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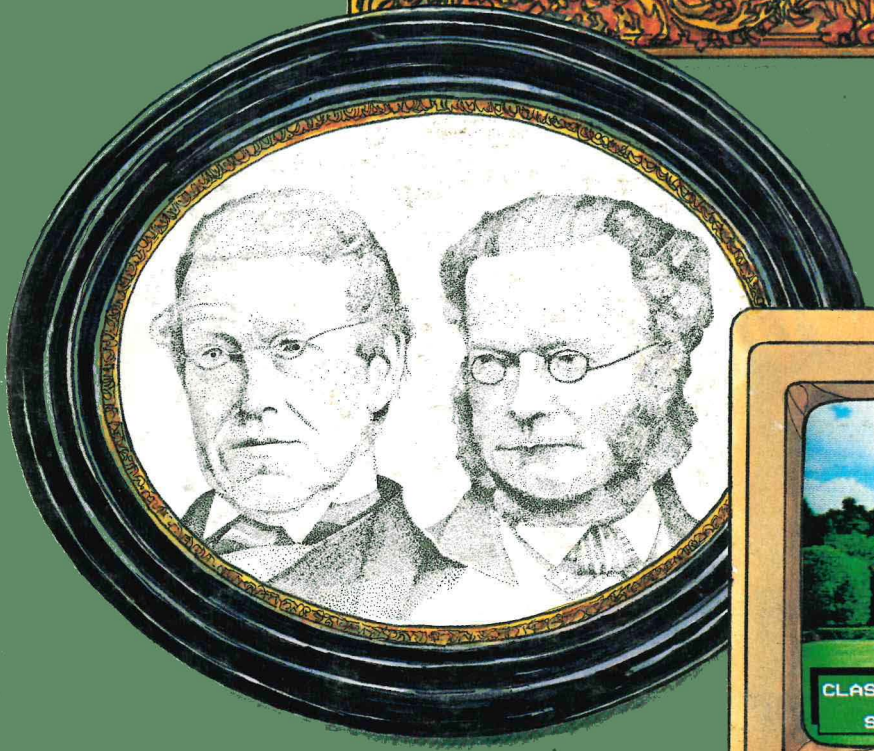
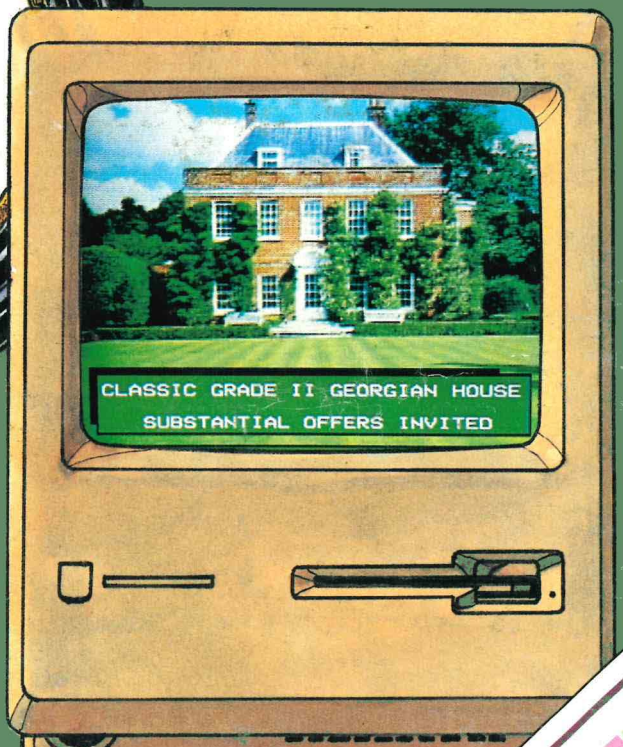
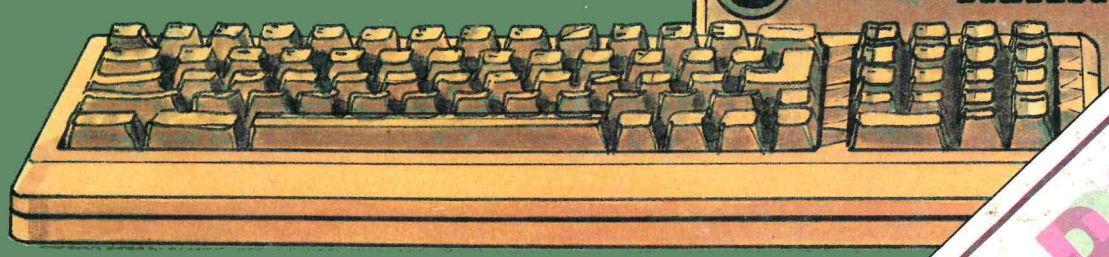
Volume 8 Number 1

British TELECOM Journal







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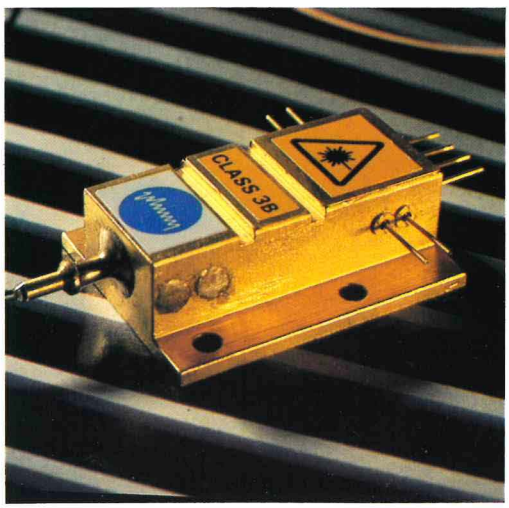

For further information, contact Mike Hocking, Transmission Systems, Plessey Network & Office Systems Ltd, Beeston, Nottingham, United Kingdom NG9 1LA. Tel: Nottingham (0602) 254831, ext. 3542. International telephone: 44 602 254831. Telex: 37201.

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Let's get it right

Revolutions usually cause chaos. They are brought about by real or imagined shortcomings in the status quo and are fuelled by mass desire for change. In this issue, British Telecom Chairman Sir George Jefferson talks about the 'Communications Revolution' which, according to many observers, will affect the lives of ordinary people more than the Industrial Revolution did 200 years ago. Another article looks at the birth of telecommunications with 19th Century research into the first telegraph which sceptics at the time regarded as of limited use — a view in sharp contrast to the facts of today and Sir George's ideas for the future.

The difference between this Revolution and others is the opportunity for those at the forefront of what has become an often supply-led industry, to organise and steer change to the benefit of all concerned. Not least, there is the challenge of guiding customers through an ever more confusing maze of technology and procedure.

This was one of the main considerations underlying the recent decision of British Telecom to merge its Inland Communications and Business Services Divisions into a single organisation, UK Communications.

The new Division will provide a single focus of managerial responsibility for meeting customer needs in the UK at a time when consumers are often baffled as to what they need and how to go about it.

A challenge then for UKC. But in this Revolution the whole communications industry shares an awesome responsibility. The changes taking place now are likely to shape people's lives, jobs and attitudes for generations. The computers crunching data between one sky-scraper and another half a world away can, and will, have a growing impact on global politics and prosperity.

Ultimately, the users of any system are responsible for their own actions. But during a period of rapid technological change, the communications industry itself has a chance to ensure that this Revolution is being steered towards the greater good. ■

Cover: Get into the picture with the *British Telecom Journal!* And this issue helps you to do just that with a watercolour of a British Telecom site recently sold at Sotheby's (the land that is, not the painting); an etching of Cooke and Wheatstone who patented the original telegraph system, and the latest in photo videotex which will be a boon to estate agents amongst others. **USE YOUR FREE 3D GLASSES TO REALLY GET INTO THE PICTURE BY TURNING TO PAGE 45!**

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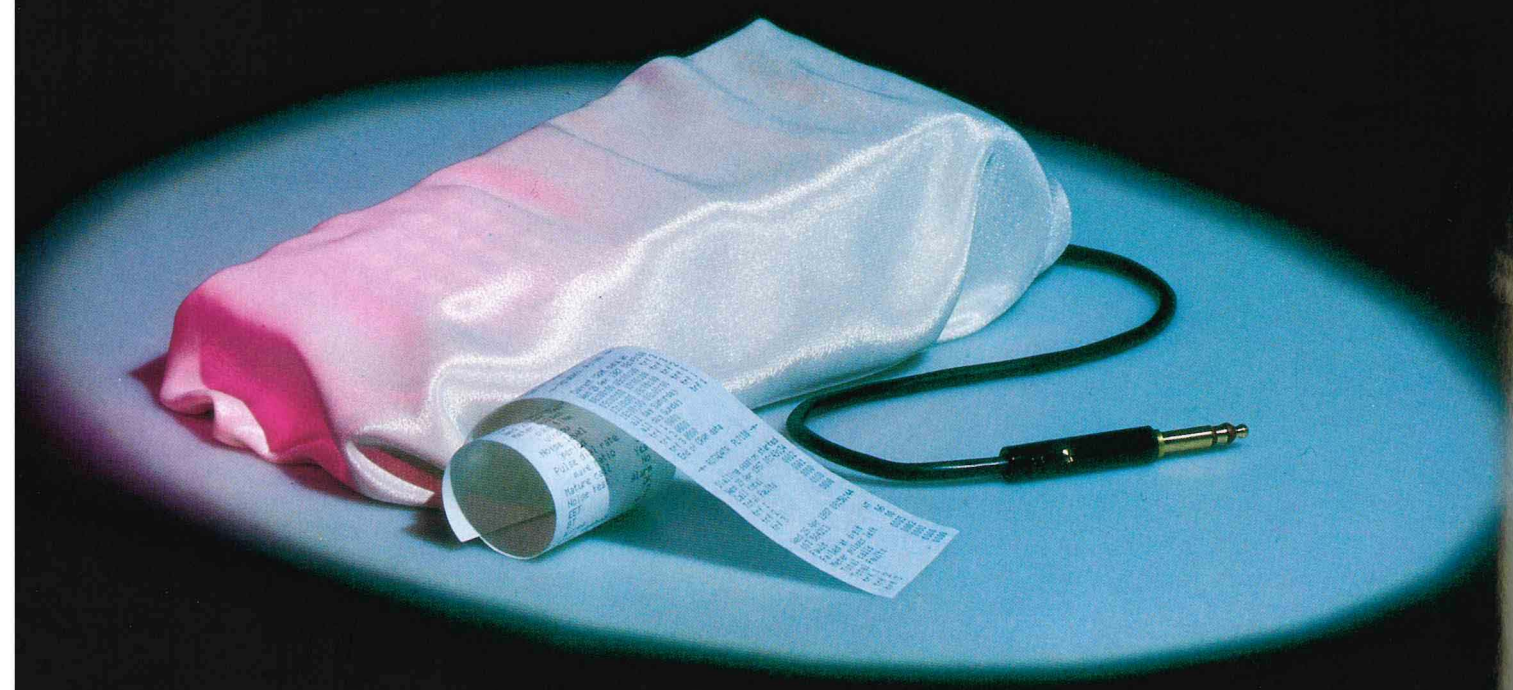
THE ULTIMATE TEST CALLSENDER



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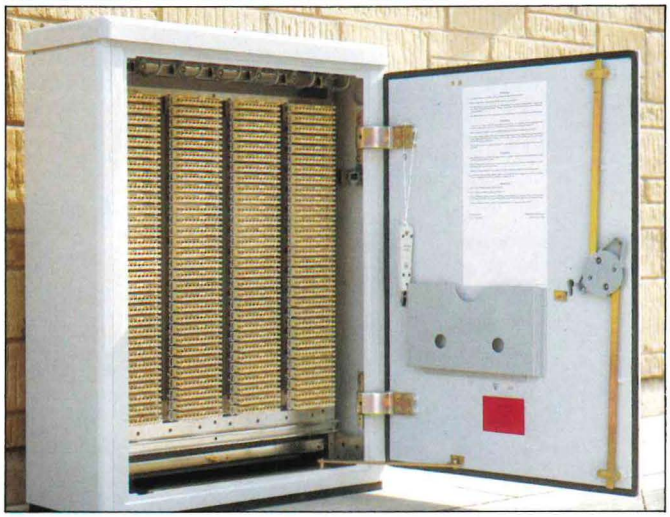
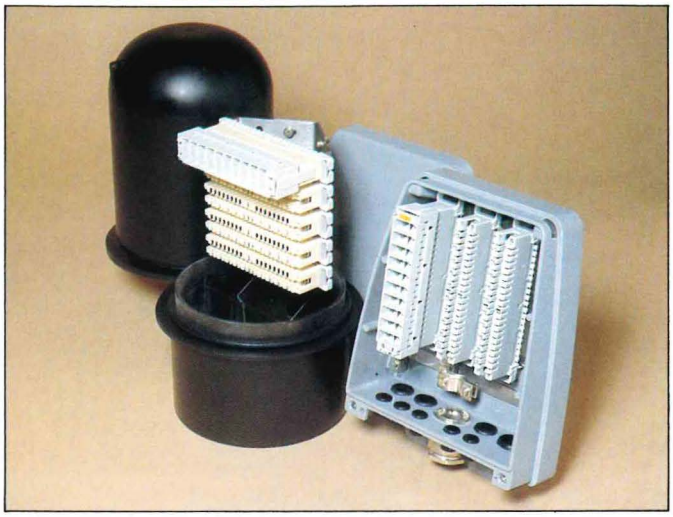
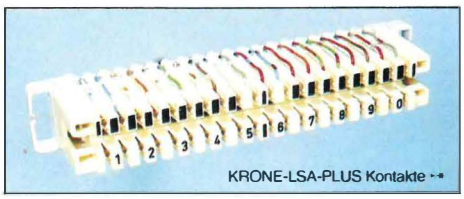




EXTERNAL CHOICE



KRONE LSA-PLUS MODULE

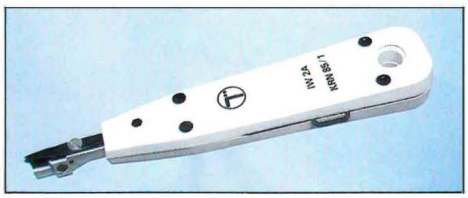


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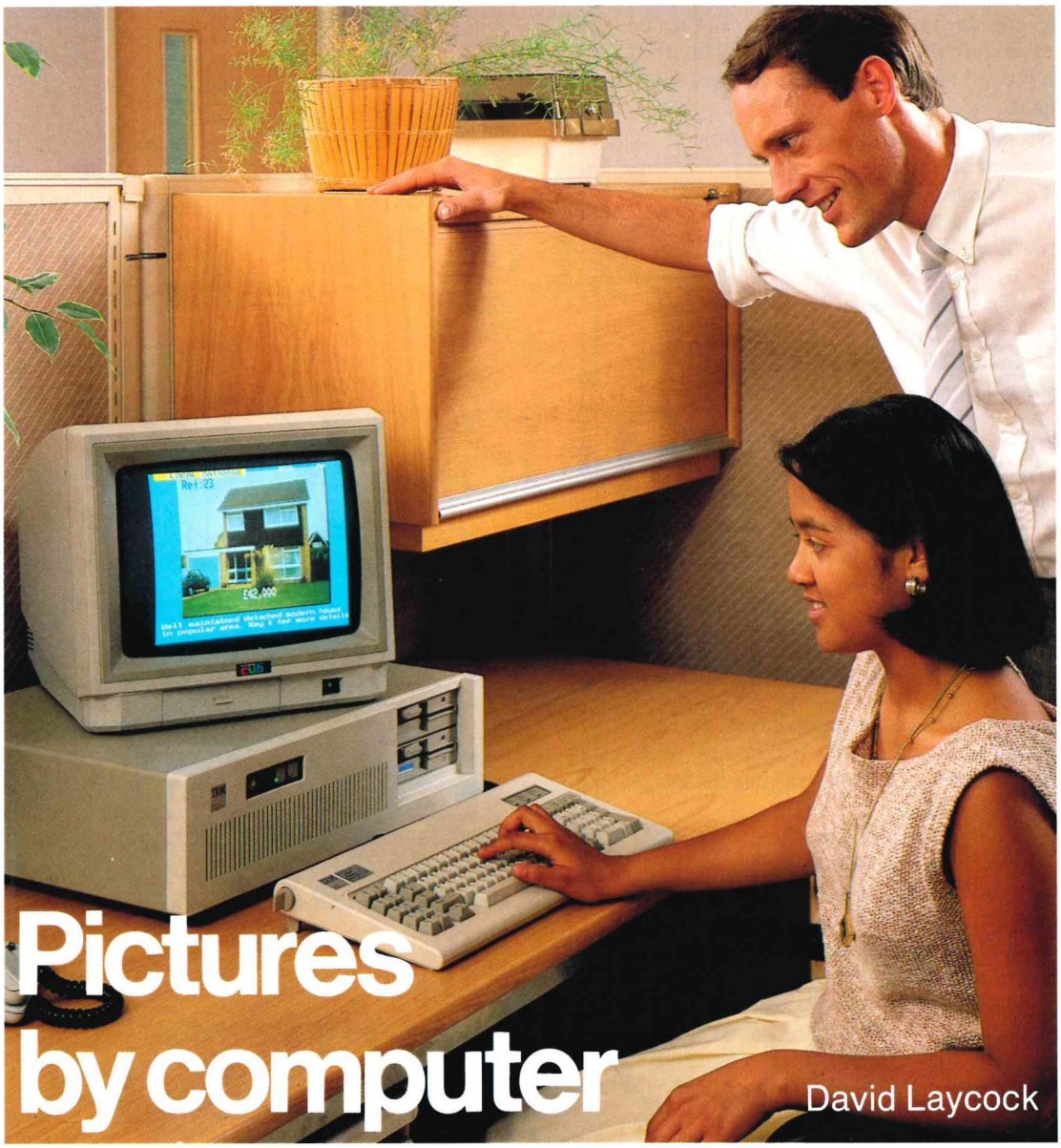
Photo videotex will be a boon to estate agents and many other industries.



Pictures by computer

David Laycock

A new unit – Photo Applications – has been set up at British Telecom to market a range of photographic computer products based on image digitization technology.

Until recently, the successful videotex systems like Prestel, have been limited in application because of their ability to carry only textual and simple graphical information. Now photo videotex enables pictures to be added to this established technology, opening up a whole new range of uses for this type of database.

Photo videotex is a major development area within Photo Applications, and photo database systems incorporating this technology are now becoming commercially available on a range of proprietary systems.

Developed by British Telecom Research Laboratories, Martlesham Heath, the story of photo videotex started shortly after the launch of Prestel in 1979. Realising that pictures would be a significant benefit to videotex, British Telecom combined digital television techniques with the basic videotex technology, hence incorporating still photographs into those systems.

Demonstrations of the result stimulated great interest but there were technical problems. It is advances in the general technologies of photographic coding, the fall in the cost of random access memory (RAM), the widespread use of personal computers and the introduction of the new generation of high-speed transmission links that have helped overcome these problems to make photo videotex a practical reality.

To give an idea of the development effort involved in producing the finished product, early demonstrations utilised the power of a digital PDP 11/23 computer — a machine the size of two large filing cabinets – just to 'capture' a photographic image. That same process is now performed with an IBM personal computer sitting on a desk.

Just like any traditional videotex system, photo videotex systems utilise three major elements: an editor, a central database and retrieval terminals. The editor is used by the information provider (IP) to compose frames containing photographs.

As already mentioned, the equipment required includes an IBM personal computer containing British Telecom's three plug-in circuit boards and software. This is connected to a standard video camera which is simply pointed at the required picture or object. The push of a button digitizes the image and then the software allows for a whole range of picture manipulations (including cropping, shrinking, copying and colour change) to occur. ▷

Text and enhanced computer graphics can then be added to produce the finished page. Typically this creation process takes a trained operator less than 10 minutes.

Finished pages are then stored on a central database ready for retrieval and viewing by systems users. The retrieval terminal is also an IBM personal computer (or compatible) whilst the central database can be held on either a personal computer when the system is small, or on a much larger machine. As a result of a new joint venture with the Applied Telematics Group, any of the DEC VAX range of machines can now be used as the host computer.

Response

All the computers are linked together using high-speed communications paths. This is necessary because of the large amount of information contained in a picture – a typical page occupying 20K/byte of computer memory. The choice of communication medium will depend on the speed of response dictated by the application.

Using the Integrated Services Digital Network (ISDN) transmitting at 64K/bits per second means that a picture is received in approximately two and a half seconds, whilst a 9.6K/bits 'dial up link' over the normal telephone network transmits the image in under 17 seconds.

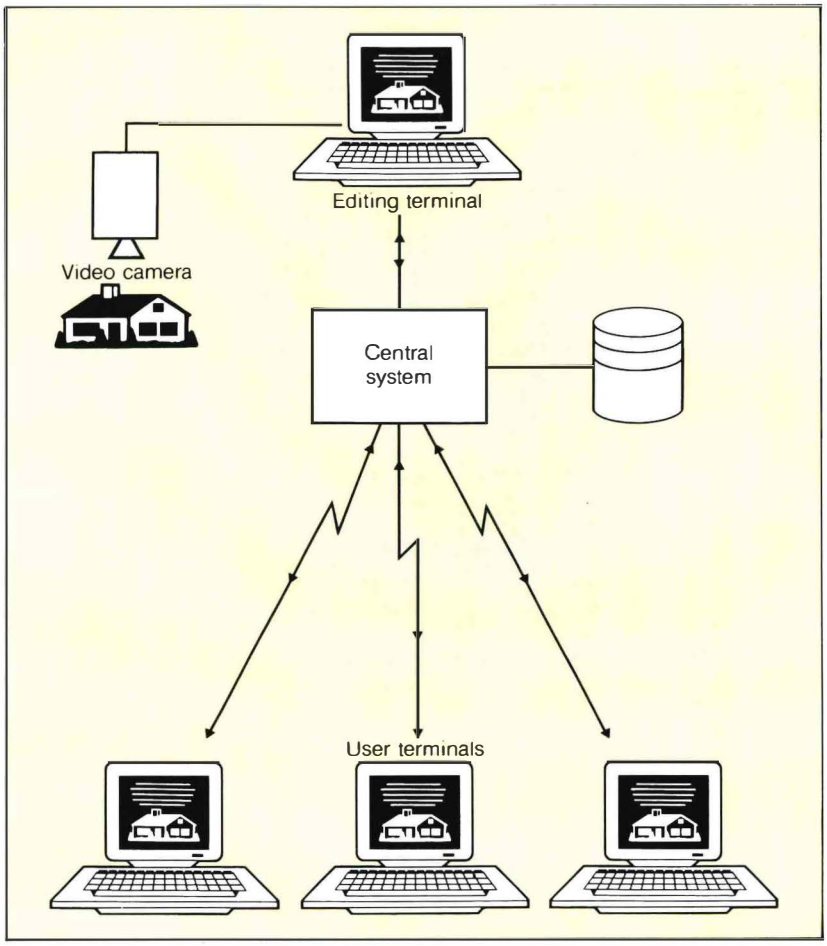
Unlike Prestel, photo videotex is not a public access system. This new technology is being marketed by British Telecom Photo Applications as a private system for use in commerce. Its range of applications is vast because it retains all the advantages of videotex whilst allowing a choice of information display, be it textual, graphical or photographic.

An example of such a private videotex system is being jointly marketed by British Telecom and Viewtext Ltd, the Tunbridge Wells-based viewdata specialist, and is now commercially available. Viewtext are adding photo videotex to their portfolio, to add the ultimate 'state-of-the-art' technology to their well-established and highly successful range.

Enquiries are coming in from many industries, with estate agencies, photo libraries and retailing looking set to lead the field in the progression to photo videotex. An estate agent can now use a smartly presented display of properties, photo libraries can hold their entire stock of photographs on one computer and any security-conscious company can use photographs held centrally in place of forgery-prone passcards.

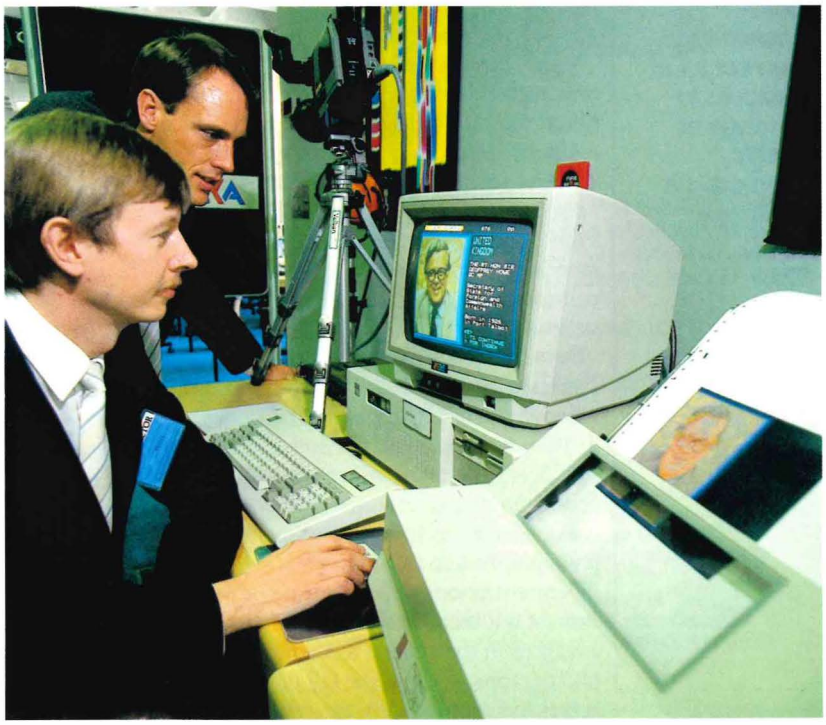
This same technology is being used in Milton Keynes and overseas, to provide a low-cost television channel carrying community information and advertising. This is another development from the photo videotex-based technology called Photo Cable. Kays Catalogues, the mail order company, is using Photo Cable to prepare and transmit picture and text programmes (telemagazines) to a cable TV station. In this way a selection of Kays' merchandise can be advertised via the cable TV channel and goods, delivered directly to the customer's home. The programmes can be varied and updated rapidly and directly, with seasonal or topical themes and this is a major benefit in the fashion market.

