Brian Wharton, head of major business systems.



As a result of 'Big Bang' the traditional 'single capacity' system of stockbrokers dealing through jobbers at fixed minimum commission rates has gone forever and has been replaced by a 'dual capacity' system with 'market makers' acting as both brokers and jobbers.

The lifting of exchange controls in the late 1970's and the introduction of new rules to help Stock Exchange members compete with foreign brokers has led to a broadening of the Stock Exchange membership to include corporations as well as individuals.

In the growing list of potential market makers, those companies with high-tech, flexible, communications systems will have the edge and a new type of 'conglomerate' market maker with the financial muscle to install such systems has appeared formed by mergers between international banks and broking and jobbing firms.

British Telecom's City of London District contains by far the highest concentration of



banks, brokers and financial houses in the UK and is therefore able to focus sharply upon the special needs of these organisations. Formed on 1 April this year, the District comprises the former City and North Central Areas. The expertise required to understand the complex financial markets and their communications requirements therefore already existed, and the new District was ideally placed to help in preparation for the Big Bang.

Discussions with the communications managers of companies likely to be affected started well before the District was formally established. This forward planning was essential and ensured that orders were placed so that they could be fulfilled in time. Even so, with a certain amount of secrecy as to individual companies' plans, dealers did not know who they would need to deal with until very late in the day and many orders for equipment and circuits were held back. Inevitably, this late ordering for early completion has stretched the District's resources to the limit.

More than 300 trained engineers were drafted in from other Districts in order to condense three years work into one year, as well as coping with normal demand and other specialist installations such as the new Lloyds Insurance building. The present demand for private circuits is running at 65 per cent above normal and exchange line supply is up by 39 per cent. The need for rapid installation and movement of large volumes of private telephone and data circuits is expected to continue well into next year until trading relationships in the new markets have settled down.

In the short term there is a requirement for a versatile network that can be easily reconfigured whilst allowing for future expansion with fibre optic technology and an interim solution to this problem has been provided by British Telecom. Called Dealerinterlink, it is a flexible, low-cost scheme, based on Moorgate telephone exchange and provides companies with blocks of 30 voice

and low-speed data lines. New and reconfigured circuits can be provided to any other network user within 24 hours.

The scheme has proved extremely successful, with 87 members to date, and over 100 other companies expressing serious interest. Twenty-four of the 29 market makers in the gilts market are subscribers, including names like Barclays de Zoete Wedd (BZW). This organisation is a good example of the new style of large market maker and is installing a dealing room with over 600 Key Business System (KBS) positions.

For terminal equipment, British Telecom is majoring on KBS and the touch-screen City Business Systems (CBS). The installation of major projects, often involving the connection of a complex range of services including thousands of circuits and hundreds of KBS or CBS dealing positions plus major PABX's, is running at four times higher than last year.

### Largest

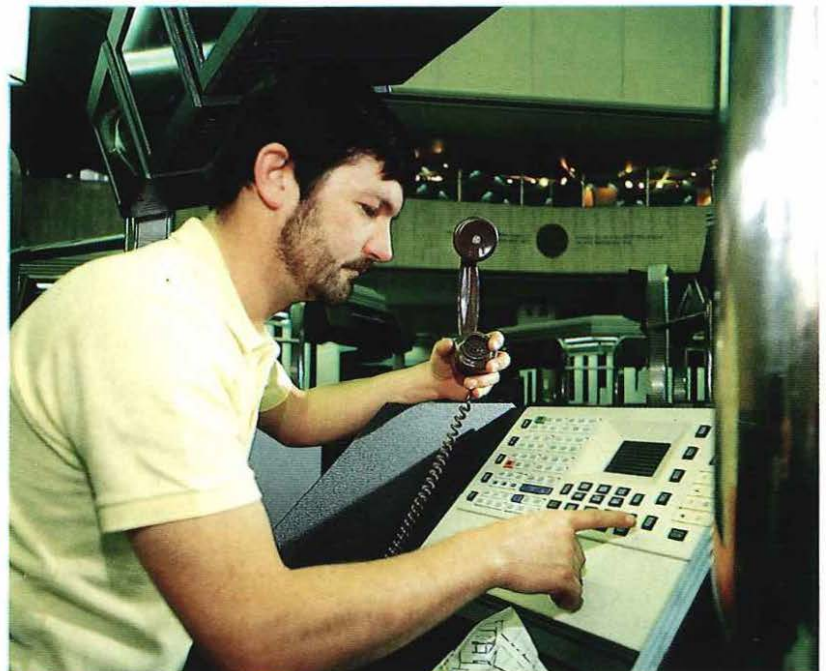
Of the 80 projects undertaken this year alone, worth about £100 million in total, the largest so far has been the £5 million contract with Shearson Lehman Brothers International, a major trading house specialising in securities, foreign exchange and commodities. The system comprises three Mitel SX2000 PABX's, a major KBS dealing system, and internal cabling for what is thought to be one of the largest trading floors outside the USA.

Another example is the amalgamation of four firms to form the Mercury International Group (MIG), providing the District with a £3 million contract to install 500 KBS positions. In addition, more than 1200 private circuits are being moved and two new MDX PABX's introduced. A third PABX is being reconfigured to cope with 350 exchange lines and 4500 extensions.

Staff and managers in the District worked long hours under heavy pressure to fulfill orders in time for the deadline and the District as a whole ▷

Bottom left: senior technician Alan Thompson installing a KBS console.

Below right: technical officer Gerry Heggarty conducts system commissioning tests on a KBS console on the Stock Exchange floor.





worked closely with the companies involved to ensure that everything went according to plan.

Another aspect of the Big Bang is the unrelenting pressure on space in the City. The new financial conglomerates demand column-free floors in excess of 40,000 square feet and are few, if any, of those now unallocated in the City.

But, current telecommunication technology allows companies to look outside the conventional confines of the 'square mile' whilst still retaining fully effective links, and there is a gradual 'blurring' of the old City boundaries. Hence the move of some companies westwards and the establishment of a whole new 'City' on the South Bank of the Thames by London Bridge.

The City of London Corporation planning department has indicated that — whilst not exactly throwing the rule book out of the window — they will treat applications for developments with a new flexibility and open-mindedness. This is now being reflected in

massive redevelopment throughout the City in order to fight off the competitive threat from new development areas, such as Canary Wharf in East London Dockland.

All of this means that British Telecom in London must plan in detail to meet such challenges and must consider available options which will take the District successfully into the 1990's. ■

## Effort behind the scenes

Nowhere have the effects of Big Bang been felt more keenly than in the Stock Exchange itself where teams of City District and Stock Exchange engineers have extended the network by almost doubling the number of circuits and providing cabling to serve the system.

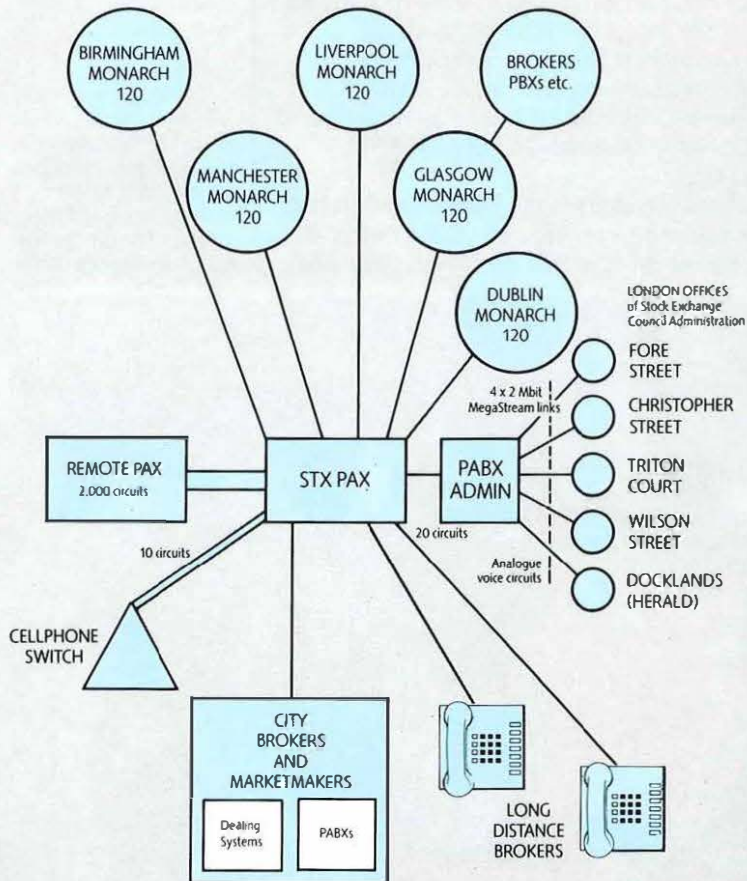
In the run-up to Big Bang, City District had a Stock Exchange installation and maintenance crew of nearly 50 and much of their work was done in the evenings and at weekends. In addition, British Telecom has also upgraded systems in the Birmingham, Liverpool, Manchester, Glasgow and Dublin Stock Exchanges.

At the centre of all this activity was the new Stock Exchange Automatic Quotation System (SEAQ) which allows trading in stocks and shares to be done at the press of a button instead of face to face on the market floor or over the telephone. SEAQ provides companies with three levels of access — level one is similar to the existing market price viewdata Topic service; level two displays quotations in market maker order; and level three allows electronic trading to take place. Some 500 level three terminals have been provided and they are most visible on the new market floor in London where they have been installed alongside British Telecom's Key Business System (KBS).

The SEAQ terminals and the KBS therefore provide the infrastructure of communications on the market floor. In a contract worth over £1 million, British Telecom supplied 270 KBS positions giving access to 3000 private circuits. Elsewhere, the KBS should gradually replace the Key and Lamp systems which companies utilise in their boxes (small private offices) around the market floor.

A second major contract, worth over £250,000 was completed for the expansion of the Stock Exchange switched speech network. The organisation's administrative PABX more than doubled in size from 800 to 1800 lines, as two extra buildings were occupied to accommodate additional staff, and the Stock Exchange internal PAX has increased in size from about 3950 lines to 7350 lines in just nine months to cope with the demand from member companies.

British Telecom now has a vital role to play in providing services which will help to attract foreign business to the Stock Exchange. ■



**The Stock Exchange speech network**



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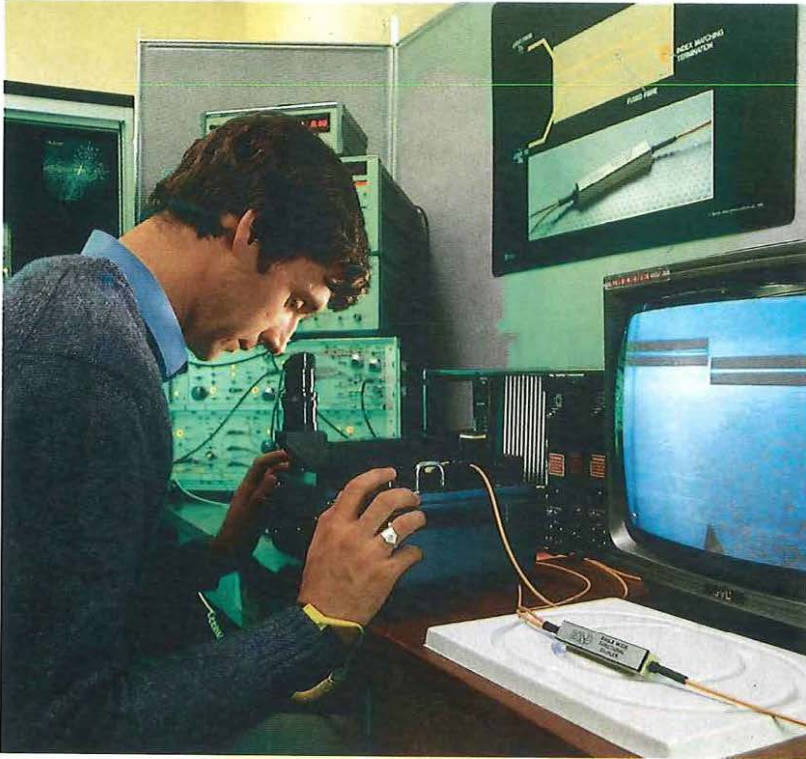
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Technical officer David Gosling splices a directional coupler to optical fibre at British Telecom Research Laboratories, Martlesham Heath.

# Two-way fibres cut costs

Greg Coombs

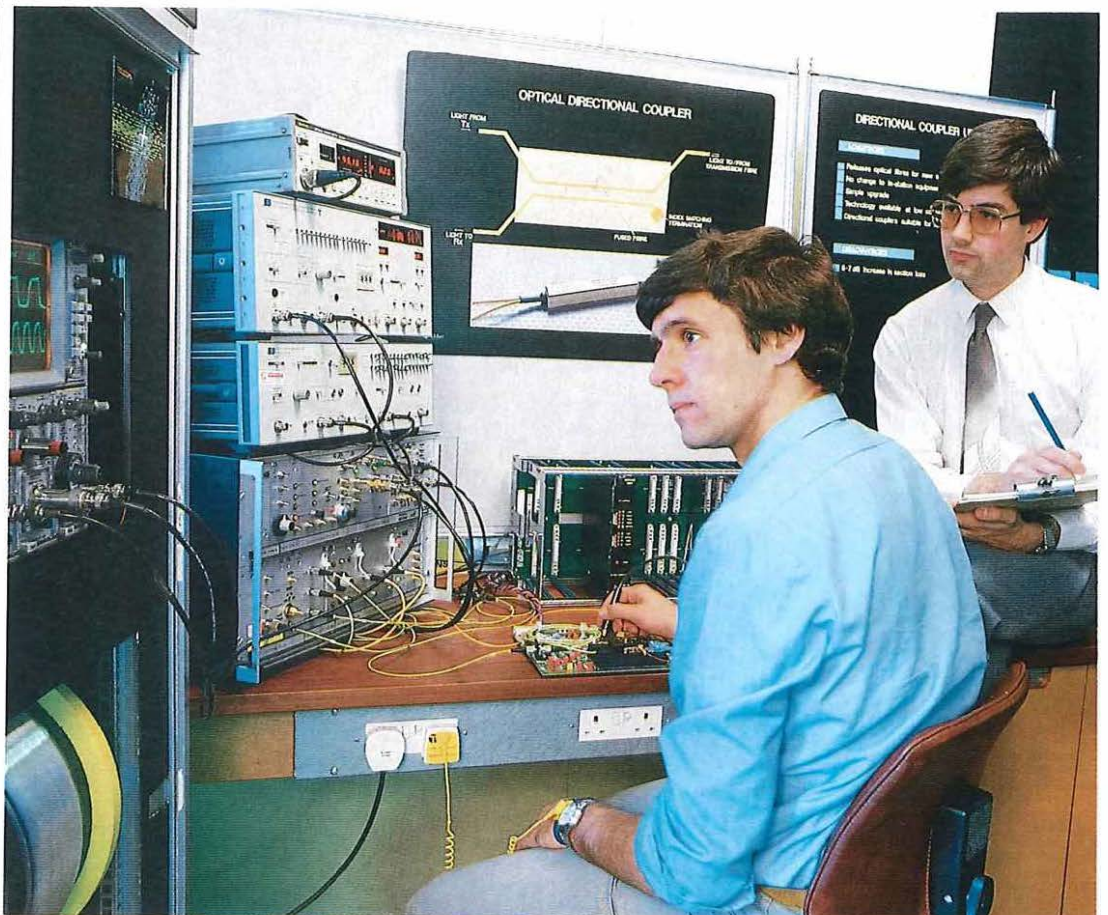


The ability to send light both ways at once in fibre, known as optical duplex transmission, will not only cut the cost of new optical systems but also allow the capacity of existing links to be increased quickly and cheaply without investing in the laying of extra cables.

The technique places no constraint upon the design of the necessary opto-electronic equipment situated at each end of the optical fibre and, as a result, large portions of British Telecom's network may be converted to duplex working without the need for replacing terminal or repeater electronics.

Conversion of an installed optical transmission system is quick and uses only two low-cost devices per repeater section. The normal fibre arrangement is adapted to duplex operation by fusion splicing an optical directional coupler on to each end of a single fibre section. Lengths of cable recovered from the previous arrangement are then fusion spliced to the equipment ports of each directional coupler to maintain the same interface between equipment and the cable. The conversion is then complete, leaving a spare fibre section.

**A technical breakthrough now enables pulses of laser light to be sent along long-distance optical fibre both ways at once. British Telecom is the first operating company in the world to accomplish this feat in a commercial cable and the achievement will help to keep down the cost of long-distance calls.**



Author Greg Coombs (right) records system performance of a duplex transmission experiment conducted by technical officer David Gosling.

# BT demonstrate two-way fibres

British Telecom has developed a technique for pulses of laser light along long distance

The couplers used consist of two short lengths of optical fibre which have been twisted and fused together. The fusing is precisely controlled so that the outer glass cladding of each fibre merges while the two cores remain separate. This allows a part of the light entering through a fibre on one side of the device to be transferred in the fused region to the other fibre so that light emerges from both fibres on the other side.

Duplex systems transfer 50 per cent of the incoming light to each output and the unused fibre on the cable section side is terminated with an index-matching load to absorb entering light.

In practice, the combined loss of both optical couplers may be expected to introduce a transmission loss of less than 7dB — only 1dB more than the loss inherent in the use of the system. However, the loss of installed fibre is much less than originally expected and allows the technique to be widely applied in the network.

Over the last few months, several demonstrations have been successfully performed both in the laboratory and on installed cables. The first, in March, used the latest generation of high capacity transmission equipment developed by British Telecom Research Laboratories, Martlesham Heath, in association with Fulcrum Communications Ltd, a wholly-owned British Telecom subsidiary. The equipment was used to achieve 565Mbit/s transmission over 50 km of commercial single-mode fibre, establishing a world record.

The laboratory duplex system had margins of approximately 8dB for each channel which is sufficient for normal cable repair, temperature and ageing margins, and operated error free over a test period of 65 hours. To increase awareness of the potential of duplex, the demonstration was repeated recently at 'Top Telco', a major presentation to senior British Telecom managers

at the National Exhibition Centre in Birmingham.

Following the laboratory demonstration, 565Mbit/s duplex transmission was established over a 77km trunk cable between Birmingham and Derby, see diagram on this page. The route used only one intermediate optical repeater and featured a record-breaking span of 45km for an installed system between Tamworth and Derby, a similar distance to that in the laboratory. Converting the route took three staff little more than a day which confirmed that the operation is both straight-forward and economic.

Two installed 140Mbit/s standard optical systems have since been converted to duplex operation — Ealing-Paddington (14km) and Newcastle-Darlington (68km).

With the successful completion of this work, duplex transmission is expected to be rapidly deployed in the optical fibre network resulting in significant cost savings. ■

# Telecom equipment helps to make history

By Duncan Brodie

EQUIPMENT designed by BT Telecom's research

Two-way optical fibre transmission has been established between Birmingham and Derby.

Mr G P Coombs is an executive engineer at British Telecom Research Laboratories, Martlesham Heath, working on the development of next generation optical systems.



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ANA is a desk top unit operating under computer control making test calls from up to 32 exchanges, immediately alerting engineering staff to plant and route failures once a preset threshold is exceeded. Performance is recorded over almost a thousand route codes, yet it is remarkably easy to use and like all Rotadata products is backed by a complete after sales service. Complete system only £9850.



The Rotadata MAC Printer available as BT Printer 10A item code 314627, also started as a joint development project. Over 4000 printers are now operating successfully throughout British Telecom. Designed around a single chip microprocessor with software developed specifically for printing call failure details and exchange daily cumulative totals for all sequences at MAC monitored units. Translates MAC data into an intelligible format on standard 2¼ in. tally rolls. At £135 it can cost less than a repair to your old printer.

#### Supply Details

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# Satellites-a sure bet

Tony Spittle

Satellites, traditionally used for intercontinental telecommunications links and wide area television broadcasting and distribution, are now seen as having a bright future in both domestic and international private networks. Changing economics make satellites increasingly viable as a medium for inland signal distribution and the potential market represents a profitable growth for British Telecom.

Satellite distribution systems, known as point to multipoint, have a number of advantages for business. They offer a distribution service which is:

- ★ economical, reliable and secure against unauthorised participation
- ★ capable of carrying virtually any combination of sound, vision and data signals to any number of receiving terminals
- ★ flexible because signals can be addressed selectively to individual sites, and new sites can be added without regard to the availability of landlines

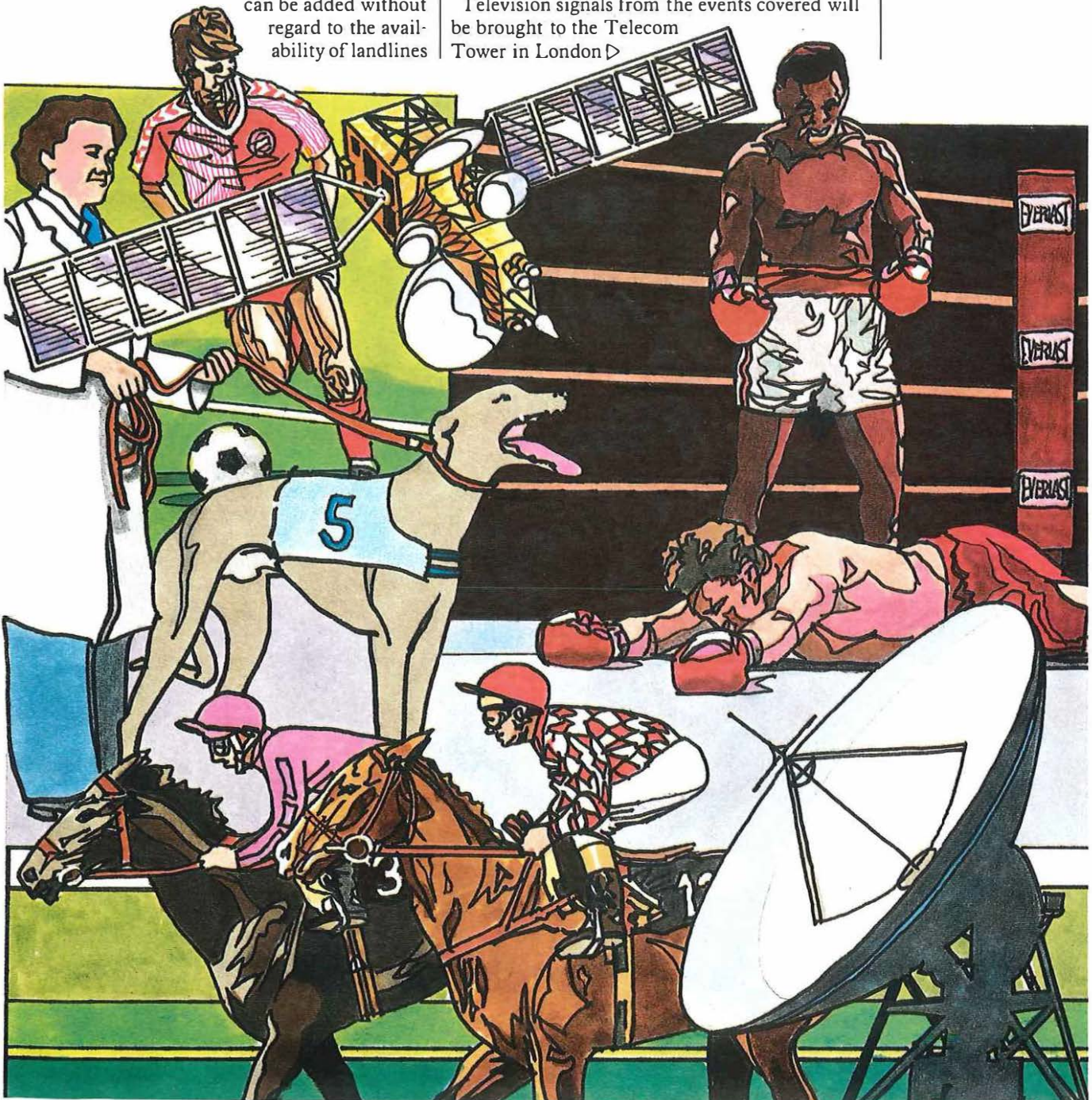
★ based on well-proven technology which can be provided at short notice.