It is intended that photo videotex capability be incorporated into an ever growing range of applications, giving the businesses of today and tomorrow information systems which are good to look at and simple to use. ■



Below: Full colour photographs can now be incorporated on screen with text and graphics.

Mr D Laycock is International Sales Manager for Photo Applications.



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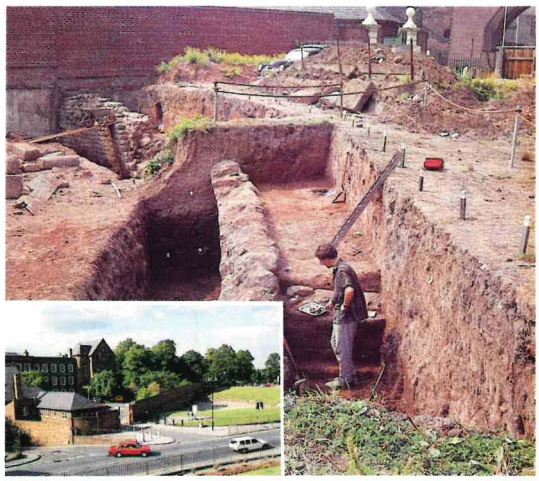


The site of Dee House, Chester, used by British Telecom for office accommodation, also includes the remains of half a Roman amphitheatre which is to be sold and excavated as a major tourist attraction.

For sale: BT joins the pr market

Ed Costelloe

Over the last few years, British Telecom's property assets have been the subject of numerous studies prompted by the upheavals caused by privatisation and the subsequent administrative changes which resulted in the creation of new Districts and other units. The process is continuing and has been accelerated by the need to respond ever more rapidly to changing markets, technology and the impact of competition.

One of the major tasks of BT Property, under its Director Richard Luff, is the sale of surplus properties and the raising of substantial capital from any under-used property assets, in order to support new investment and other business activities.

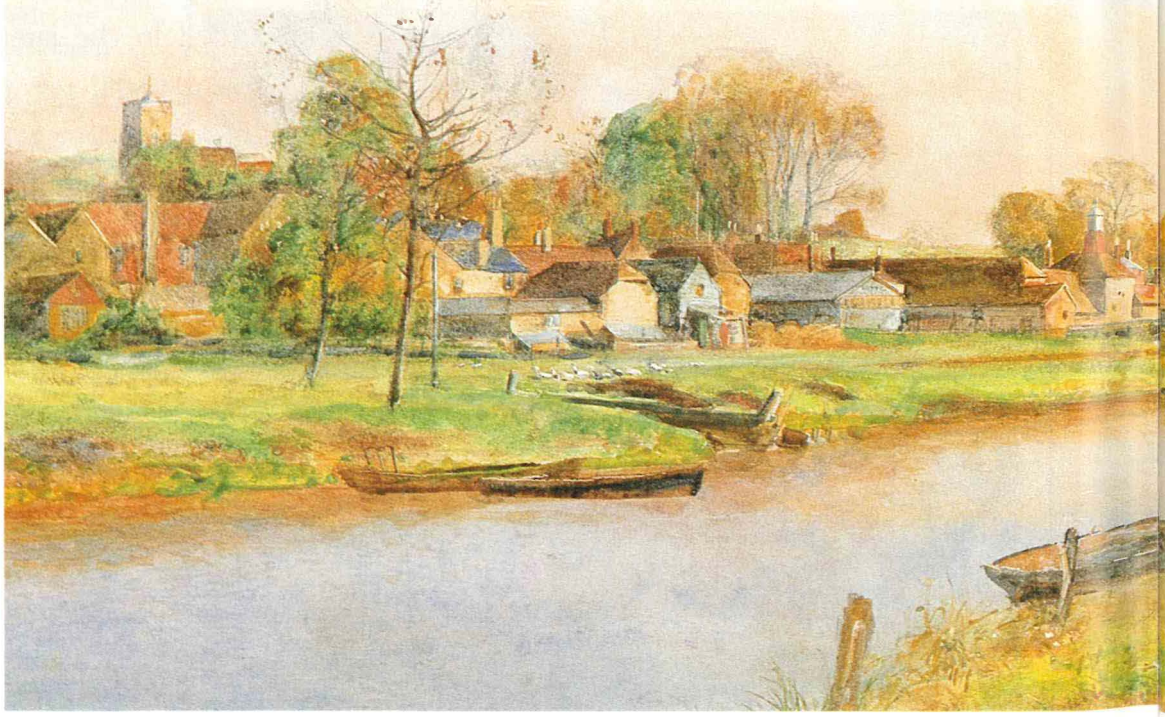
A unit headed by Chief Estates Surveyor Ed Costelloe has the prime duty of disposing of the redundant estate, the investigation of development potential and overseeing the study of property rationalisation proposals for the commercial advantage of the company.

It consists of two teams of three surveyors, each with geographical responsibilities, who spend much of their time inspecting and evaluating the company's land and buildings which they or local management have identified as surplus. This also means that they become involved with engineering and network modernisation plans so that planning staff are aware of development potential and the value of buildings which should be released as soon as possible.

The work involves close liaison with District estates staff (who are generally responsible for the day-to-day work and the instruction of Solicitor's Office) and constant negotiations with prospective purchasers, consultants, surveyors, developers, town planners and other interested groups.

BTP's commercial experience frequently enables the team to identify opportunities not immediately apparent, such as the release of back land for development purposes, or to be aware of development schemes into which particular BT buildings may be usefully slotted to maximise the potential sale price. The team describes its work as an exciting, challenging and commercially orientated task involving exceptional contacts at all levels within the company and in the property world.

BTP can ensure that the properties are discreetly marketed and interest in them maximised before the actual sale, which frequently has the effect of raising the price. It is also possible to enter into tentative negotiations with other adjoining owners for larger scale redevelopment, where a number of alternative schemes are likely to come to fruition within the timescale needed for BT to close down its operations and remove its equipment.



A classic landscape showing (on the far river bank) part of a 1.6 acre site at Pulborough, West Sussex, which British Telecom sold at Sotheby's for £275,000.

With former telephone exchanges it is possible, where the former operational equipment is of no further use to BT, to involve Teletrade in its disposal and removal for overseas markets, or even to arrange for removal by sub-contractors if BT resources are being used for modernisation purposes.

Major difficulties can arise where BT buildings are scheduled for release, but cannot be vacated in time to allow for incorporation in adjoining development schemes. It is possible to miss such 'windows' of opportunity and be forced to give consideration to retaining properties for perhaps 20 years to await the next development cycle. The only options available then are maximising income or use of the premises or alternatively accepting a lesser sale price and selling in the short-term.

The sale of larger exchanges occupying strategic positions in the BT network will involve major joint studies to allow for retention of a cable chamber and access, and the possible provision of continuing smaller scale equipment needs.

If demolition and redevelopment is envisaged, structural and architectural studies are needed to allow construction to proceed around existing BT facilities and many of these problems have never been tackled or solved before. Standard solutions are unlikely to be found and each building will require its own particular investigation and engineering solution.

BTP has raised the profile of the company dramatically in the property world and has earned a reputation for aggressive commercial dealing.

A bingo hall next to a telephone exchange in Blackburn, Lancashire, has been sold for redevelopment as a wine bar and casino.

British Telecom was once thought of as the 'developers' friend', but, the property world now knows that the company will always seek the best possible deal and is as well-represented professionally as any other.

Other aspects of BTP's activities include overall guidance of major property relocation studies where, for example, Districts have been helped to move into new and efficient accommodation, whilst tying up the disposal of older and unsuitable property within an overall package deal which has been to the considerable advantage of British Telecom as a whole.

Such deals may arise from studies of existing office provision within Districts and Divisions, from revision of telephone engineering centre strategies and by the impact of material management unit provision within Districts. Other studies are directed towards de-centralisation or relocation from expensive areas and the benefits which can accrue to the company from radical re-examination of its property assets. These developments may not only include substantial savings in running costs and release of capital, but will often provide staff with improved and higher quality accommodation.

A wide range of interesting or valuable properties have been sold, or are in the process of being sold, as a result of BTP's efforts.

An option has been agreed on a property in Chester, currently a listed Georgian building used as offices, but which lies on top of significant Roman ruins and half an amphitheatre. The prospective purchaser has obtained planning permission to demolish the premises, excavate the remains and construct a major tourist attraction to rival the Jorvik Centre at York. The move will guarantee a substantial profit to the company and a development which will benefit the City of Chester considerably.

The sale of the Punch Bowl public house adjoining Mayfair telephone exchange in central London involved a number of parties including breweries but an outright sale would have ▷

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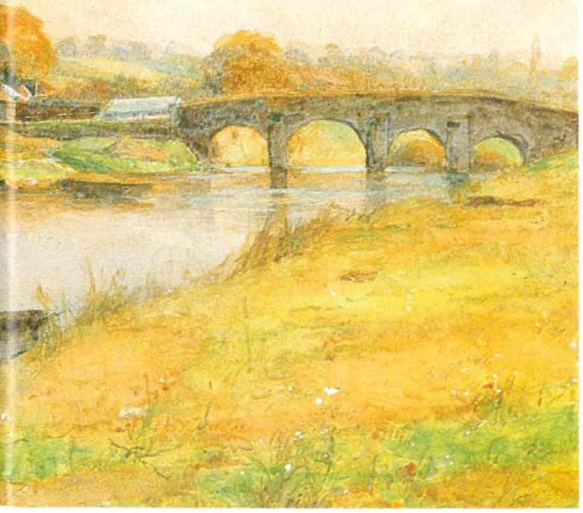
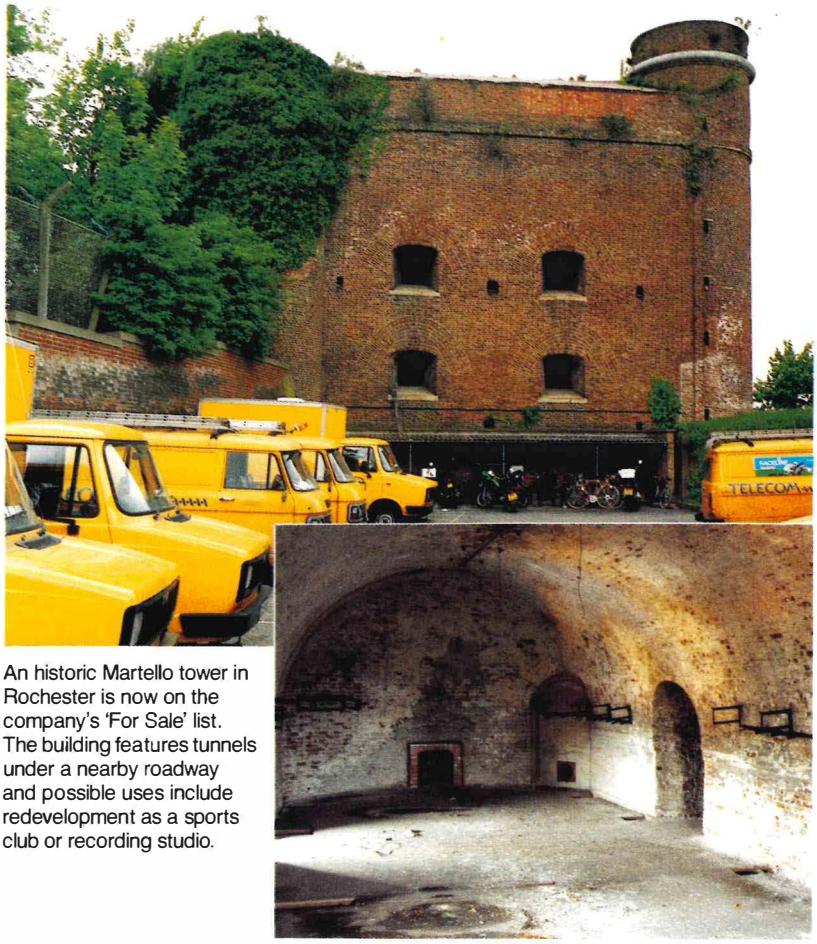




An historic Martello tower in Rochester is now on the company's 'For Sale' list. The building features tunnels under a nearby roadway and possible uses include redevelopment as a sports club or recording studio.

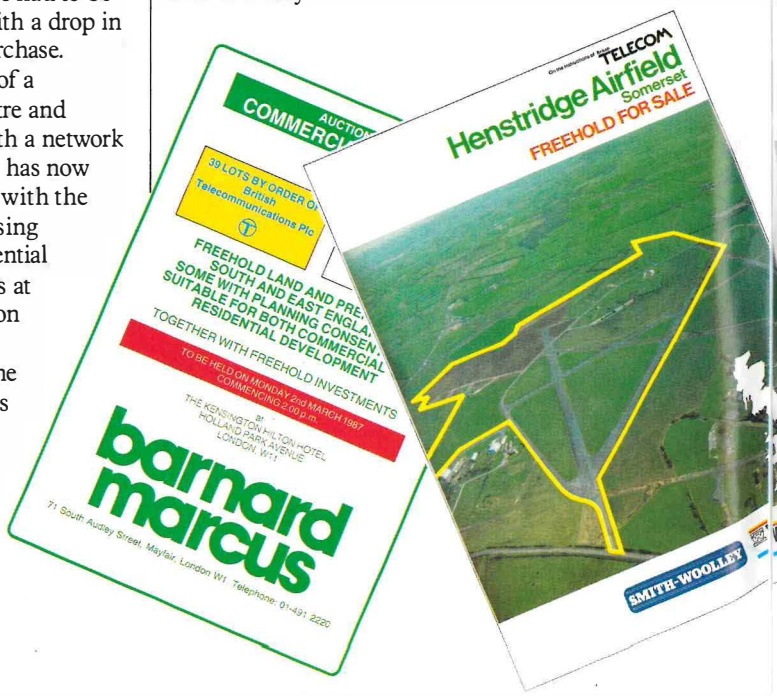
endangered BT's rights to gain access to a wall of the exchange for maintenance and renewal purposes. BTP, therefore, sold a 999-year lease of the premises to safeguard operations whilst receiving a small ground rent for the future - in cash, not beer!

British Telecom has successfully sold a former greyhound stadium in Falkirk which had been purchased originally for strategic reasons and a former war-time air field at Henstridge in Somerset, purchased as a possible earth satellite station by BTI but no longer required due to the expansion of facilities elsewhere. Immense difficulties had to be overcome in town planning together with a drop in agricultural value since the original purchase.

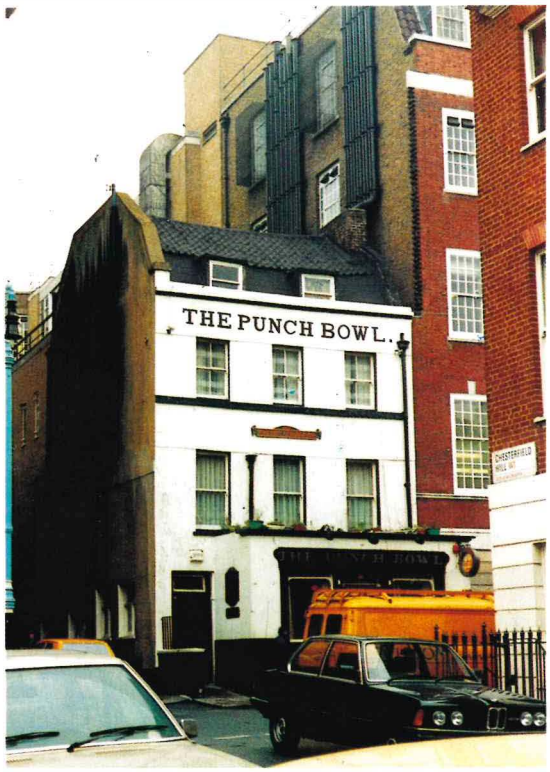
A disused fort which used to be part of a Telecommunications Engineering Centre and designated as an ancient monument with a network of underground chambers and tunnels, has now been sold for leisure purposes together with the former Portishead radio station for housing which achieved a record price for residential building land in the Bristol area; TEC's at Crawley and Cornwallis Road in London N19 for sums around £4½ million each and the purchase of a site in Silverthorne Road, Battersea for a District Materials Management Unit and the subsequent sale of a part of the site which was not required for £640,000.

Substantial sales of British Telecom premises have been made in Guildford including TEC and office units resulting from the closure of Guildford area and the transfer of work to Thameswey District. Bridge House, for example, was sold for £1 million and this obviated major repair work and avoided litigation in respect of liabilities for repair.

A major deal in Southern London District involving the acquisition of an office block known as Delta Point is part of a package deal, disposing of four other major property holdings unsuited to Customer Service Systems (CSS) working and providing the District with a single headquarters and substantial improvements to working standards and efficiency.



Glossy brochures produced to advertise surplus British Telecom properties.



Centre: British Telecom has recently sold its offices at Lutyens House and River Plate House in Finsbury Circus, central London.

The Punch Bowl pub in Mayfair, London, has been sold in a deal which still gives access to maintain an adjacent telephone exchange.

The relocation of a TEC in Solent District from Redbridge to Nursling, released the existing site for more valuable residential use and saved £1 million on the cost of the replacement facility, and, in South Wales, a disused bus garage has been sold on the Gower Peninsula.

These examples show the variety of property held within the BT portfolio and there are many hundreds of other sales of a more mundane nature some of which have been used for mountain rescue posts, model railway layouts, artists studios, garden sheds, kennels and small holiday homes.

Numerically this element of the portfolio is the largest, but it is also the least attractive financially, and BTP recently held an auction of a number of small rural sites and buildings together with a small percentage of more attractive premises in London to see whether interest could be aroused in properties of this kind.

The auction was spectacularly successful raising a total of £1,326,000 from 37 lots, a figure substantially in excess of the reserve prices and which attracted some 500 bidders. Observers from Districts not involved in the sale were impressed by the results and it is anticipated that similar auctions will be held during the year.

One of the principal advantages is that large numbers of low-value properties can be disposed of with minimal BT staff resources to provide quick capital whilst removing properties which would otherwise clog the system and prevent BTP and District staff from dealing with more valuable estate. Other methods of sale include formal public tender - BTP devote significant resources to advising on the most appropriate form of sale and marketing for particular properties and the organisation's services are available on a company-wide basis.

Author: Mr E C Costelloe is British Telecom's Chief Estates Surveyor.

two innovations from Telspec

NOW AVAILABLE

A single card alternative for the Announcer 9A tape machine, designed to replace the 9A buffer amplifier, relay etc. and provide a continuous announcement over eight outlets. No deterioration in message quality with time, no tapes to break or wear out. Replaces any number of standard line interface cards in a Ceptel shelf to provide combined CNI/CNA facility.

CEPTEL

The CEPTEL system is Telspec's solution to the problem of providing Automatic Changed Number Intercept and/or General Announcements.

Employing the latest developments in digital speech storage technology, this highly sophisticated, yet easy to mainpulate system is enjoying widespread use in many British Telecom Exchanges throughtout the network.

The CEPTEL exchange based equipment consists of two parts, the Exchange Control Unit (ECU) and the Line Interface Shelf (LIS). The ECU allows full manipulation of the message and per line parameters for any of the 960 (maximum) local terminations. The recent extended facility of remote working over a dial up line allows the same manipulations to take place for an additional 1440 (maximum) lines remote from the ECU, located anywhere in multiple sites throughout the PSTN.

Each LIS houses up to 80 terminations built up of sub-modules of 8 lines minimum. Each 16 line module (5 per shelf) is totally independent of the rest, with its own control and user-defined vocabulary.

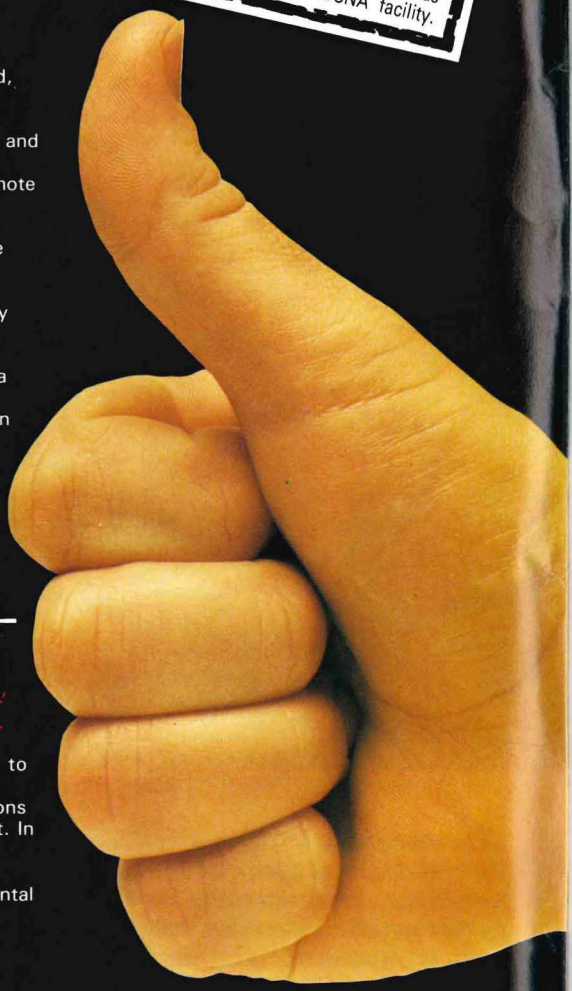
Each module has an on-board battery to provide full memory support, in the event of 50V supply failure, for a minimum of four days.

The CEPTEL Studio Unit is a desk mounted, mains driven, additional system for the user to efficiently produce their own message vocabulary and structured announcements rapidly, using a microphone or tape input source.

A feature of the Studio Unit is the ability to retain the recognisable personality of the voice when digitised, useful for adding a local content to the announcement.

CEPTEL Features

- 2 or 3 wire exchange compatible.
- Comprehensive traffic analysis.
- Automatic self-diagnosis with alarm output and fault report.
- All lines monitorable (local and remote sites).
- Total non-blocking system – all calls answered with no waiting.
- Ongoing enhancement development.



LINE CONCENTRATOR 14/5A Mk. II

The Line Concentrator 14/5A Mk. II is a pair gain system consisting of two units, one housed in the telephone exchange and the other on a pole or in a cabinet.

14 subscribers' lines are concentrated by the exchange unit to four trunks (plus 1 for the data link/power feed). The other end of the trunks feeds a remote unit which distributes appropriately to the 14 subscribers.

A maximum of 4 subscribers at any time have access, hence low usage or low growth applications are ideal. A cost-effective alternative to cable is coupled with ease of recovery and reassignment. In some cases the 14/5A Mk. II may provide a permanent solution to expensive alternatives.

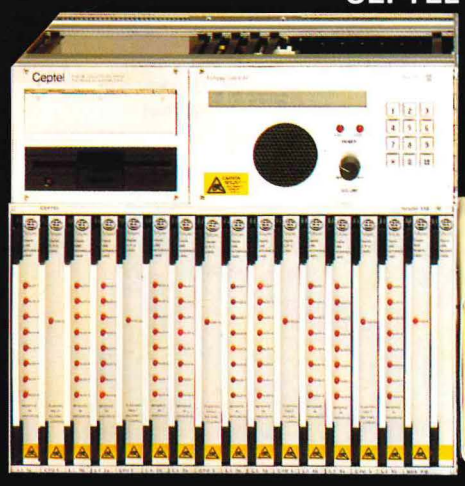
All connections from the exchange unit to subscriber are metallic.

This Mk. II system has been designed with considerable attention being given to high environmental reliability and maintenance of near standard line conditions.

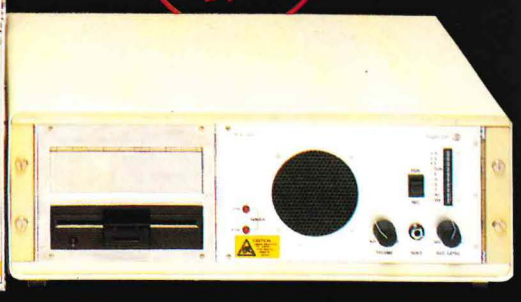
Line Concentrator 14/5A Mk. II Features

- Reliable service in hostile environments.
- Quick clearance of customer waiting list.
- Cheaper alternative to cable.
- Constant dc line conditions to subscriber for memory 'phone support, etc.
- Busy tone supplied to subscriber going off-hook when unit has 4 trunks in use.
- Full compatability with the Mk. I units.
- Suitable for 2 or 3 wire exchanges.
- Remote unit available in either an economical sleeve 32A or a hermetically sealed metal box for pole or cabinet mounting.
- Comprehensive self-test capability.
- Ongoing enhancement development.

CEPTEL **LINE CONCENTRATOR**



Accepted and Adopted by BT



For further details on either of these systems, or information on TELSPEC Ltd.'s other products, call or write to:

Kevin Hermanson (CEPTEL technical enquiries)
David Barrington (CONCENTRATOR technical enquiries)
David Earl (SALES enquiries)

Telspec Limited

TELSPEC Ltd. Lancaster Parker Road Rochester Airport Kent ME1 3QU

British Telecom has traditionally been one of the largest recruiters of young graduates in the UK, seeking several hundred each year. The company's demand for graduates has remained fairly constant over the last five years but the supply in certain key disciplines has reduced and competition for the best young talent has grown from companies developing in the information technology field and from the 'City'. This article looks at how BT keeps the intake up to scratch.

High-calibre intake for a healthy business

Catherine Ash

Success in attracting the right calibre of new graduates can be enhanced by effectively marketing the company and its job and career opportunities; highlighting the attractiveness of the salary, training and future prospects package and by good administration so that candidates are not lost to competitors who can deal with their applications more efficiently.

In addition, British Telecom can ensure that it fully develops and trains existing people for management and professional jobs, and, recruits job changers - recent graduates who have spent time with other companies.

Attention is focused on final year undergraduates on the university 'milk-round' - where all major graduate recruiters are present. It is vital to make a major impact in this forum with the Graduate Opportunities brochure, advertisements in careers directories and student press, and a short video showing graduates at work in British Telecom. The Districts, supported by colleagues from other units wanting to recruit graduates, also arrange presentations on campus offering information on jobs and careers and an opportunity for students to meet and question BT managers and recent graduate recruits.

Graduates are recruited to M&PS Bands A-C (exceptionally at Bands D-F) and this range of salaries and the broad terms and conditions which BT offers compare favourably with those of major competitors.

UK Communications' District 'Liaison Officers' deal with local universities and Polytechnics cultivating contacts with Careers Advisory Services; marketing BT's career opportunities to graduates; and acting as receiving points and preliminary selection agencies for all prospective recruits. This generates several thousand applications which are considered and sifted by means of tests and interviews between January and April.

Districts circulate the applications of those successful at this stage to potential recruitment units for final consideration with the help of a national computerised database of graduate vacancies.

Although the 'milk-round' is not the sole source of new graduate recruits - some graduates more confident in a sellers' market delay job applications until the summer - it still provides British Telecom and many other companies with the greatest single opportunity to attract top quality talent. The process, however, is backed up in three separate ways - by increased BT presence at summer recruitment fairs; by more direct press advertising aimed at young job-changer graduates and, increasingly, by sponsorship of students.

During the last two years, there has been a significant increase in the number of bursary awards made by British Telecom to promising sixth form students, and to existing 2nd/3rd year undergraduates at university. These bursaries, of ▷

Above: recent graduate recruit Bob Cunningham at work at the London Teleport.

Mrs C M Ash is responsible for central co-ordination of BT's graduate recruitment activity.

£800 a year, coupled with opportunities for the holders to gain more knowledge of BT through work experience during their vacations have been operated for many years centrally by Corporate Personnel Division, Training Division and the Technology Executive. They are now being offered by other Divisions and many UKC Districts have small sponsorship schemes of their own which vary from a local commitment by a BT unit to sponsor one or two individuals per year to study their chosen course, to the far more involved and structured sponsorship arrangements which BT has evolved with the Universities of Aston, Newcastle and York.

Under five year contracts with the three universities BT sponsors up to 60 individuals a year to study for Masters courses in Telecoms Engineering which have particular relevance to BT's needs. BT funds staff and equipment, and influences course design.

Technology Executive and other BT Divisions have research contracts totalling over £1 million and fund four University Chairs, together with numerous other lecturers and support staff at various universities.

In addition, British Telecom staff are seconded to or regularly lecture at a number of polytechnics/ universities.

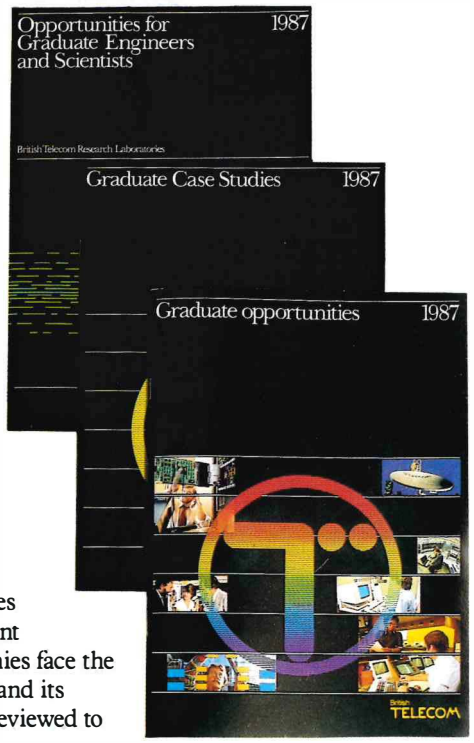
Research involvement helps to attract graduates and BT's efforts to promote undergraduate awareness are confirmed by the Student Industrial Society which voted BT 'Most Helpful Company' of 1986.

To ensure a future supply of good graduates the company is involved, via its Education Service, in providing a good company image in the schools and influencing the curriculum.

The nation has two problems - a critical shortage of qualified physics and maths teachers and the still widely-held view that a job in industry is unattractive and unrewarding. British Telecom is helping to produce solutions and is involved in the national debate on the future direction of education and its relationship with industry. The company, for example, is a member of the recently formed Council for Industry and Higher Education.

British Telecom's performance in the 1990's is largely dependent on a good supply of managers or professional people either as fresh graduates, sponsored graduates or young job changers to supplement 'homegrown' talent. Other companies face the same challenge and the BT image and its attractiveness must be constantly reviewed to ensure success.

Brochures spell out the wide range of opportunities available to graduate recruits.



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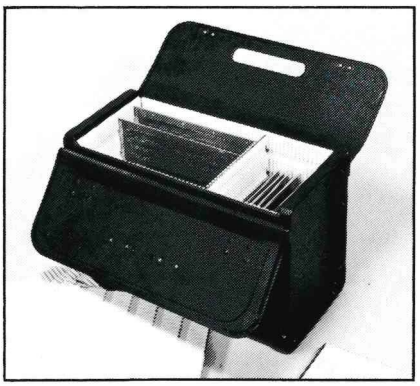

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Prestige package with all 'mod comms'

British Telecom is to provide a substantial package of telephony, entertainment and site services – including the latest in video security surveillance – for the prestigious £100 million Chelsea Harbour development in the heart of London.

First-class communications will be an important feature of the Chelsea Harbour project which will transform 20 acres of land previously used by British Rail for train sidings into a new riverside village with a half-mile frontage on the River Thames.

British Telecom's Westminster District won the contract for a package of communications services against stiff competition from several other companies. The contract will include:

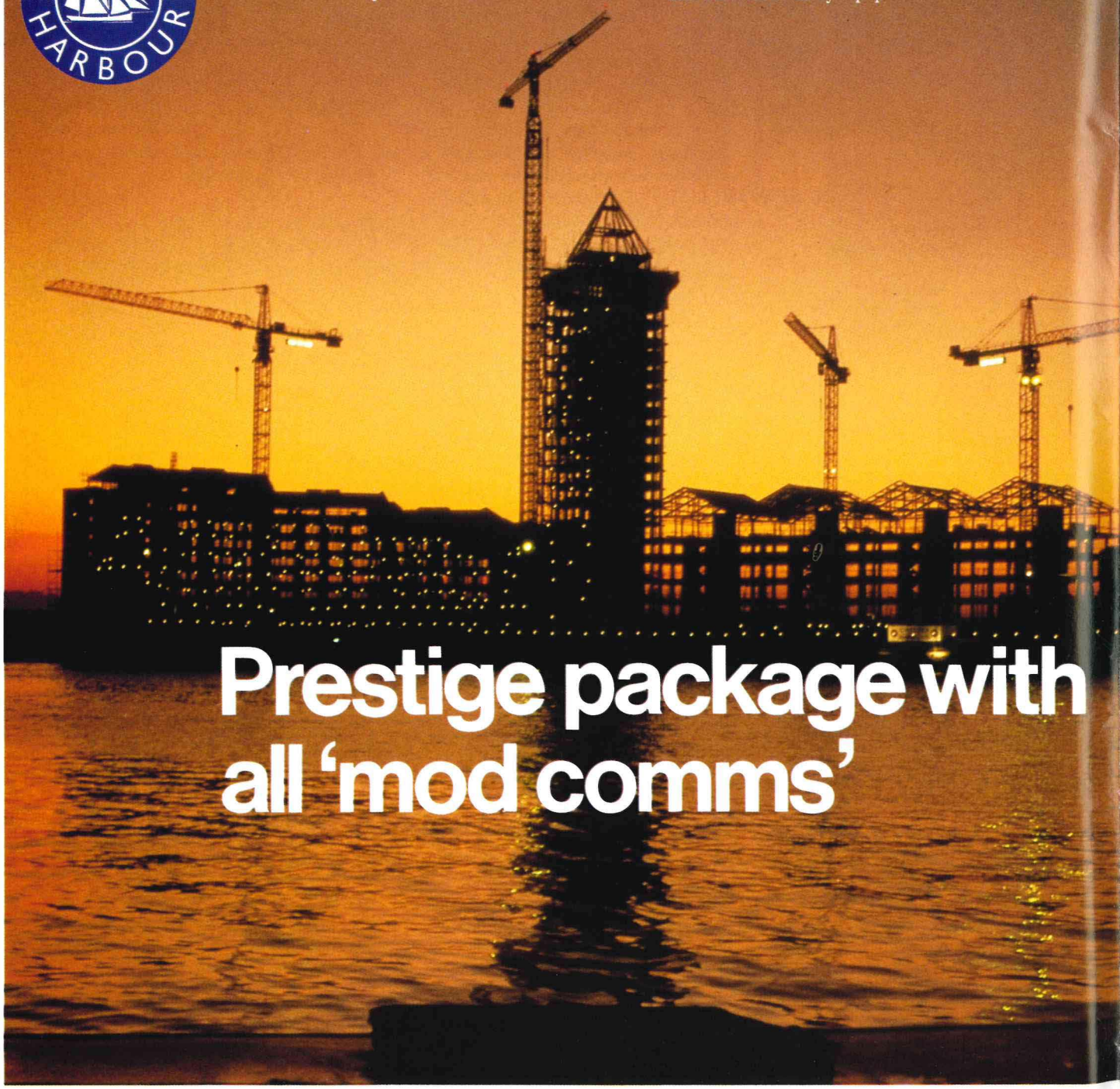
- video entry systems for each of the houses and apartments in the development;
- closed-circuit television for site security;
- television services via a master aerial system;
- security door access systems;
- a fully equipped central security control room;
- advanced telephone services.

Chelsea Harbour Limited – a joint development by P & O and Globe Investment Trusts – describes the planned 'village' surrounding a new 75-berth harbour as 'a special world of its own and a unique place to live, work and relax'.

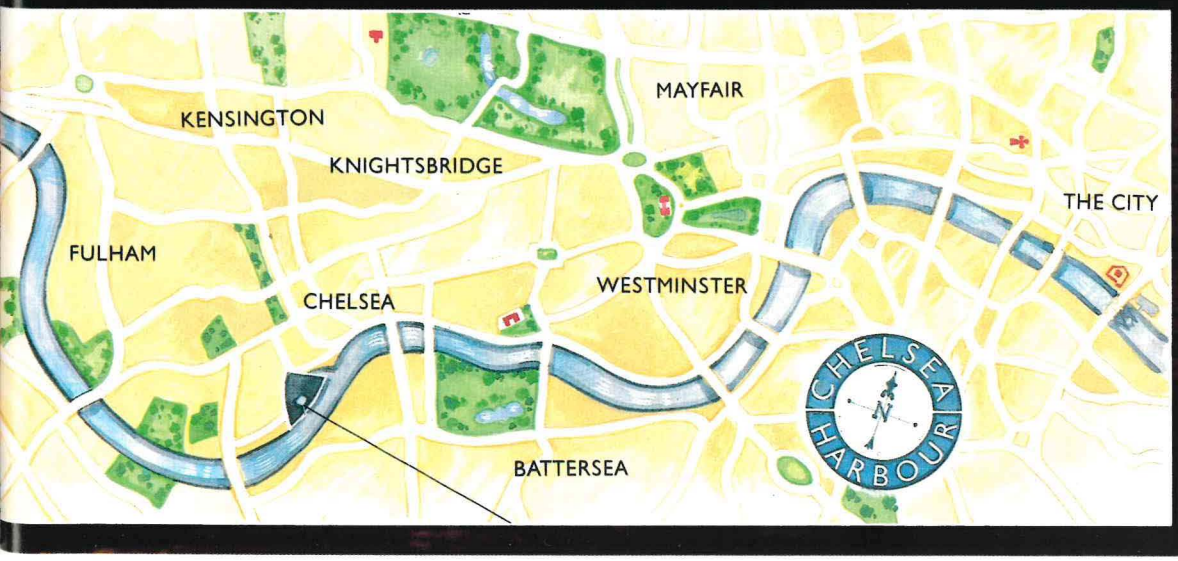
In addition to the houses and apartments, the development includes an hotel, restaurant, shops, office chambers and studio workshops. Properties range from one bedroom studio apartments, to the cream of the site – a penthouse covering the top three floors of the 'Belvedere' tower.

West End District, on behalf of BT Site Services, are designing a fibre optic loop which will encircle the entire site and will be able to carry alarm signals from each apartment to a central control room. The cable will also carry signals from the perimeter security surveillance cameras.

Site Services security equipment will be used to ▷



View across the harbour.



Map shows the development's central location.

Below: artist's impression of the completed project.

protect residents' property. Facilities include:

- video door entry systems;
- closed-circuit TV;
- video systems for building and perimeter surveillance;
- local paging.

The video system used for perimeter surveillance will incorporate a British Telecom supplied Digiplex 4000 digital video movement detector. Each camera can be programmed to sound an alert only when movement takes place in particular parts of the area it covers. For example, on an area adjacent to a public street, the alert is raised only when movement is detected inside the controlled area.

Movements within the controlled area can be automatically stored on tape for security purposes to avoid the need to constantly monitor the screen.

The intruder alarm in each apartment can also have alarm links to the central security control room, allowing security staff to be alerted instantly.

Apartments and houses will be served with two or more television outlets from the master aerial system (MATV) to be installed by British Telecom's own TV Division, BT Vision. Each apartment and house will also be served with advanced telephone facilities known as Star Services, from the System X exchange at Chelsea.

Chief Operations Manager Sue Davidson, said: "This is a particularly important project for British Telecom not only because it is a high-profile development but also because it is the first time that we have been total suppliers of telephony, entertainment and site services.

"A team of BT people from Westminster, West End, BT Vision and BT Site Services are working together to provide a 'seamless' service to ensure future business," she said.

The communications package could be further enhanced in the future as business customers move into the development and also cater for the needs of office automation. Direct private circuit links to the City are also a possibility. ■

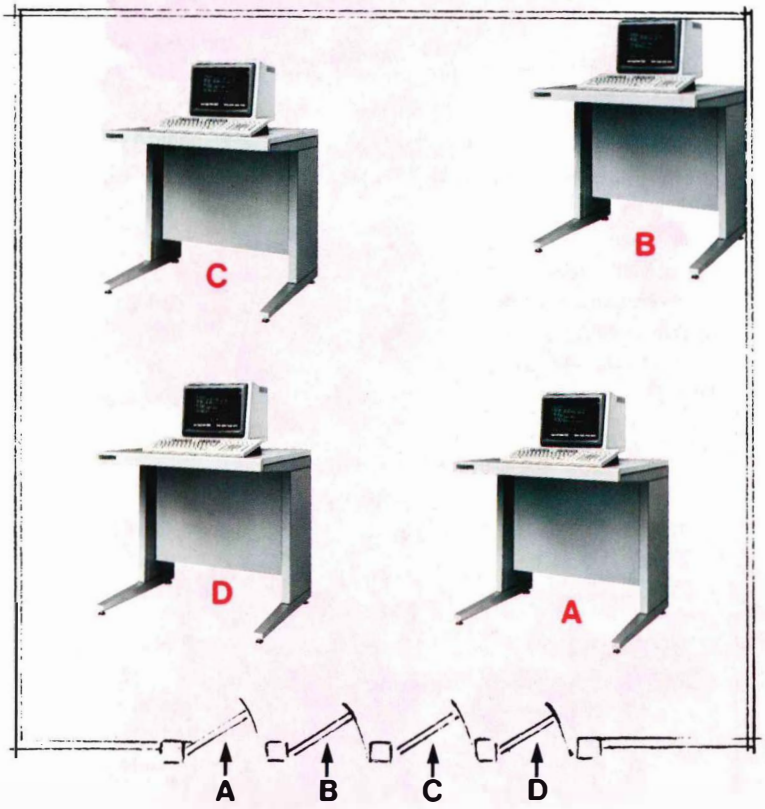
British Telecom Site Services

BT VISION

CAN YOU WORK IT OUT?

Four design engineers are working, independently, on the same project. They have made a vow that their paths won't cross (literally!).

On Monday morning, how can Engineer A reach workstation A, Engineer B reach workstation B and so on . . . without breaking the vow?



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Developing modern radar . . . but astounded by costly test techniques?

Relax. Hewlett-Packard now offers the first off-the-shelf Vector Modulation test system. It's specially designed for wide modulation bandwidths.

Complex products need a complex test system. How do you get yours up and running fast?

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If you have, great. If not, don't worry – the answer's below. You can use the coupon to get further details on Hewlett-Packard test and measurement products.

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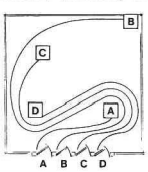

Well, were you on the right path?

WE CAN WORK IT OUT

Two hundred years ago the Industrial Revolution began to change the whole structure of society and the entire focus of economic activity shifted from the fields to the factories. Today, the Communications Revolution is not only transforming business and commercial practice the world over, but also opening up previously undreamt of personal opportunities. British Telecom chairman, Sir George Jefferson, gives his views on the future and the strategic tasks facing the company.

Right: guiding customers through the technological maze.

BT and the Communications Revolution

Sir George Jefferson

No-one can, with any certainty, predict exactly how the Communications Revolution will shape our lives as the 20th century draws to a close, but you can take it from me that British Telecom will be playing a key role in the pattern that emerges.

Let me explain why I have such confidence in British Telecom's ability to thrive in the new environment. Probably the most fundamental reason is that we are in a unique position in the UK to be able to identify and meet the wide ranging needs that companies will have as the revolution takes hold.

Currently, I believe we face four main strategic tasks if we are to develop successfully into one of the small number of leading international information technology companies that will exist in the new order. Our vast resources equip us with the ability to exploit opportunities as they arise.

In the first place we must broaden our revenue base both internationally and by committing ourselves to the information technology market. Next we must ensure that we have a secure platform to do this by improving services to our existing customers and maintaining their loyalty. Thirdly we must keep our costs down to remain competitive and finally we need to introduce a competitive spirit into all activities and continue to improve our dealings with customers.

With voice and data transmission rapidly becoming commodity items in a competitive and developed market place, British Telecom has to broaden its revenue base away from traditional areas. A major thrust is to increase activity outside the UK not only to spread investment and currency risk, but more importantly to capitalise on the growing international nature of telecommunications: no telecommunications company can expect to be successful in the long-term without an international profile.

Fortunately, British Telecom already has a well-earned reputation abroad through its consultancy role in more than 60 countries and it is now beginning to set up offices in major business centres

like New York, Hong Kong and Tokyo.

But as well as expansion overseas, widening British Telecom's revenue base means becoming involved in the development world of information technology. Again we are fortunate to have a head start in this field but we must remain alert to take advantage of all the opportunities which present themselves. Our approach is to build on current strengths to anticipate - and meet - the needs of our customers.

The loyalty of our customers is something we should never overlook: indeed our future well-being depends upon it. We recognise that, in the past, concern for our customers may not have been our strongest suit but we are now making up rapidly for lost time.

Vast sums of money are being invested in modernising our network to make it as fast, flexible and reliable as possible. Digital exchanges are coming into service at the rate of one every working day and optical fibre cable is being installed throughout the land. It all adds up to a much better deal for the customer and extra opportunities for British Telecom to exploit the new technology by introducing a new range of services and standards.

The third key issue of keeping down costs is achieved by the introduction of new technology with vastly reduced maintenance requirements. Equally, the onset of liberalisation and competition will ensure that British Telecom becomes increasingly competitive across the full range of its products and services.

The company's prices are essentially based on three criteria and, firstly, must be increasingly aligned with costs. As I have already indicated this means that in the longer term they will fall. Presently, however, we are still tackling the short-term problem of redressing a historical imbalance created by the political considerations and overall Treasury requirements of the past.

Secondly there is competition. In the apparatus markets we have learned many lessons over the past few years and it seems that pricing will generally remain stable and be subject to the normal pressures of competition, supply and demand.

Network prices are different and above all it is important to understand that British Telecom is bound to be a premium priced supplier in those markets where it has historical dominance. This is because there are classic economic reasons for 'new entrants' to undercut the lead suppliers. What is essential is that British Telecom is seen to offer the customer value for the price he pays.

Finally there is the third crucial element - compliance with the regulatory requirements. Our situation has been clearly spelt out in our licence and we do not expect significant changes in the foreseeable future.

The company's fourth main strategic task is improving our contacts with customers and putting ourselves in the position where we can help guide them through what must sometimes seem to be a technological maze. This puts the onus on us to provide a sort of consultancy service in an area in which we are quickly developing our expertise to give the best possible advice in any given situation.

This, then briefly is how British Telecom stands poised to exploit the opportunities presented by the Communications Revolution. We will continue working closely with all sectors of the industry, and in so doing are determined to succeed for our customers, our staff, our shareholders and the UK generally. ■

Faster connection of overseas calls and quicker enquiry handling are achieved with the aid of computers at the international operator centre in Mondial House, London.

A new British Telecom service harnesses information technology to speed up credit card transactions at hotels, petrol stations and stores.

Customers can keep in touch wherever they are thanks to the Communications Revolution.

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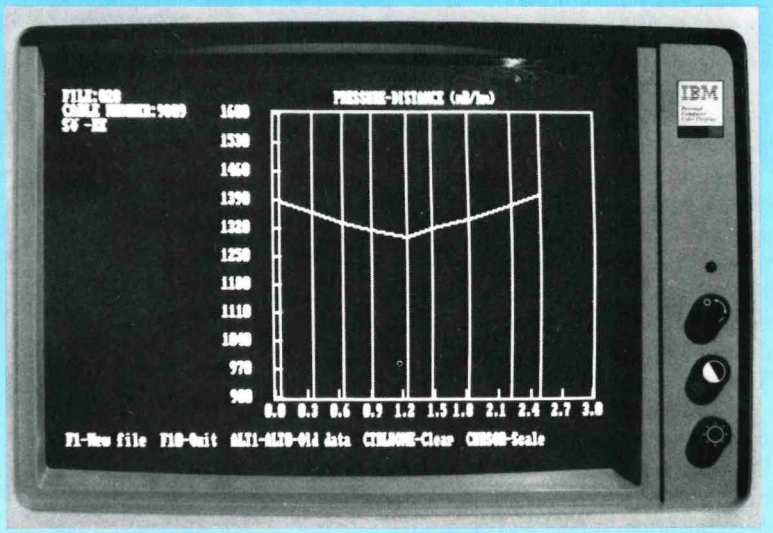

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Do you need an automatic changed number interceptor and announcer system?

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Firstly... Team 32 may be installed with 1 to 4 digital common message cards each giving up to 1 minute of recorded speech – for level changes and general service announcements.

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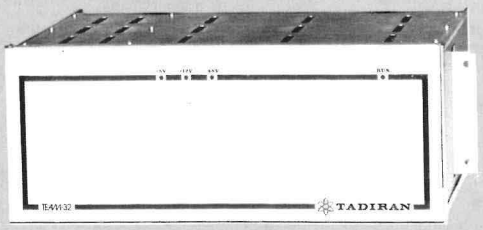

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TADIRAN

Giving to charity on a large scale is a new policy for British Telecom and a direct result of privatisation. A year ago, a Charities Unit was established as part of the Secretary's Office and is responsible for administering a much enhanced charities budget of £750,000. This article looks at the ways in which the company and individuals try to help those in need.

New approach to help those in need

Tina Pecksen

As a nationalised industry, British Telecom's contributions to charities were modest but with the new status of a public limited company all that has changed. It is the practice of most large companies in the private sector to give substantial sums to charities and as a result of a policy review in 1985 it was decided that BT should follow suit.

It is clearly in a company's interest to help the community in which it operates. Not only does it improve the company's image but a healthy community is good for business. In BT's case the community is nationwide so the total charities budget comprises a large central budget for donations to national charities and an allocation for District Offices from which local causes are supported.

Since the Charities Unit was only established

Having a phone chat with a friend is such an everyday part of life, but for Darren Pritchard — a young sufferer from spina bifida — learning to talk on the telephone has got a very special meaning.

Hearing someone speak down the line and finding words to answer back has opened up a new world for Darren, aged five, a pupil at the Vranch House School, near Exeter.

A group of phones were specially installed in the classroom by British Telecom free of charge after a local West Country manager had been told that they could be a help to young pupils with speech difficulties. British Telecom engineers put them in during their own time and a local shop owner provided red wooden boxes to go with them.

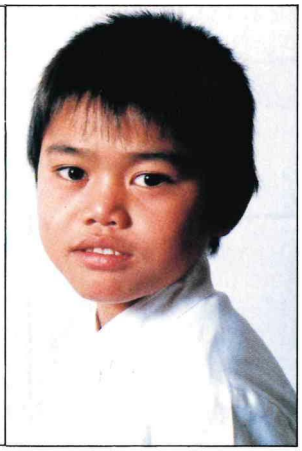
Darren, pictured here with nursery supervisor Ann Bailman, reacts with sheer delight to the idéa of phoning friends. His usual whispered replies strengthen to a clear and excited "hello, it's me" when the bell rings and he can talk to a young classmate.

There's a touch of magic in the way that the play therapy of the phones has helped him and others be stronger and more confident in speech, say his teachers. Says headmaster, Stan Johnson: "We try to use every aid for the children's development and these phones have proved really helpful for Darren."

recently and there is still much to learn about the charities field, the budget is being built up in stages with the object of topping the £1 million mark.

Overall responsibility for BT's charitable activities is vested in a Board Charities Committee which is chaired by Mr John Goble, one of BT's non-executive Corporate Directors. The Committee authorises all large donations and generally ensures that the company's charities policy is properly implemented and that board members are advised of its activities.

Since numerous appeals are now being received from some of the 150,000 registered charities in the UK it has been necessary to define a strict set of criteria governing the type of charities that BT will support. Donations are made to registered charities which aid medical research, the handicapped, the elderly, the underprivileged and the unemployed, education, the arts, national heritage, the environment and overseas causes.