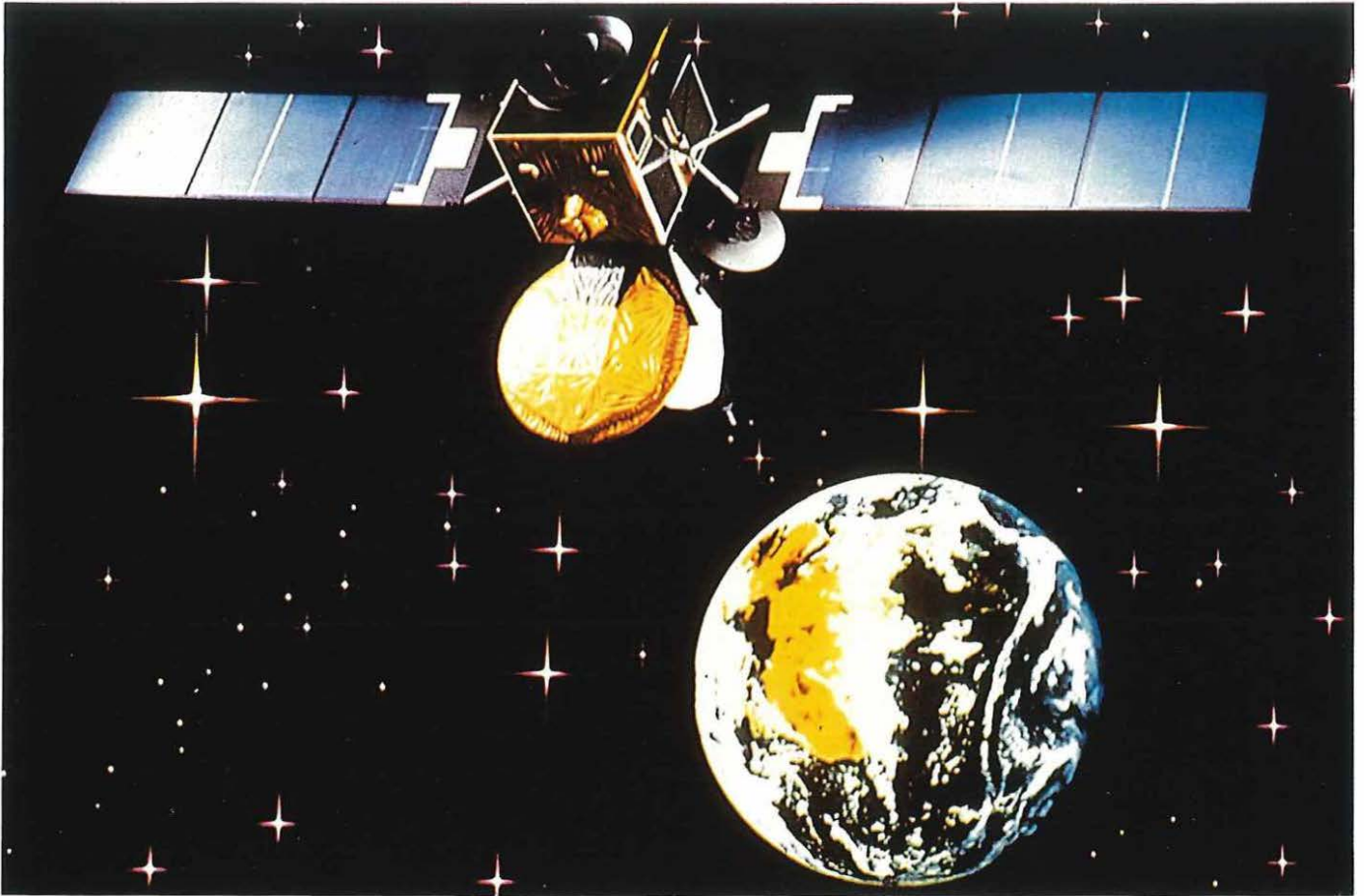
British Telecom Satellite Systems' first contracts were for national closed circuit television distribution of religious and sporting meetings, and were by their nature occasional and short-term affairs. A new five year contract will enable Satellite Racing Development (SRD) Ltd., a consortium of bookmakers, to screen live coverage of betting-related events throughout Britain. The system which provides television pictures multiple sound channels and teletext pages is a major breakthrough for the betting and racing industries.

The network, which places British Telecom at the forefront of this market, is not only the first such private network in Europe but also one of the largest satellite networks in the world. It has been designed to provide high performance and flexibility over the contract period.

Television signals from the events covered will be brought to the Telecom Tower in London ▷

British Telecom is to provide High Street betting shops with live television coverage of sporting events in a private satellite network deal which will be the largest of its kind in Europe. It is the first of several such projects being developed by the newly-formed British Telecom Satellite Systems section and British Telecom International.





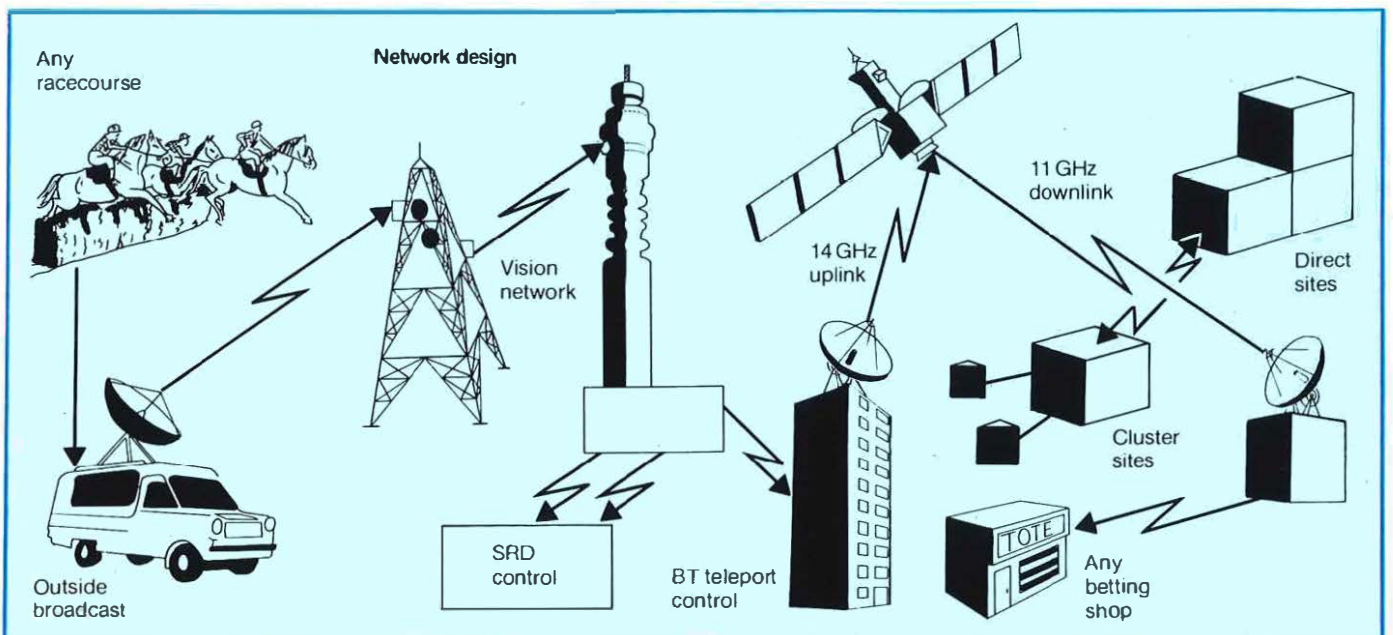
The Intelsat V satellite in geostationary orbit above the earth.

over British Telecom's outside broadcast vision network and then sent for editing to SRD's control centre located nearby in purpose-built studios.

Live signals comprising vision, sound and data will be sent from the control centre to the tower for relaying over dedicated lines to the London Teleport, British Telecom's satellite earth station in London's Docklands. The Teleport which plays a key role in transmitting satellite television throughout Europe, will beam the signal up to an Intelsat V satellite located in geostationary orbit at 332.5 degrees east.

The signal will be a composite one, made up of a number of audio channels, a single 9.6 kbit/s data stream and a PAL I vision signal encoded by the B-MAC process. MAC, standing for multiplexed analogue components, retains the image and colour information of the television picture in original component form rather than as a conventional and encoded composite form.

Components will be transmitted separately and combined into a normal TV picture only at the distant receiver. In this way the picture will be protected against possible distortion during its transmission path, and in the process the signal



will be made unreceivable by conventional receivers, to guarantee privacy. Further encryption will be applied to the composite signal.

The combined signals are to be transmitted at 11 GHz to receiving aerials on or near the bookmakers' premises. A dish receiver antenna as small as 1.3 metres in diameter will be used in most locations, together with the appropriate downconverter, tuner and decoder apparatus. A shop will usually have its own receive satellite terminal, but if a building is structurally unsuitable, the equipment may be located nearby. A terminal may also be shared in a 'cluster' arrangement where a number of shops are located nearby.

### Coverage

Test programmes start in November and daily coverage of races will begin in January next year. Racing coverage will be available to all 10,000 licensed betting offices by then, and SRD expects to link up its 4,000 members during the first year.

Live coverage is planned to entail at least six hours per day, six days a week (although this may increase if betting shops win permission to open for evening events). The SRD consortium is backed by the country's big four bookmakers, Ladbrook Racing Ltd., Mecca Bookmakers, the William Hill Organisation and Coral Racing, together with the Tote.

Television is important to the betting industry

as part of its scheme to make betting shops more attractive to customers. For some years, bookmakers have been seeking to improve the appearance and facilities of their premises and earlier this year an Amendment Order was made to the Betting, Gaming and Lotteries Act, which legalised the provision of live pictures and light refreshments.

The fast response by British Telecom Satellite Systems and BTI to this new business opportunity was certainly aided by their combination of resources and capabilities which are unique to British Telecom and give the concern a major tactical advantage.

British Telecom Satellite Systems — part of Business Network Services and based at their new Angel Centre headquarters in London — is a small integrated multi-disciplinary team, comprising technical, planning and marketing staff.

Specialist skills, covering satellite receiver technology as well as video signal processing and encryption have been brought in from British Telecom's research laboratories at Martlesham Heath in Suffolk, and staff based there are engaged on continuing research for the project. Backing up the team there is the national field engineering staff, enabling Inland Satellite Systems to offer a truly nationwide service.

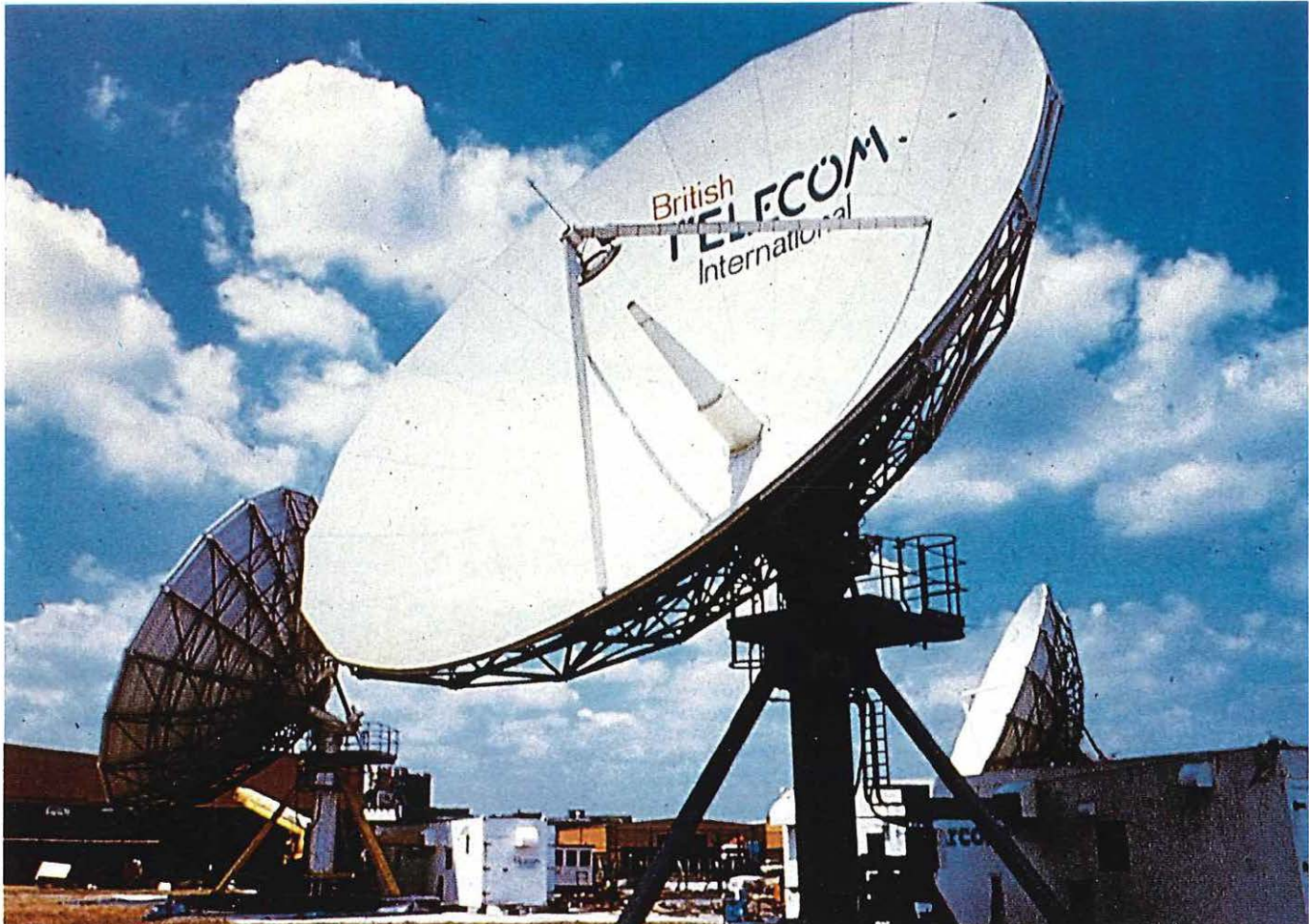
The team is currently examining several other promising network applications, and the success of the SRD contract will not be the last. The stakes are high — but so are the winnings. ■



Small satellite dishes of the type attached to this building are likely to become a familiar sight on High Street betting shops.

**Mr A Spittle is Business Manager for Inland Satellite Systems.**

British Telecom's London Teleport will beam sports coverage to an Intelsat V satellite for transmission to dishes on the bookmakers' premises.



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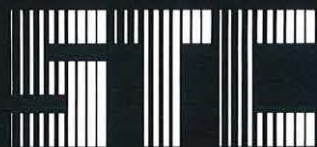
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# FACING UP TO NEW



One of the specially designed and built cleanrooms at British Telecom Research Laboratories, Martlesham Heath.

Most people with an interest in telecommunications are aware of the fact that British Telecom employs nearly a quarter of a million people and that the latest annual turnover figure exceeded £8.3 billion. Such figures are of themselves 'phone number' statistics and throw little light on the degree of expertise, effort and experience behind them.

But the entrepreneurial spirit which drives the company forward is being echoed and mirrored throughout the telecommunications industry and the ramifications of change go far beyond the boundaries of British Telecom.

This article looks at three companies which have been greatly affected by liberalisation and the company's privatisation. Two of them are well-known in the telecommunications industry — STC, manufacturers of such things as telephones, telex terminals, radiopagers, printed circuit boards, switching systems and network equipment; and Thorn Ericsson, a key supplier in British Telecom's digital modernisation programme. The third is less well known, but has an important part to play in the high-tech future ahead by designing and building clean room complexes for research and manufacturing products.

These, and many more companies, have benefitted in terms of jobs and profitability as a result of British Telecom contracts and are examples of how change is affecting the industry as a whole.

The contracts have all involved research, risk, and the future job prospects of large numbers of people and illustrate the point that everyone involved in telecommunications has to strive for new horizons to succeed in today's environment.

# HORIZONS



■ Research ■ Development ■ Jobs ■

■ Research ■ Development ■ Jobs ■

**A**n unusual spin-off from British Telecom research is aiding advances in building design and construction technology.

The development has resulted from a close working relationship between British Telecom and the design-and-construction company Kyle Stewart, who are currently building a clean room complex at the research laboratories at Martlesham Heath, near Ipswich. And for Kyle Stewart subsidiary company, Lakers Process Engineering, who specialise in pipework installation for process gases, the partnership has led to an exciting development which has aroused interest world-wide.

Kyle Stewart's involvement with Martlesham Heath began in 1984 with the start of a nine-month long joint feasibility study of clean room design in conjunction with BTRL's own clean room engineers, which eventually led to the £6.5 million project. During this time, the company was appointed design-and-construct contractor for a smaller clean room project in which 14 Class 10 work-stations were provided inside an existing steel-framed building. This meant

constructing a 'room within a room', surrounded by a complex system of servicing ductwork. During the 'ideas' period, Kyle Stewart experts travelled to the United States to examine existing 'state of the art' facilities.

Unlike many clean room facilities in 'high-tech' industries, the complex was designed around a central clean room area. This took into account the huge volume of ductwork necessary to condition the air to close limits as well as a separate system to carry away process gases. In addition, the clean rooms needed to be served by laboratories and offices within close reach.

Designs for the new complex were constantly re-thought during the ninth-month study phase. Only when both sides were satisfied that the new building would be as advanced as possible were the ideas committed to a Computer Aided Design process. This has involved a team of up to 18 Kyle Stewart designers, including architects, services engineers, and mechanical, public health and electrical engineers, working on the project, both at Martlesham Heath and at the company's North London offices.

Construction has been carried out under a management team based permanently on site, and supervising activities of a number of specialist sub-contractors in addition to the company's own workforce. When the entire complex is finished, there will be a 16-week commissioning period, during which constant air changes will 'scour' the clean area, following a complete sweep by an industrial cleaner fitted with special filters. This will ensure that by the time the complex comes on-stream, it will be 100 per cent clean.

Work on the clean rooms opened up an entire new area for the Kyle Stewart Group, and the Lakers subsidiary has also been awarded a £500,000 contract to supply and install the pipework which will carry process gases at the joint British Telecom/Dupont manufacturing facility close to the Martlesham Heath laboratories.

The pipework itself has to be assembled under 'clean' conditions on site, and a search of the laboratory market revealed that there was nothing suitable in the way of mobile clean rooms where such assembly could take place. Consequently, a team from Lakers and Kyle Stewart Group Design Services designed and manufactured an advanced mobile facility which can be split into three sections and transported by lorry anywhere in the world. It can be set up and operational within 24 hours of arriving on site.

Keen interest has been shown in the mobile clean room from major industrial concerns throughout the world, to the extent that the company now plans to manufacture these mobile units for sale in Britain and overseas — a direct result of the research and development carried out in conjunction with British Telecom. ▷

Right: an STC engineer working on a primary digital multiplexer (PDMX) used in junction, trunk and local applications.

## ■ Research ■ Development ■ Jobs ■

## ■ Research ■ Development ■ Jobs ■

**S**TC, a major British electronics group employing 36,000 people with an annual turnover of nearly £2 billion and operations in more than 50 countries, has itself undergone a period of major upheaval since the liberalisation of British Telecom.

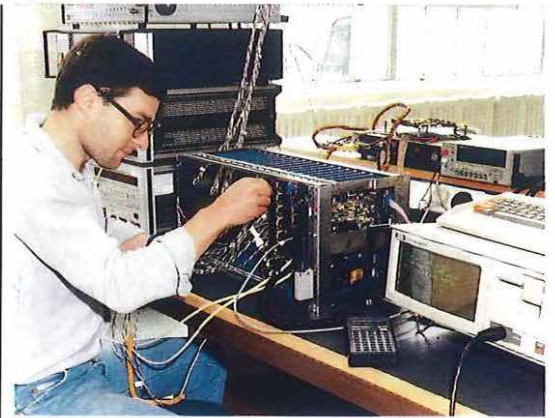
One of the biggest manufacturers of telephones in the UK and a major supplier of transmissions systems, STC has had to weather shockwaves of change and now places high emphasis on creating the products people want to buy and marketing them in a highly competitive arena. The company has had to speculate vast amounts of money on research to woo potential customers, including British Telecom, and now has an impressive portfolio of products and services.

The company's Communications Terminals Division, for example, has a turnover of about £40 million a year and 80 per cent of its business is geared to British Telecom — a customer for the past 25 years. The Division admits that it used to be dependent on British Telecom but now markets its wares on a wider basis to growing independent and overseas outlets.

It aims to develop and market the full range of voice, text and data products and manufactures 95 per cent of its output in the UK — principally at the company's Monkstown factory near Belfast.

The Division builds Britain's most popular phone — British Telecom's Viscount range — and more than 3 million units have been produced on an exclusive basis. The instrument is built to the highest technical standards and is a result of joint research between the two companies four years ago. Export sales are a possibility, but for some markets the standards achieved are too high to permit effective price competition.

An assembly line producing telephones for British Telecom at STC's Monkstown factory near Belfast.



Britain remains the prime outlet and surprisingly 75 per cent of the 30 million installed phones are still rented from British Telecom despite the boom in independent High Street phone shops and foreign imports.

Radiopagers, however, are a different story and the Division exports the majority of its production to the United States with British Telecom taking about 10,000 units a year. Development work is now taking place at the company's New Southgate site in North London for a 1200 baud fast pager due for launch next year and a new alpha-numeric pager.

### Competition

Telex is a market still growing at about five per cent a year despite competition from fax and the Division has manufactured British Telecom's popular Cheetah terminal since 1981. A new product, TX 3000 has been launched and its main features are ease of use, a large memory and an upgradeable terminal. The machine can also be linked to a personal computer (PC) and the Division believes that the future lies with terminals which can double as PC's and perform as word processors.

All new product research involves risk and the Division spent £5 million developing its SDX 40 digital phone system — primarily with British Telecom in mind. But British Telecom decided to launch the rival Octara as its first digital system and the two are now in competition.

New Southgate is also the headquarters of STC's Local Transmission Division which does £150 million worth of business a year with British Telecom — mainly on the enhancement of TXE 4 telephone exchanges from analogue to digital operation.

As part of British Telecom's programme to update the country's communications network, about 500 electronic telephone exchanges are now in service, equipped with TXE 4. Enhancement involves modernisation with the latest microprocessor developments to give additional features such as call logging which allows the electronic calculation of customers' bills, and common channel signalling, which allows the instant transmission of the dialling of a number from one handset to another.

The Division's main product for the future is the primary digital multiplexer PDMX® which is a digital component whose capabilities are used in junction, trunk and local applications for



concentration and time-switching. The product is under consideration by Teletrade, on an Original Equipment Manufacturer (OEM) basis for home and overseas use and was represented recently at an exhibition in Kenya.

A £25 million order has been placed by British Telecom for the Directory Assistance System (DAS) which has been designed to speed up and improve the Directory Enquiries service by replacing books and microfiche. DAS operators are supported by 70 computers and three computer centres which provide the selected listings from 23 million possibilities within 1.5 seconds. DAS enables the average time to handle a directory assistance call to be cut from 53 to 30 seconds.

Known to British Telecom as the DPS 1500, STC's Envoy switching system has been designed to suit the requirements of packet switching networks. A staggering 600 man years have been spent in developing the product for the Dutch network and a further 200 man years in enhancing it for British Telecom's needs.

British Telecom's network plans involve four main exchanges — in Manchester, Birmingham and two in London — and 11 local exchanges. Through British Telecom International gateways, the system will enable a personal computer to talk to another PC anywhere in the world within two seconds and, on the domestic front, will play a key role in the development of electronic shopping and data transfer between banks and building societies.

Work in the two Divisions and elsewhere within STC shows both an historic and vibrant new link with British Telecom and its future plans.

■ Research ■ Development ■ Jobs ■

■ Research ■ Development ■ Jobs ■

**E**arlier this year, British Telecom announced the results of a tender to supply up to 600,000 lines of digital exchange capacity as part of the local exchange modernisation programme. The successful company, Thorn Ericsson, has undergone some big changes as a result.

The contract is worth up to £100 million over three years, and involved doubling the capacity of the company's Scunthorpe factory — which was already making digital exchanges at the rate of 100,000 lines per year.

The system chosen is known as AXE. This is a computer-controlled, digital exchange capable of handling both voice and data traffic. It is built up from function modules, so it can be expanded and modified to accommodate increasing demand for services of future advances in technology.

The first 100,000 lines are due for delivery during this financial year, with a further 300,000 to 500,000 lines to be delivered the following year. The company is used to installing AXE exchanges in the UK. British Telecom International already operates one at Keybridge House — the world's biggest digital international exchange, with over 50,000 lines.

The system's modular construction was exploited at Keybridge earlier this year as the central processors were swapped to increase its capacity. It now uses Thorn Ericsson APZ 212 processors — claimed to be the most powerful telecommunications processors available.

AXE is being extensively customised for the UK local exchange network. A new line circuit was designed for UK standards, and a large team of programmers is working on the advanced management, maintenance and subscriber facilities that the new exchanges will support. Three years ago, there were 45 people working at Thorn Ericsson's software house. Now it is home for over 160 programmers and systems engineers.

## Training

Skilled telecommunications engineers are a rare commodity, so the company has invested heavily in training and last financial year it spent over £2 million on new training schools in Brighton and Scunthorpe. More than 20 qualified instructors use full-scale models of AXE exchanges to train both British Telecom and Thorn Ericsson engineers.

In June, work began on a £3 million, 60,000 square foot expansion at the company's Scunthorpe factory, where AXE is built for the UK market. This will house some £11 million of high-technology production equipment. The purpose-built plant is computer-controlled for fast, flexible production, and is already one of the most modern telecommunications factories in the world.

When the new buildings are completed in early 1987, over 250 new jobs will be created there, with a similar number being created in the rest of the country as testing and installation engineers. Depending on future order levels, the company says that it could be employing 1,000 new people within two years. ■

Below: printed circuit board assembly at the Thorn Ericsson factory which is manufacturing digital exchanges for British Telecom.



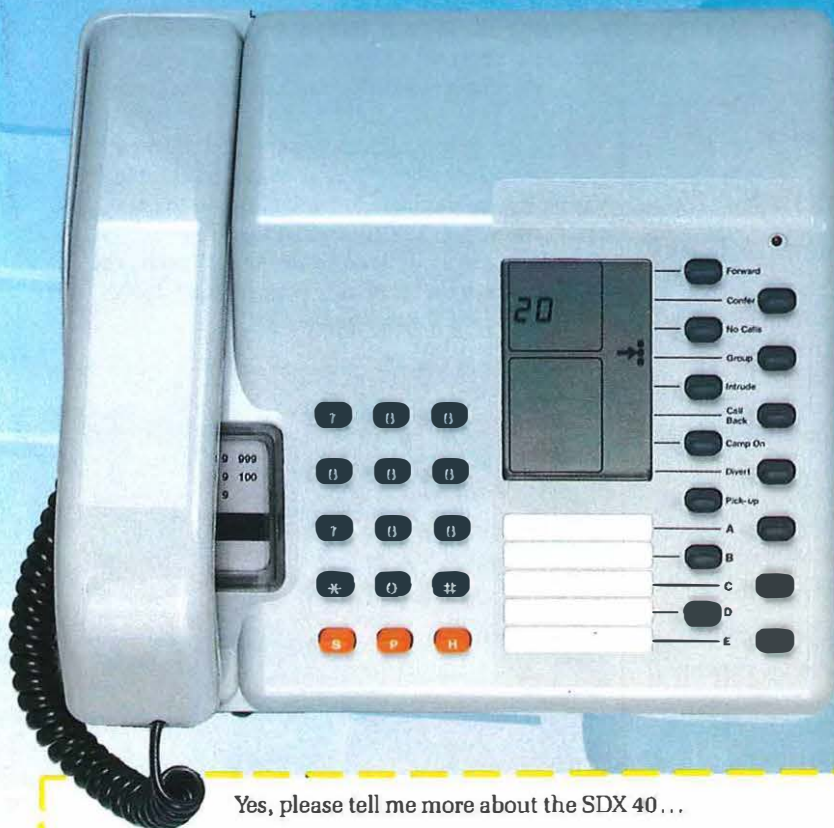
# SDX 40

## YOUR CHOICE IS CRYSTAL CLEAR

The SDX 40 digital telephone system is a dramatic new way of improving communications for small businesses. The modular 40 port system can be supplied as a stand alone unit or attached to an existing PABX.

Installation is simple because everything including line cards, trunk cards (LD & MF), tie line cards (AC 15, DC 5/10), two wire cards and the IDC wiring connectors are housed within the compact control unit.

Stylish telephones offer dedicated and programmable feature keys with an advanced liquid crystal display to tell the user exactly what's happening. Interested? The answer is crystal clear.....



Yes, please tell me more about the SDX 40...

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Post Code: \_\_\_\_\_ Telephone No. \_\_\_\_\_

Please send the form to: Peter Livesey, Communication Terminals Division,  
STC Telecommunications Ltd., Oakleigh Road South, New Southgate,  
LONDON N11 1HB. Tel: 01-368 1234 ext. 3267.



STC TELECOMMUNICATIONS LTD

## ...Talking Business

# FACTS AND FIGURES — five years of British Telecom progress

## Number of exchange connections

	Year ended 31 March				
	1986	1985	1984	1983	1982
Business .....	4,147,000	3,938,000	3,774,000	3,646,000	3,574,000
(% growth over previous year) .....	(5.3)	(4.3)	(3.5)	(2.0)	(1.9)
Residential .....	17,140,000	16,614,000	16,062,000	15,564,000	15,177,000
(% growth over previous year) .....	(3.2)	(3.4)	(3.2)	(2.5)	(3.3)
<b>Switching</b>					
Number of exchange connections served by electronic and digital systems .....	7,859,000	6,869,000	6,273,000	5,013,000	3,606,000
(% of total exchange connections) .....	(36)	(33)	(31)	(26)	(19)
Number of electronic units .....	2,116	2,121	1,965	1,748	1,480
(% of total switching units) .....	(34)	(31)	(29)	(25)	(22)
Number of digital units .....	183	84	51	14	1
(% of total switching units) .....	(3.0)	(1.2)	(0.8)	(0.2)	(0)

## Call growth

	Year ended 31 March				
	1986	1985	1984	1983	1982
% growth in telephone call volume over the volume in the previous year was about:					
Inland .....	7	8	6	3	3
International .....	11	14	12	11	14

## Exchange equipment

At 31 March 1986 British Telecom operated exchanges in the following technologies:	Local exchanges	Trunk exchanges	International exchanges
	Strowger .....	3,345	** 333
Crossbar .....	549	121	5
Electronic .....	2,116	0	0
Digital .....	157	*** 25	1
Total .....	6,167	479	6

## Trunk network transmission

Systems operating at 140 Mbit/s in the trunk network are:	Number of systems	
Coaxial cable .....	666	55%
Microwave radio .....	170	14%
Optical fibre .....	367	31%
Total .....	1,203	100%

Each system has a point to point capacity of 1,920 digital channels giving a total capacity of 2.3 million digital channels. By 31 March 1986, 91,000 fibre-kilometres of optical fibre had been installed in the national (trunk) network, 33,000 fibre-kilometres in the junction network.

## Telex system

	At 31 March				
	1986*	1985	1984	1983	1982
Number of exchange connections .....	104,300	97,000	92,900	90,600	90,400
(% increase on previous year) .....	(7.2)	(4.4)	(2.5)	(0.3)	(2.8)

## Capital expenditure (net)

	1986	1985	1984	1983	1982
	£m	£m	£m	£m	£m
Additions:					
Land and buildings .....	214	170	162	176	133
Plant and equipment:					
Transmission equipment .....	567	592	550	479	405
Telephone exchanges .....	698	643	586	673	705
Other .....	514	474	265	225	237
Total additions .....	1,993	1,879	1,563	1,553	1,480
Changes in materials awaiting installation and disposals and adjustments .....	(20)	(24)	(30)	(3)	(4)
Total net expenditure on fixed assets .....	1,973	1,855	1,533	1,550	1,476

Note Other includes inter alia customer equipment, motor vehicles and computers and investments in satellite consortia.

## Research and development expenditure

	1986	1985	1984	1983	1982
	£m	£m	£m	£m	£m
Research and development expenditure for year ended 31 March .....	161	182	179	172	158

Note The main areas of expenditure are: switching and transmission systems development; information technology; network strategy and standards, and basic technology in hardware and software.

## Manpower\*\*\*\* Number of employees by division as at 31 March.

	1986	1985	1984	1983	1982
Local Communications Services .....	191,900	197,500	210,600	216,100	220,300
National Networks .....	11,700	10,800	2,700	1,500	
British Telecom International .....	9,800	10,400	11,700	12,800	14,200
British Telecom Enterprises .....	4,100	3,500	2,100	1,200	900
Development and Procurement .....	9,700	10,100	11,400	12,100	12,500
Corporate headquarters .....	2,800	2,900	2,600	2,300	3,700
Overseas division .....	200	—	—	—	—
Total .....	230,200	235,200	241,100	246,000	251,600

\* Includes BT service connections.

\*\* Includes 8 derived services (LinkLine) exchanges.

\*\*\* Includes 4 units operating in the junction network.

\*\*\*\* Figures for earlier years have not been reworked to reflect transfers of staff between divisions.

British Telecom is forging links with housebuilding companies in an effort to make telephones and data equipment standard in new homes in the same way as central heating and fitted kitchens.

# Piping the dream



Forget motorway misery, the office can come to you down a telephone line.

That final call and it's 'feet up' without being footsore at the end of a busy day.

The concept of the 'office in the home' with an executive exchanging miles of travelling for a datalinked office in a spare room has been possible for some years and British Telecom has long been preaching its merits and developing significant systems to meet potential demand.

But without the acceptance of the ultimate end user, and without the necessary 'social hardware' such as houses built to cope with the new

technology, much of what could be the most important social revolution in three centuries has remained a pipedream.

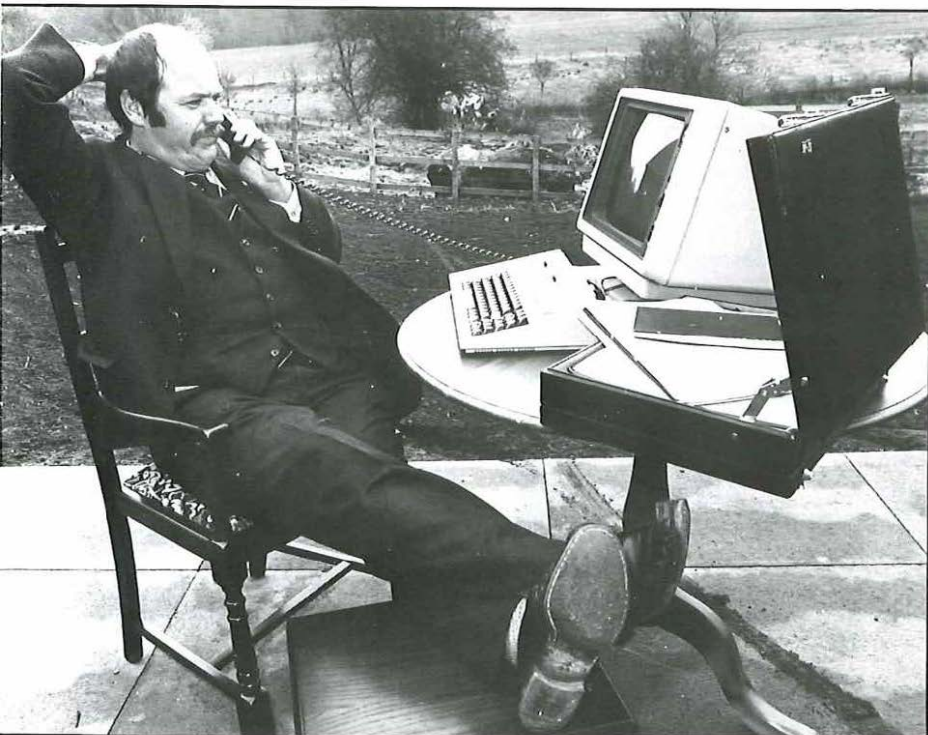
Now, however, a major housebuilder, Alfred McAlpine Homes West Ltd, has taken a big stride towards making the pipedream a reality by unveiling its first computerised showhome in the picture postcard village of Hook Norton, about ten miles south west of Banbury in Oxfordshire.

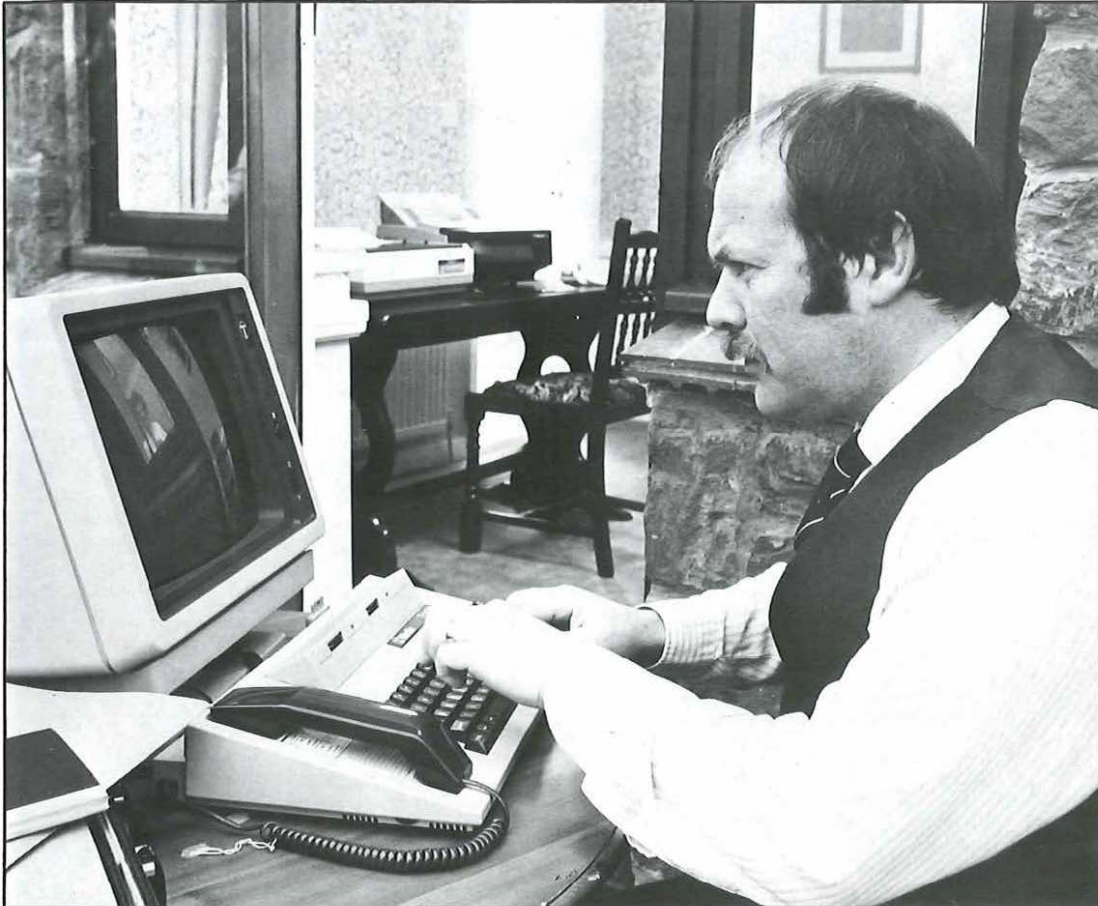
At the same time, British Telecom is collaborating with Wimpey to exploit the thriving residential property market and together launched a six-month trial of a new service called BT Homeline Plus in the Thameswey District at the beginning of August.

The scheme offers home buyers a working telephone service on the day they move in and spares them the inconvenience of arranging appointments with British Telecom and the resultant delays at a time when the phone is most needed. Furthermore, the installation charge will be included in their mortgage so that buyers will not have to pay in one lump sum. Another marketable benefit of the scheme is the absence of unsightly extension telephone wiring.

If successful, the Thameswey trial will be followed by a full-scale promotion to builders throughout the country. British Telecom plans to make the service available to any builder who agrees to abide by their specifications.

Thameswey was chosen as the test site because of the large numbers of houses being built there. Wimpey also wanted to test the scheme in one area to evaluate its effect more easily. It was felt that if other Districts entered into negotiations at an early stage, builders would take advantage of





The latest office information is available in the comfortable surroundings of home.

the confusion to play Districts off against each other. British Telecom stands to profit handsomely from the scheme — at least £70 per house should be generated from increased call revenue and extended rental and product sales should amount to £50,000 a year in Thamesway alone. The arrangement will also save costly engineers' time.

With the house-building market looking stable at present — around 150,000 new homes a year are being built — the scheme is certain to represent a regular source of income to British Telecom.

### Potential

In Oxfordshire, the small estate of McAlpine homes recognises the potential for information technology on an executive style estate in the country. The builders approached British Telecom to collaborate in developing the project by demonstrating some of the company's latest data processing hardware, and by striking a deal whereby all new houses on the estate would be pre-wired with two telephone lines. The first line would be used for ordinary telephone calls and Prestel, and the other for use with a communicating workstation such as the Merlin Tonto, a combined computer and telephone with built-in modem.

Immediate results have been highly successful with Alfred McAlpine Homes able to demonstrate a genuine on-line showhome to a bevy of interested local business people and potential customers. Visitors to the showhome were able to see how easily British Telecom hardware could be accommodated in the

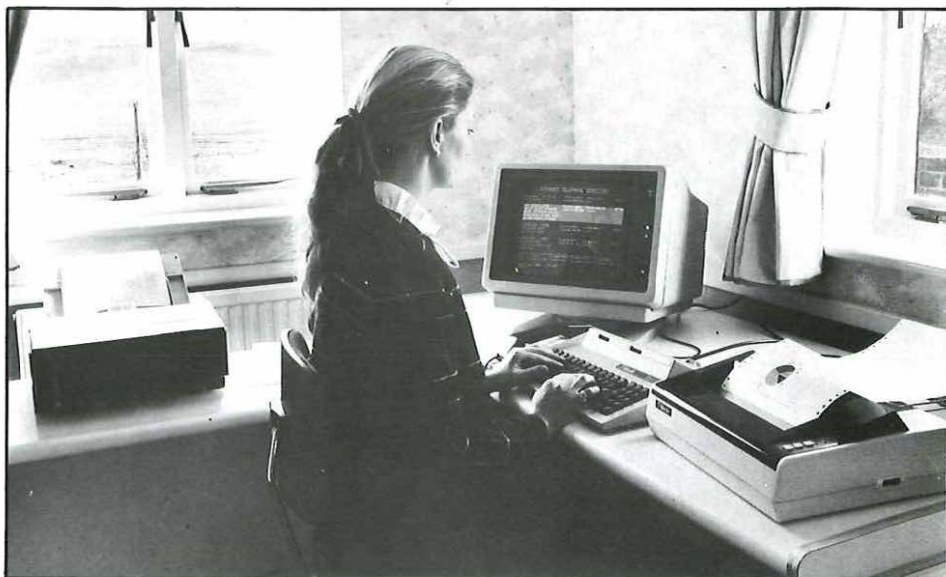
smallest bedroom.

Compact units carrying the Merlin Tonto, a printer and the Merlin combined Fax and photocopier could all be easily packed away into a cupboard overnight if required, yet provide the businessman with all his needs. Total cost of the British Telecom equipment works out at less than half the cost of even a modest executive car.

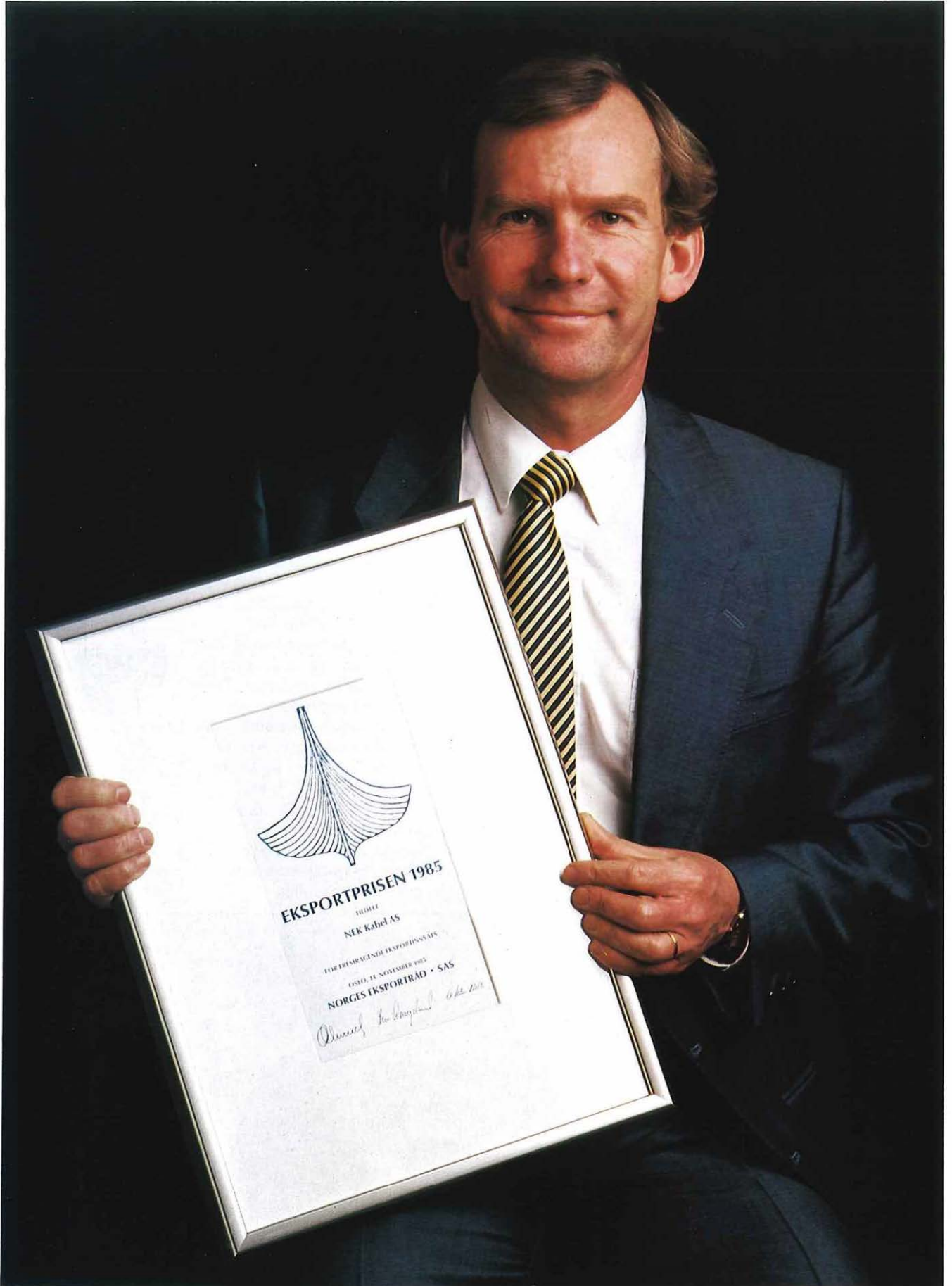
But possibly the most far reaching benefit of the concept is that for the first time employees can choose where they want to live without having to consider the limitations of distance from the office and travel facilities. Early indications show that the idea will quickly develop and more estates in rural Oxfordshire are already on the drawing board. ■



Time to think and the means to communicate.