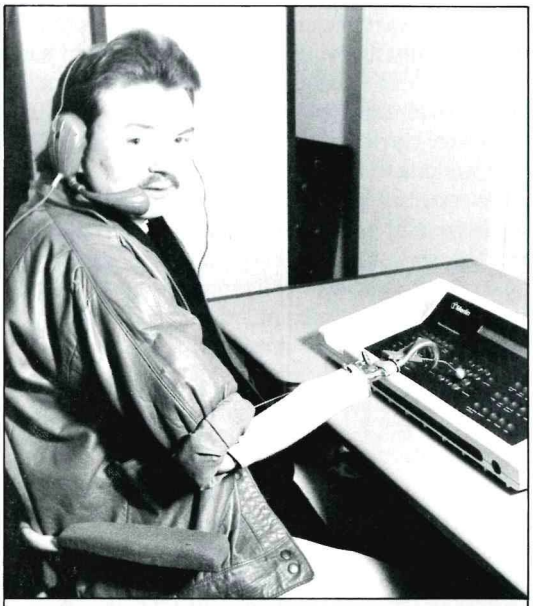
British Telecom's only adopted child, 12 year-old Samran Laepone from Thailand, is currently being educated at the company's expense at the Pestalozzi Children's Village near Hastings.

Samran, adopted by the Charities Unit at a cost of £1,800 a year, is among a number of specially selected children from Thailand, India, Saudi Arabia and Africa who will be taught skills in England which will be useful on their return home.

Apart from a conventional education, the children will be taught specific skills with the aim of producing the doctors, nurses, agricultural and building experts of the future.

The Charities Unit is also keen to help charities for which BT employees are raising money - provided the criteria are met. On the other hand, BT will not donate to any appeal where it is likely that the money will be used for sectarian or political purposes, nor to individuals.

Part of the charities budget is set aside to make substantial donations to special projects. Last year £16,000 was given to the Youth Business Initiative which makes grants of up to £1,000 to young unemployed people to assist them to set up their own businesses.



British Telecom Northern Ireland came to the rescue when Belfastman David Loughran, 25, who has been disabled since birth because of the Thalidomide drug, took on the might of the Monarch switching system.

The picture shows David mastering the switchboard with the help of a BT-designed 'bionic' probe.

Belfast technical officer Jackie Mahon led a team of engineers who produced the touch-sensitive probe. David has since started work as a telephonist with the Arts Council in Belfast.

Guidance

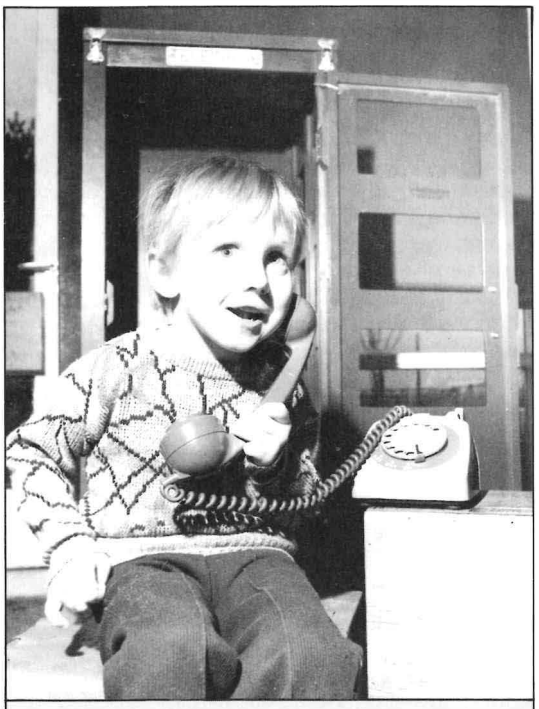
The money was allocated to four separate District Offices, which backed up the awards by giving the young people advice and guidance on marketing, accountancy and cash flow. In view of the success of this project it is planned to increase this level of support this year.

The Samaritans is another charity which receives special attention from BT and last May BT provided a donation of £10,000 towards the cost of Samaritans Week.

The launch of Samaritans week took place outside Mansion House in London where Sir George Jefferson and other senior representatives from BT sat at trestle tables in the street where they were served with a superb cooked breakfast in full view of passing commuters.

The Lord Mayor of London was also in attendance and used one of BT's mobile roadphones to speak to the newest branch of the Samaritans in the Shetland Isles. A cellphone ▷

A £6,000 Sony video camera has been donated by British Telecom's Film and Video Unit to the London based charity, the Job Change Project. The charity helps unemployed executives over 35 years of age to prepare themselves for new challenges and the camera will be used for interview techniques training. The picture shows Jill Austin from the Job Change Project receiving the camera from BT's Bill Abbott.



Another success for British Telecom's efforts to help handicapped pupils at Vranch House School, near Exeter, concerns four year-old Paul Webster who has difficulty uttering sounds.

A special phone system installed free of charge encourages him to overcome his speech impediment.

Since they were installed, the phones have been in constant use, with pupils often queuing to take their turn.

was installed in the Samaritan's bus for its tour of the UK during the week and numerous balloons were set free carrying BT phonecards for the lucky finders.

For this year, the Charities Unit is giving special emphasis to the homeless and will be working closely with a new charity called International Year of Shelter for the Homeless which is launching many projects throughout the country aimed at tackling this serious problem. The aim of the Charities Unit will be to co-ordinate assistance on a national basis in conjunction with BT's District Offices.

Understanding

A major exercise has been the company's involvement with TV personality Esther Rantzen and the ChildLine project which provides a helpful and understanding 'ear' for children throughout the country who feel menaced or threatened in any way.

The company has given the project, free of all charges, office space in the City of London worth about £1 million over 10 years and has also fully furnished and fitted it out.

On the publicity front, BT has given (or obtained) over £100,000 worth of work, including stickers for all public payphones and for 40,000 Telecom vehicles. A manager has been seconded to the project to help expansion and another manager sits on the ChildLine Council, which meets at British Telecom Centre in London, to ensure close and ongoing co-operation.

Charity Telethons are another, and high-profile, example of the company's efforts. BT's main experience derives from the Thames Telethons – the one in October 1985 was one of the largest of its kind with nearly 600 telephones manned over 36 hours.

This event raised about £2.75 million from 200,000 calls as a result of special programmes and TV personalities encouraging people to ring in and pledge money to an advertised charity, usually in the hands of a trust.

BT provided 550 MK1 Ambassador 8202R and 32 special range phones. The lines at the Connaught Rooms in London were provided from spare capacity as a TXE4 exchange in the then South Central Area.

A large staffing scheme was required to ensure that phones were manned at all times during the evening whilst allowing operators a break from hard and noisy work – a room full of 500 people is not conducive to using the telephone. A total of 1,840 shifts were carried out mainly by BT operators who were working in their own time after a day's work.

The company has had a smaller scale involvement in other events such as helping to answer phones over the weekend of the Band Aid Live Aid Concert last year when BT provided about 70 volunteers. Phones, accommodation and about 60 volunteers were also provided for the Six O'Clock Show Handicapped Children Appeal (LWT), a one hour programme which raised over £70,000 for handicapped children in the London area.

British Telecom has also joined the Per Cent Club organised by Sir Hector Laing, of United Biscuits, with the aim of encouraging private companies, initially, to contribute a half percent of pre-tax profits to community activities. In BT's case these activities, in addition to charitable donations, include sponsorship, education, community activities, Action for Disabled Customers and secondment.

There are many ways to help charities apart from the donation of cash. The provision of accommodation or facilities for conferences and meetings can be invaluable to a charity along with gifts of furniture and office equipment. A secondhand video camera worth £6,000 was recently handed over to the Job Change Project by Corporate Relations Department's Films and Video Group. The project helps unemployed people in the 35-plus age group and the camera will be used mainly to film mock interviews.

Every charity which requests a donation is subject to careful scrutiny to make sure that its administrative expenses are not excessive and that the money will be used for the purposes outlined in the appeal.

By having a well-defined charities policy and making the effort to help charities achieve their aims it is to be hoped that British Telecom will be able to establish a reputation as a company that cares for the well-being of people in the community. ■

Mrs C M Pecksen is head of British Telecom's Charities Unit.

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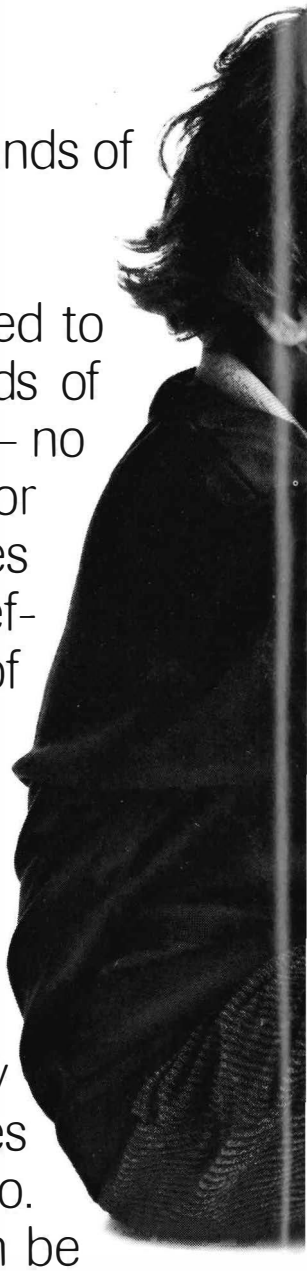

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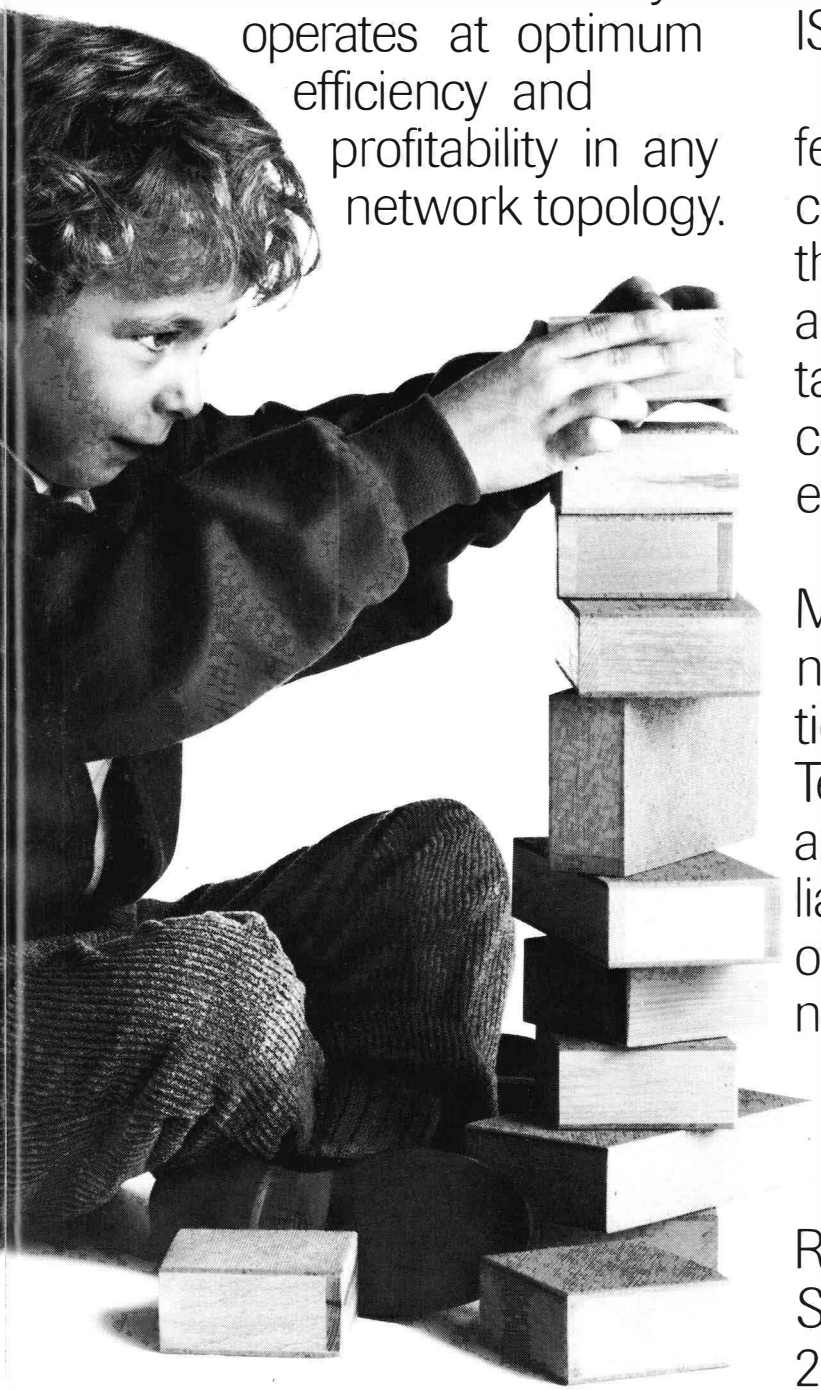

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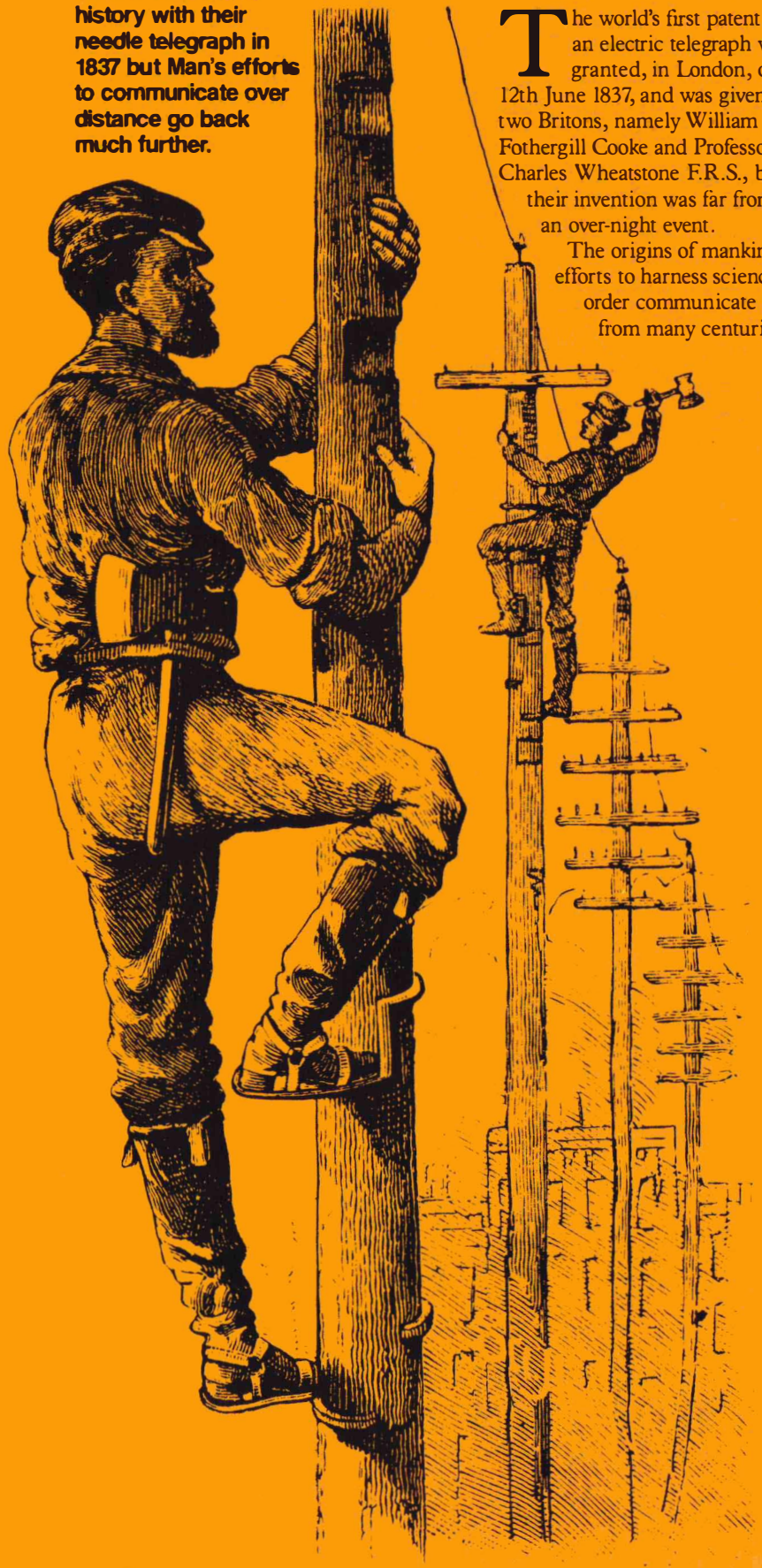
The telegraph–how it

This year marks the 150th anniversary of the electric telegraph popularly believed to be a British invention. Cooke and Wheatstone made history with their needle telegraph in 1837 but Man's efforts to communicate over distance go back much further.

Neil Johannessen



The world's first patent for an electric telegraph was granted, in London, on 12th June 1837, and was given to two Britons, namely William Fothergill Cooke and Professor Charles Wheatstone F.R.S., but their invention was far from an over-night event.

The origins of mankind's efforts to harness science in order communicate date from many centuries ago, when the magnetic properties of the lodestone were discovered. The best known use of this is in the magnetic compass but, in 1617, an article was published suggesting a 'sympathetic needle' system of communication and, in 1632, Galileo wrote about the possibility of magnetic needles communicating over two or three thousand miles.

It was, however, electric science that offered the basis of today's methods and the story begins with the work of Gray and Wheeler who, in 1729, demonstrated the transmission of an electric discharge through wires over 800 feet long, with the invention of the Leyden Jar, a device able to store the 'electrical fluid', the numerous experimenters in the field were soon sending the current 20 and more miles. And it was not only through wires; the use of the earth as a conductor was tried, and it is recorded that the King of France was delighted at a demonstration where a circle of 180 French Guards standing hand-in-hand had a discharge passed through them!

But, from there, it was not a major step to envisaging the use of electricity as a means of communicating and, it is generally agreed, the first mention of this was in a letter titled 'An expeditious method of conveying intelligence', in the *Scots Magazine* of 17 February 1753. Signed 'C.M.', the letter described in some detail a practical electrostatic telegraph in which as many wires as there were characters to be transmitted were provided.

Unlikely

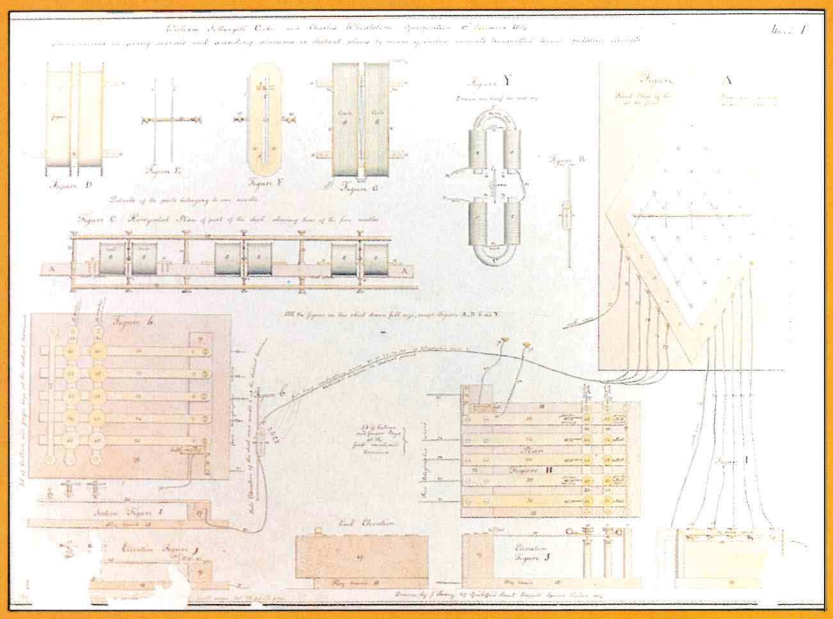
Just who 'C.M.' was has never been fully established and it is unlikely that his idea was actually constructed. Others though followed up his idea, most notably Le Sage in Geneva in 1774 (on a small scale), and Don Salvá who in 1795 proposed a 44 wire system (a pair for each of 22 letters) from Barcelona to a town 13 miles away. A later single wire and earth return system by Salvá spanned a distance of 26 miles or so, in 1798.

At this stage it is worth reflecting just how primitive the activities of the numerous people involved were at the time. Whilst it may be plainly obvious that there would be no mail-order component supplier, it is perhaps less realised that most of the fundamental aspects of electricity which are nowadays taken for granted had not even been established, and all the work so far relied on sources of static electricity.

Galvani, an Italian Professor of Anatomy and Gynaecology, didn't publish his experiments with frogs legs until 1791 - the year when Michael Faraday was born! The indicators or detectors then available to the experimenter were restricted to electroscopes and pith balls. Don Salvá's 1795 system used 22 men, who called out their respective letter when they felt a shock!

But, with the invention of the battery by Volta in

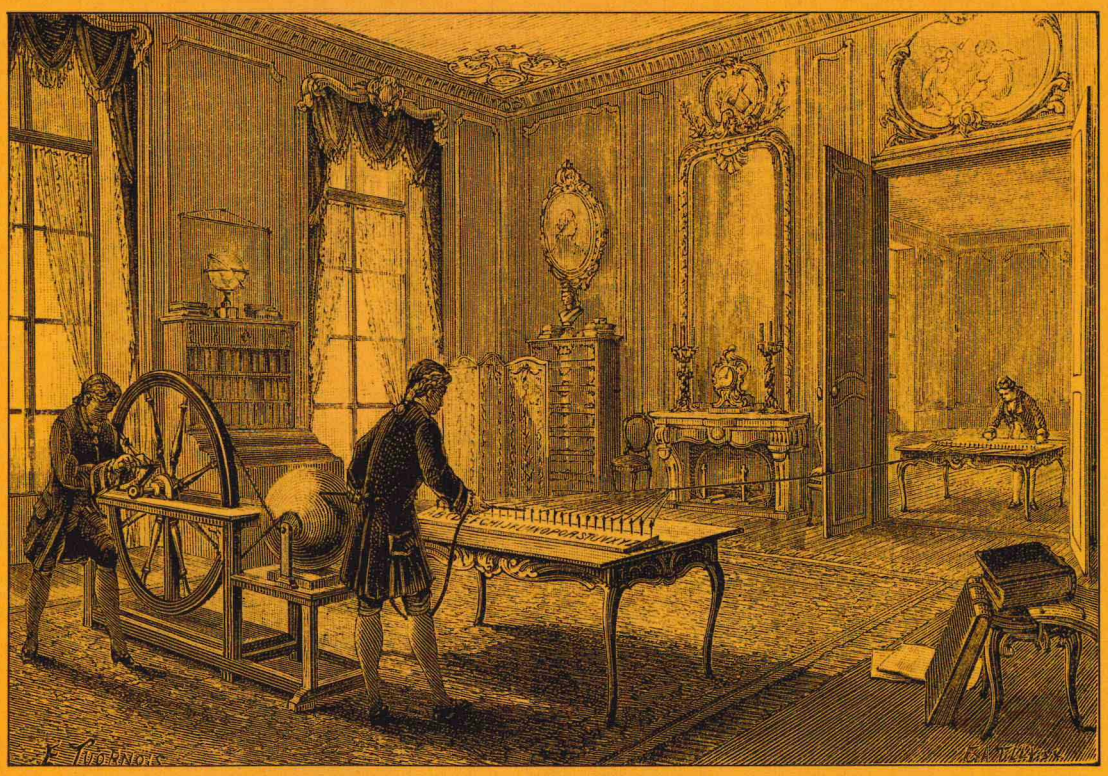
all started



Cooke and Wheatstone's original patent drawings.

1800, a reliable source of electricity was available, and the first application of this to telegraphy was by a Dr Sömmering, a surgeon, who exhibited a device in Munich in 1809. Making use of recent work on electrolysis, his telegraph used 35 wires (and operating keys) and the signals were indicated by bubbles rising from pins in a glass trough containing a solution of acid.

At the same time, however, countries such as Britain and France were erecting and using perfectly feasible telegraph systems in the form of mechanical semaphores operating over a great many miles. In the early 19th century they played an important role in government and military communications, usually from the capital to the main naval ports.

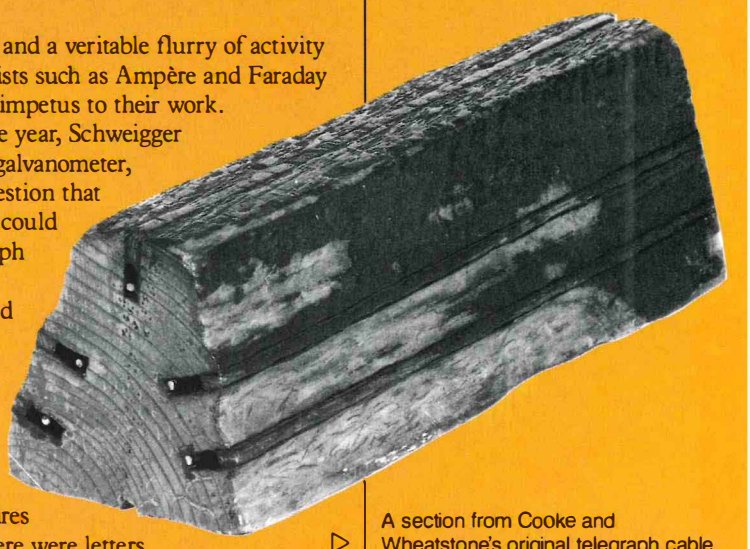


The first ever electrical telegraph built by Le Sage in Geneva in 1774.

Work with electrostatic telegraphs had not entirely ceased either. In 1816, Francis Ronalds used his Hammersmith garden for an ingenious single-wire system, and he wrote to the Admiralty proposing its use. Their response that 'telegraphs of any kind are now wholly unnecessary; and that no other than the one now in use will be adopted' must have been a disappointment to him, although posterity did him greater justice and many years later he received a knighthood for his 'early and remarkable labours in telegraphic investigations'.

Despite all this pioneering work, most of the properties of electricity had still to be discovered. But in 1820, and in some way by pure chance, Hans Christian Oersted, Professor of Physics at Copenhagen University, discovered electromagnetism and a veritable flurry of activity began, and scientists such as Ampère and Faraday were given a new impetus to their work.

By the end of the year, Schweigger had invented the galvanometer, and the first suggestion that magnetic needles could be used as telegraph indicators also occurred at around the same time. Most of the immediate ideas for electric telegraphs still envisaged the use of as many wires and needles as there were letters



A section from Cooke and Wheatstone's original telegraph cable.

▷

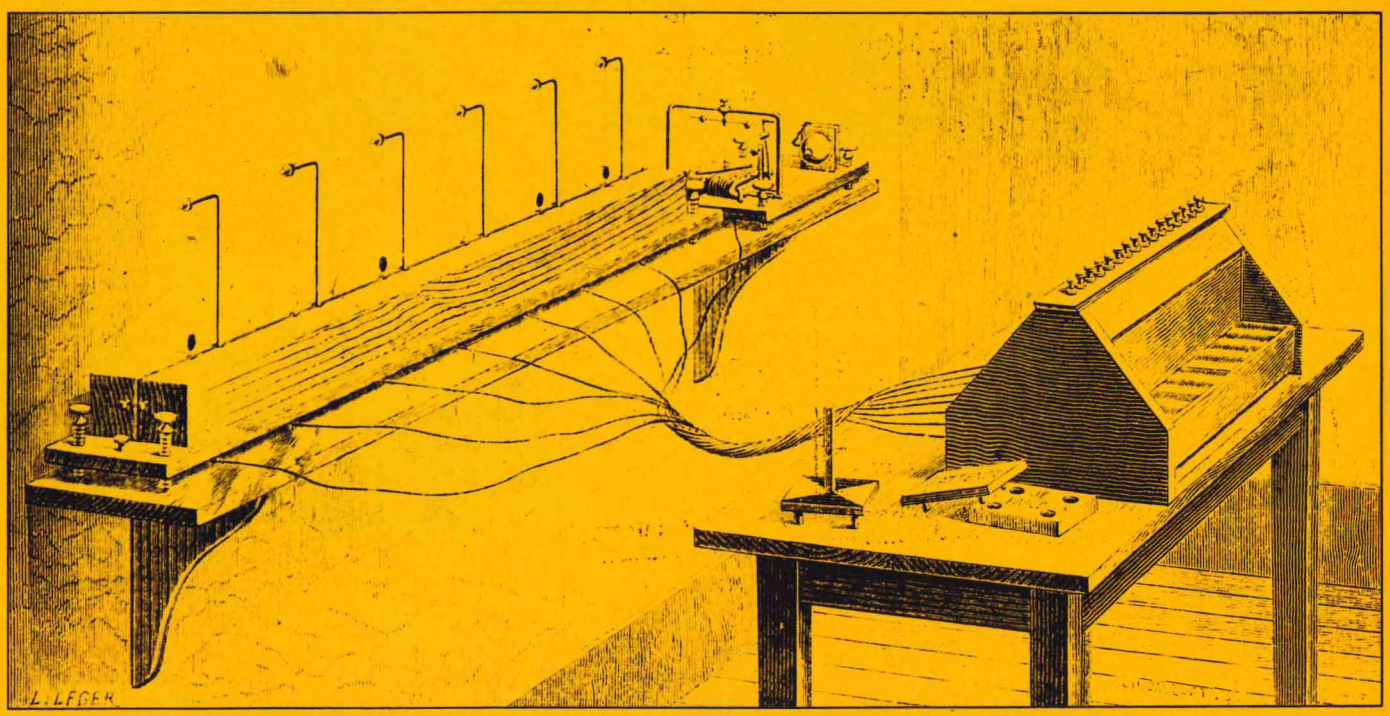
Wheatstone's patent for improving the telegraph bought by the General Post Office.

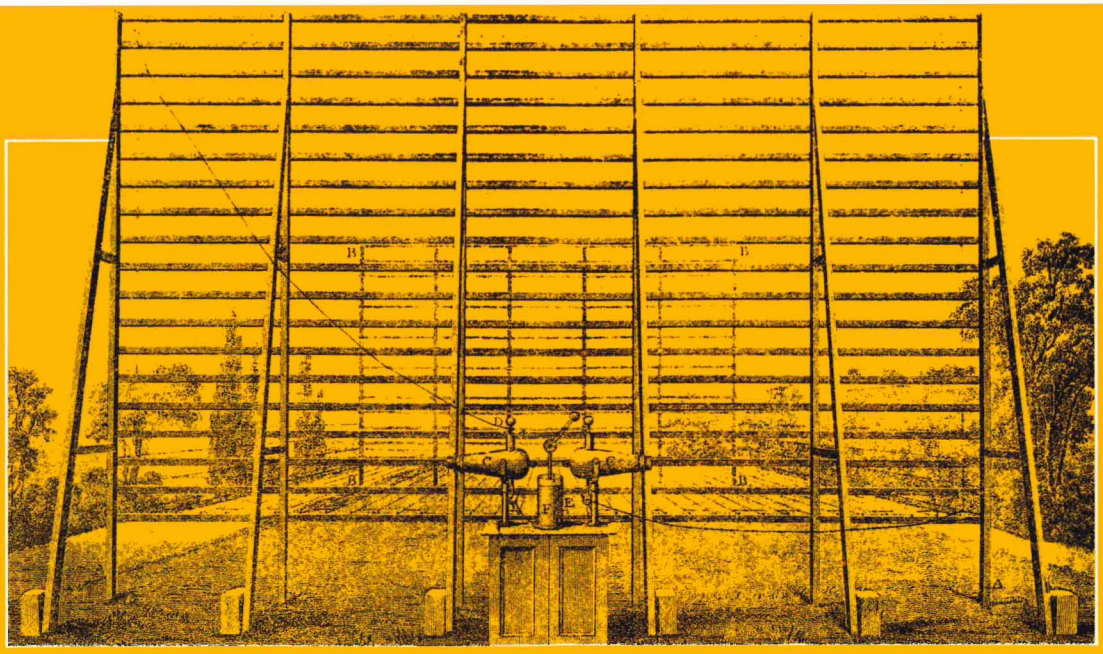
and symbols to be transmitted, but, in 1832, Baron P L Schilling, a member of the Russian diplomatic service living in Germany, produced a damped horizontal single needle system in which a code was used to indicate the characters, and copies of his instrument were sent to friends elsewhere in Europe.

Gause and Weber, however, were the first to put the 'needle' to practical use and their system was in daily use at over one and a quarter miles at Göttingen, between 1833 and 1838. An interesting feature of this device was the use of a small mirror on the needle's suspension thread, in effect a very early mirror galvanometer.

So far, no mention of Cooke and Wheatstone but none of the early pioneers worked in isolation from each other. Modern communications

Russian diplomat Baron P L Schilling produced this revolutionary telegraph in 1832.





Francis Ronalds built telegraph systems in his Hammersmith garden in the early 19th century and later received a knighthood for his efforts.

did not exist, but through travel and published papers (often still in Latin!) the ideas and news of progress travelled far. In March 1836, whilst studying anatomy in Heidelburg, Cooke saw a telegraph demonstration which used a model of Schilling's device.

To say that Cooke was seized by the idea is an understatement. Within a matter of weeks he had produced a three needle device that, in most respects, was based on the same principle as later commercial models. By February of 1837, not only had he progressed through a number of other prototypes, including electro-mechanical systems, but he had also returned to London and had been in contact with the Board of the new Liverpool and Manchester Railway to whom he offered a 60 signal system.

They were not immediately interested and, realising the inadequacy of his own scientific skills, and taking the advice of Faraday and Roget (of Thesaurus fame), Cooke made contact with Professor Wheatstone of Kings College London, and, seeing the benefit of having a noted name associated with his work, urged Wheatstone to enter into a partnership, which they did in May 1837.

On 12th June, after substantially improving the device, they were granted a patent which was the world's first for an electric telegraph. Meanwhile Cooke, the business man of the team, had also been busy drumming up custom, and through the interest of Robert Stephenson and a series of small demonstrations, the Liverpool and Manchester Railway gave an order for a system to be installed alongside the railway between Ruston and Chalk Farm in London.

This was in use by the end of July 1837 and the thrill of what was happening can be imagined in the words of Wheatstone on seeing the first message come through — *"Never did I feel such a tumultuous sensation before, as when, all alone in the still room I heard the needles click and, as I spelled the words, I felt all the magnitude of the invention to be pronounced to be practicable beyond cavil or dispute".*

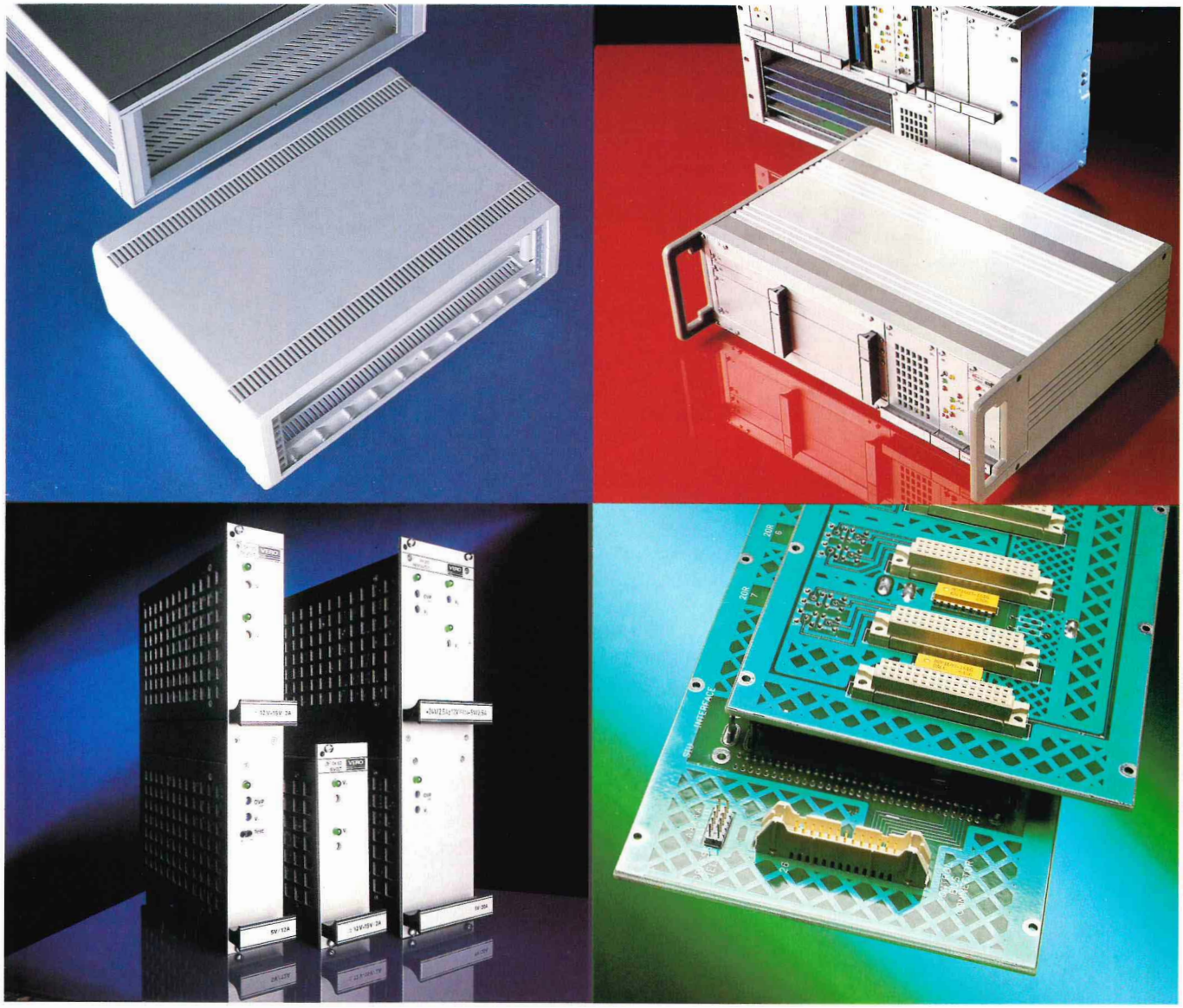
The Railway Company were evidently not as impressed, for the installation was recovered shortly afterwards, and such plans as there were for a line from London to Birmingham were not adopted.

Of course, some might have given up there and then. But the partnership continued, albeit somewhat acrimoniously, and further developments were made, more demonstrations were arranged, and interest grew. Meanwhile, other inventors were busily promoting their own systems.

But it is to Cooke and Wheatstone that popular British history credits the electric telegraph, and in many ways this is quite true. They both later received knighthoods for their work but they would plainly be hard pressed to claim all the credit. ■

Mr N Johannessen is manager of the Telecom Technology Showcase.

Early telephones were decidedly eccentric.



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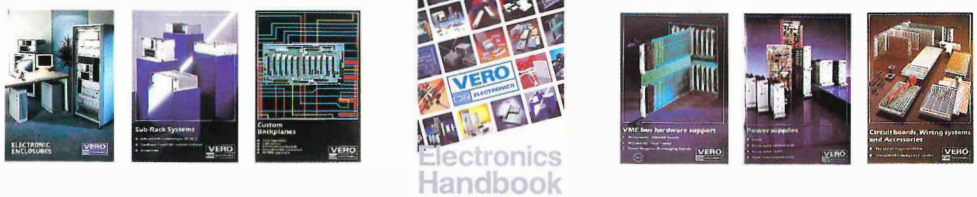

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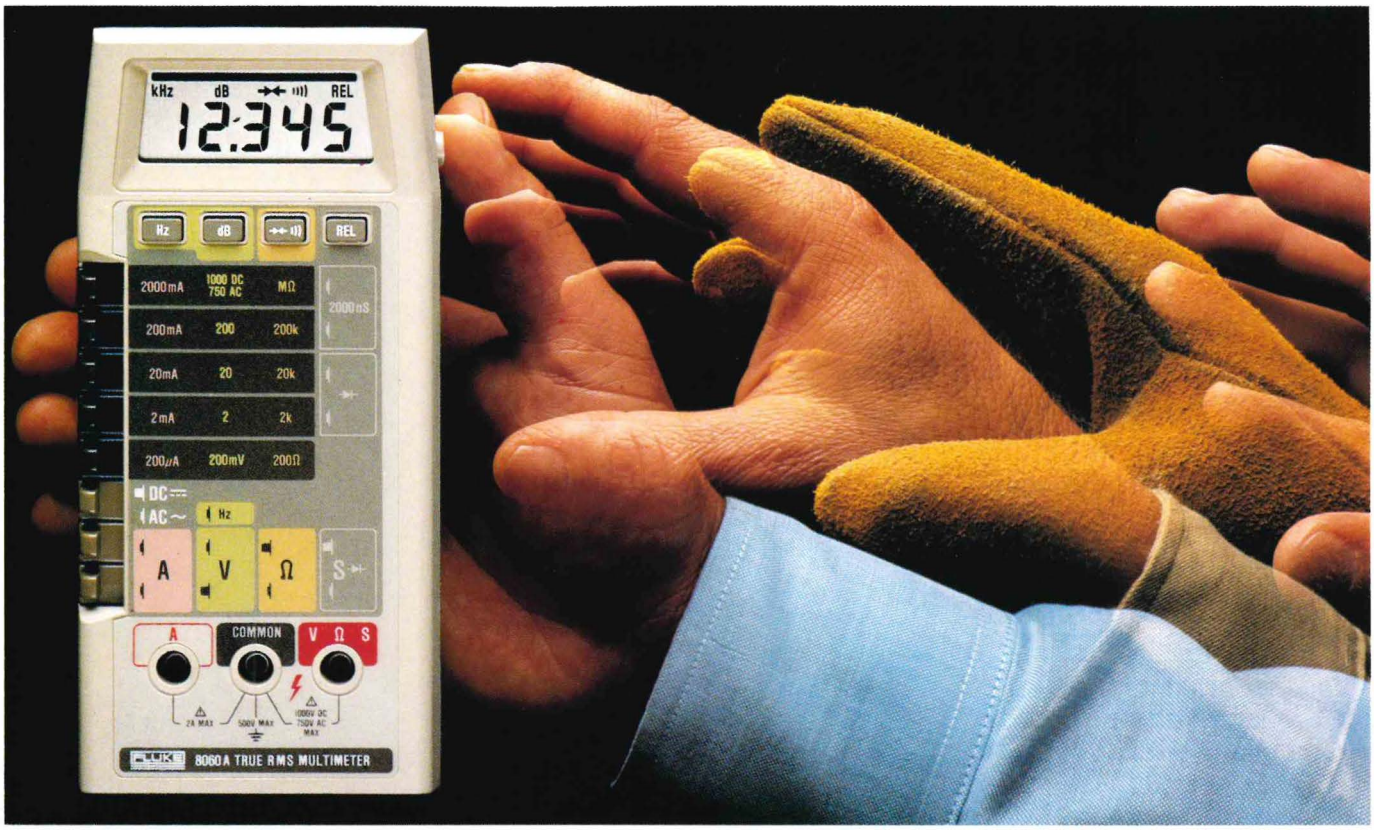

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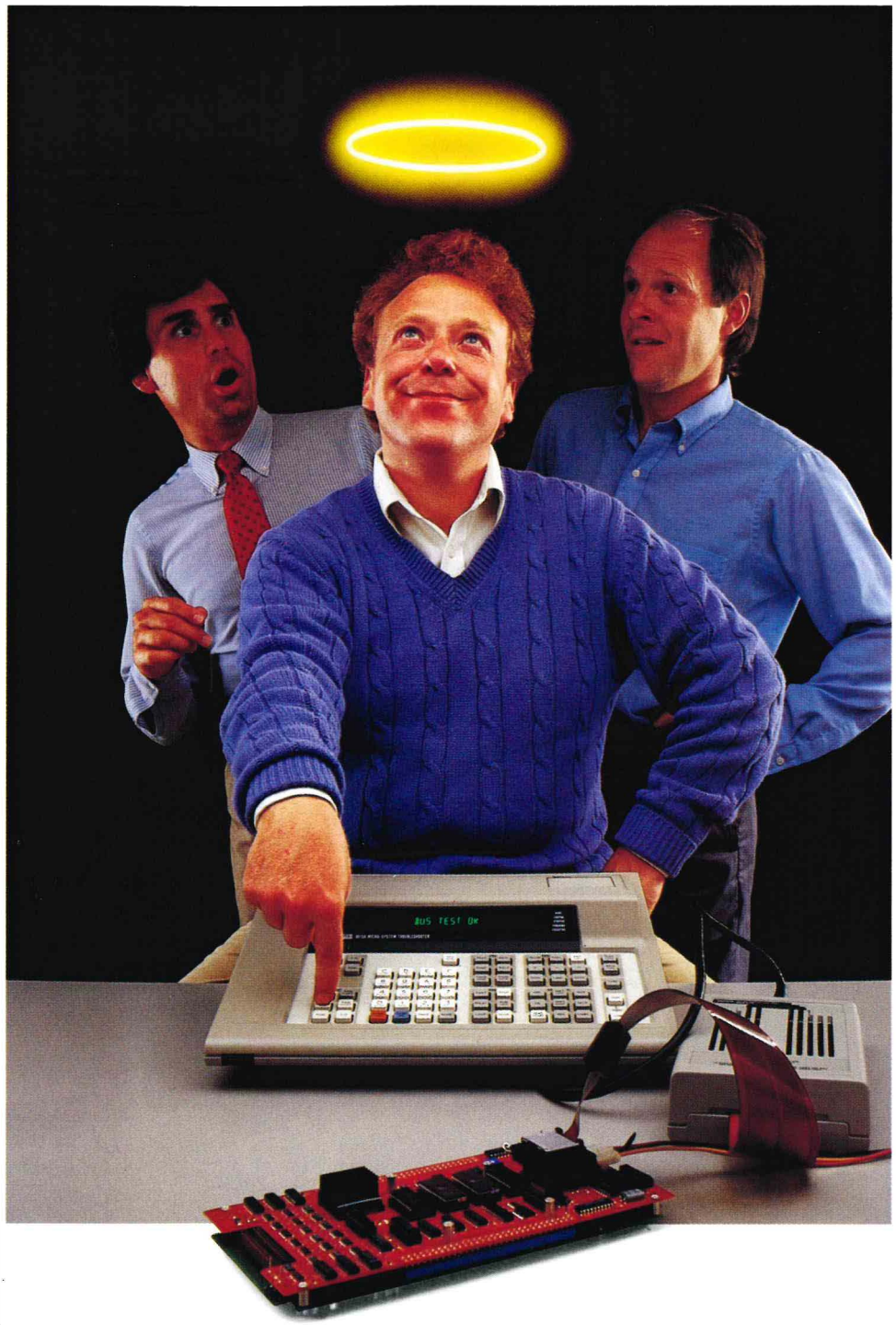

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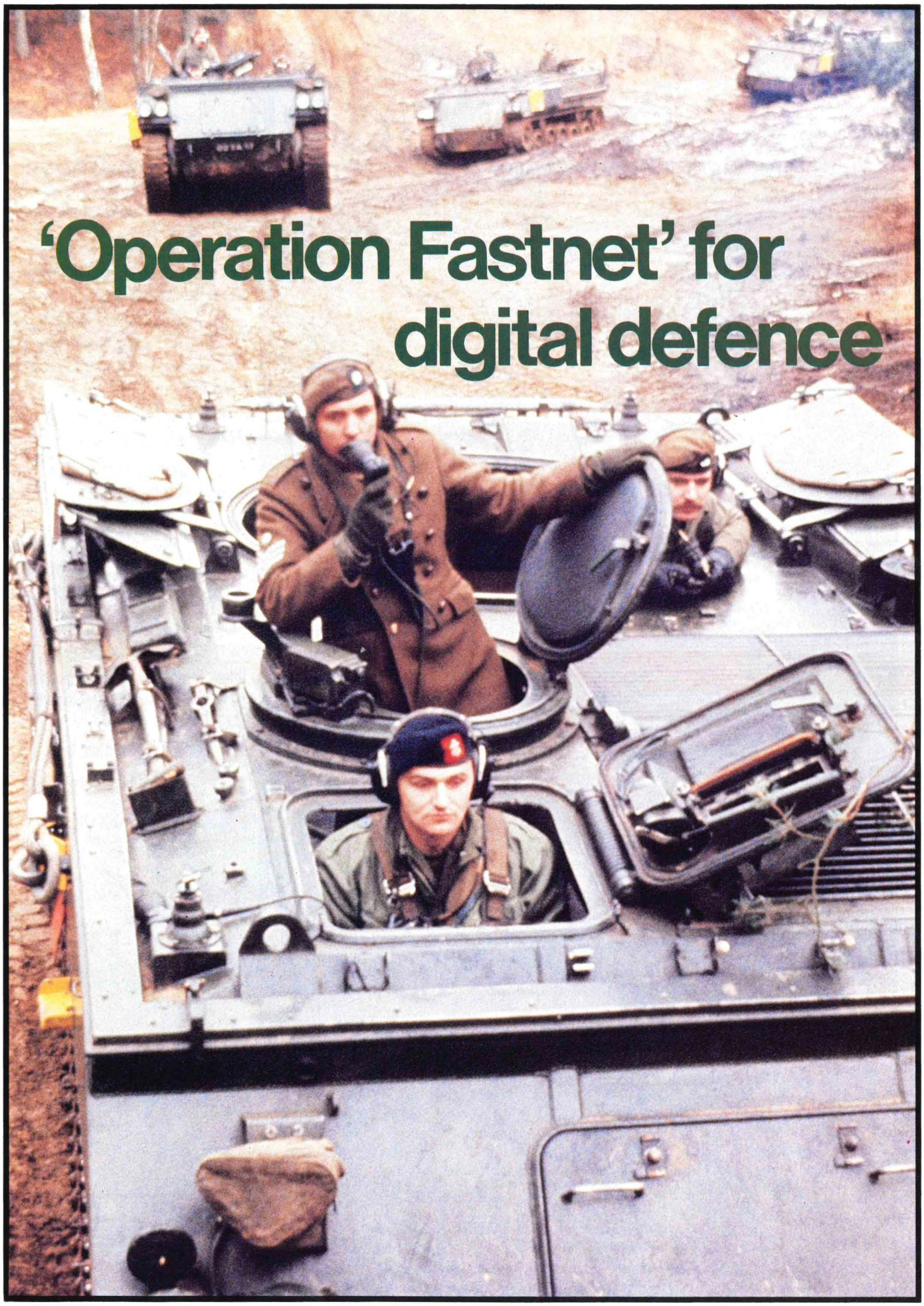
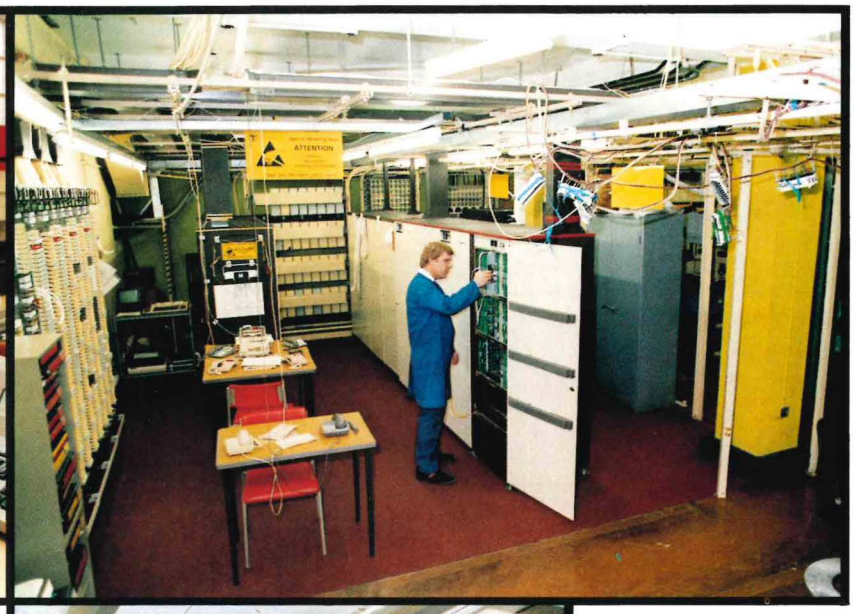


‘Operation Fastnet’ for digital defence



Britain's largest and most advanced private digital communications system is now seeing action with 'The Professionals'. Called Fastnet, the Army's new system is British Telecom's first move into the international defence market and illustrates the company's ability to produce tailor-made solutions to customers' communications problems regardless of their size and complexity.