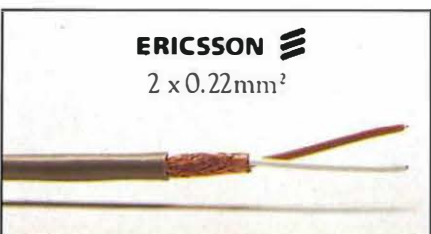


# NEK-THE LEADERS IN



Last year NEK was awarded the 1985 Export Trophy for the company's success on the world market. The award was received by Managing Director Mr Bard Snilsberg.

# COMPUTER CABLES



Now in 1986 we are set to make an even greater impact on the international computing and electronics markets.

Now recognised as one of the world's leading manufacturers of computer cable, demand for our products has increased substantially in major high-tech markets such as the USA, the UK, Norway and Sweden. Our customer list includes IBM, Xerox, ICL, NCR, Wang, Norsk Data and Ericsson – companies which demand only the highest quality cable for their equipment.

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When you choose NEK cables you can be sure of the manufacturing source, and of the quality – unlike many suppliers of computer cables who buy in from producers all over the world. With NEK any inconsistencies are eliminated, because you know you are getting the best quality with every order.

At NEK all our computer cables are produced by us at our own plants, meeting exactly our own, or the computer manufacturer's specifications. All production is fully controlled by us. For you the customer, it means the peace of mind you only get when you know the product is the best.

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NEK has a reputation for good and consistent service – a reputation we fully intend to retain.

As a result of the expertise we have built up in the field of advanced computer cables, we can make a positive contribution in discussing our customers' special cable requirements with them. We are always ready to advise on the development of custom products, or the use of existing cable types. Our aim is to provide the best solution for your specific cable requirements.

Our standard product range covers every conceivable application using cable, in many different sectors of industry. And if we do not already manufacture the cable you require, we can design and manufacture it to meet your requirements exactly.

## EASY AVAILABILITY

So great has been our success, that you can now obtain NEK cable all round the world. With our headquarters in

Norway, subsidiary offices have been set up in Sweden, the UK and the USA. Sales offices and agencies also operate in a further 15 countries.

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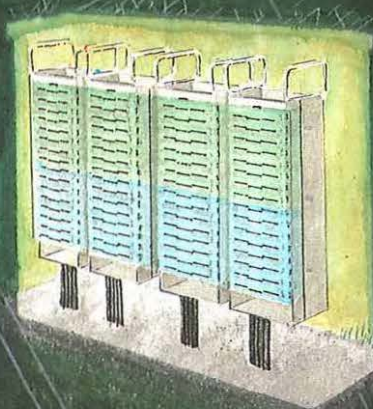
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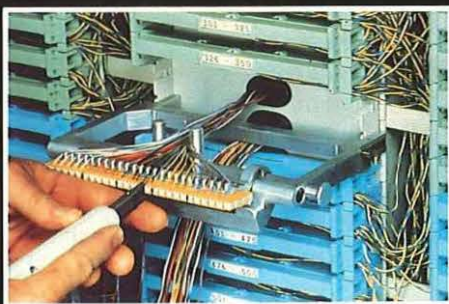


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Installing Bix is simplicity itself, for both



new and retrofit installations, as our training video demonstrates.

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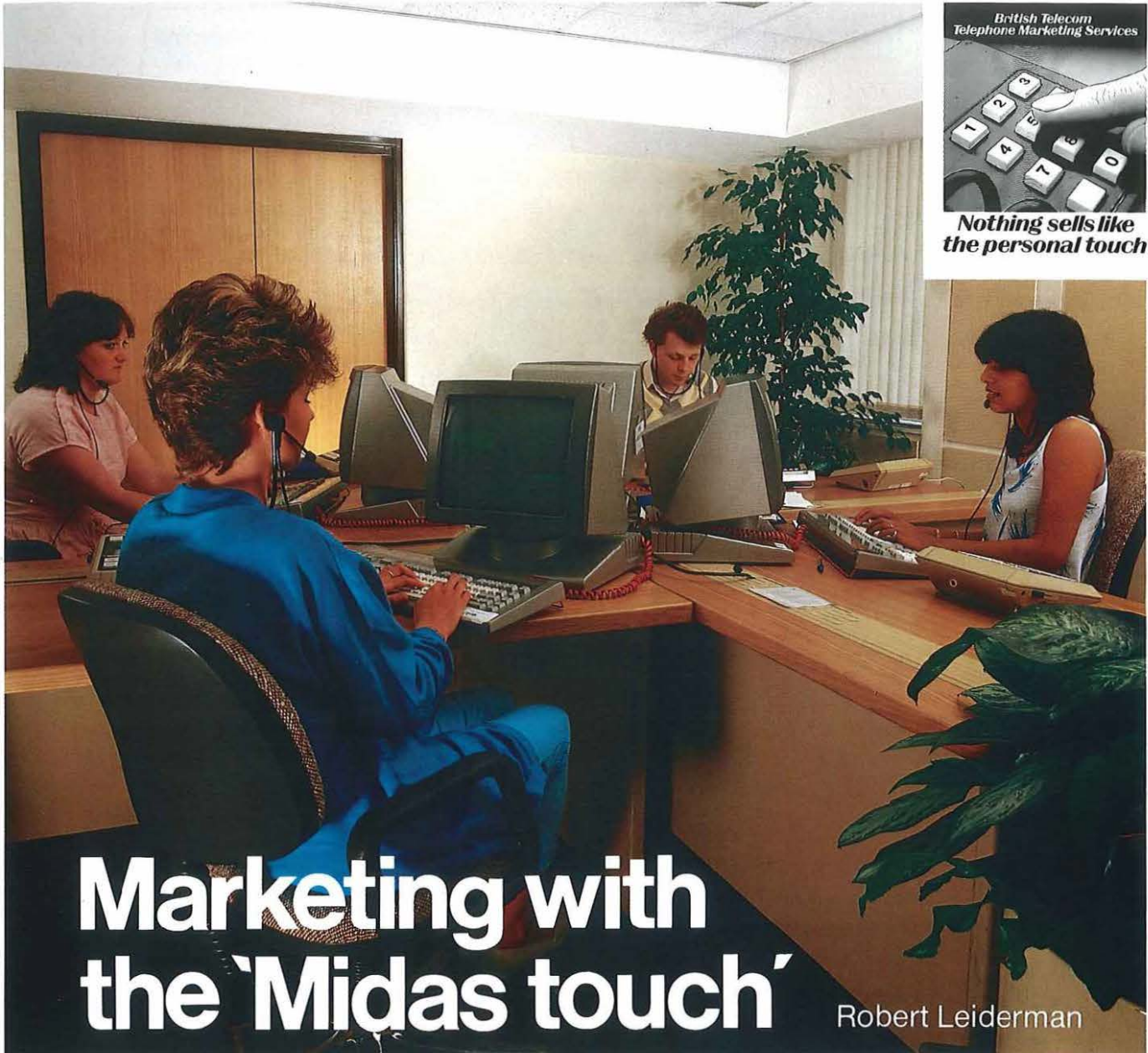
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British Telecom  
Telephone Marketing Services



Nothing sells like  
the personal touch

# Marketing with the 'Midas touch'

Robert Leiderman

**T**elephone marketing is the fastest growing market medium in Britain and to cope with the boom in demand British Telecom's autonomously run call-handling and call-making services — Telecom TAN and Telecom Telemarketing — have been brought together to work under a single management structure with a combined sales force.

Telecom Telemarketing, the outbound division, has carried out call-making assignments for more than 500 clients and turnover, which doubled in 1985, is expected to increase by another 100 per cent this year.

To handle this rapidly expanding client base, the operation will be adding a further 50 telephone lines to the existing 50 which operate from its offices at Ebury Bridge Road, Chelsea, London.

Recent projects undertaken have ranged from assisting a major oil company to successfully launch a garage forecourt promotion to boosting annual subscription renewals for an international English language publication.

The Telemarketing client list includes 'blue chip' names such as American Express, British Caledonian, Budget Rent a Car and Compucard, and other areas covered include entertainment, office equipment, computers, mail order houses and truck manufacturers.

Outbound telephone marketing recognises and uses the telephone as being the most personal medium available today. But great care must be taken not to abuse its power and ▶

**British Telecom's Telephone Marketing Services has become, in less than four years, the largest telephone marketing operation in Europe and a leading name in the industry worldwide. This article looks at the methods used and highlights three case studies.**



Above: part of the Telecom Tan team at Bristol.

Left: Telemarketing's client list includes major companies such as Budget Rent a Car.



**Nothing sells like the personal touch**

## Marketing with the 'Midas touch' AT HARRODS

Last Christmas a full-page advertisement appeared in the New York Times inviting readers to choose from a selection of cashmere clothing on offer in the annual sale at Harrods of London. An international 0800 toll-free telephone number invited purchasers to call and

give details of the garments required plus their American Express number. The bought items were then sent from London to New York by air parcel post with the charge already built into the special dollar prices.

The response was tremendous and over 3,000 calls were handled on behalf of Harrods by Telecom TAN during a five-day period. Of these, 2,200 enquiries were converted to orders worth more than £300,000.



## Marketing with the 'Midas touch' IN PUBLISHING

Most travel agents in Britain keep a copy of Travel Trade Gazette, one of the trade 'bibles' of the travel business. The magazine is published by Morgan-Grampian, one of the UK's largest professional trade magazine publishers, and goes to 21,000 people in the travel business to bring them up to date on the latest news, views and information.

When Morgan-Grampian wanted to carry out a detailed market survey of the agencies as part of a circulation-building campaign, they found they needed to tackle nearly 8,000 travel agencies in a very short space of time and asked Telecom Telemarketing to take on a large part of the job on their behalf.

The publishers needed to obtain the answers to 12 questions from 6,000 individual outlets. They supplied the names and addresses for Telecom Telemarketing to contact, together with a comprehensive questionnaire.

As the calls were completed, Telecom Telemarketing was able to computerise elements of the response. This not only enabled Morgan-Grampian to have interim analysis as the project progressed, but also to feed information directly into their own computer at the end.

the emphasis must be on sensitivity to avoid generating a nuisance.

A well-planned and co-ordinated telephone marketing campaign is also claimed to be the most controlled and precisely targeted medium. Trained telemarketing communicators can deliver messages directly to decision-making customers and the responses achieved will be handed on to the sales force to dramatically improve their efficiency.

Telecom Telemarketing's 50 outbound call lines operate between 9.00 am and 9.00 pm Monday to Friday and at the weekend when necessary. In addition to the trained communicators who execute the telephone campaign, the division also acts on a consultative basis as part of the service. This includes:

- identifying the potential and position of the telephone in the client's marketing mix;
- advising on the marketing strategy and creative support of the telephone marketing campaign;
- designing market research strategies and following them through.

Telecom TAN, the inbound division, is positioned at the forefront of call-handling in the UK. Last year, calls handled by TAN operators rose from two to four million and as a result, a new operations centre was opened in



March which has doubled the company's call-handling capacity to eight million.

Although telephone marketing is a relatively new discipline, awareness rose sharply in 1984 when TAN's 0272 272 272 number became synonymous with the British Telecom flotation during which it handled more than 600,000 calls in 12 weeks.

The TAN service was launched in Bristol in 1982 with a team of 12 people and just two clients, Habitat and Littlewoods. It now employs 200 full-time staff and 100 part-timers and has a rapidly increasing portfolio of clients that includes well-known names such as Harrods, Saab GB Limited and IBM. Other companies cover a diverse range of industries including mail-order, insurance, computers, central heating, publishing, health-care, home furnishings and travel.

Telecom TAN combines highly sophisticated telecommunications equipment, computer techniques and expertly trained operators to enable businesses to give a 24 hours/365 days a year personal service.

The telephone number connects the potential customer to the TAN operations centre in Bristol. Incoming calls are routed through a computer which identifies the client concerned, selects the most suitable free operator for that client, displays the relevant data on the operator's terminal and routes the call through to the selected operator — all in less than three seconds.

The operator can also record the name of the caller, take orders, deal with credit card purchases, take the caller through a predetermined question and answer routine, indicate the nearest sales outlet and arrange to send brochures.

Information which assists with media planning is then printed out on a daily basis to help keep those in need in the picture. ■



*Nothing sells like the personal touch*

## Marketing with the 'Midas touch' IN CAMBRIDGE

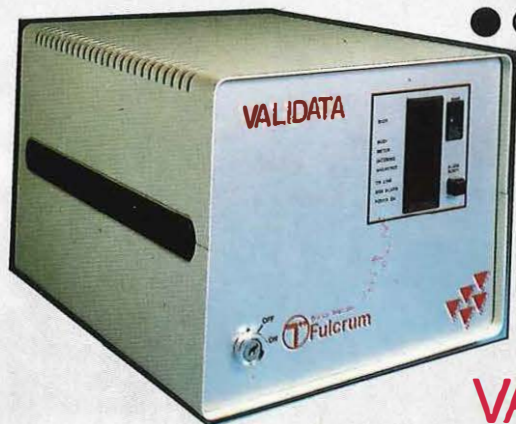
Faced with an influx of high-tech companies to the area — all wanting exceptionally qualified scientists, engineers and managers — Cambridge Recruitment Consultants had to go about their business in an unorthodox way.

The company took the view that it was Cambridgeshire, as one of the UK's fastest growing high-tech areas, that had to be sold to their specific market-place of job seekers, and support from the local industry was enlisted. A full-page advertisement was placed in a major national newspaper carrying a toll free 0800 number routed directly through to Telecom TAN. The response was even more successful than anticipated with around 300 calls a week, all from people with doctorates or similar!

Mr R Leiderman is Telephone Marketing Services' Group Managing Director.

# your answer to billing disputes

The electronic exchange based Call Management System.



- Cost effective ● Quicker response to customer queries ● LD/MF4 signalling (auto sensing)
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# TOUGH, RELIABLE and BRITISH!

Smith Cases are tough, reliable and made in Britain.

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We are willing to design and manufacture to order, and many other systems are under development at present — enquiries welcomed.



## BRITISH STANDARD

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GET INTO THE HABIT. DON'T ZAPP IT.**



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# Plane speaking...

Peter Fenning



British Telecom International has recently placed contracts for another stage of its Skyphone aeronautical satellite service, scheduled for commercial operation in 1988. The service, being developed through a collaborative agreement between BTI, Racal Decca and British Airways, will enable airline passengers to make automatic dial direct telephone calls to almost anywhere in the world.▷



speed, roll, pitch and geographical position relative to the geostationary satellite. It also has to be small and light enough to be acceptable to the airlines and must not increase the aircraft's drag factor. Operating in L-Band to the satellite, a typical antenna is shaped to allow flush mounting on the top of the aircraft fuselage.

To optimise the satellite's limited power and bandwidth, the system will use voice coding techniques to transmit a voice using one duplex 9.6 K bit/s channel, instead of the 64 K bit/s used in the terrestrial digital telephone network.

The passenger cabin will have several wall mounted cordless telephone units. A standard credit or charge card is inserted in the wall unit and the cordless handset is released for the passenger to return to his seat and make his call.

**T**ravel can be a frustrating business, with changes of schedule, delays and time zone differences all compounding the problems for business traveller and tourist alike. Yet more than 18 million passengers travel the North Atlantic by air every year.

Although it is sometimes a pleasure to get away from incoming telephone calls, how often would it have been helpful or reassuring to make an air-to-ground call: booking the hire-car; confirming the appointment; re-arranging collection times; checking that last minute detail in the presentation?

British Telecom International already provide a manual phonepatch service for cockpit crew, using the aircraft's standard high frequency (HF) radio transceiver to contact BTI's Portishead Radio Station but airline security and operational problems normally preclude its use for passengers.

The new Skyphone satellite service will complement Portishead HF radio by providing an automatic service direct from the passenger cabin, via INMARSAT's Atlantic Ocean Region satellite to BTI's Goonhilly Earth Station. Special Radio Frequency equipment, together with new signalling and switching equipment is being designed, specified and procured by BTI for use with Aerial 7 at Goonhilly. The initial service will be for air-to-ground calls and, if there is a demand, the system will be enhanced to include ground-to-air calls and passenger data services.

Racal Decca are designing the aircraft antenna and avionics. The equipment is highly complex since it has to allow for the effects of aircraft


No intervention is required by the airline's busy cabin staff.

The avionics select a satellite channel and the passenger dials direct to the country of his choice via BTI's extensive terrestrial network. At the end of his call, the passenger returns the handset to the wall unit and retrieves his credit card.



Mr P Fenning is British Telecom's head of aeronautical services.

Illustrations courtesy of Racal Avionics.



Aircraft manufacturers are already looking at the future communications demands of airline passengers and seat-back telephones may well be a standard fitting in the years ahead.

BTI's ground equipment is even more complex than that installed in the aircraft. Operating at C-BAND to the satellite, its functions include conversion of terrestrial signalling and transmission standards to those of the satellite, call logging for charging, credit card validation, call control and channel assignment.

BTI will be operating this service in the Atlantic Ocean Region but as soon as the aircraft flies around the world it will be able to log-on to the other ground

stations via INMARSAT's Indian Ocean and Pacific Ocean region satellites.

Technical trials will start next year and the service is due to begin at the end of 1988. Racal Decca will be testing the equipment on their company Jetstream aircraft and British Airways will initially equip three Boeing 747's for passenger trials.

Passengers, however, represent only part of the market for long range aircraft communications. The system also has potential to offer aircraft operators a range of cockpit services (voice and/or data) and, eventually, Air Traffic Control could be carried by such a system. Before very long, aircraft may have many of the telecommunications services normally associated with life on the ground. ■





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The optional X.25 diagnostics and monitoring package extends the performance of the Datatest II Plus still further. Key features include

emulation and test on the first three levels of X.25; storage of up to 512 frames; counts of data, reject, reset and call packets; and complete SNA decode and diagnostic facilities.

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# Dealing with disputes

Maggie Nichols

**Customer complaints are an inevitable fact of life for a company the size of British Telecom. But grievances are taken seriously and a mechanism of arbitration exists to give customers an impartial hearing and the company is bound to accept its findings. The service costs £15 — refundable in some cases.**

It is good policy for large companies like British Telecom to provide customers with the means and opportunity to defend their rights. Since 1979, British Telecom has run in conjunction with the Chartered Institute of Arbitration (CIArb), a service which allows an independent third party to settle simple disputes.

The principle of arbitration was built into British Telecom's licence on privatisation in 1984 and, today, the service is busier than ever as a result of the company's own wishes to give customers a fair deal and the constructive stance of the Office of Telecommunications (OfTel) which encourages people to use it.

Many of British Telecom's customers are financially unable to take the company to court, even if the process were not in itself quite daunting. For a sum of £15, which is refundable at the arbitrators' discretion, customers can have an impartial opinion which both the company and customers are bound to accept and both sides have to agree to this before arbitration can commence. At the moment, this arbitration work is prepared jointly between the Districts and Government Relations Department (GRD) at British Telecom Centre in London.

The service has evolved from the former Complaints Procedure which was set up with a panel drawn from suitably qualified members of the CIArb. The procedure involved an examination of documents, which allowed customers the opportunity to set out their complaint. The system was both quicker and cheaper than the alternative of court action and, although not legally bound to do so, British Telecom always stressed that it would honour the panel member's recommendation.

The large majority of such cases involved billing disputes, with occasional complaints about unsatisfactory service. For disputes relating to services where there was a legal liability prior to 5 August 1984, more formal arbitration arrangements were administered.

The decision to set up a complaints procedure was taken as part of British Telecom's stated aim to deal fairly with customers when things go wrong, and the company has always borne the cost of administering the scheme. Since 5 August 1984, British Telecom's services have

been provided under contract, deemed or actual, and as a result its legal liability has increased. Further, the company is now obliged, as a condition of several of its various licences, to provide an inexpensive, independent Arbitration Procedure.

There are certain restrictions on the type of dispute which may be dealt with by arbitration and British Telecom is not obliged, for instance, to agree to accept arbitration on any case which involves complicated issues of law, or a sum greater than £1,000, which is the level currently set by the Director General of Telecommunications.

Although the procedure is very similar to the original Complaints Procedure, there are differences — the most important of which being that both company and customer must agree that the arbitrators' award will be both final and binding. There can be no legal action taken by either party on any point considered by the arbitrator, once the award has been made.

The Arbitration Procedure provides the opportunity for British Telecom to 'stand back' from each individual dispute and review the situation dispassionately. It is all too easy to overlook the obvious occasionally, especially when working in close proximity to a problem.

The mere process of preparing a detailed defence to a customer's claim does occasionally highlight a previously missed point and it gives the company a chance to admit its mistake and

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COMPLETE HIS TASK  
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settle the matter amicably with its customer during arbitration. It is possible for British Telecom to settle a dispute to mutual satisfaction at any stage of the proceedings until an award is actually made.

The arrangements for arbitration have recently been extended to embrace Radiopaging and Mobilephone. This is a condition of the licence under which these services are run and, in common with British Telecom's main operating licence, the procedures and the manner in which arbitrators are appointed, have to be reviewed by the Director General of Telecommunications at least once every five years.

Prior to 1984, the Post Office Users' National Council and organisations such as the Citizen's Advice Bureaux previously used to steer some customers in the direction of the Complaints Procedure, but customers were often not made aware of the procedure until British Telecom advised them of it. Of tel is much more constructive and specifically recommends customers to follow the arbitration procedure and this encouragement has naturally led to a marked increase in both customer awareness and the number of claims submitted.

The intention within the near future is to devolve responsibility for individual arbitration cases to the Districts from which they originated giving far more local responsibility and control. One thing is certain — both customers and Of tel like arbitration and the service is here to stay. ■



The Chartered Institute of Arbitrators (CIArb) is a multi-disciplinary body with nearly 6,000 members drawn from many walks of life including law, banking, shipping, building, engineering, insurance, accountancy and the commodity markets.

The original Institute of Arbitrators was formed in 1915 and was granted a Royal Charter in March 1979. Today, the majority of its membership is in the United Kingdom, but there are also members in 72 countries throughout the world and CIArb has branches in England, Scotland, Ireland, New Zealand and Hong Kong.



Ms M Nichols is British Telecom's Arbitration Manager.

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# PABX-power for the people!

John Brown

**T**he introduction of a Centrex service in the UK has been discussed on a number of occasions with no positive outcome until recent research indicated a considerable interest amongst a wide spectrum of business customers which could only be properly assessed by a market trial in a realistic environment.

The UK lags 20 years behind North America in the initial introduction of Centrex because of different market needs. But even in the USA Centrex was originally viewed by the Bell Companies as nothing more than a purely commodity product warranting little attention.

However, since divestiture, much has changed and all North American telephone companies now view Centrex as much more of a prestigious and important product and there are enormous pressures on established and potential North American switching system suppliers to incorporate sophisticated feature sets to mirror and track PABX developments.

Centrex increases the range of choice open to customers, for sites of all sizes. It provides features normally found only on large PABXs and at the same time it frees the customer from the need for a large capital outlay. Centrex can also enable some or all of the customer's responsibilities for system planning and management to be handled by British Telecom if the customer wishes. Furthermore, as the company grows, the size of the installation and the features required can be quickly adjusted.

Initially, the Centrex market trial will offer telephone services only with the possibility that some data facilities will be added if sufficient demand becomes evident. In the longer term, ISDN Centrex may be available allowing customers to use multi-purpose data terminals as well as telephones on their extensions.

The trial will have a maximum capacity of 10,000 lines using a dedicated Switching Unit from AT & T and Phillips Telecommunications (UK) Limited.

The feature set will be as extensive as any that is available on a modern PABX and will include:

- line hunting, seeking out the next available free extension in a group,
- abbreviated dialling,
- three-way calls,
- call forwarding
- automatic call-back,
- call hold, transfer and pick-up,
- direct dialling into extensions.

The facilities will not be limited to customers on a single site and can be provided whether sites are located within the immediate vicinity of the trial exchange or more widely dispersed. All

the above facilities will be available between extensions geographically separated but will appear to users as though on the same site.

Communications Managers will be able to control moves of individual extensions and changes to the features available to them and will be given details of extension calls and feature usage.

The service will be able to interwork with a range of customer's own PABX and, where signalling systems are compatible, will also be able to interwork features between PABX and Centrex users.

Charges for the trial have not yet been fixed but the intention is to ensure that they are realistic with respect to anticipated non-trial tariffs.

## Facilities

In addition to automatic PBX facilities trial customers will also be able to nominate a particular extension on their own premises to act as an operator position. Alternatively, the same facility can be provided by British Telecom on an agency basis.

The trial will use a 5ESS exchange which is similar to the nine exchanges already on order for the Digital Derived Services Network (DDSN) but it has a number of significant differences.

The principal difference is that whereas the exchanges ordered for the DDSN are customised for the British Telecom's network, the Centrex exchange is basically the same as would be used for a North American operating company. This is to ensure that Centrex can be made available within a short timescale.

Currently no switching system developed in Europe can offer proven Centrex facilities but British Telecom has specified Centrex features in System X and AXE 10 switches to be used in the development of the network.


The trial will mark a further departure from tradition by supporting optical fibre links from the Centrex exchange to the customer's premises.

A separate single mode optical fibre cable system will be used to some customers, together with proprietary multiplexing and demultiplexing equipment, because North American standards are incompatible with basic British Telecom equipment.

The project presents enormous technical challenges as well as an equally large opportunity to enter an extremely competitive area of communication at a critical period in British Telecom's development. ■

**Centrex, the telecommunications service which provides customers with the facilities of a modern electronic switchboard from a public telephone exchange, is to be introduced by British Telecom in London next year. The trial service will be more advanced than even the latest forms of North American Centrex which have been evolving for the past 20 years.**

**Mr J Brown is Centrex product development manager.**



The CL680 line test system from Vanderhoff is just the kind of state-of-the-art product you would expect from one of the leaders in the industry. Consisting of one or more master stations and exchange located remote test units, the modular CL680 provides a cost effective means for centralised routine and automated fault testing of customer lines.

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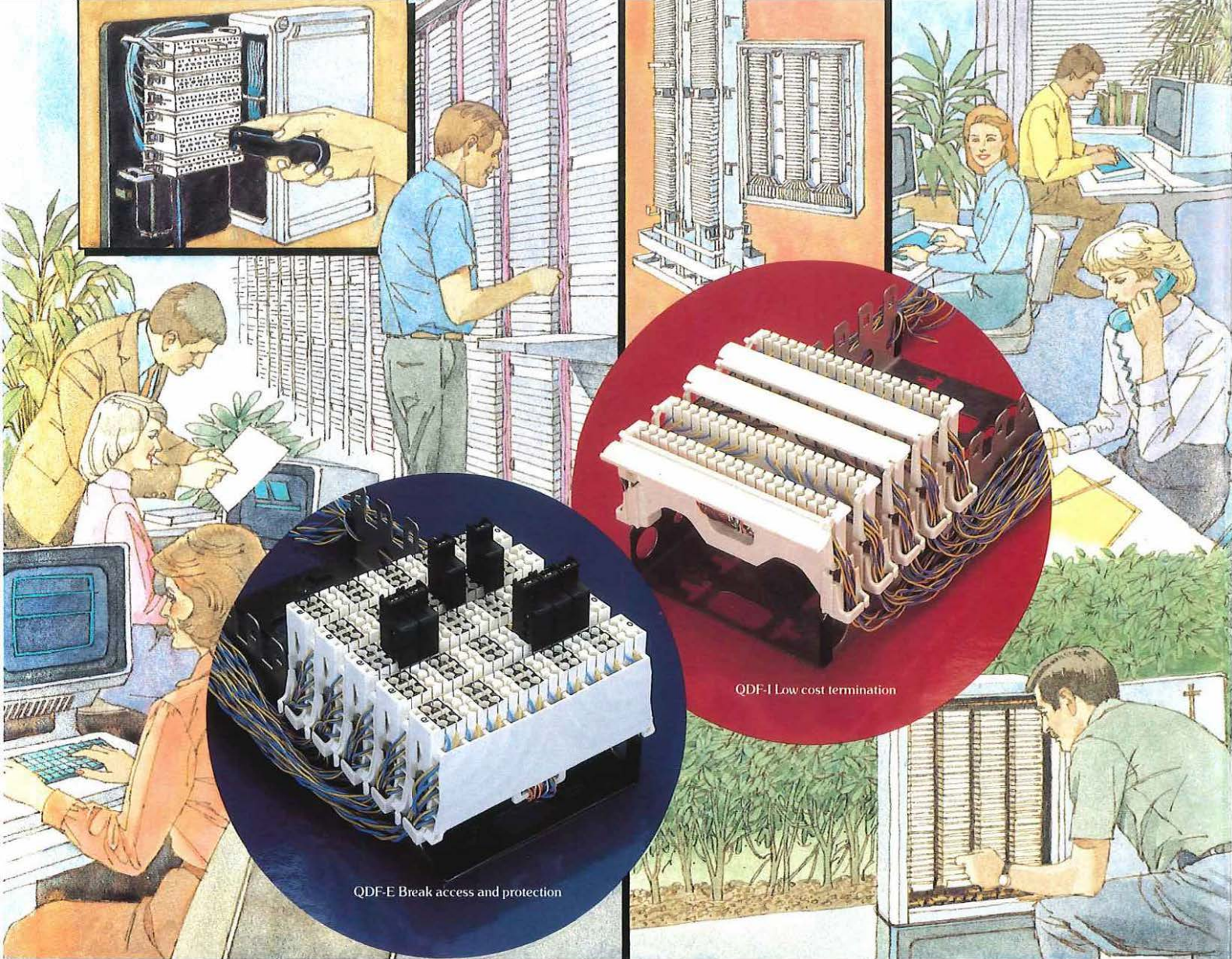
If you would like to hear more about the remarkable CL680, call Denis Webb on 0203 341111.

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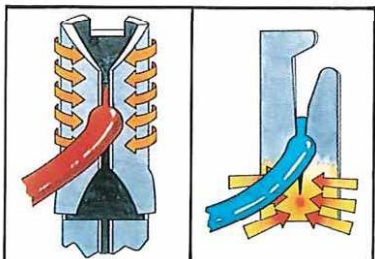


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# Making IT the right choice

Geoff Brooks

**T**he world market in Information Technology (IT) is experiencing accelerated change to the extent that much of the hardware installed even a couple of years ago is becoming obsolete.

The users of advanced Information Technology are businesses of all kinds who need to maintain and improve their competitive position and administrative bodies who need to provide a complex range of services and facilities as efficiently as possible.

But the decision-makers are being confused by a plethora of promotional literature, technological jargon and different suppliers. Their own experts are usually specialists in either computer or telecommunications technology — seldom both because people with the know-how to bridge the whole IT spectrum are scarce and only the very largest companies can afford such expertise themselves.

Help is at hand in the shape of British Telecom Applied Technology, a rapidly growing commercial systems-building and systems-integration business which currently has about 400 staff operating from centres in Leeds, Newcastle, Brighton and London.

BTAT aims to become the market leader in the design and supply of advanced communications orientated computer systems. With cheaper

**As tele-communications and computer technology converge, large businesses and administrative bodies are being faced with a bewildering array of Information Technology products and systems. To help them make the right choice, British Telecom Applied Technology offers a complete design and supply service and in a short time has become one of the leading companies in the field.**



A customer uses a terminal on the BTAT designed Link Network which connects such major banks and building societies as the Co-op, Abbey National, Nationwide and National Girobank to the Packet SwitchStream carrier network.



computer hardware, increasingly sophisticated software and the growth of international competition, BTAT has an opportunity to become a world force in 'convergent' technology.

BTAT is located in British Telecom Enterprises but operates as a corporate body, with no direct sales force of its own. It seeks its business through the National and Major Account Managers in Business Services and through Overseas Division. It provides consultancy on systems-building and the market to those parts of British Telecom concerned with developing advanced products and special market opportunities. BTAT not only designs and builds systems, but it runs them as well, building on the facilities management base established by the former National Data Processing Service.

Typically, an account manager, who has been working with his customer, will identify a large system requirement. He will bring in BTAT which will provide technical and/or market sector consultants with the aim of gaining a contract to design and supply the total system.

In such a system the actual carrier network such as Packet SwitchStream (PSS) may be the subject of a separate contract, but the technical means of interconnecting the computers and the lines — hardware and software — will be part of the BTAT system design and the overall turnkey project will be managed by BTAT or by British Telecom's 'Major Customer Project' group if very large. Other business is gained through the 'Operational Requirement' route.

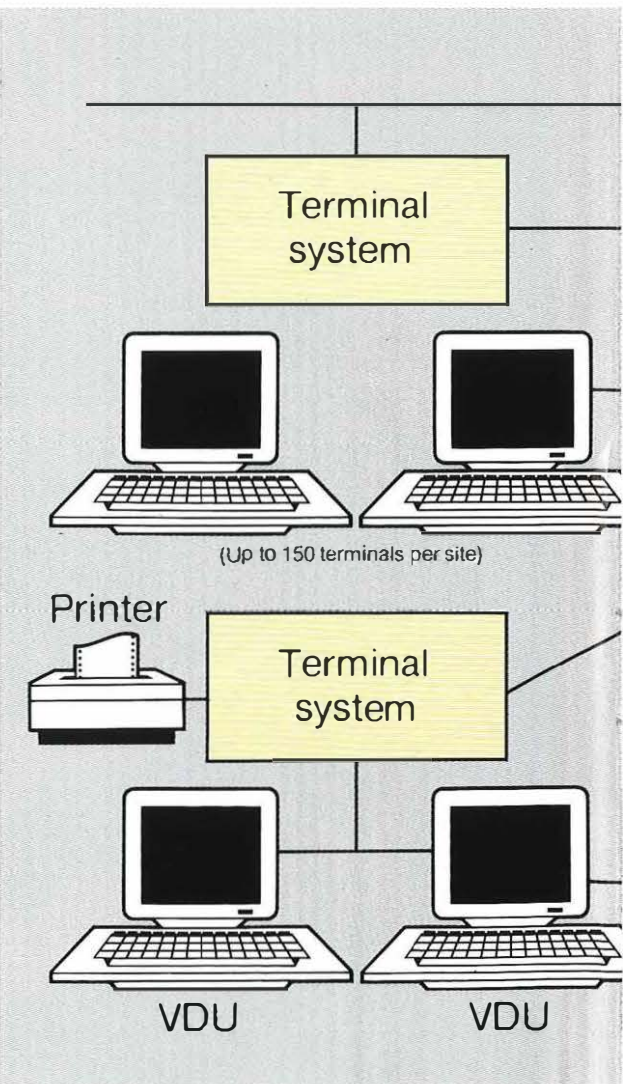
Government departments and some companies issue an Operational Requirement (OR)

and prospective suppliers are invited to submit proposals on how best to meet it. A short-list of three or four suppliers is drawn up and there follows an intensive period of demonstration, design work and benchmarking — which each short-listed prospective supplier has to fund.

The 'survivors' are then invited to tender against a rigorously-defined specification and as all of the tenderers have by this time demonstrated the suitability of their design and their own competence, the contract is usually awarded on price.

The market-place is highly competitive with most leading suppliers anxious to obtain a foothold which will lead to future business. Normally, the period from receipt of OR to the award of a contract is six-15 months on systems where capital value is between £1-20 million and such pre-sale costs can be considerable. BTAT strives for high quality to reduce re-design and de-bugging time and this demands total project control — the project managers and designers must anticipate as well as review progress to enable their work to be pre-emptive rather than reactive.

In order to produce work of commercial cost and quality, BTAT uses the PROMPT Project Management System and a Quality Management System (QMS) based on requirements laid down



by the British Standards Institute which has awarded the system centres in Leeds and Newcastle a Registration Certificate for quality. The Brighton Centre will be audited by BSI before the end of the year and a QMS is being installed in the London Centre so that BTAT's complete output will be BSI approved.

Modern software production requires a rigorous 'support environment' and BTAT uses a modified version of the Intergrated Project Environment developed at British Telecom's research laboratories at Martlesham Heath, near Ipswich. Other tools and techniques include two fourth generation languages (INGRES and PROGRESS), which considerably improve software productivity.

**Relevant**

Particularly relevant to a communications company such as British Telecom are projects involving Open Systems Interconnection (OSI) and the International Messaging Standard X400.

OSI requires a high level of integration between equipment from different manufacturers and creates an additional demand for the use of telecommunications networks so it is hardly surprising that British Telecom is committed to the concept and has announced its own Open Networks Architecture (ONA) built around it.

A major project in Mid-Yorkshire District will introduce an OSI communications network into a mixed-vendor environment primarily for Customer Service Systems (CSS) running on IBM, but also for other operational systems running on DEC, ICL, ITL, and others which will either exist for an interim period of several years or will remain permanent features of the District's requirements. The project exploits OSI in a 'systems integration' mode and is arousing considerable interest outside British Telecom, particularly in the financial sector.

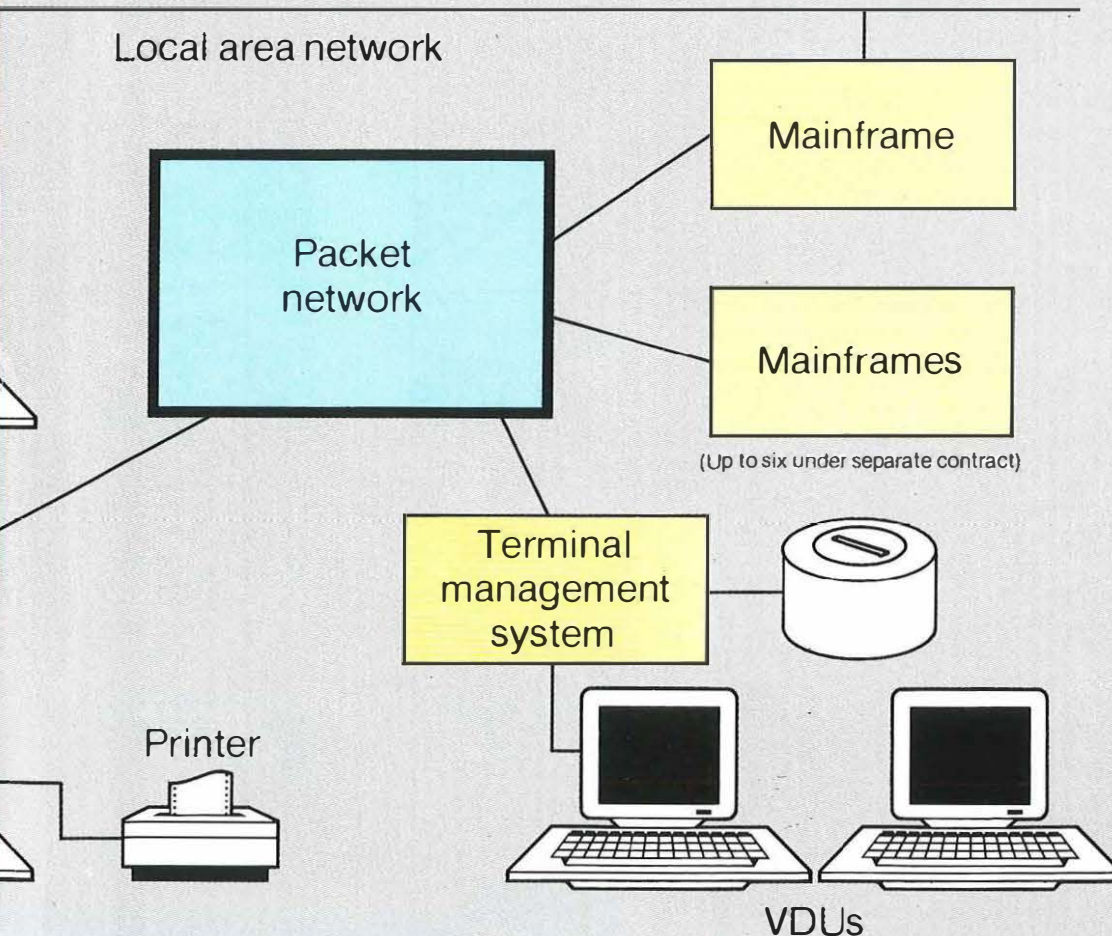
X400 is an international standard for electronic messaging and conforms to the International Standards Organisation's OSI model and British Telecom has given a clear signal of its intentions by its purchase of the US messaging software company DIALCOM and its announcement of a public X400 message-handling service to open early next year.

BTAT has considerable expertise in X400 and provides technical input to these developments. The market for private X400 systems is already opening up both in the UK and overseas and British Telecom expects to be a major force.

BTAT is already a leader in the exploitation of advanced computer communications standards such as OSI and X400 and it is growing rapidly to meet an even faster growth of demand for its special type of expertise. ■

Below: BTAT's projects can be huge and include an operational terminal system for the Department of Health and Social Security which, over the next seven years, will provide pension and benefit services throughout the UK. The system will link 500 local offices with a total of 800 minicomputers and 28,000 terminals.

**Terminal system for the DHSS**



Mr G G Brooks is Chief Executive of British Telecom Applied Technology.

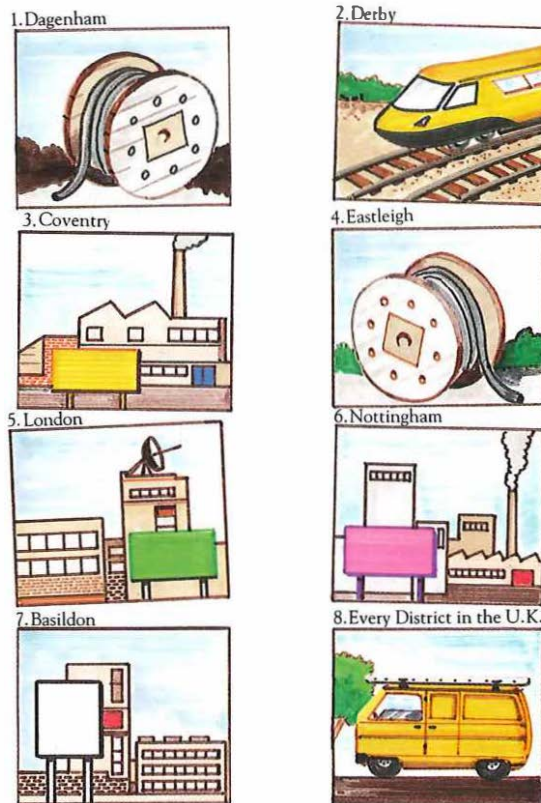
# Have a drink on us



**From Lands End to John O'Groats, our Fusion Splicers are making all the right connections.** So much so that to celebrate our success we've devised a little competition with a bottle of Bubbly for the winner. All you have to do is make a few connections yourself.

Simply look at the list of towns on the entry form below and decide which major company based in that area uses our Fusion Splicer (better known to our friends at British Telecom as the Machine Joining 201A – there's a clue). We've included an illustration to help you make your choice. Once your entry form is complete send it to us at Comtec. The first five correct answers will each win a Magnum of Moët et Chandon.

(By the way, if you don't want to cut your copy of B.T.J. you can make your entry on plain paper). But don't wait too long, this competition closes on December 5th 1986 – So why not join us right now.



1. Dagenham.....	2. Derby.....
3. Coventry.....	4. Eastleigh.....
5. London.....	6. Nottingham.....
7. Basildon.....	8. Every District in the U.K.....

Name \_\_\_\_\_ Position \_\_\_\_\_  
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 The prizes will be awarded to five entrants who have correctly identified the eight companies involved, and will be chosen at random.  
 All entries should be received by Friday December 5th 1986. Winners will be notified by post. Decisions of the judges are final and no correspondence can be entered into. Entry implies acceptance of the rules as final and legally binding.

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DMS supports HiNet with full technical, user training and field engineering services. Internationally, over 50 systems houses are developing and providing solutions based on HiNet. No wonder HiNet is Europe's favourite!

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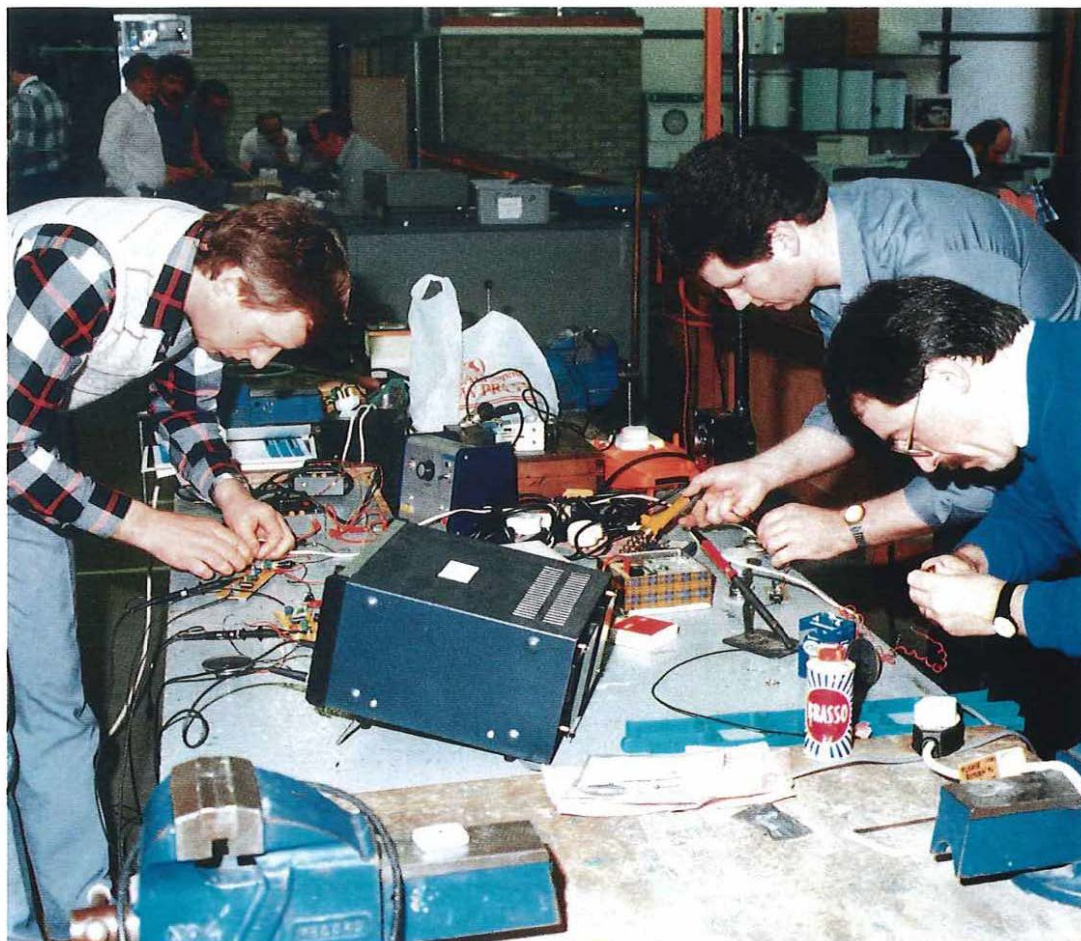
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# GIVE INDUSTRY A CHANCE...

Peter Thompson

The long-standing need for British Telecom to recruit substantial numbers of 16 year-old school leavers has now past. But the company's links with schools must remain as strong as ever — particularly at a time of increasing competition for highly prized Information Technology skills in the graduate recruitment market. This article examines those links as 1986, Industry Year, draws to a close.