The £13 million Fastnet network covers the Army's largest 50 sites. More than 30,000 extensions are planned, to form an integrated system, handling phone calls, data, facsimile and teleprinter messages.

A total of 72 Merlin DX digital PABXs manufactured by Plessey, are being installed under the contract. These are linked by a digital high-capacity bearer system, made up of 119 MegaStream wide-band leased circuits.

Together, the switches and bearers form an integrated digital private network, which uses the Digital Private Network Signalling System (DPNSS). This means that specialised user features, such as call transfer and ring-when-free, will work across the entire network.

As well as interconnecting Army users in the UK, Fastnet also provides communication overseas. It will handle calls to the other service and government networks as well as the public telephone system.

Thameswey's Principal Management Centre (PMC) is the centralised fault reporting point for the whole network on a 24-hour basis.

When, after three years, the second and third phases of Fastnet are completed, nearly all the Army sites in the UK will be covered by an integrated voice and data network.

BT has recently bid for Phase 2 of the project. This will modernise 150 PABX installations at Army sites throughout the country.

Phase 3 is to integrate non-voice services into the network and will eventually encompass automatic data processing, office automation and information technology, facsimile, telegraph and messaging. The result will be a totally integrated digital network interfacing to Local Area Networks.

For the future, there is the wider issue of the integration of Fastnet and the two other digital networks planned for the Navy and the Royal Air Force into the Defence Fixed Telegraph System. The approach to be taken to manage the networks will be a key feature of this amalgamation, which is an area in which British Telecom's experience and expertise is expected to be at the forefront. ■

Top left: a compact Fastnet switchroom compared with its cumbersome predecessor (centre).

Top right: a BT engineer at work during the transition stage from ancient to modern. Pictures from Thameswey District.

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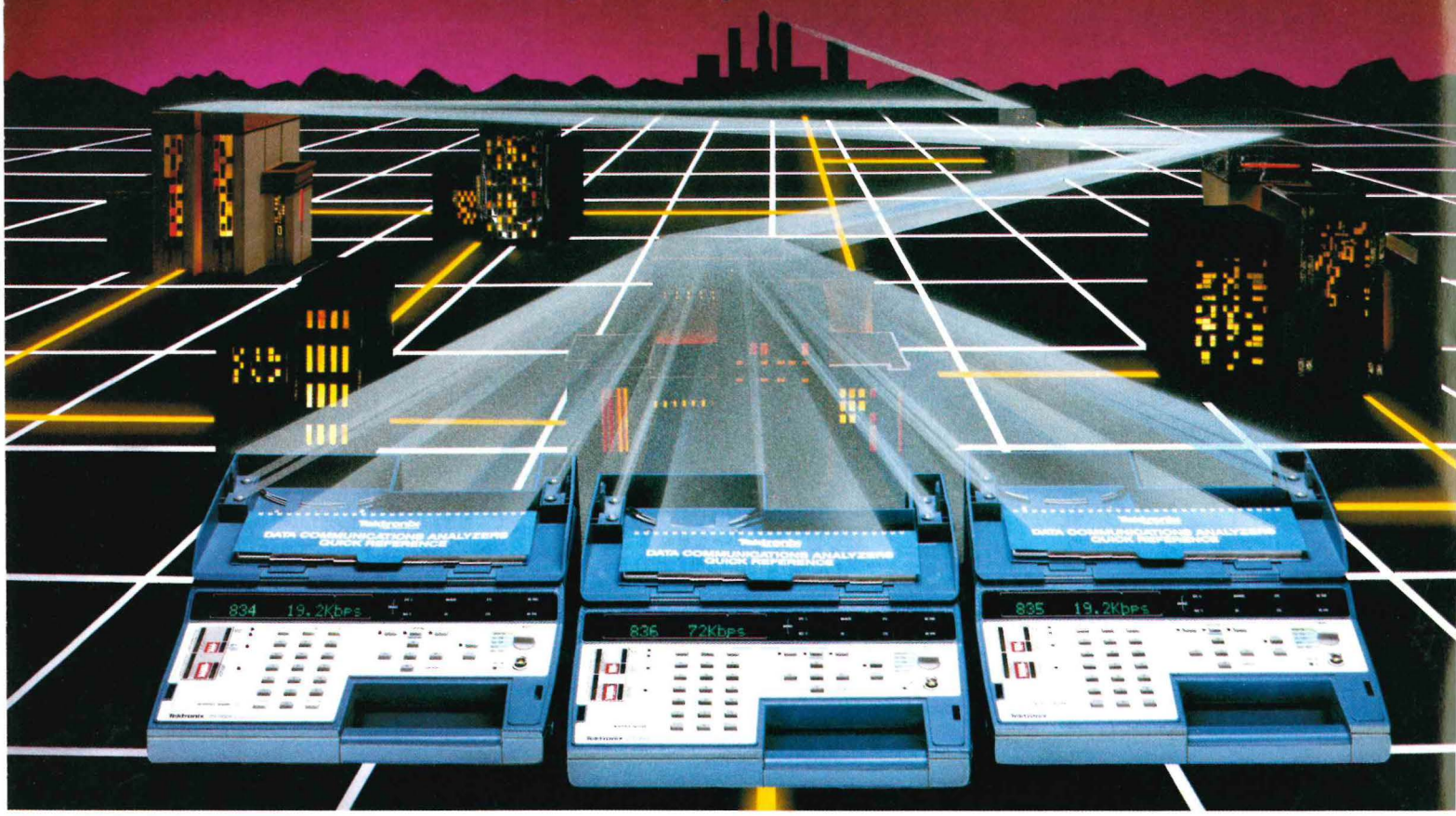

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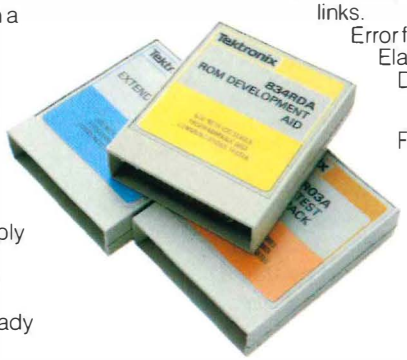

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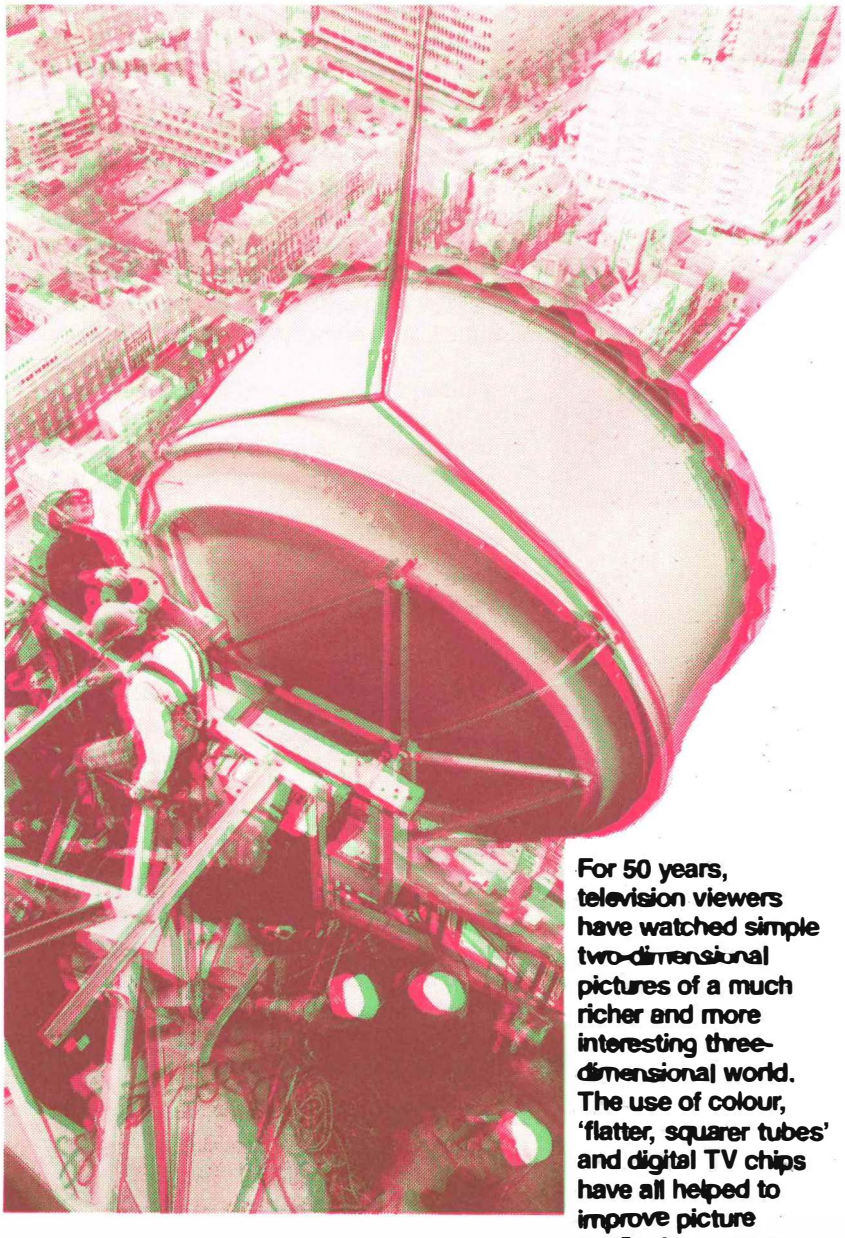
3DTV– A view of the future

Dave Crawford

In the future, sociologists predict that people will have more spare time and a greater need for entertainment, and, as a result, there will be an increased and profitable market for the 'leisure industries'. Furthermore, British Telecom's plans for the penetration of single mode optical fibres into the local network will open up an almost unlimited bandwidth for service providers for the benefit of their customers. BT is preparing for this by researching into new visual telecommunications services – such as three-dimensional television (3DTV) and high definition television (HDTV).

As part of a BT corporately-funded research programme, the Visual Telecommunications Division at BTRL has been looking at some of the problems and possible solutions to transmitting 3DTV. The latter topic of HDTV involves a collaborative research programme with European organisations and will be dealt with in a subsequent article. The fruits of these and other researches will enable BT to develop a coherent strategy for the transmission of future wideband communications and entertainment services.



For 50 years, television viewers have watched simple two-dimensional pictures of a much richer and more interesting three-dimensional world. The use of colour, 'flatter, squarer tubes' and digital TV chips have all helped to improve picture quality but current work on 3DTV at British Telecom Research Laboratories, Martlesham Heath, could help to pave the way for a whole new viewing experience.

The human visual system is a remarkable and complicated processor of biological signals and cues obtained from the eyes' field of view. Depth is perceived through two main classes of stimuli:

- physiological – neural feedback to the brain concerning the muscle control of the eyes when looking at an object of interest;
- psychological – the detection by the brain of differences between each eye's view of an object due to parallax, a process known as 'binocular disparity'.

There are other more subtle stimuli concerned with such things as texture and shading, relative sizes of objects, their focus and perspective. However, the dominant stimulus is undoubtedly that of binocular disparity, and this can be reproduced in a televised image in a number of ways. By necessity, two cameras are required, positioned 'eye distance' apart at the source and directed at the object of interest. At the display, some form of 'barrier technique' is employed to ▷

Above: lifting a new microwave dish into position as part of a re-equipment programme for the Telecom Tower, London.

Left: children gaze in fascination as a mobile SatStream dish travels through London.

Main picture: if you collect back issues of the *British Telecom Journal*, as many of our readers do, compare the 3D treatment of this photograph showing repainting at Goonhilly earth station, Cornwall, with the conventional image used for the front cover, winter 85/86, volume 6 number 4.

Right: researcher Geoff Tomlin with the Martlesham stereoscopic projector.

Far right: 3DTV could be out of this world!

preserve separation of left and right eye signals and to direct them to the corresponding eye of the viewer. The result is the simplest form of 3DTV – binocular 'stereoscopic television'.

Figure 1, page 49, shows how simple 3DTV can be arranged using a two-colour or 'anaglyph' technique. The left eye view of the apple is viewed by a monochrome camera via a green optical filter and is transmitted as a monochrome television signal to the green channel input of a television monitor. The right eye view is similarly transmitted, and corresponds to the red colour

channel. The monitor picture is composed of the superimposed single eye views with their relative binocular disparity.

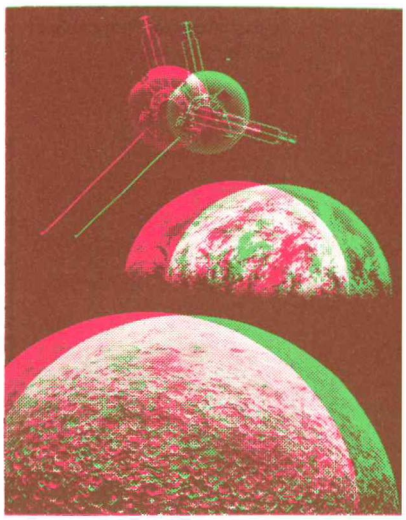
If correspondingly coloured lens spectacles are used to separate the eye channel information – a green lens for the left eye, and a red lens for the right – then the viewer's brain will fuse the images into a single perception of a 3D apple. The possible colour range for the apple is unfortunately limited to greens, yellows and reds, but the perception of depth will be quite unmistakeable.

Several variations upon this theme have evolved. Full colour left and right eye views can be projected via plane polarised optical filters, with planes at ±45° to separate left and right eye channels. Polaroid glasses with corresponding orthogonal planes of polarisation are worn by the viewer to preserve channel separation. Although there is some slight transmission loss through the filters, the true colours in the transmitted scene are preserved.

Alternatively, special spectacles with liquid crystal shutters can be synchronised to the sequential display of left and right eye pictures on the display. A flickering, but truly 3D image is obtained.

These systems have been carefully investigated at Martlesham Heath. While sometimes producing impressive 3DTV effects, the requirement of wearing special glasses has been found to be a serious drawback to the viewer for many applications.

Glasses-free systems have been developed. The barrier technique employed at the display to separate left and right eye views can be transferred, in effect, from the users' nose to the front of the ▷



Below: a fresh look at the laying of optical fibre cable in the City of London.

display. Such techniques usually employ special screens with precise slits or a series of very fine vertical lenses called lenticules.

The principle of stereoscopic 3DTV via lenticular screen is shown in Figure 2. The system demands a high degree of display linearity and precision, and some careful alignment of lenticular optics (and also the viewer, unfortunately!).

The main disadvantage is that sideways movement of the viewer's head will cause strange image 'flips' when left and right eye picture stripes become projected to the wrong eyes. Solutions to this problem which involve tracking of the viewer's head to adjust the lenticule/picture stripe positioning are considered too unwieldy.

The main failing of stereoscopic TV is that only a single viewpoint image is achieved. A movement of the head means that the viewer cannot see round the object at all, because the cameras at the distant end do not track the movement. Ideally, 3D images should gradually show their right side when the viewer moves right, and their left side when the viewer moves left. Such a truly 3D representation is called an autostereoscopic display.

Autostereoscopic systems tend to divide into two main classes:

- those based on ordinary (incoherent) white light, such as the 'parallax panoramagram', and the vari-focal mirror;
- those whose formation requires the production of light beams with stable phase relationships (coherent light), such as the 'hologram'.

The parallax panoramagram can be formed essentially by an extension of the glasses-free sterescopic TV principles described above. Multiple TV cameras are employed at the source in an arc around the object to be viewed. At the receiver there are multiple interleaving picture stripes representing the views from all source camera positions.

As the viewer moves his head from left to right, the optical ray paths are engineered via finely split screens or lenticular sheets to at first project views from cameras 1 and 2, then from cameras 2 and 3, and scan until the limit of the arc of cameras is reached. To cope with any significant head movements, a large number of interleaving pictures are required at the receiver, and high resolution, linearity, and optical precision are necessary.

Vari-focal mirror systems use a vibrating mirror and lens to produce a virtual image, of which only a portion is in focus. The perception of depth can be conveyed to the viewer by sharpening the focus at the front of an object and blurring the more distant details.

Alternatively, the brightness of the object can be varied over its depth. Such systems in theory can produce more realistic 3D images than the rather 'cardboard cut-out' effects of stereoscopic television. However, in practice, the pictures are often blurry and 'noisy'.

Another aspect of 3D display is holography - the recording of the light interference pattern produced by a direct reference light beam and a reflected object illuminating beam, both derived from the same coherent (laser) light source. This is shown in Figure 3.

The interference pattern is typically recorded by photographic techniques; and the 3D image is reproduced by light of the right wavelength passing through the hologram to form a virtual image as shown in Figure 3. But there are several shortcomings in using holograms for 3DTV:

- a coherent (laser) light source is required for their formation;
- recording can be performed only in a darkroom;
- the reconstructed image is monochromatic and can only produce various shades of a single colour - colour holograms are not yet well developed;
- the object must be perfectly still for the production of a good hologram.

Holograms have been carefully recorded and displayed as 3D cinema films. However, the requirement of stillness for recording and the extremely high density of data for transmission, make their use in 'real-time' television systems impractical as yet. For example, the time taken to transmit the information in one television picture, which is transmitted now in its 2D form in 1/25

second, would take two hours as a 3D hologram!

True colour 3DTV systems are most simply achieved by stereoscopic means. In industrial (inspection) applications, the use of glasses for viewing is probably acceptable. However, for home entertainment and face-to-face video communications they are highly undesirable.

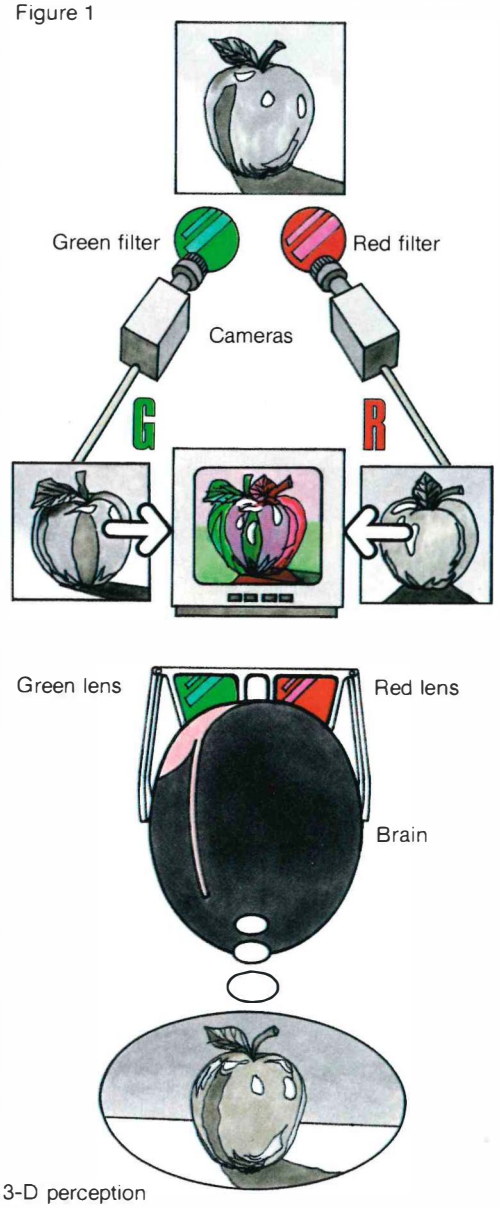
The future development of large high density, solid state matrix displays may solve some of the lenticular sheet and panoramagram limitations. These displays would probably be flat 'hang on the wall' devices, corresponding to moveable windows with programmable views.

The hologram is a high density storage medium for optical information and has many applications. At its present level of development, however, its usefulness to real time 3DTV is not so certain.

The Visual Telecommunications Division's task has been to research and evaluate many of the new imaging technologies, and to stimulate development of futuristic new services such as 3DTV, in preparation for the visual communication requirements of tomorrow. ■

Stereoscopic presentation by anaglyph

Figure 1



Schematic plan of stereoscopic presentation by lenticular screen

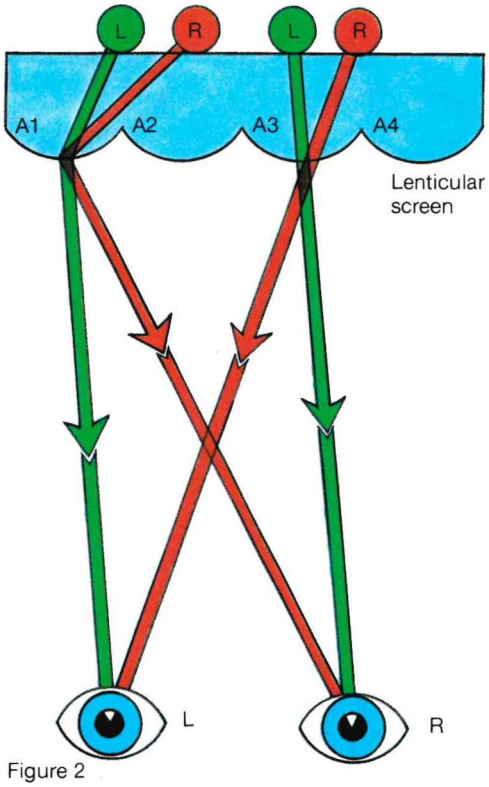
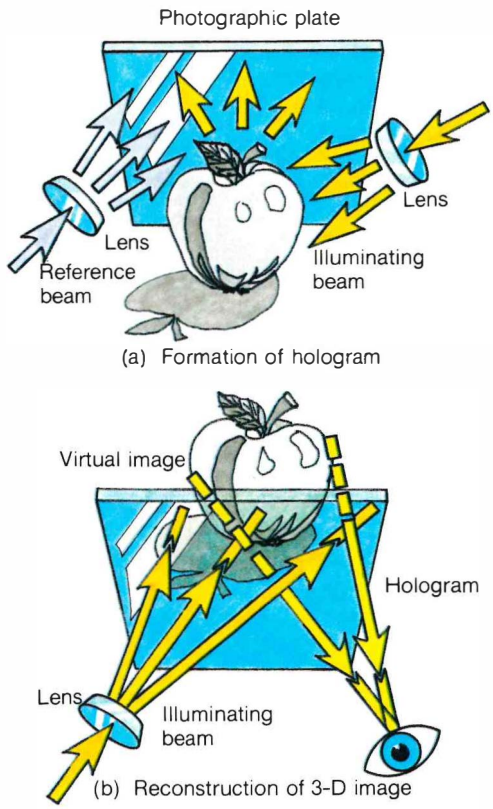


Figure 2



Holographic 3-D display

Figure 3

Dr D I Crawford is head of advanced TV studies at British Telecom Research Laboratories, Martlesham.