Teachers working on an optical-fibre project during one of a series of workshops organised by British Telecom and aimed at giving science in the classroom an industrial flavour.



Industry Year should not have been necessary. It would not have happened in Japan, where no doubt, every year is an 'Industry Year' but in Britain there is a continuing need to raise the level of understanding and appreciation of industry — particularly amongst the school population.

This was confirmed last year in a major survey amongst school children, which concluded that Britain is an industrial country with an anti-industrial culture. The children interviewed had 'no significant understanding of the importance of business as the basis of wealth creation', and rated the contribution to the life of the country made by those in industry lower than teachers, soldiers, doctors, civil servants, farm workers and many others.

In education, one of the aims of Industry Year has been to link all secondary schools and as many primary schools as possible with local companies and even individual employees to develop mutual understanding and concentrate on curriculum development. ▷

Left: TV presenter Tommy Boyd discusses a prize-giving entry with pupils who took part in a competition organised by British Telecom and Junior Education Magazine.

Centre: an unusual link between education and telecommunications is the study of rare plants and insects at British Telecom's Goonhilly Earth Station in Cornwall.

# INDUSTRY YEAR 1986

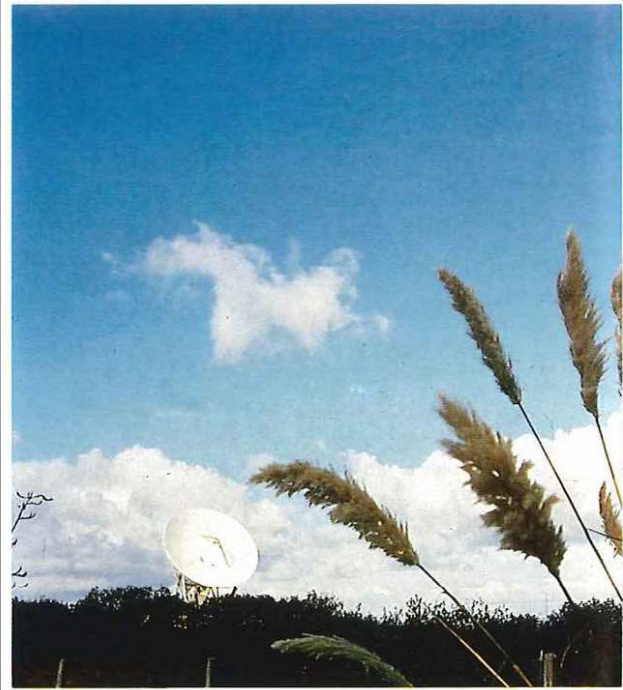
Industry weeks have also been organised in schools and colleges throughout the country drawing on the experience and expertise of members of the local industrial community and providing a focus to highlight the industry/education link. In the summer the government chipped in too, by providing more money for both initial and in-service training for teachers.

British Telecom through its offices throughout the country has traditionally had close links with many hundreds of local schools but in some places those contacts have diminished and it is fair to say that Industry Year came as a timely reminder to some parts of the company, that there is still much to be gained from fostering more general links with education.

Throughout the year, British Telecom's Education Service has continued to produce educational material for primary and secondary schools and recent publications include 'Sounds, Signals and the Telephone' — the first in a series of three booklets for 11-14 year-olds with the general title of 'Understanding Communications' — and a video on Satellite Communications.

A project is currently in progress which will provide information about the flora and fauna of the Lizard peninsula — a project with a strong but perhaps surprising link with telecommunications.

The new General Certificate of Secondary Education exams place much greater emphasis on project work and, for science subjects in particular, on the social, economic and environmental implications. Two biology teachers from Mullion School on the Lizard are currently working with British Telecom's Education Service; British Telecom International staff at Goonhilly Earth Station, and the Nature Conservancy Council to show that nature and high technology can exist and work together.



The Goonhilly staff have been keen to ensure that the station fits in well to the natural environment and a number of rare plants of the area are less at risk inside the station confines than on the heathland outside! The results of the project could be an important contribution to the GCSE science syllabus.

Work has also continued during Industry Year on a project to produce educational computer software for schools. The teacher groups in Croydon and Leeds have come up with a number of ideas for programs and the first one of these, 'SCOOP' for English and business studies pupils, has just been published and three more physics programs will follow shortly. The Government last year announced grants to local education authorities of over £3 million to encourage the buying of more software for schools and British Telecom's initiative is therefore timely.

The major project for Industry Year has, however, been the running of a series of workshops for science teachers providing an industrial dimension to their in-service training and keeping them updated with the latest developments in telecommunications and how







these may relate to the science curriculum.

Workshops have already been held in conjunction with four British Telecom Districts (Manchester, Lancs and Cumbria, North East and Severnside) and more are due to be added to the list next year and the progress of the project has been closely followed by the Department of Education and Science.

### Activities

During the year, a wide range of activities have also been undertaken within Districts and other major units such as Martlesham, Goonhilly and Madley. For example, Mid-Anglia District ran a schools essay competition; British Telecom Northern Ireland mounted a travelling exhibition to provincial schools; Westward adopted 11 schools and approached over 100 more offering talks and presentations about the company's role in industry; and Lancs and Cumbria ran an Information Technology project in around 50 local schools.

The successes of 1986 for British Telecom and many other large companies have created a high level of interest in industry from school children, their parents and teachers. The greater relevance of GCSE exams to the 'real world' and the inclusion in teacher training courses of modules on industry and commerce is bound to consolidate this interest. It is now up to industry to build on the contacts made over the last 12 months and to tap the enthusiasm that now exists for industry/education liaison both in companies and in schools and colleges.

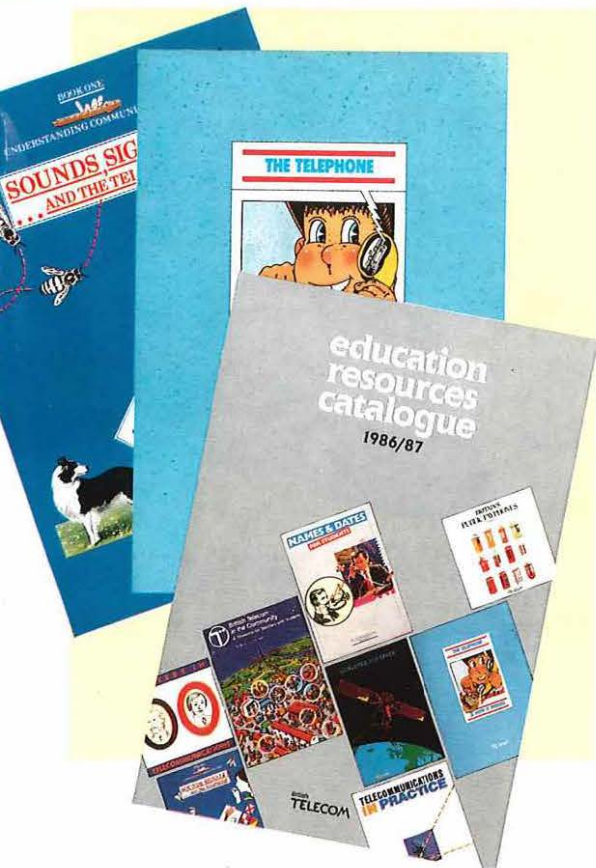
British Telecom has an even greater major stimulus. Faced with competition on the commercial front in almost all operational areas and from other companies for highly prized Information Technology skills in the graduate recruitment market, it is important for the company to continue to develop and maintain the goodwill of the educational world.

Teachers will help influence attitudes, but it is the pupils themselves, whether they be five or 18, where the greatest impact can be made. Whether they end up working for British Telecom or not, it should not be forgotten that they will be the customers of 1990s and the 21st century. ■

Top left: five year-old primary schoolchildren show that it's never too early to start learning about modern communications.

Bottom left: British Telecom's Education Service produces a wide range of literature to help both pupils and teachers understand more about telecommunications.

Mr P A Thompson manages the British Telecom Education Service.



DICK TWINNEY 86

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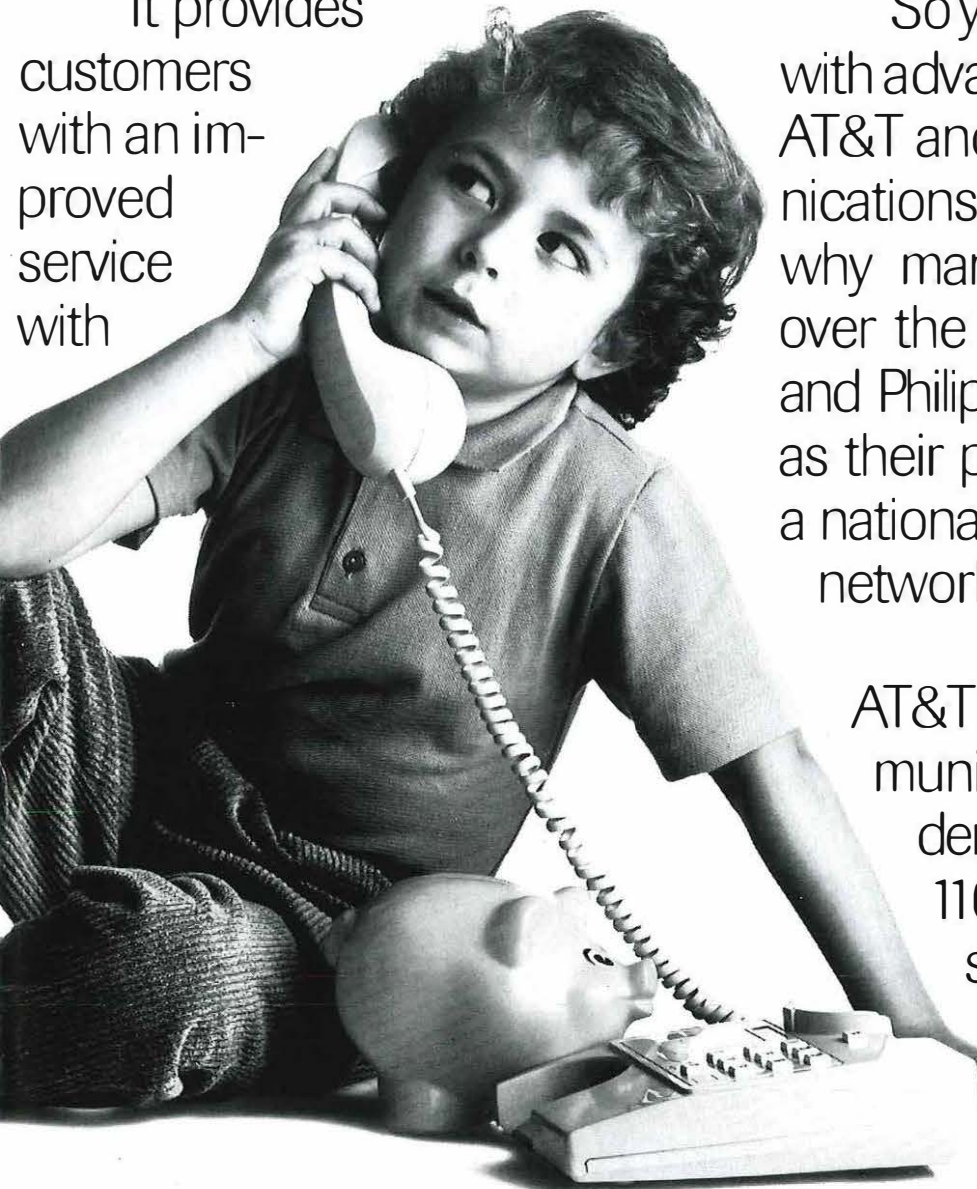
Out of all the Freephone systems on the market, the 5ESS-PRX offers the most comprehensive charge of services. It is one of the latest systems to be developed and as such it utilises the most advanced digital technology available.

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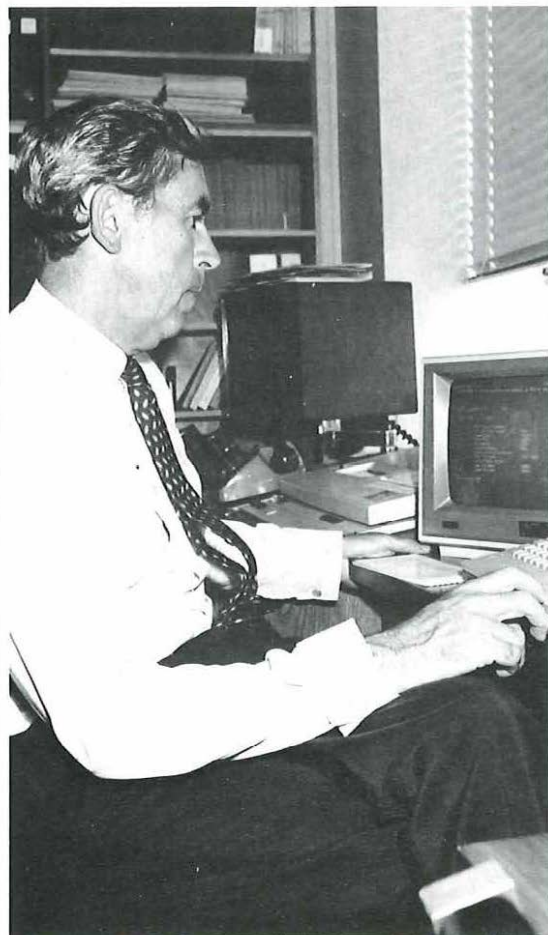


Mark Howell

# Law in the fast lane

**Most people would agree that the workings of the legal profession appear slow and a recent study by British Telecom has shown that solicitors spend most of their time on the telephone, swapping written material or in court. A new British Telecom division, Property and Law Services, has been formed to speed things up.**

Bill Blackburn, chairman of the Law Society committee which endorsed the use of electronic mail, uses Network for Law for quick results.



**T**he traditional areas of solicitors' work are under attack from various different sources. Most obvious is the challenge posed by the building societies and banks in the conveyancing market. Inroads are also being made by accountants, who are now providing legal advice on tax and other matters.

As such a large proportion of legal office work involves talking or writing to others within the profession, faster communications to improve service and reduce costs were deemed to be the most immediate way of tackling the opposition.

But solicitors need to 'talk' to barristers and both require access to an increasing range of computerised legal research material. They also need to 'talk' to estate agents, building societies and land registries and this work also needs the regular retrieval of computer information.

Many of the largest firms were acutely aware of the need to develop and use electronic communication, but smaller firms, which make up the vast bulk of the profession, felt that such services were either outside their price range or not relevant to their particular needs.

In a move to remedy this situation the Law Society approached British Telecom to undertake a study of solicitors' working methods and to come up with solutions within reasonable cost constraints.

The study concluded that a communication

system could be developed to meet all the needs of the profession but it would need to progress in small steps and use several technological solutions. In the short term, British Telecom recommended the formation of an electronic communication network based on Telecom Gold, its own electronic mail service, tailored specifically for solicitors and this recommendation was endorsed by the Law Society.

Following the Society's decision, a new British Telecom division was set up to market value added network products which address the communication and information needs of both the legal and property communities.

Called Property and Law Services, the division has established a framework within which a series of parallel networks will be set up to provide a range of electronic services. Each network will be able to communicate with other networks, and will make use of a range of British Telecom value added products including the Prestel viewdata service, and the Telecom Gold electronic mail service.

### **Geared**

Already, an electronic mail user group called Network for Law has been set up to provide a communications and information service which is geared specifically to the needs of solicitors.

Given the high level of solicitor-to-solicitor communications within the profession, Network for Law provides a fast and simple alternative to the postal system. It also cuts out time wasted in phone calls to colleagues who are tied up in meetings or who are already speaking on the line because messages can be left in electronic mailboxes for attention as soon as possible.

Network for Law is a closed user group and each mailbox has been tailored to offer a 'user-

friendly' menu, from which the user can select any of the standard facilities of Telecom Gold as well as additional facilities that are private to the group. The special features include a directory of Network for Law users and a Law Society bulletin board covering such items as council meetings and updates on new legislation and tax reforms.

Network for Law currently has 150 solicitors and is growing at 15 per cent per month. In order to inform existing and potential users of the benefits and features of Network for Law, a series of nationwide seminars is being run in conjunction with local Law Societies throughout the UK.

One of the immediate attractions of Network for Law for the smaller firm is the facility for sending and receiving telexes.

The group's potential for development is enormous, and includes such possibilities as providing electronic communications with the Legal Aid HQ, Land Registries and Local Authorities. It can also be extended to 'talk' to building societies, and legal publishers' information databases.

It is intended to extend the user base to include barristers, Scottish lawyers, the Courts and Government Administrators. A project researching the special needs of barristers is already underway, and access to computerised daily updates of court listing services via either electronic mail or Prestel's Lawtel database is currently being trialled.

British Telecom's ultimate aim is to build a full electronic communication and information service. Such a major ambition cannot be realised overnight. However, the creation of Property and Law Services shows British Telecom's newly-strengthened commitment to providing customised services to cater for the needs of those and other specific business communities. ■

Below: Mr Anthony Abrahams, a partner in Bedford firm of solicitors Alexander Farr and Sons, accesses his mailbox in the Network for Law electronic mail user group.

**Mr M Howell is General Manager of Property and Law Services.**





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See us on stand C74 at Communications 86

The methods used in the electronic publishing of national newspapers are at the centre of a bitter controversy. Although publishing is not a mainstream activity for British Telecom, it nevertheless represents high-volume business and the company has culled the best from present technology to make the production of its literature as efficient as possible.

The traditional method of publishing text in which an author uses a typewriter or word processor and then hands over a 'hard copy' to the publisher or printer for re-keying all over again for typesetting purposes is a waste of resources because:

- manpower is wasted re-keying
- the author has to proof check the text twice and has to pay for the second re-keying exercise.

Alternative technology has existed for years allowing an author or journalist to type information on to a word processor which is then fed directly to a typesetter for setting. With a disc-to-disc transfer system whereby text from word processor discs is transferred directly to the typesetters' discs, there are obvious savings to be made — re-keying of the author's text from hard copy is eliminated, proof checking of the re-keyed text becomes obsolete and the overall production process is speeded up.

In British Telecom, typesetting is particularly relevant in the production of the vast amount of customer service information, training manuals, equipment guides and catalogues, to professional standards with a pleasing image.

But British Telecom managers wishing to use new typesetting methods face an added difficulty because word processors, personal computers and typesetters have not been bought by the business for the common purpose of single key stroke publishing. Information providers and typesetters tend to be in different geographical locations and operate as separate functions, and because equipment was originally bought for a number of different reasons it is common for the 'marriage' between a word processor/personal computer and typesetter to break down on grounds of incompatibility before the honeymoon has even started.

The reasons usually centre around differing disc sizes, language problems and 'bugs' in the transfer of text, which eventually make re-keying the entire job by traditional methods a costly but unavoidable alternative.

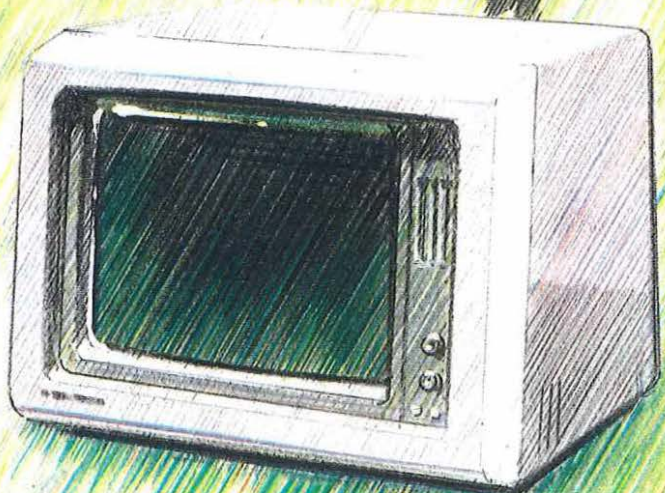
British Telecom Reprographics, one of the largest in-house publications and design houses within any British company, has well established and comprehensive typesetting facilities at Harrogate, Yorkshire. But the unit experienced the same frustration as its British Telecom customers whenever disc-to-disc typesetting was involved until it set out to find a solution.

The unit started to use a commercial disc



# 'Talking' discs bridge the gap

John MacDonald







A disc-to-disc transfer system now links British Telecom typesetters in Harrogate with London designers to speed up the production of company literature.

reading service to gain valuable experience, and later bought its own disc reader to enable it to offer a disc-to-disc single key stroke typesetting service to customers. The disc reading service was to bridge the incompatibility gap between the customer's word processor or personal computer and Reprographics' typesetters so that information could be transferred from disc-to-disc, and be typeset, printed and distributed, without time wasted in proof reading for a second time.

Customers' discs are now inserted into the multi-disc reader, which is capable of handling 3½", 5¼" and 8" discs plus magnetic tape. The Harrogate team then write and input a translation table to delete all extraneous data from the disc-to-disc transfer.

The current 'buy British Telecom within the business' policy will eventually reduce the spread of machine types but technology modifications and authors' individual styles will ensure that a disc reading service will be here to stay for the foreseeable future.

Whilst the disc reading service was being established, however, it became apparent that geography was a problem which could indirectly affect typesetting operations. The unit has a large and comprehensive typesetting facility at Harrogate with 14 keyboards armed with 100 type faces but the ever-growing demand for typesetting to be part of a design package was making its location too remote from some customers.

Illustrators in London who, for example, were designing complete packages containing an element of typesetting within short timescales, were tending to use local companies for urgent typesetting with correspondingly high costs. The Harrogate unit with its wealth of work experience and 'out of London' low overheads

had to find a solution to bring designer and typesetter closer together.

A typesetter with communication facilities was subsequently installed in the London Design Studio and when connected via the telephone network to Harrogate, both sides of the operation — although separated by 200 miles — were brought together to provide a cost effective alternative to the use of subcontractors.

Illustrators in London can now fax the text for typesetting to Harrogate and the data is then returned through a modem via the telephone network to the typesetter in the London Design Studio. Illustrators can view the text in the typesetter's visual display unit to ensure that layout and content is correct.

Any amendments required can be carried out immediately and hard copy produced ready for insertion into artwork so that within a few hours an urgent order for typesetting can be carried out between the two locations regardless of the distances involved. ■

#### **A business within a business**

As the UK's largest company, British Telecom has to communicate with a huge network of customers and employees.

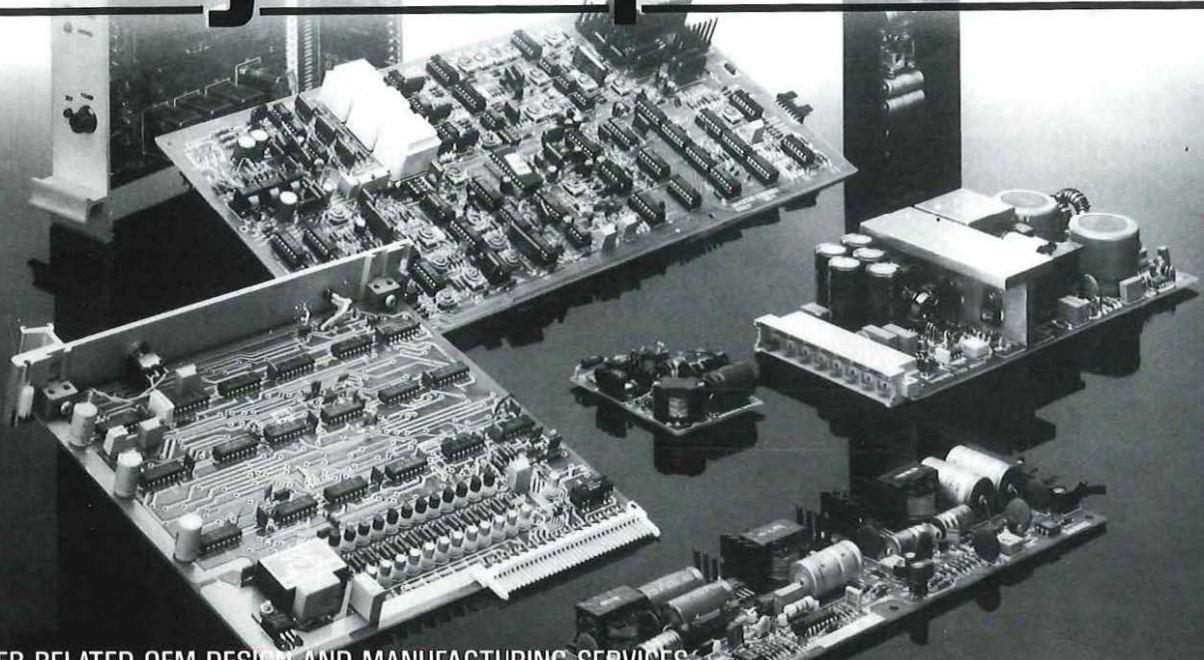
To reach these audiences, the company has to produce a complete cross-section of communications materials.