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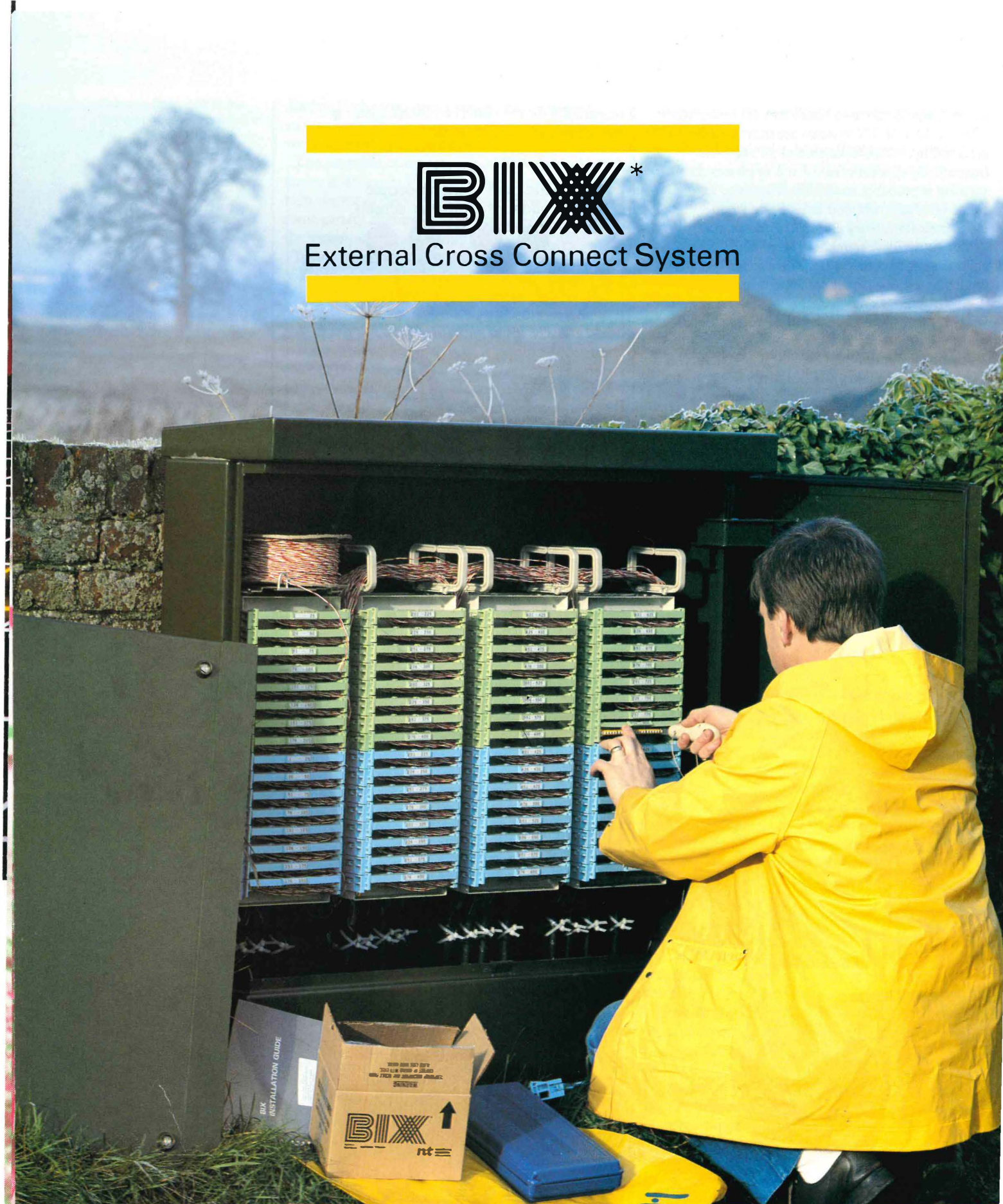

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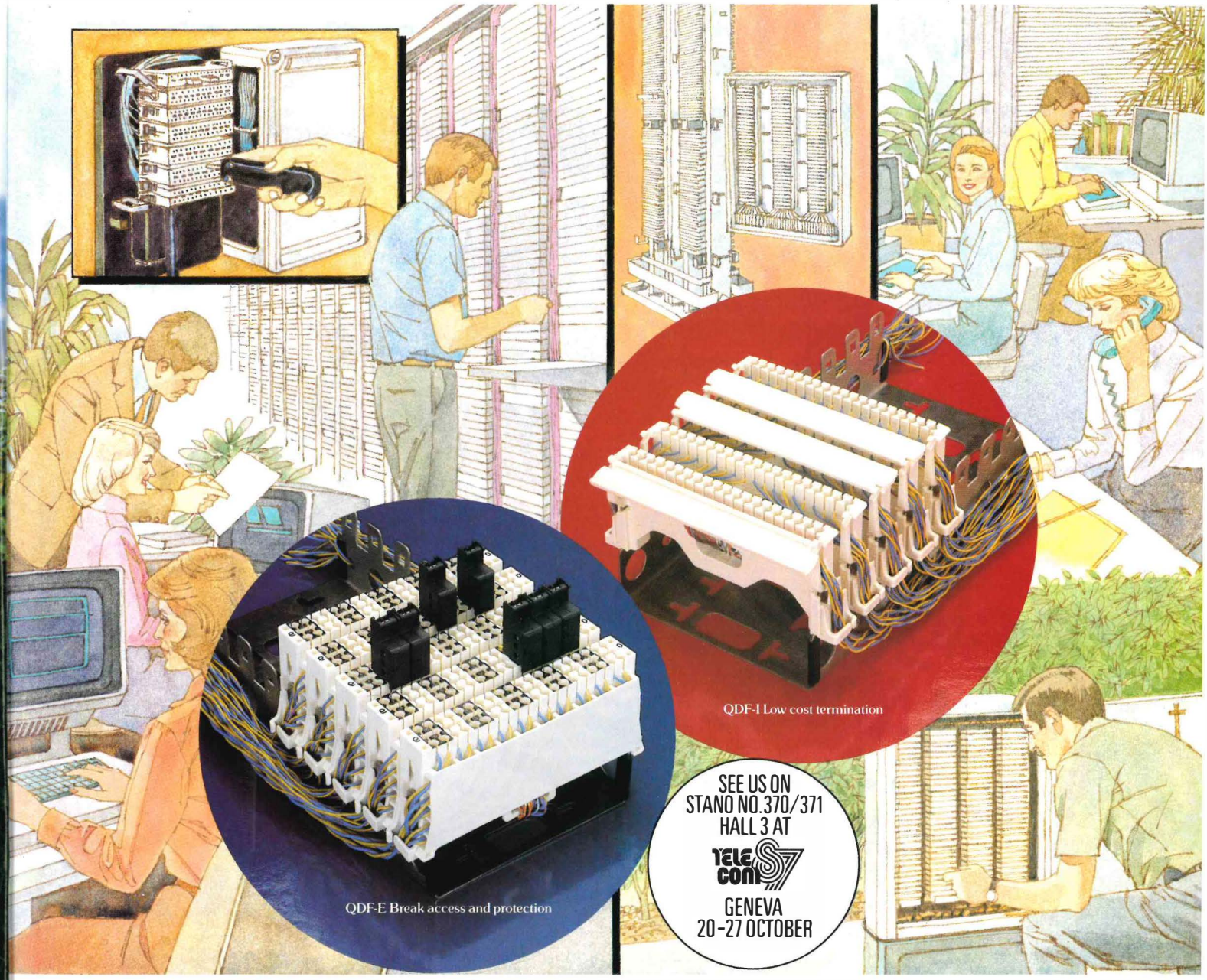

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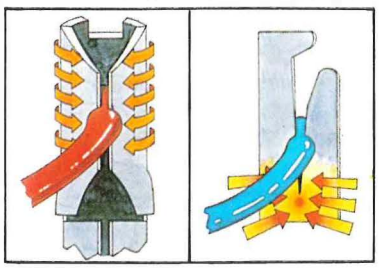

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Signs and labels for just about any purpose are manufactured in high volume, but with the personal touch, at the Cwmcarn factory.

Signs of the times

Colin Penfold

Few people would associate British Telecom with printing, but an increasing number of outside companies are turning to BT to manufacture their signs and labels. The BT Label Centre, part of BT Consumer Electronics, based at Cwmcarn in Gwent, has evolved from an internal supplier to a highly visible and significant force in the UK market.

British Telecom's Label Centre, in its present form, was established in late 1969 and marked the rationalisation of the internal print facilities within the various GPO Telecommunications factories. The restructuring was such that production would be centralised at one site - Cwmcarn was chosen.

The idea behind it was to provide an economic source of labelling which combined good quality, rapid turnround and competitive pricing linked to all orders irrespective of size. Today, not only does British Telecom use the services of the Label Centre, but many other companies have become valued customers, particularly since 1984 when changed rules permitted trading beyond its historical customers - British Telecom and the Post Office.

At the outset, the Label Centre utilised two traditional print techniques to meet the demands of the day. The processes were engraving, either by hand or by pantograph which used motor driven cutters, and hot foil printing which was an adaptation of the gold blocking techniques originally used in the book binding industry.

Obviously, specification and requirements for labels and signs have changed with the introduction of new materials and different applications and, as a result, techniques have also changed to keep pace with market conditions.

Other print processes have also been incorporated and, today, a computerised engraver operates alongside the pantographs, allowing both short and long run printing. Reel-to-reel hot foil machines, with the latest technology, supplement the blocking hot foil equipment.

In addition, a screen print shop has been set up to accommodate hand operated and semi-automated tables and a flexographic unit has been installed for the production of paper labels. Other facilities include a computer controlled vinyl letter cutting machine to solve the problem of supplying small quantities of signs economically and a transfer pad printing process for use on concave, convex or textured surfaces and on three dimensional objects.

The investment has not been limited to the printing section, because sophisticated equipment has also been purchased in the Artwork and Design Department and includes the latest process technology for film development and laser photo-typesetting. The equipment is operated by highly experienced and well-trained personnel, and the technical staff can offer a first-class advice service for any label or sign needs.

To complement the production unit, the centre operates a fully computerised price estimating system and a computerised sales order processing system which enables quotations to be calculated quickly and orders to be processed efficiently.

At the moment, the system handles more than 300 orders a day.

With all the constant improvements in the range of services on offer, one result has been that the Label Centre produces not only labels, but also meets customers requirements for larger formats, new materials, more colour options, colour matching, and serial numbering which can now be easily accommodated as a result of the expansion. The ever increasing range of materials they typically want include several types of rigid plastic, self-adhesive vinyls, self-adhesive paper, window stick, card, paper, polycarbonates, polyester, glass and metals including aluminium.

The essence of any label or sign is to solve a problem in conveying information and the bulk of the centre's products warn, inform, instruct or advise. There is a need to be legible and visible, but in today's market the criteria does not end there and may demand products to stand up to use in harsh climates such as arctic conditions or to survive high levels of ultra-violet light in hot climates.

The products may have to be vandal resistant; able to withstand abrasion or scratching, resistant to fire or flame, or have the ability to be cleaned should they be sprayed with aerosol spray.

Other labels and signs must be non-transferable from one piece of equipment to another to prevent fraud. Some need to be singularly numbered to provide instant recognition and others are meant to

be temporary, requiring peelable adhesives. All these features and many more have to be considered before selecting the correct material and print for the job.

Since privatisation the number of accounts has increased dramatically and the order book includes increased sales on safety signs and on made-to-order labels and signs. The bulk of these sales fall into the following categories:

- safety signs to Central Government Departments, Local Authorities, Health Authorities and a multitude of independent companies ranging from industry to groups of solicitors and accountants

Author Colin Penfold sits at his desk laden with a small selection of the factory's output.

- approved labels, such as the familiar 'Green Dot' Label, for use on telecommunications equipment manufactured by companies such as Plessey, STC, Philips/TMC and Racal
- customised printing on telephones, sold through British Telecom sales groups to end customers including the Halifax Building Society, Trust House Forte and the Scottish Office.
- printed-to-order products such as nameplates for Barclays; vehicle labelling for Powell Duffryn; racking and equipment labels for high technology industries, and wide-ranging signs for company buildings.

The centre has the equipment and expertise to tackle any type of labelling or signage and the growing number of clients both within and outside British Telecom reflect its achievements both in short and long-run printing.

Mr C J Penfold is marketing manager at the British Telecom Label Centre.

Straight from stock

Whilst the bulk of labels and signs are produced to the exact specifications of customers, there are two standard ranges available from stock from the British Telecom label centre.

The first is a comprehensive range of safety signs to the relevant British Standards conforming to BS 5378 in the case of Warning, Mandatory and Prohibition signs, and to BS 5499 for Fire signs and safe conditions. Recent additions include labels and signs to meet the Asbestos Products (Safety) Regulations 1985; the 1981 Dangerous Substances (Conveyance by road in road tankers and tank containers) Regulations; Classification, Packaging and Labelling of Dangerous Substances Regulations 1984; and various Statutory notices.

The second range covers plant and equipment labelling mainly for use within British Telecom in such areas as telephone exchanges; engineering installation and maintenance; fire and safety; buildings and estates, operational and test equipment; and transport and business systems. More than 1600 items are available from stock.

Another type of labelling category, which has a standard format but with individualised print legends, is corporate identity labelling. These are based on British Telecom and Post Office specifications, and are now becoming widely adopted in outside industry and commerce. The grouping includes nameplates, doorplates, deskplates, conference stands and lapel badges.

Left: the stamping of personalised telephones is a typical example of the work that the Cwmcam factory carries out for companies outside British Telecom.

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.

Made under licence from Badger — a division of TTI — it's so easy to use it practically runs itself, yet offers as wide a range of tests and facilities as you could possibly wish for. These include:

Automatic tests with call queuing, supported by user assigned diagnostic messages and line termination statements. Parametric single-shot or camp on repetitive tests. Field personnel access with synthesised speech report back. Automatic routing programmes under full user control.

Needless to say, all this means you can identify

The end of the line for faults

faults accurately, reducing maintenance costs and improving the quality of service to your customers.

If you would like to hear more about the remarkable CL680, call Denis Webb on 0203 341111. Or write to him at:

Vanderhoff Communications Limited
Bermuda Road, Nuneaton, Warwicks CV10 7QF
Tel: Nuneaton (0203) 341111. Telex: 311563 VANCOM G

Vanderhoff

In the vanguard of telecom technology

BUSINESS PAGES

A 70-strong team in the Business File Department speaks directly to customers to check that their directory entries are correct.

Opposite page: the directories are a handy source of reference for business of all kinds.

Helping business to stay in touch

Richard Kidd

Countless millions of secretaries, managers and business executives have since the 1930s, 'let their fingers do the walking' through the classified entries in Yellow Pages and its forerunners. But the needs of industry and commerce are constantly changing, and Yellow Pages management has investigated ways to improve its range of business directories. A new and specialised regional directory is already proving successful in meeting those needs.

Having identified the need for a regional business directory, an intensive research programme was carried out to establish the geographic areas that could be profitably covered - and to discover the directory layout that would be most helpful to business users. The decision was taken to concentrate on the seven main industrial regions of Britain - Yorkshire and North East; West Pennines; East Midlands; West Midlands; London; Bristol and South Wales; and Central Southern which covers an area stretching from High Wycombe down to Portsmouth, Southampton and the Isle of Wight.

This research was followed by the pilot launch of Bristol and South Wales Business Pages in 1984. Buoyed by an encouraging reception by business users in Wales and the West Country, BT Yellow Pages followed it up with regional Business Pages directories in the other six areas.

The new directory was, from the start, geared exclusively to business-to-business use, in contrast to Yellow Pages which caters for the needs both of private households and commerce and industry. For example, whereas Yellow Pages lists High Street chemists, Business Pages only lists the pharmaceutical wholesalers which supply those chemists. Being confined entirely to commercial and industrial entries, it provides an appreciably

quicker and more helpful reference for the business user under pressure.

One aspect of the Yellow Pages operation is the importance placed on research. Intensive market research not only determined the launch format of British Telecom's directory, but has also guided its publishers on subsequent improvements.

Initial surveys amongst potential users revealed that businessmen and women required a directory that would combine the time-saving advantages of a specialised reference source, the comprehensiveness of a general classified directory and the ease of access to regular supplier details provided by the alphabetical phone book - a challenging task for any new directory to achieve.

To meet these criteria it was decided to divide the classifications into 14 industry sectors - from 'Agriculture, Horticulture and Foodstuffs' through to 'Business Services' - thereby aiding the user who wanted to search for specific products or services in several classifications within a single industry sector. This layout enables the user to focus search efforts within an industry sector of between nine and 90 pages - rather than facing the daunting task of looking through the whole 650!

An alphabetical section was also added which listed all the free entries in the classified section - thus allowing users to easily refer to regular suppliers without needing to search under classified headings. The directory coverage areas were also thoroughly researched to ensure that all the key industrial and commercial centres of importance to businesses within the area were included.

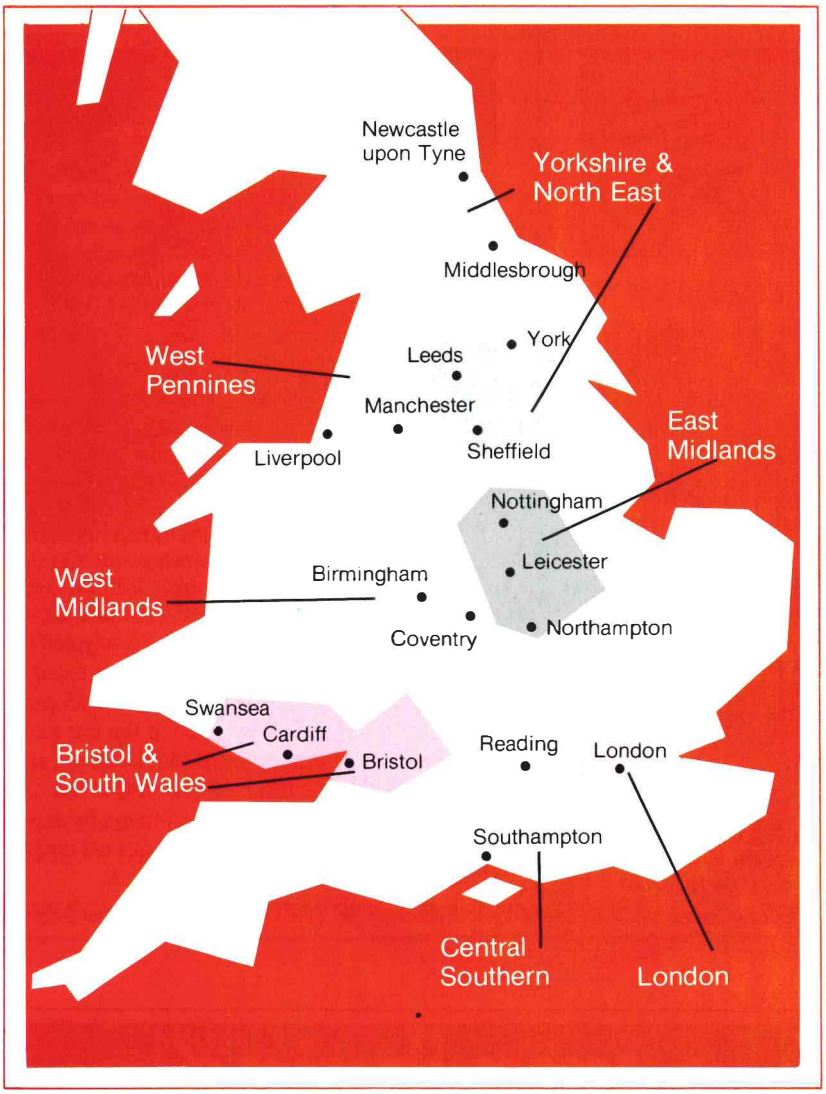
Ongoing research during 1985 and '86 indicated a swing in user preference away from the 'industry sector' format to a strictly alphabetical classification listing. It came to light that many new Business Pages users were omitting to read the instructions, and were therefore 'thrown' when they found that the layout differed from that familiar to them in Yellow Pages.

Sequence

This user feedback led to more research - and to a further development of the directory's format. The revised layout solution that has now been adopted is to have the headings within the body of the directory arranged in alphabetical sequence - from 'Abattoirs' through to 'Zip Fasteners' - and to combine this, from late 1987 onwards, with an additional classification index arranged in industry sector groupings at the front of the book. This will give users the advantage of both formats in a single directory in such a way that even those who do not read the instructions can benefit from.

The new East Midlands and West Midlands editions, just published, feature the alphabetical classification format, and it will be introduced progressively in the other regions as each new edition is brought out.

In the short space of two and a half years Business Pages has established itself as a valued reference source for many thousands of British firms - both for those buying and those selling goods and services. It is now circulated to over 750,000 purchasing decision makers throughout commerce and industry and research has revealed that it is ▷



Right: Business Pages cover seven key industrial and commercial regions and include more than 400,000 companies.

Above: an extensive advertising campaign in the national and specialist press has heightened awareness of the directories.

Mr R G Kidd is business products manager for British Telecom Yellow Pages.

referred to 17 million times a year - in most instances by a business buyer seeking a supplier.

The most recent quarterly survey also revealed that, of those interviewed who had a copy, 65 per cent had referred to it at least once in the last four weeks. And 62 per cent of users had contacted at least one supplier as a result of their use of the book. These figures are hardly surprising because more than 400,000 free classified entries are coupled with extensive display advertising to pack substantially more information between its covers than any other business directory.

An important factor that keeps Business Pages ahead of its competitors is the currency and accuracy of these 400,000 entries. This is made possible by immediate access to the 4,000 new and changed business phone numbers that British Telecom Yellow Pages processes every day.

These changes are fed to the 70-strong Business File Department staff who check each new or altered number - and who telephone each subscriber to verify their address and the nature of their business before the new or revised entry is finalised. The entries are then fed into the computer-operated electronic publishing system, on which the directory is compiled. The time savings made possible by this system result in a much more up-to-date directory at the time of publication.

All these 'plus' features combine to make Business Pages a singularly effective business-to-business advertising medium. With circulation confined strictly to business addresses and to key industrial and commercial areas, the advertiser can more accurately target his sales message to his market - and can benefit from superior cost-effectiveness.

And the fact that each advertiser's display appears within the classification that is relevant to his business adds to its effect.

With awareness rapidly increasing, the publishers are finding that the majority of business people are now reaching instinctively for Business Pages when they need to source a product or service.

Improving Customer Services

As designers and manufacturers of a range of advanced communications products incorporating the latest microprocessor technology, Landis & Gyr Communications Ltd are major suppliers of electronic payphones to British Telecom and other telecommunications authorities worldwide.

PAYPHONE 100
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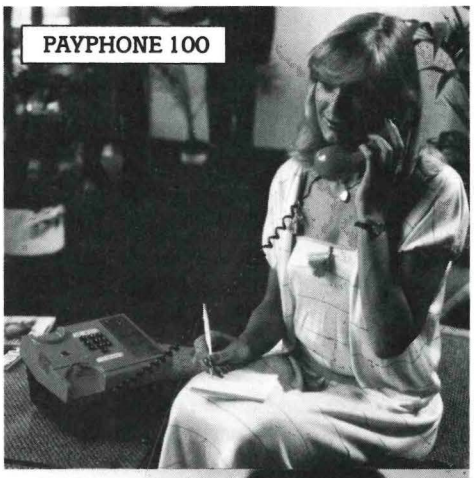
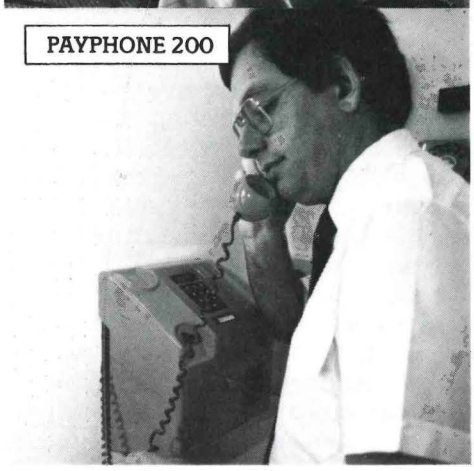
Extremely convenient to use either as a normal telephone or as a payphone for calls made in clubs, restaurants, bars, hotels, guest houses, etc.
The renter has access to the cash box and all calls are charged at the subscriber rate.
- DUAL MODE OPERATION
  Coin or no coin operation— payphone or subscriber mode as determined by renter.
- MULTI-COIN ELECTRONIC VALIDATION
- COIN STORAGE AND REFUND FACILITY
- SIZE: 230 x 200 x 152mm

PAYPHONE 200
Indoor, Wall Mounting Payphone
A worthy successor to the current electro-mechanical payphones, the Payphone 200 capitalises on the reliability and many other inherent advantages of today's microprocessor technology.
- MULTI-COIN ELECTRONIC VALIDATION
- LARGE CASH DRAWER
- STEEL WALL MOUNTING FRAME
- SIZE: 310 x 260 x 190mm

ALL PAYPHONE ENQUIRIES SHOULD BE DIRECTED TO YOUR LOCAL BRITISH TELECOM AREA SALES OFFICE

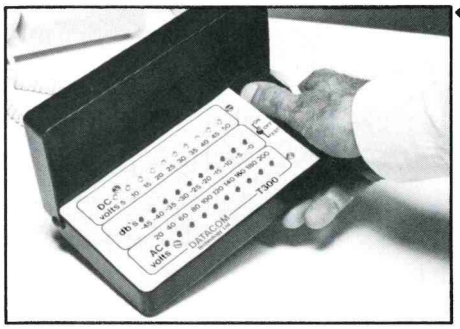




LANDIS & GYR

Landis & Gyr Communications Ltd.,
Company Headquarters, Marketing & Sales,
Ebblake Industrial Estate, Verwood,
Wimborne, Dorset, England. BH21 6BB
Tel: Verwood (0202) 824644 Telex: 418341

Datacom Level Meter will Test analogue voltages at telephone socket



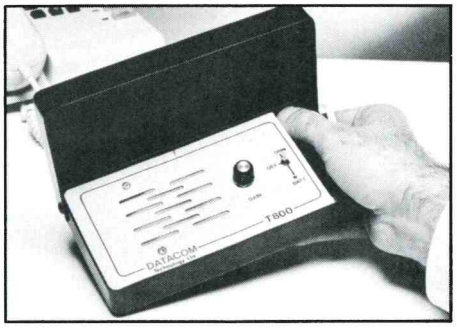
T300

The Datacom T300 Level Meter will measure the three analogue voltages found at telephone termination points. In use, it will not affect any signal, load the line or influence any connected apparatus. Designed specifically for the field or workshop based engineer, it is ideal for testing line voltages on a wide range of other equipment connected to the telephone network, such as modems, telephones, facsimile, answering machines etc.

T800

This new hands-free audio monitor for line monitoring at telephone termination points is the first line tester of its kind to get BT Type Approval. In use, there is no load or external influence on the line or connected equipment. Variable gain control allows remote monitoring. Datacom T800 is the ideal instrument for large organisations or users wishing to monitor line quality.

...And new Datacom portable Line Tester will monitor line quality



Two new BT Approved test instruments from Datacom Technology

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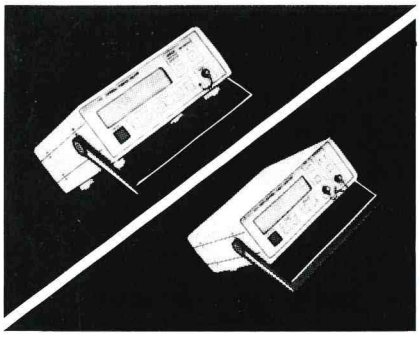
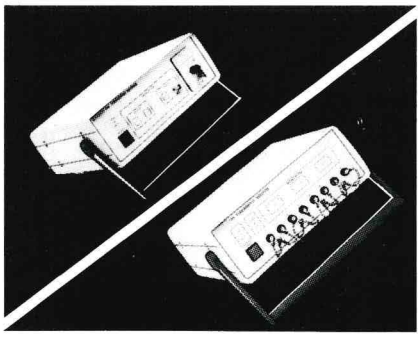


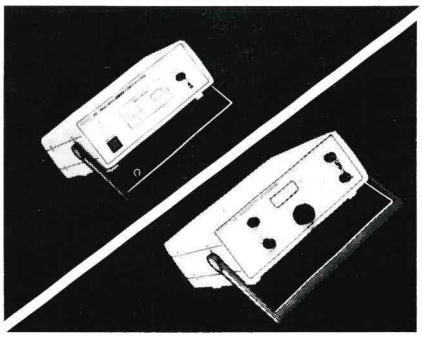
LOSS SETS

MODULAR SOURCES



MULTIPLE SOURCES

DUAL WAVELENGTH SOURCES



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Street corners all over the country are undergoing a facelift as the familiar red telephone boxes are being replaced by modern payphones to boost usage and cut down vandalism and theft.