The role of British Telecom Reprographics is to provide British Telecom managers and staff with all the resources they need to meet their communications objectives.

The end-products include forms and manuals, leaflets and brochures, microfilm and microfiche, photographs and presentations, videos and exhibitions.

Mr J MacDonald is marketing manager for British Telecom Reprographics.

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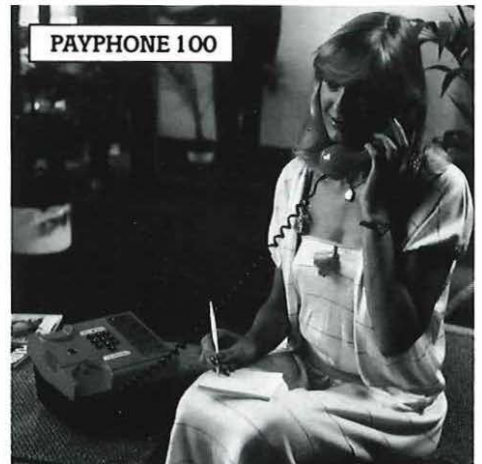
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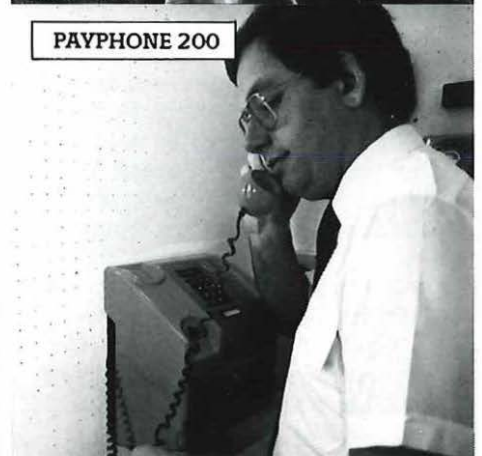
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# Ideas in action reap rewards



Methods of improving British Telecom's service and maintenance performance with a view to bringing long-term benefits to customers took top prizes in the company's New Ideas Competition. More than 2,000 ideas were received nationwide but first place went to a team from Nottingham who devised an Automatic Network Analyser to combat faults.



**T**his year's winning suggestion in British Telecom's New Ideas Competition was for an Automatic Network Analyser (ANA) — a centralised callsending unit which uses the latest technology to make a balanced programme of test calls.

Service on all exchanges, their outgoing junction routes and various other measurement points are monitored automatically by the system. When a deterioration is detected, the local exchange maintenance staff are alerted who then investigate the problem, using hold and trace callsenders, to ensure that it is rectified as soon as possible.



Opposite page: first prize went to a Nottingham team for their work on an Automatic Network Analyser. They are (from the left) Joe Oskiewicz, Tom Henson, Ian Rollinson and team leader Geoff Wesson.

Runner-up was Bristol technical officer Jim Harrison for his modifications to an exchange processor programme.

ANA won Nottingham team Geoff Wesson, an assistant executive engineer, and technical officers Tom Henson, Joe Oskiewicz and Ian Rollinson the top prize of £2,000.

Their system has 16 processor-controlled callsenders each with two channels. Each of the 32 channels has a callsending programme and produces a set of results to enable one man, familiar with the area and its local routes, to monitor 32 exchanges.

ANA was developed to give engineering groups accurate and immediate location of faults within the Public Switched Telephone Network (PSTN) and this is achieved by sending a continuous and balanced pattern of test traffic and analysing the results of the paths taken by all faulty calls.

The system can take a maximum of five measurement points for each call processed. This allows individual junction routes and originating, terminating and tandem units to have their performances monitored and analysed by the computer and associated software.

### Presented

All printouts from ANA are presented in a format which is readily acceptable to maintenance engineers. Paperwork has been purposely kept to a minimum, with the facility to access any 999 failure files where in-depth analysis may be required.

The continuous assessment of route failures has proved to be a more accurate and immediate indicator of faults than a historic percentage performance. ANA also lists the 15 worst percentage performances in 'plant defect', 'plant engaged' and 'wrong charge' categories and displays them on an hourly updated screen.

The first manufactured ANA unit was supplied to British Telecom's Nottingham District in March 1985 and since then 35 systems have

been provided for use throughout the PSTN.

Second place in the competition went to Jim Harrison, a technical officer from Bristol, for his idea to modify an exchange processor programme resulting in speedier testing and allowing more lines to be tested. He won £1,000.

Keith Beddoe, a technical officer from Southampton, won third place for a microprocessor-based monitoring system for the tariff pulses generated within a telephone exchange. This will enable faults to be rectified quickly, avoiding incorrectly charged calls. He won £500.

A special award of £1,500 was made to Ernie Huggins, winner of last year's competition, for his invention — Claudivs Converse — an aid which allows speech impaired customers to use the telephone. ■



Keith Beddoe, a Southampton technical officer, came third with a monitoring system for tariff pulse within an exchange.

Opposite page: a technician checks components during manufacture of the Automatic Network Analyser at Rotadata's Derby factory.

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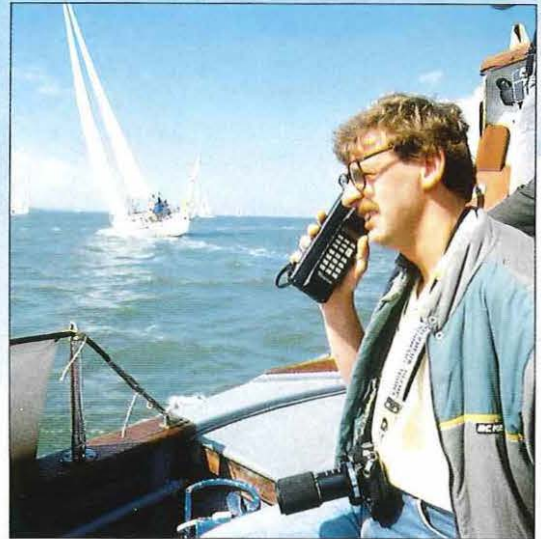


# Sailing ahead

British Telecom used its latest telecommunications services to help make this year's coverage of Cowes Week the best ever.

The company's involvement was spearheaded by a free results service on LinkLine 0800 which yachting enthusiasts called throughout the week, 24 hours a day.

Cellnet telephones enabled journalists to file stories direct from the official press launch and British Telecom also provided the White Group Finish Line Committee Vessel — the Thames sailing barge 'Beric' — and donated a special trophy for one of the races. ■



# The big name in British Telecom's cabinet reshuffle.

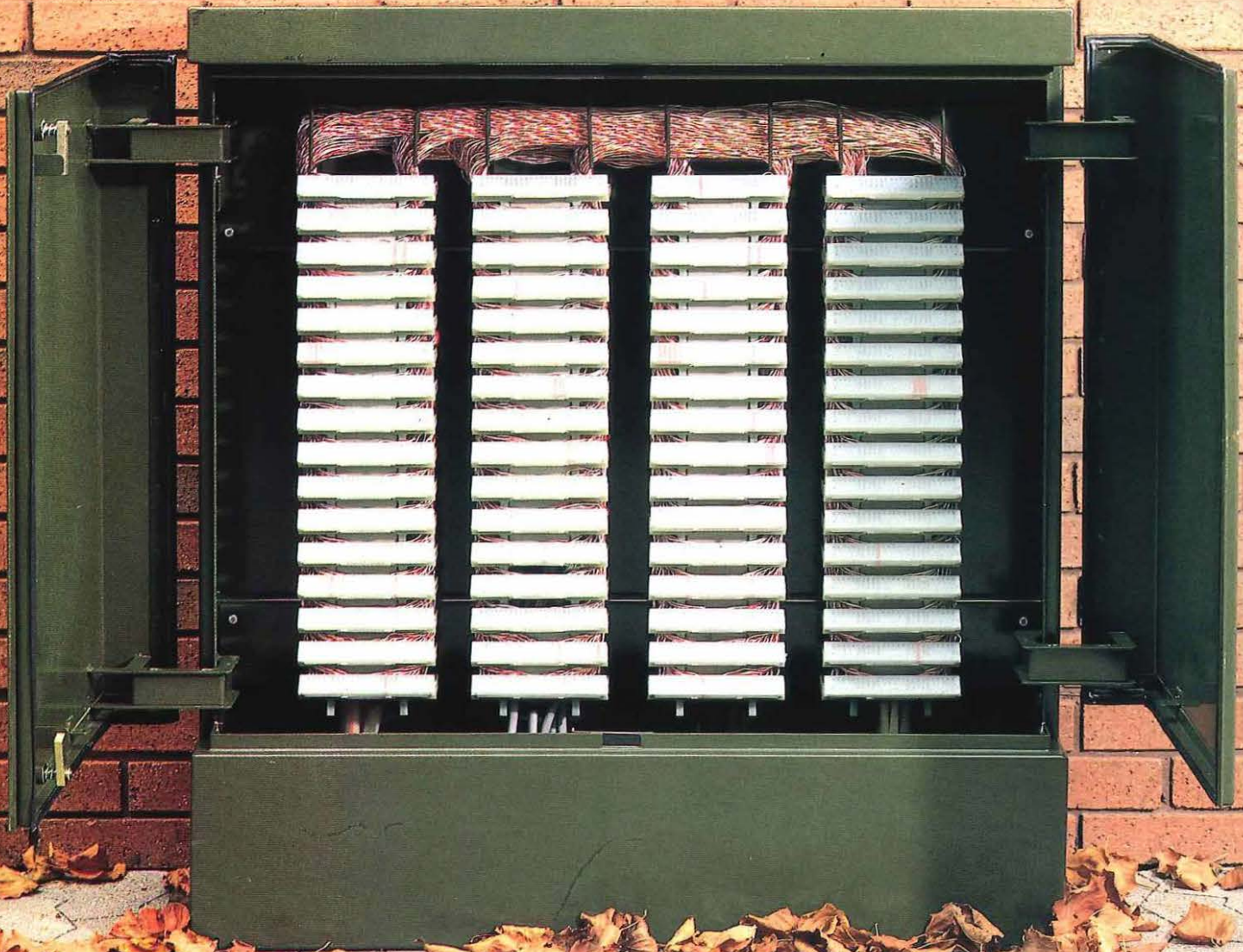
More and more BT engineers are specifying the MS<sup>2</sup> Cross Connect System from 3M. (BT Code MCCS). BT approved and made to the highest standard it brings a new order to cabinet cross connection.

Not only good housekeeping, but also an exclusive modular design gives easy test access to cable pairs without opening connectors or interrupting circuits.

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For more details, talk to Scott Heycock, Telcomm Products Group on Bracknell (0344) 58306. 3M United Kingdom PLC, Bracknell, Berkshire RG12 1JU.

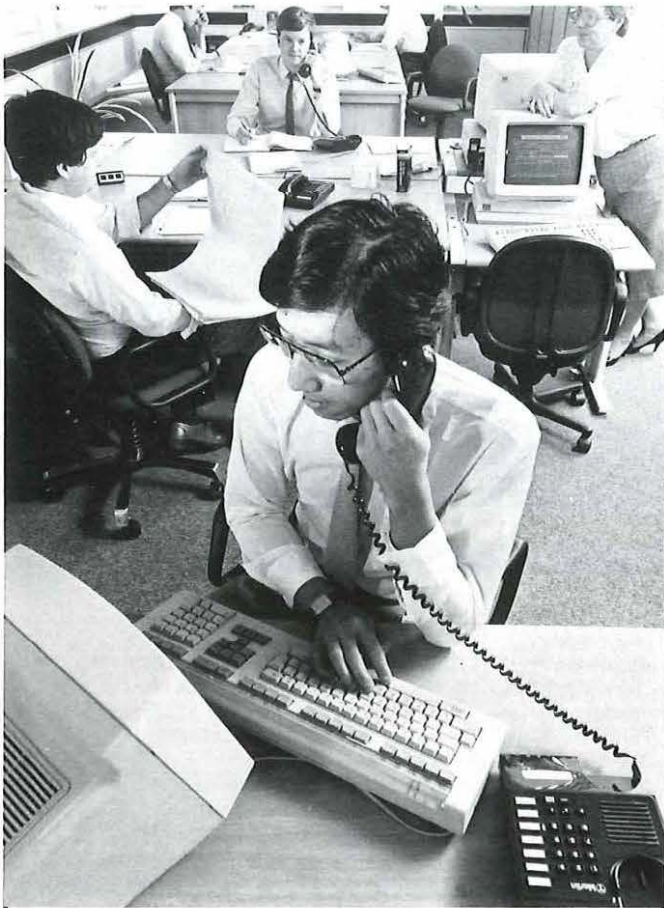
## MS<sup>2</sup> Cross Connect System.



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## Network Control

British Telecom has launched a comprehensive new service for managing corporate communications networks, drawing on its expertise in planning and operating voice and data networks.

It aims at becoming leader in the emerging market for what is known as third-party Communications Facilities Management (CFM) — a market estimated to be worth more than £500 million a year by the 1990s.

British Telecom's CFM division can design, install, commission, operate and manage an entire private network, leaving the

customer free to pursue its own mainstream business without the burden of telecommunications management.

The division has opened two facility management centres — at Baynard House in the City of London and a back-up centre in Ipswich. They provide the central database and management control facilities, handle technical control and monitor customers' lines to ensure they are working properly. In addition, Ipswich also houses a 24-hour help desk (seen here) to deal with customers' queries.

### Socket to them!

British Telecom has welcomed the changes in arrangements for installing extension sockets and wiring, announced by the Office of Telecommunications (OfTel).

The changes, which take effect from December 1, will allow customers to choose whether to install extension sockets and associated wiring themselves, employ a private contractor to carry out the work or continue to take advantage of British Telecom's services.

The master socket, which forms part of the exchange line, is not

affected by these changes. British Telecom retains sole responsibility for all master sockets on its network.

Before installing extension sockets, customers must have a new-style master socket which allows a simple plug-in connection of the extension wiring.

### New prices 'fairer'

Price changes aimed at creating a fairer balance between costs and charges for British Telecom's main services are to be introduced in November.

The new tariffs will cut some customers' telephone bills which continue to compare favourably

with those of other countries including France, West Germany, Japan and Italy.

The price of British Telecom's 'regulated services' — which include telephone line rentals, local and national dialled calls made over ordinary (non-payphone) lines — has been reduced by 0.3 per cent overall. This has been achieved against the background of a 2.5 per cent rise in annual inflation.

Over three years, the company will have met its licence obligation to keep its 'basket' of price changes, taken as a whole, three per cent below the Retail Price Index.

Within the overall package some charges are reduced, some are unchanged and others go up. The changes are a further step in an ongoing policy of tariff rebalancing started in 1980 which aims to match charges more closely with costs. All the changes, the first to main telephone services since November 1985, have been notified to OfTel.

### Quicker queries

An electronic exchange-based call management system for fast answers to queried phone bills has been launched by British Telecom subsidiary, Fulcrum Communications Limited.

Called Validata, the system makes conventional printer meter check equipment obsolete and simplifies the task of monitoring telephone traffic, checking customers' lines and solving billing disputes.

The compact Validata can be installed anywhere in the exchange, even on a small desk-top. It does the work of up to 16 printer meter checks and has the memory capacity for 10,000 calls.

### System X progress

The opening of a new British Telecom digital System X exchange in Wood Street, in the City of London, marked an important step forward in the company's exchange modernisation programme which will see, on average, one new digital exchange entering service every working day.

The programme runs to 2.5 million digital lines a year, all being purchased on a competitive basis. By next March, the company expects to have provided over 1 million digital connections for its customers.

Modernisation of the trunk network is also on course, with 45 of the 55 main digital switching centres already in service. They should all be operational by the autumn of next year.

Rural communities, too, benefit from digital modernisation. Nearly 200 smaller UXD5 exchanges,

offering customers in villages and towns the facilities similar to those of the larger System X units are already in service, with a further 300 either being installed or on order.

All customers connected to digital exchanges will benefit from a significant improvement in the range and quality of service.

### Global network

Planning for a world-wide digital telecommunications network took a major step forward when British Telecom hosted a meeting of international parties interested in the proposed TAT-9 transatlantic optical fibre cable.

Representatives of 30 telecommunications organisations from 21 countries met in Britain in October to consider the levels of their ownership and use of the cable which is due to come into service in 1991.

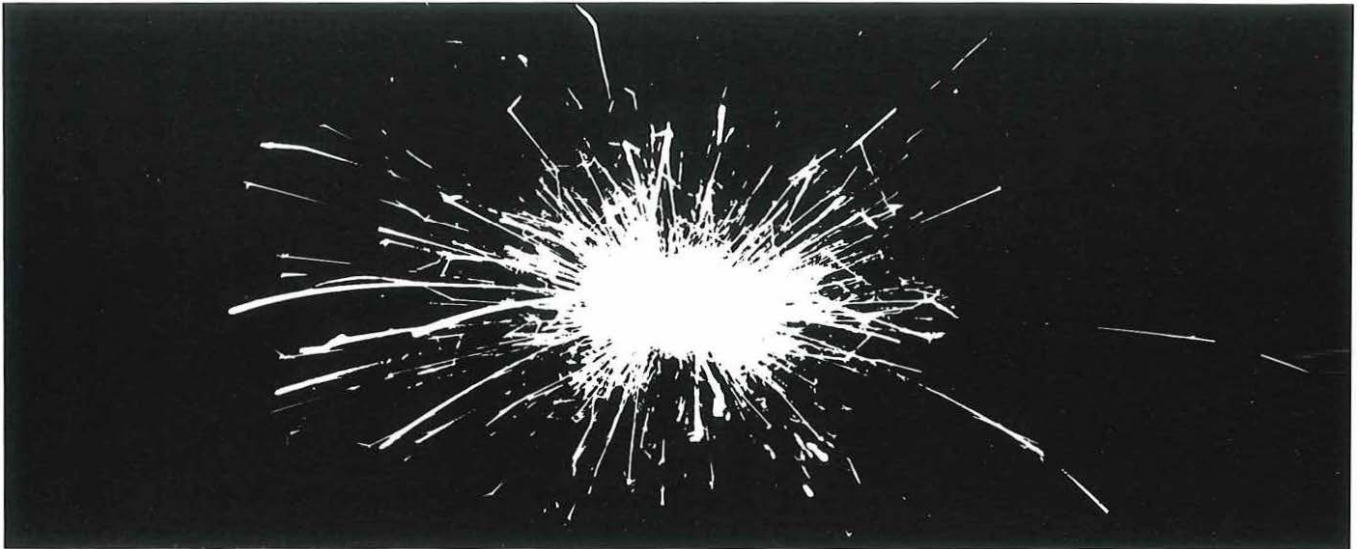
The conference was hosted by British Telecom International (BTI) on behalf of the five partners who signed the initial TAT-9 agreement — British Telecom, AT&T Company of America, TELEGLOBE, Canada, the French DGT and Telefonica of Spain.

For British Telecom, TAT-9 will supplement the transatlantic capacity offered by satellites and by the first transatlantic optical fibre cable coming into service in 1988. It will also provide a new digital connection with Spain and extensions into the Mediterranean. Together with other links, the proposed cable will offer wholly digital connections between the Pacific basin, the US and across the Atlantic to Northern and Southern Europe.

### Watchdog chairman

Eminent barrister Mr Louis Blom-Cooper QC has been appointed Chairman of the committee which will oversee the application of the Association of Telephone Information and Entertainment Providers (ATIEP) Code of Practice for premium telephone services.

The Code provides guidance on acceptable standards of content for messages carried over the premium services network. ▷



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- ★ Telecommunication Systems Management and Economics.....16-20 February 1987
- ★ Image Processing .....2-6 March 1987
- ★ Speech Processing .....2-6 March 1987
- ★ VLSI Systems .....16-20 March 1987
- ★ Performance Engineering of Computer and Communication Systems .....16-20 March 1987

The registration fee for each course is £485.

For further details contact Mrs. J. E. Mead, Department of Electronic Systems Engineering, University of Essex, Wivenhoe Park, Colchester CO4 3SQ, UK. Telephone (0206) 862286, Ext. 2201.

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## Japan buys CBS

British Telecom has announced the signing of an agreement between Teletrade, the export unit of British Telecom's International Products Division, and the Japanese trading company Mitsui & Co Ltd, to distribute the City Business System in Japan.

Mitsui's subsidiary, Adamnet — specialising in telecommunications — will handle sales, installation and support.

The City Business System (CBS), a touch-screen dealing board for the financial community, has been specially developed for the Japanese market, including the use of Kanji characters for the visual display screens.

A technical collaboration agreement was signed at the same time, which it is hoped will lead to the further enhancement of CBS with the incorporation of Japanese high technology components.

The introduction of Kanji characters was seen as a necessary development to enable CBS to be successfully sold to Japanese financial institutions. CBS in its standard version is already being used by the Japanese offices of international companies and sales in Japan this year are expected to be worth in excess of £2 million. The Kanji version is expected to create further growth and will be available during the first quarter of 1987.

## BT goes Dutch

As a result of its expansion plans in the international marketplace, British Telecom Datacomms, part of the recently formed International Products Division, has announced an agreement with the Delft-based company Repko BV for the distribution of British Telecom modems in The Netherlands.

British Telecom Datacomms has progressively expanded its range of products from its in-house design and development activities and is now a world leader in its field. Its modem products have been approved, or are in the process of approval, in 18 countries and will be available from approved distributors in ten of them.

Repko BV is one of the leading companies in Dutch datacommunications and apart from its distribution role it also manufactures communications equipment of its own design.

## Christmas calling

Conference Call, the British Telecom service for high quality multiway business meetings over the telephone, will be running two seasonal services this Christmas.

They are: Five Way Family Phone-In, a service to bring families and friends together over the telephone from anywhere in the world; and PartyLine, a new telephone hospitality service complete with champagne and Christmas novelties primarily intended for UK business.

# Faster DAS

The first phase of an £80 million programme to computerise inland directory enquiries has been introduced by British Telecom.

At the 186 centres where the Directory Assistance System (DAS) has been installed to give nationwide coverage, British Telecom operators can now call up numbers on to a screen at the touch of a button.

This has cut the average time taken to handle an enquiry from 52 to 39 seconds and will help to cope with an expected 500 million calls this year.

Phase two of the project will involve a doubling of capacity to enable the system to handle calls through to the 1990s. Installation of extra computer power has already begun and should be completed by next summer.

The picture shows an operator finding a number without having to leaf through piles of phone books.



## Contracts

**A P Besson**, a division of Crystalate Electronics Ltd, has been awarded a £4 million contract by British Telecom to manufacture and supply the Venue telephone which was developed by British Telecom to meet the growing market for featurephones.

**Concurrent Computer Corporation** is to supply British Telecom with parallel processing systems worth £3 million. They will be used in a new system now being established by British Telecom for managing its modern digital public telecommunications network.

**Ferranti Computer Systems Limited** has won a further order for nearly 600 computer terminals bringing its total sales to British Telecom to 12,000 units. The deal will provide terminals for further implementation of British Telecom's electronic order handling system.

**Hewlett-Packard** has won a multi-million pound contract for the supply of specialised remote access and test (RATES) equipment to British Telecom. This represents the third part of a four year programme worth more than £15 million in total. The RATES system improves the maintenance of private circuit services by reducing time spent in fault diagnosis.

**Metier Management Systems** has won an order to provide the Major Customer Projects unit of British Telecom with its project management software system, Artemis which is used as the major planning and control mechanism for selected projects in the National Accounts and Sales organisation. Applications include critical path control, sophisticated scheduling and extensive graphics generation.

**Microscribe**, the leading British hand-held computer manufacturer, has been awarded a contract worth up to £250,000 from British Telecom for its '320' portable terminal which will be used as a first line test and maintenance tool to set up, maintain and install

multiplexer equipment.

**Plessey Network & Office Systems Limited** are to supply an extra £1.3 million worth of Merlin Octara phone system equipment this year.

**Pye Telecom** has been awarded a £200,000 contract by the East Midland District of British Telecom to supply sophisticated two-way radio equipment which will enable British Telecom staff to communicate with maintenance engineers in radio-controlled vehicles.

**Rair Limited** has delivered a SuperMicro multi-user computer system with colour screens to British Telecom Radiopaging which receives many thousands of sales enquiries and needed a powerful computer system to record and track every lead from initial contact through to the contract stage.

**T-Bar** has received a further order for its DSM 2001 Galaxy communications matrix switch from British Telecom's Customer Service Systems in Exeter.

**Tri-Test** have been awarded a further contract for the testing of printed circuit boards (PCBs) used in British Telecom's Cardphone System.

## Fighting piracy

FAST, the Federation Against Software Theft, has accepted British Telecom as a member.

British Telecom is probably Britain's biggest user as well as a major creator of software. It already advises its staff on the need to respect software copyright and the company's membership will underline FAST's efforts to secure wider respect for software copyright.

FAST was launched in July 1984 to combat the major threat which software piracy poses to the entire computer industry, in terms of investment, innovation and jobs. The theft of software by illegal copying is estimated to cost the industry a staggering £150 million a year.

FAST aims to promote public awareness of the Copyright Act and assists its member firms to identify those infringing the law and to bring actions either under civil or criminal law.

Membership of FAST now totals 85 and includes equipment manufacturers, software houses, and major home computer games firms.

## Out of touch . . .

The average British businessman works an average 8.3 hours a day, takes work home at least one evening a week and works at home or in the office at least one weekend in four.

These revelations come from a major survey commissioned by British Telecom Radiopaging, which sets out to define the typical British businessman and his management of the time and money equation.

The report, called Time and Money, has been published to mark the launch of a new service from British Telecom Radiopaging called Message Master Plus. It is the result of a survey of over 320 businessmen and women throughout the UK.

The survey shows that although British businessmen need to be contacted, two out of every ten times they are out at an appointment, and only 18 per cent have a direct mobile communications link such as a simple pager available to them.

## Around the schools

Five sixth form pupils from **Alun School**, Mold, Clwyd have won a hypothetical multi-million pound contract from British Telecom to build a telecommunications link between London and Amsterdam using satellite microwave technology.

The pupils won the national finals of Telecom Link, the 1986 Industry Year Competition sponsored by the Institution of Electrical Engineers (IEE) in conjunction with British Telecom.

A cash prize of £500 was awarded ▷

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## AUTOMATED FILING

An automated filing and retrieval system has been installed in the sales office at British Telecom's Liverpool District Business Marketing Division.

Designed to cope with a high-

volume of paperwork, the system uses an electronic keypad to control file location. Files are held on carriers which rotate on a vertical carousel and are presented to the operator without walking or stooping.

The system uses two Lektriever automated units from Kardex Systems (UK) Limited.

to the winning school for electronics equipment for its Science/Technology Department. Pupils on the winning team have also been invited to spend a few days, later this month, at the Lizard Peninsula, Cornwall, to visit the Goonhilly Satellite Earth Station owned by British Telecom International and the Lizard National Nature Reserve. See feature on page 63.

British Telecom has helped a Widnes school set up a typing agency with a donation of a reconditioned switchboard and telephones.

**Fairfield High School** approached British Telecom's, Liverpool District for help with a scheme aimed at giving pupils business experience.

The company responded by donating and fitting a reconditioned switchboard with five extension telephones. Fifth form business study pupils are now offering a wide range of services such as typing, printing and copying for potential customers including organisations for the disabled.

**Hillside High School**, Bootle, is pioneering a unique link between education and industry having been formally adopted by British Telecom's Liverpool District.

The link is part of British Telecom's long term plans for continuing contact with schools throughout the area.

First stage of the project has been to provide an internal telephone link between a number of enterprises run by the school.

## Phone Book scheme

British Telecom is to encourage more commercial advertising in its Phone Books in the hope that the extra advertising revenue generated will help to make Phone Book operations self-financing.

An initial contract, which will run for nine months, has been signed with Cooper Marketing Services, of Kingston-upon-Thames, Surrey, during which a pilot sales drive will be carried out to secure further advertising in Phone Books in London, the South East and East

Anglia. The contract will cover books published in those areas from January next year.

Eventually, additional commercial advertisements will appear in Phone Books throughout the country. More than 22 million books are issued by British Telecom each year to its 19 million customers.

## New appointments

**Sir George Jefferson** has given up his position as Chief Executive of British Telecom whilst remaining as Chairman. Iain Vallance, at present Chief of Operations, has become the new Chief Executive.

**Mr Graeme Odgers** has been appointed Deputy Chairman of British Telecom to succeed Mr Deryk Vander Weyer who has retired. Mr Odgers has also become the company's Chief Finance Officer. A Group Managing Director of Tarmac plc, Mr Odgers was a Government appointed director of British Telecom — a nomination he relinquished on becoming Deputy Chairman.

**Mr Colin Browne** has been appointed to succeed Mr Peter Young, Director Corporate Relations on his retirement. Mr Browne, 40, has been Chief Executive Broadband Services since April 1985 and has been responsible for developing British Telecom's commitment to the cable and satellite TV market and furthering the company's drive to promote local broadband networks.

Mr Browne's successor is Mr Brian Lawrence, formerly Chief of Operations, Broadband Services. Mr Browne will, however, retain oversight of the strategic development of Broadband Services.

**Mr Michael L Ford** has been appointed to a new post as British Telecom International's resident Director, North America, and President of British Telecom's wholly owned subsidiary, British Telecom International Inc, based in New York. He has also been invited to join the board of Dialcom Inc, the electronic mail company acquired by British Telecom earlier this year. ■

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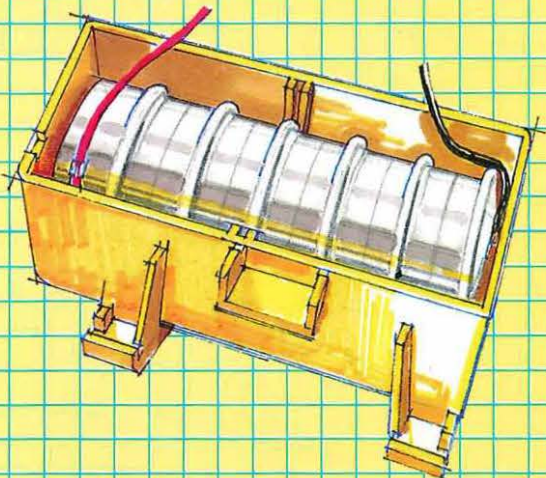
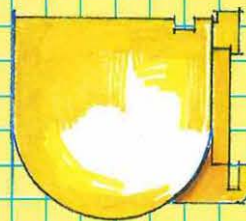
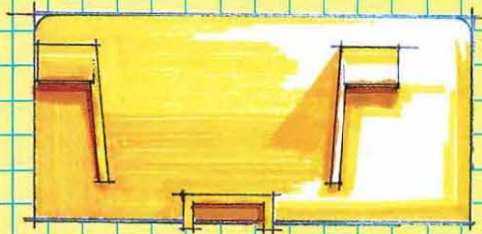
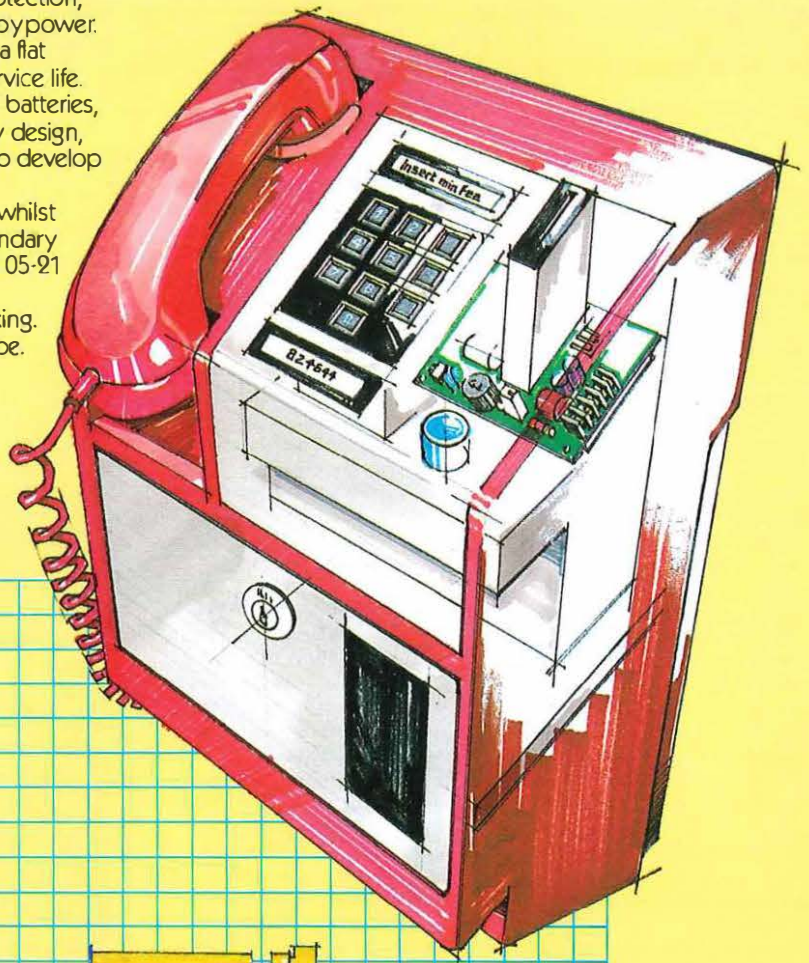
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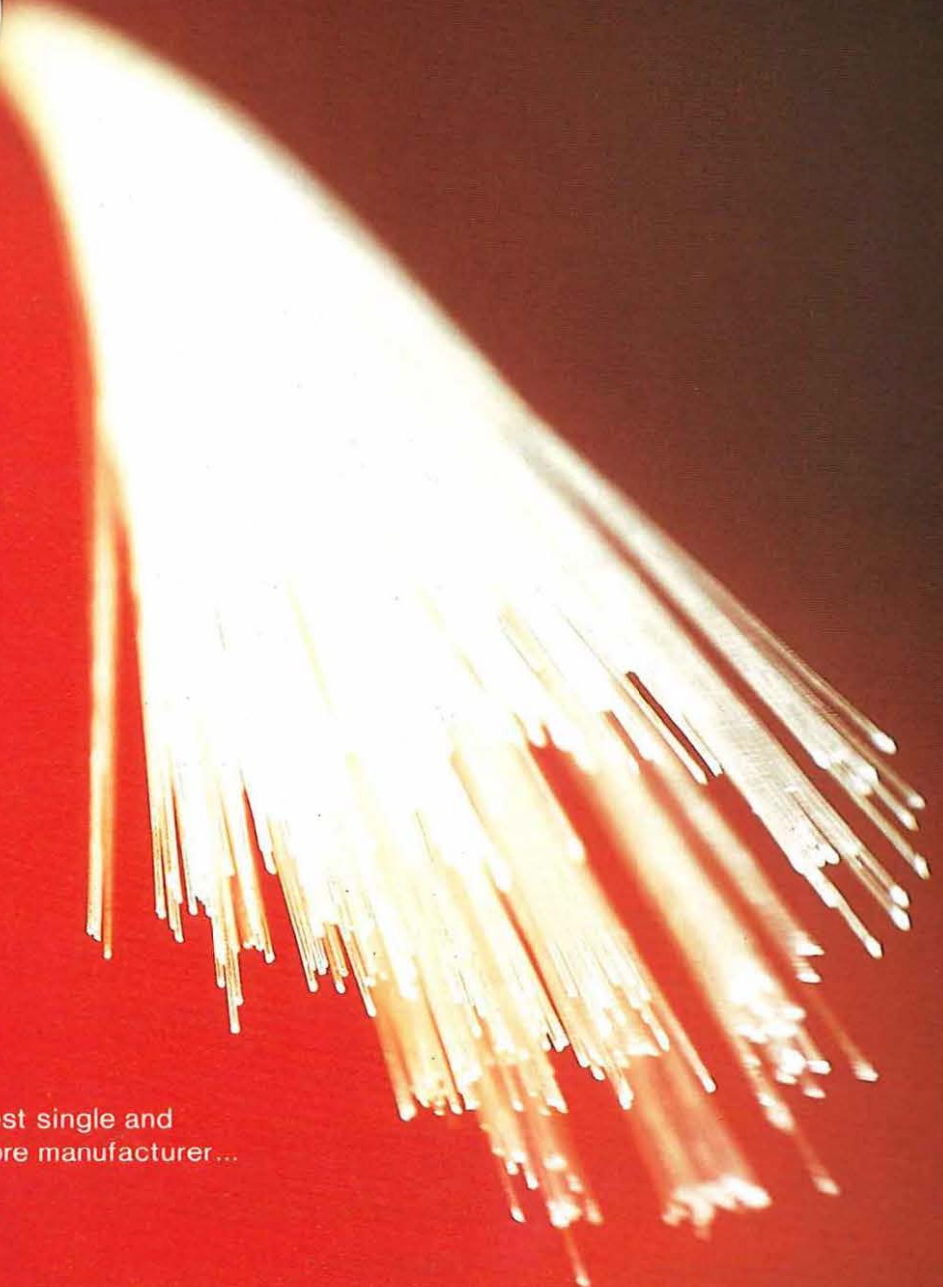
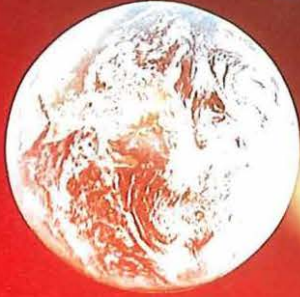
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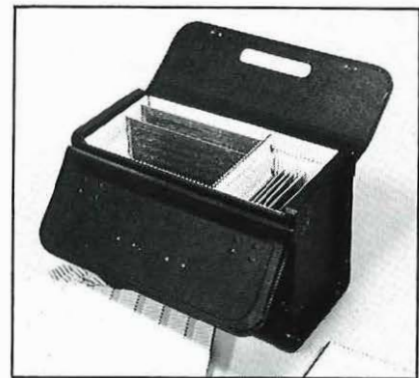
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### VENUES AND DATES

#### 1986

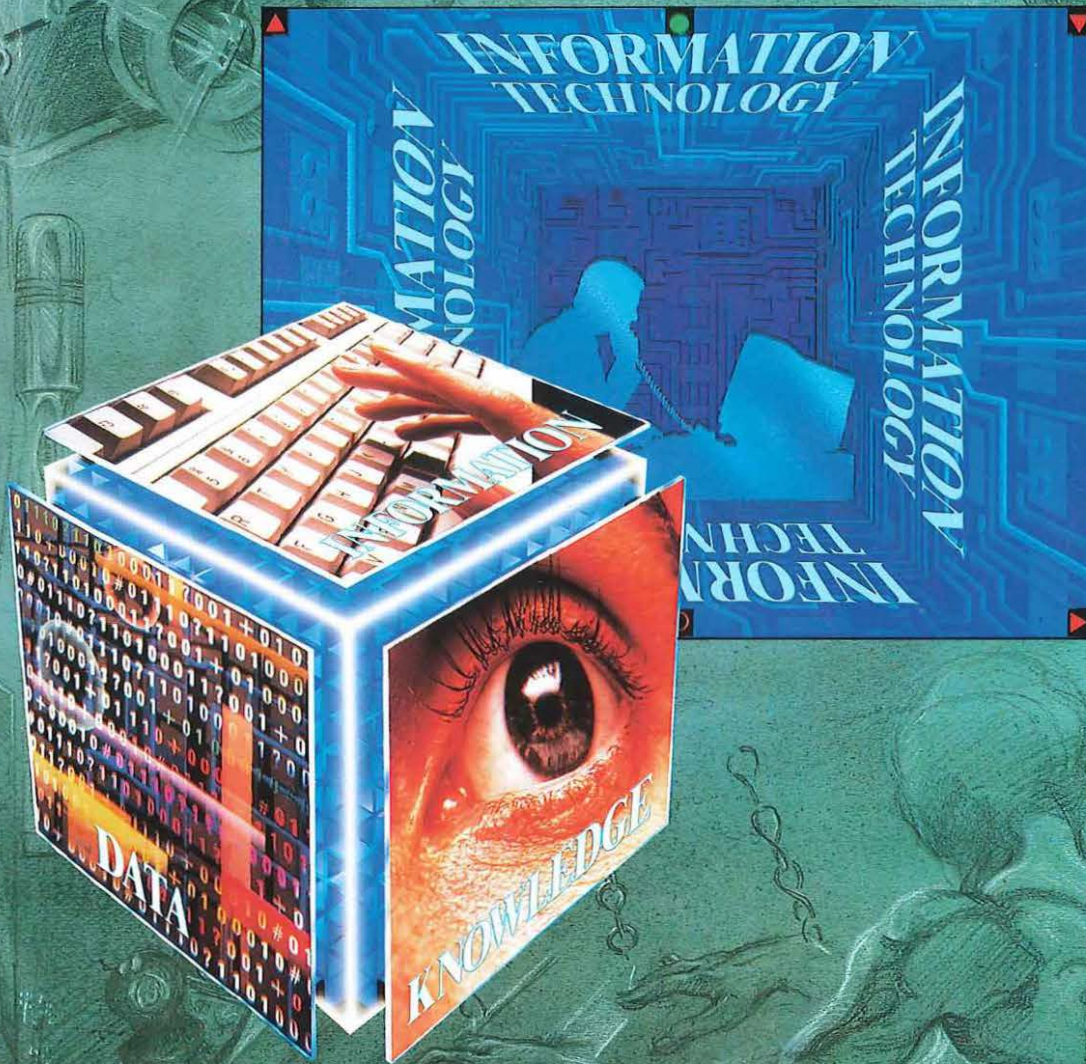
Reading, Hexagon – 7/8 October  
Glasgow, Scottish Exhibition Centre – 29 October  
Cambridge, Kelsey Kerridge Sports Hall – 12 November  
Swansea, Brangwyn Hall – 19 November  
Manchester, Free Trade Hall – 26 November  
Harrogate, Conference Centre – 3 December

#### 1987

Southampton, Guildhall – 14 January  
Sheffield, City Hall – 21 January  
Liverpool, Philharmonic Hall – 29 January  
London, Barbican – 3/4/5 February  
Coventry, Arts Centre Warwick University – 25 February  
Exeter, Great Hall Exeter University – 4 March  
Nottingham, Royal Concert Hall – 11 March  
Bristol, Colston Hall – 18 March  
Newcastle, City Hall – 25 March  
Belfast, Sir William Whitla Hall – 1 April  
Dublin, National Concert Hall – 14 April

For further information contact:  
The Faraday Officer,  
The Institution of Electrical Engineers,  
Station House, Nightingale Road, Hitchin, Herts SG5 1RJ.  
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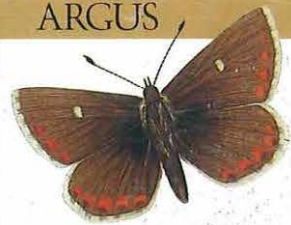
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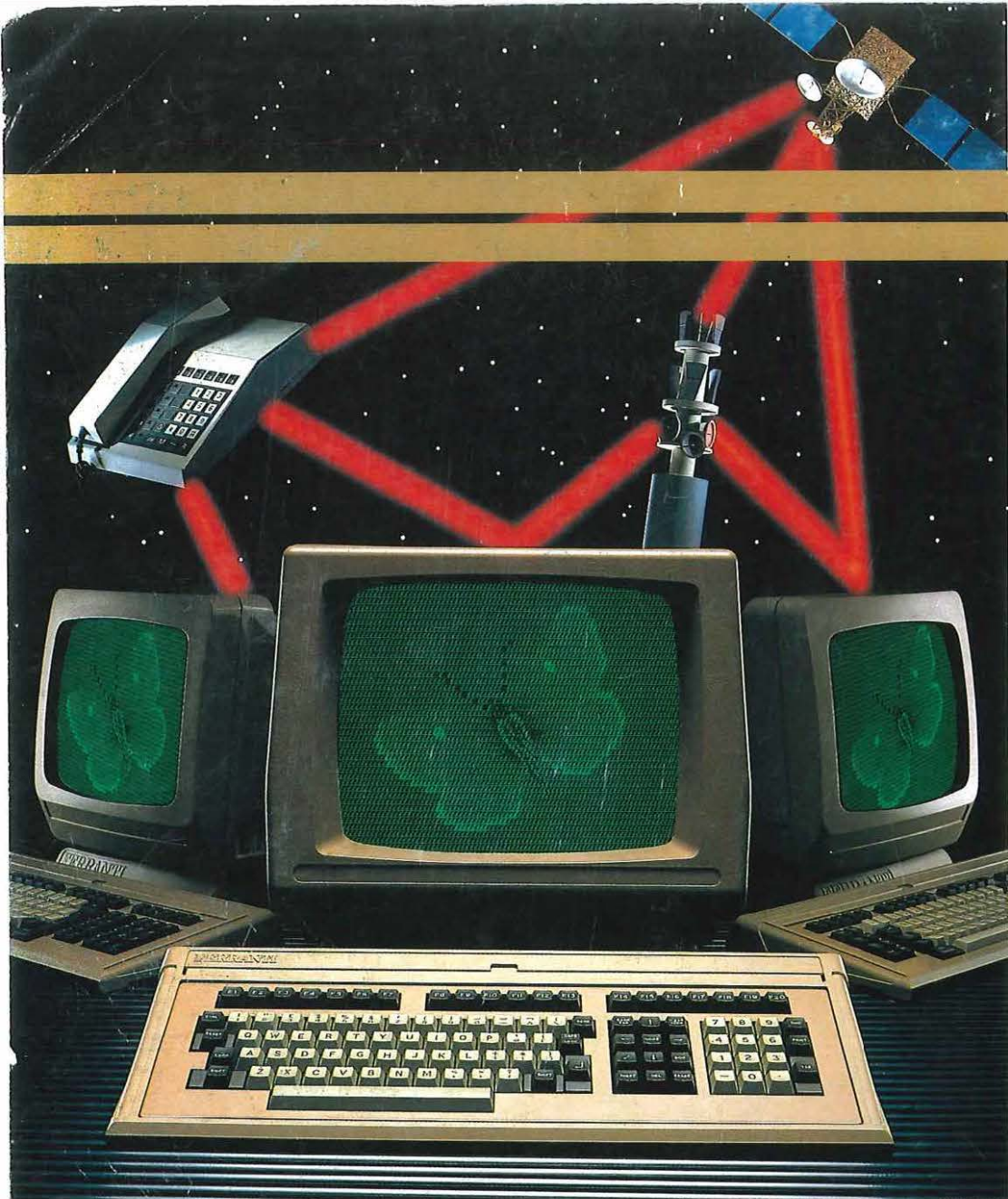
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