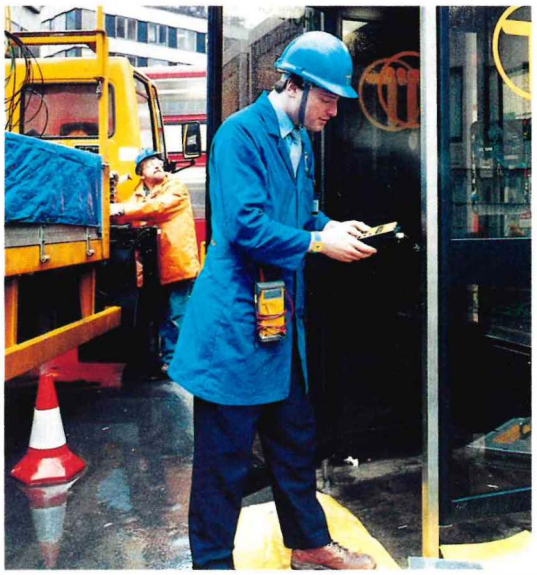
British Telecom has ordered 25,000 new-style electronic telephones as part of the final stage in its programme to modernise the UK's 77,000 public payphones.

The contracts for new telephones, worth a total of £23 million, are for:

- 15,000 electronic payphones which accept all coins from 2p to £1, return unused coins at the end of a call and automatically report their own faults, ordered from Plessey Telecommunications Products Ltd of Liverpool;
- 10,000 Cardphones which operate on holographically encoded pre-paid Phonecards, from Landis & Gyr of North Acton, London.

'Boxing' to win the payphone battle

British Telecom's payphones modernisation programme is showing results throughout the UK. The new phones have improved features and facilities and customers are making more use of them. But vandalism remains a problem and schemes such as Copacard – highlighted in the last issue of the *British Telecom Journal* and aimed at fostering relationships between community police and local schoolchildren – and a national car sticker campaign have been devised to help. This article looks at payphone progress to date.



Use it-don't abuse it A PAYPHONE SAVES LIVES

British TELECOM

More than £80 million has been invested so far in British Telecom's £160 million payphone modernisation programme. The more reliable telephones and modern housings are already boosting payphone usage and cutting down vandalism and theft.

An 18-month programme to convert most of London's 10,800 public telephone kiosks to the new-style housings has also started. The equipment in all these kiosks has already been replaced with modern electronic telephones.

A review of payphone progress to date shows that the number of Britain's public payphones has increased from 76,616 last year to 77,370 and that 10,000 new-style housings are now in use, giving much easier access for disabled customers and wheelchair users.

'Cashless'

A total of 56,000 all-electronic payphones have been installed and the trend towards 'cashless' telephones has been boosted by the installation of 6,000 public Cardphones with Phonecards now available from 8,000 outlets.

A programme to convert 3,100 kiosks on Tyneside and Teesside to new-style housings has been completed and elsewhere in the country two new cashless calling methods have been successfully launched. In Bristol, AccountCall allows customers to have the cost of calls charged to their home or office telephone account, and, in London, CreditCall operates on a customer's own credit card or charge card on special telephones at Heathrow Airport and British Rail's Waterloo station.

Payphones using Phonecards have proved to be a huge success in improving the quality of service. Because they do not have cash boxes the attraction for thieves is removed and British Telecom plans to increase the numbers installed particularly in major towns and cities.

Vandalism, however, remains a major concern and the company is actively pursuing new initiatives through police forces, schools and local communities to help to eliminate the problem.

Complementing the modernisation programme, all existing electronic payphones and Cardphones are being modified to provide operator access for assistance and transfer charge calls when coin payphones are in the emergency call-only mode because of fault or vandalism.

They will also reduce the intrusion of the operator-alert tone which alerts staff of attempted transfer-charge frauds and allows payphone calls through the operator to be charged at the appropriate rate.

The majority of Cardphones have already been modified to allow access to the '100' Operator for reverse charge and British Telecom credit card calls. The modifications will be completed throughout the country during the year.

Police protection for payphones

Typical of the many efforts to beat the problem of payphone vandalism is a joint scheme between Merseyside Police and British Telecom's Liverpool District.

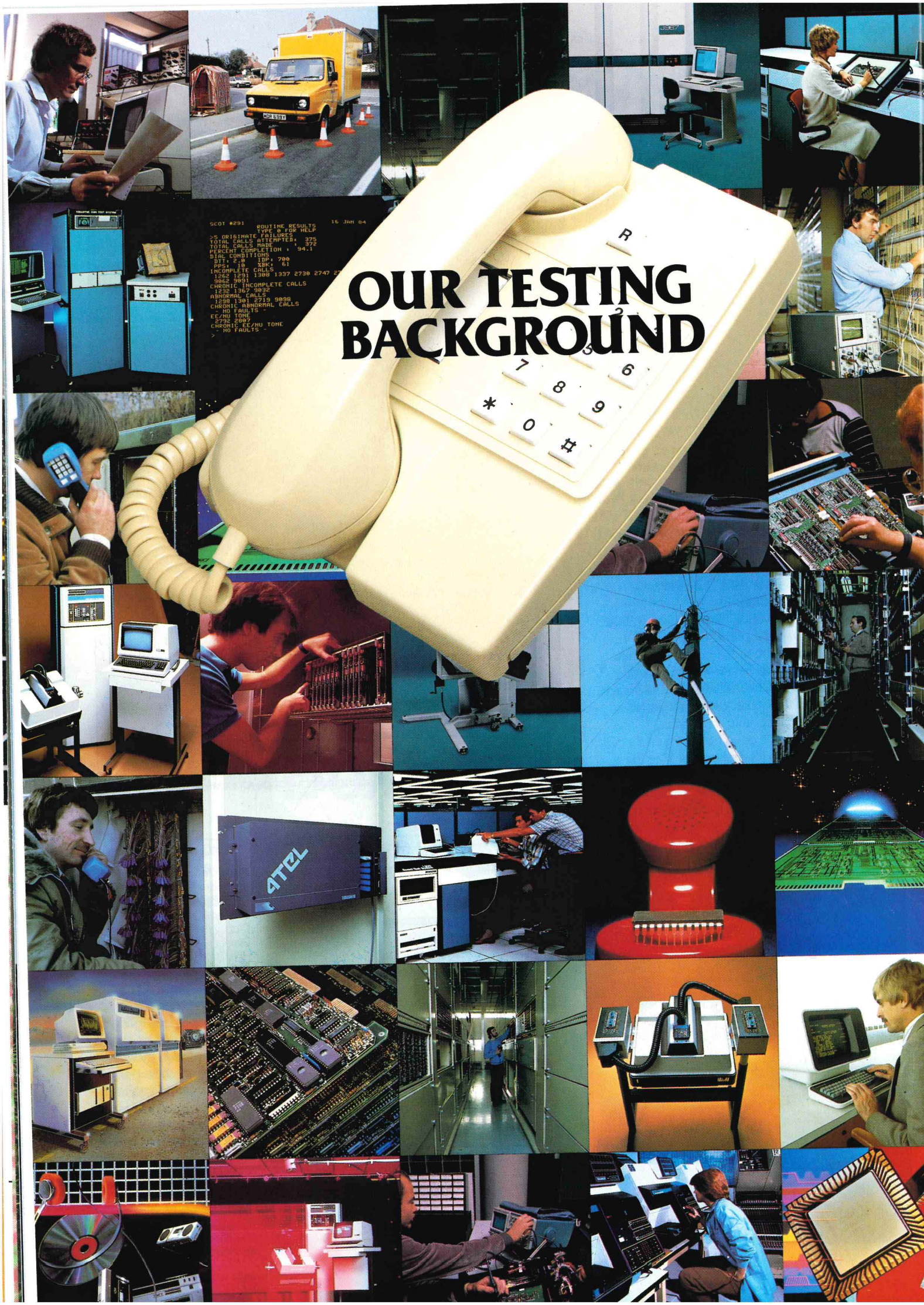
Three payphones have been installed in police stations in areas which have suffered from extensive vandalism. The trial at police stations in Wavertree Road, Belle Vale and Kirkby will last for 12 months and may then be extended to other areas. Meanwhile, in Speke and Halewood, payphones are to be moved to sites outside and within police stations.

The initiatives complement a £3 million modernisation programme for payphones in the Liverpool District and the popular education package which uses the 'PC Payphone' character.

The aim of the schemes is to make working payphones available 24-hours a day to the community in areas of high vandalism. By putting payphones under the protection of the local police station, British Telecom hopes to make them less vulnerable to vandals and at the same time the move will increase the number of payphones available to residents of the areas.

Above: opening the new payphone at Wavertree Road police station in Liverpool are Mr David Cloney (left) who is Deputy District General Manager for BT's Liverpool District and Superintendent John Colledge of Merseyside Police.

Left: the trend towards 'cashless' telephones is growing and in a joint exercise between British Telecom and the Salvation Army, London's young teenage runaways were given the chance to make a free phone call home using the new Phonecard kiosks.


OUR TESTING
BACKGROUND
SCOT #231 ROUTINE RESULTS 16 JAN 84
TYPE 0 FOR HELP
>S ORIGINATE FAILURES
TOTAL CALLS ATTEMPTED: 375
TOTAL CALLS MADE : 372
PERCENT COMPLETION : 94.1
DIAL CONDITIONS
DTT: 2.0 IDP: 700
PPS: 10 IBK: 61
INCOMPLETE CALLS
1262 1291 1308 1337 2730 2747
9062 9091
CHRONIC INCOMPLETE CALLS
1232 1367 9032
ABNORMAL CALLS
1290 1301 2719 9098
CHRONIC ABNORMAL CALLS
- NO FAULTS -
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2732 2807
CHRONIC EE/MU TONE
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PUTS US INTO THE FOREFRONT

As telecommunications networks become more sophisticated and customers demand more from them, it is vital that testing methods keep pace. One company is meeting that challenge.

The company is Teradyne. We pioneered the technology of automated electronic testing, and have unmatched experience in meeting the electronics industry's needs over the past 25 years. In the telecommunications industry our products have set the standard in automatic testing.

For local line maintenance there is 4-TEL®, the leading commercial line test system with more than 18 million lines under test in North America and Europe: CDS Craft Dispatch System, which utilises digital voice technology to enhance the efficiency of field staff: and D-MARC,™ a family of innovative, highly reliable devices that isolate customer premise faults from the network: SCOT,® the outstandingly successful switch tester, brings automatic testing to exchanges in every District of British Telecom. And now, a new network testing system: ATS 1000. It measures end to end transmission quality and isolates the specific network faults causing transmission and noise complaints.

These systems are backed by the corporate-wide resources and experience of Teradyne, plus a commitment to total system support.

Impressive, but hardly surprising when you realise that only one company has a testing background distinguished enough to put it into the forefront.

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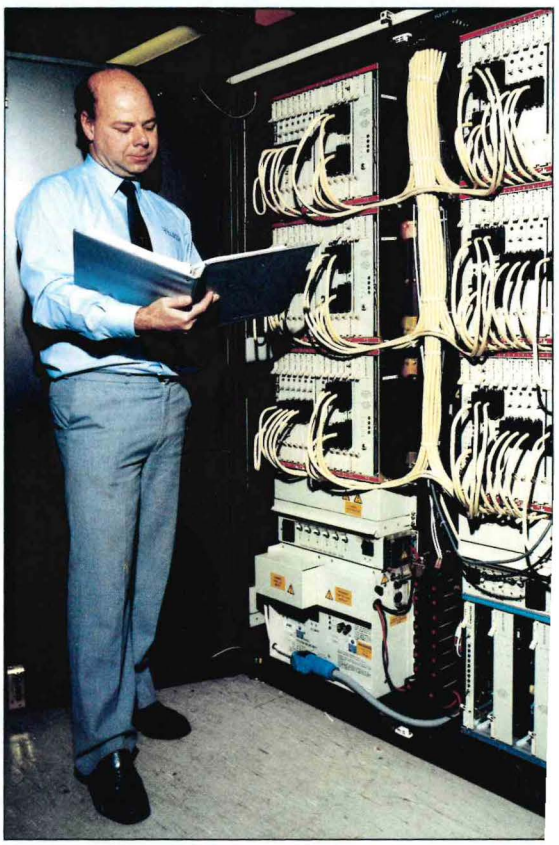
TERADYNE

Above: the BTeX switch in the offices of a leading London finance organisation — one of the growing number of large customers who depend on efficient communications management.

Pushing networks to work harder

British Telecom is heavily involved in the development of networks for large organisations and also offers call management systems for its business customers. This article looks at the way British Telecom 'practises what it preaches' and highlights the need for effective communications management.



Recent advances in technology such as digital PABXs and sophisticated signalling systems, allow the development of networks for large organisations to provide efficient internal communications and to present a more effective interface with the outside world. British Telecom has supplied many such networks to major UK business customers and, not surprisingly, uses them to meet its own needs.

Together with these advances, there has been rapid progress in the development of systems to help with network management - of particular importance to large network users, enabling full information to be provided on circuit utilisation so that equipment can be used to optimum effect.

For example, the traffic analysis capability of such systems can help determine the cost-effectiveness of private circuits against normal trunk lines.

Time to answer incoming calls can show whether

a company may be losing business by inadequate switchboard staffing. And line reports can quickly indicate the existence of faulty lines without lengthy engineering tests.

At the same time, these systems also provide the opportunity for cost allocation, allowing sensible departmental budgeting and control of a significant business expense.

There are a number of call management systems on the market and the system used at a number of British Telecom locations to assist in management of the PABXs is among those offered by the company to major business customers including British Aerospace, national and local government and the public utilities. Called the BTS ISOCOM, the system is developed and supplied by Business Telecommunications Services Limited, a specialist in the field.

British Telecom Research Laboratories at Martlesham Heath, near Ipswich, recently introduced a new network to cope with the growing need for communication services. Previously served by a TXE2 exchange which formed part of the Ipswich network, the new network comprises three British Telecom DX switches distributed around the site linked by MegaStream digital circuits. This enables the use of the new Digital Private Network Signalling System (DPNSS) to link the control processors of each switch, effectively allowing them to operate as a single unit.

Each switch in the Martlesham network is monitored by the BTS call management system to provide traffic data on external circuits, both public network and private wires to other locations. It also provides divisional cost summaries to allow cost recovery from each operating division of the laboratories.

With 35 divisions and typically eight to 10 groups in each division, and around 30,000 calls on average per week, the preparation of a weekly summary for each of these represents a considerable amount of data processing which the system handles comfortably.

On the network aspect, the use of DPNSS to link the separate switches also allows centralisation of operator functions. The increasing use of direct-dialling-in on PABXs has reduced the level of operator traffic. There is still a need for operators and it is important for any business to ensure that an efficient service is seen to be provided, particularly to incoming callers.

Again, the system has facilities to monitor incoming traffic, thereby providing the necessary information to ensure adequate operator service. A further benefit is the ability to identify faulty lines, since these will be revealed by absence of traffic.

After working on the planning and implementation of the Martlesham network, Communications Manager Terry Woolard is pleased to find that the system, in providing the traffic monitoring data, has confirmed the original system planning. And it also provides the necessary ▷

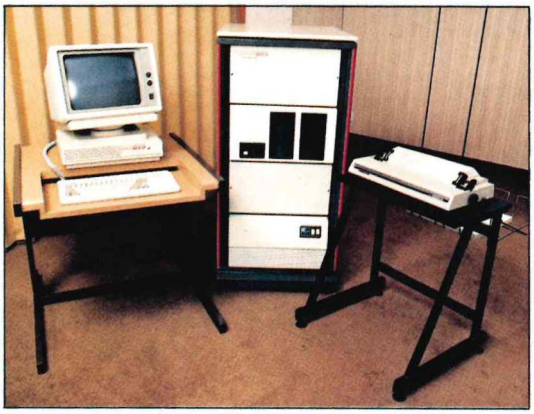
Below, opposite: engineer Gordon Watson performing checks on the GEC/BTeX switch at British Telecom Centre in central London.

Call management systems do not have to be bulky as this mobile demonstration unit shows.

data on which to base the evolution of the network.

At British Telecom Centre, London, the GEC/BTeX switch is part of a major network covering several headquarters locations. Like Martlesham, these are linked by MegaStream services to provide a coherent network to about 16,000 extensions. A similar system is used for traffic monitoring, at present confined to the Centre switch, to check circuit utilisation.

Bill Lorman, British Telecom Headquarters Communications Manager, has introduced short code access to all extensions for calls within the network. Such calls use private circuit links between the switches rather than the public network and it is clearly more cost effective to the business to maximise private circuit use. The regular traffic reports produced by the system enable a continuous check to be made on the effective use of the private circuits.



BTS call management equipment showing from left to right the operator's position, the central processor unit and the printer.

The system can similarly provide information on the need to install new private circuits to other locations. By checking total traffic levels to specific numbers the call management system gives a clear indication of the point at which a private circuit would become cost effective.

In all of these operations the communications management function is the same as required in any large organisation which needs to control its telephone network.

Other aspects of the system, not currently used within the Headquarters applications, are those concerned with the telephone directory. Increasingly, British Telecom District offices are using similar systems to both monitor switch and network performance and to provide their operators with an on-line directory. Impressions from those Districts already using this facility are proving favourable.

Speed and flexibility of operation are the main points of appeal to PABX operators. The ability to quickly access the required name and set-up the connection at the touch of a button, coupled with the ease of updating the directory, simplifies the operators' work.

Of course, any systems are useful as long as operational problems do not occur and those installed so far have proved reliable from British Telecom's point of view as both a user and a distributor.

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wheel in an Edenaire PORTABLE COOLER

British Telecom Item Code No. 533029

Designed to meet British Telecom requirements, this portable unit provides emergency localised cooling for exchange equipment which is adversely affected by heat emission. The Portable Cooler is compact enough to be wheeled between equipment racks, and operates from a standard 13 amp socket.
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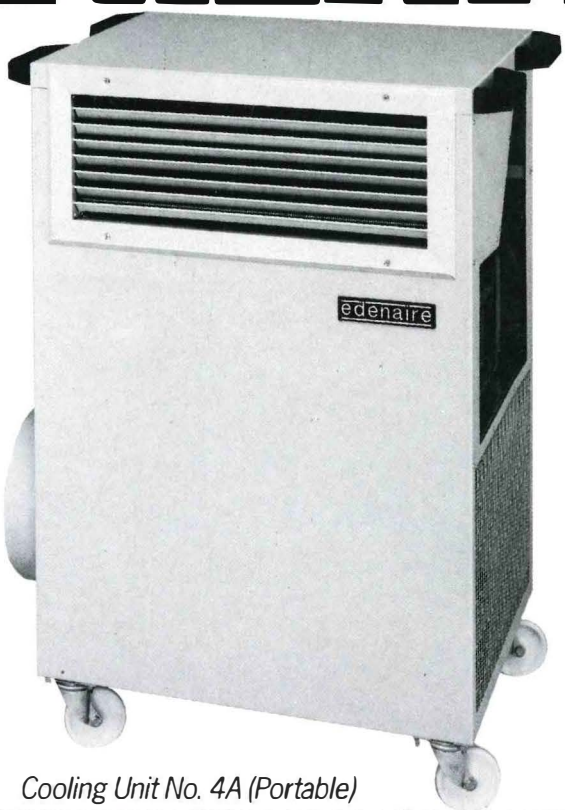
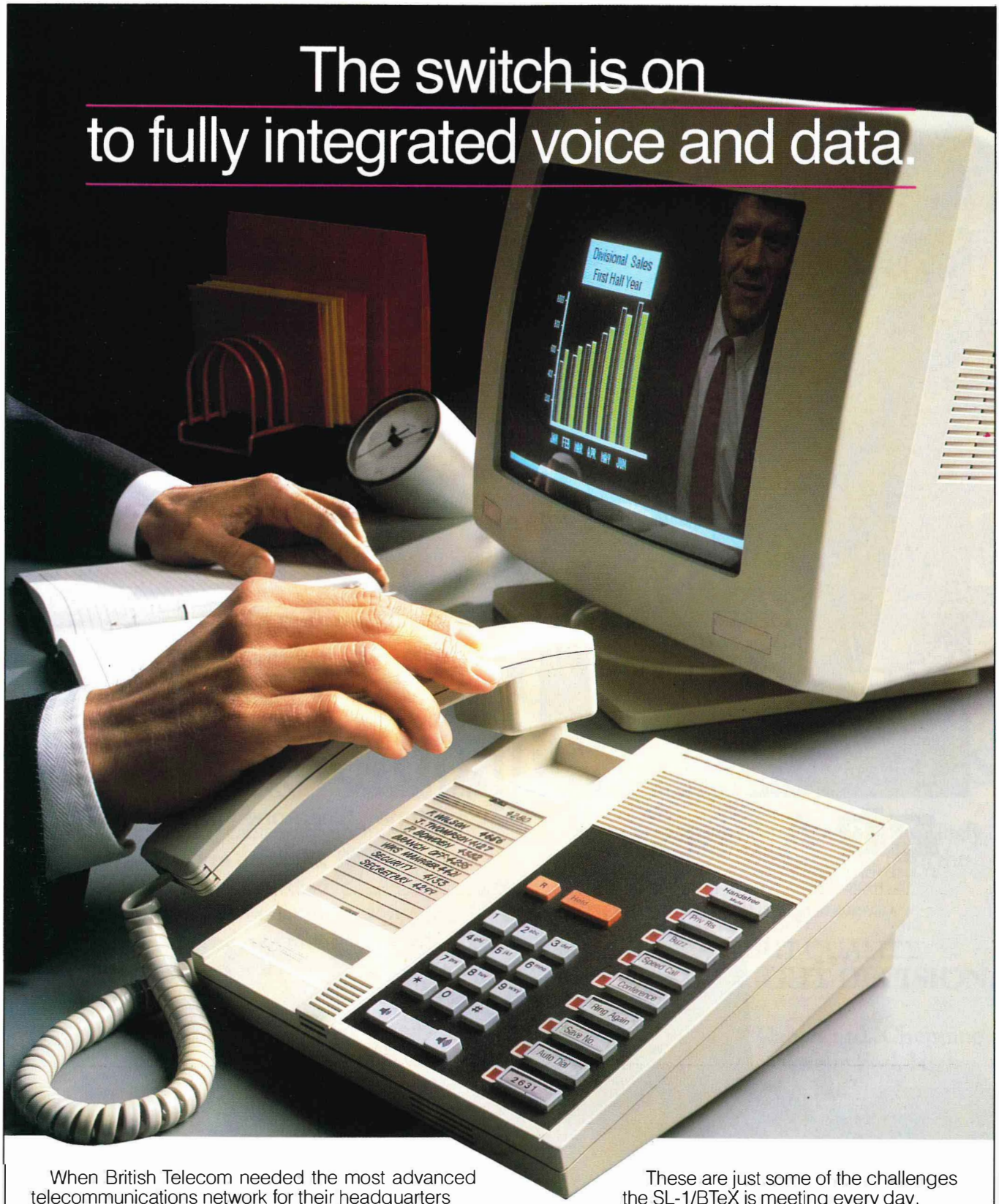


Cooling Unit No. 4A (Portable)

The switch is on to fully integrated voice and data.



When British Telecom needed the most advanced telecommunications network for their headquarters complex handling over 15,000 lines, the speed and flexibility of the world's leading digital switch, the GEC SL-1 was their logical choice.

Now the SL-1/BTeX, made in Britain by GEC, is hard at work for British Telecom's customers all over the country.

Local authorities with 55,000 employees in 40 locations, hospitals needing life and death communications reliability, financial institutions demanding speed and flexibility.

These are just some of the challenges the SL-1/BTeX is meeting every day.

And at GEC, we are working very closely with British Telecom to help more organisations switch on to the advantages of a fully integrated system.

GEC

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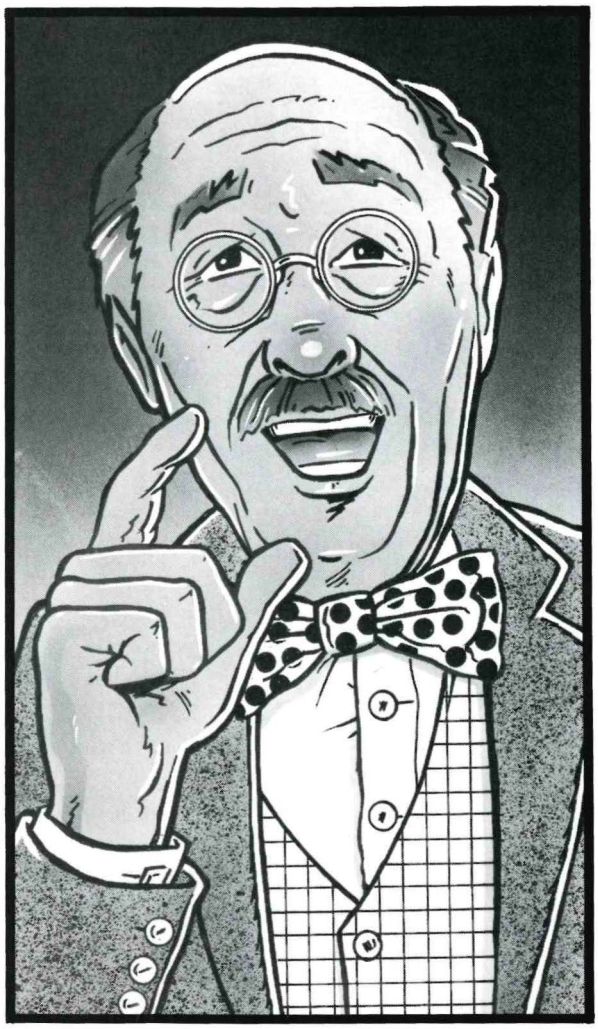
Private Systems Division, PO Box 6, Lower Ford Street, Coventry CV1 5PU.
Tel: 0203 554400



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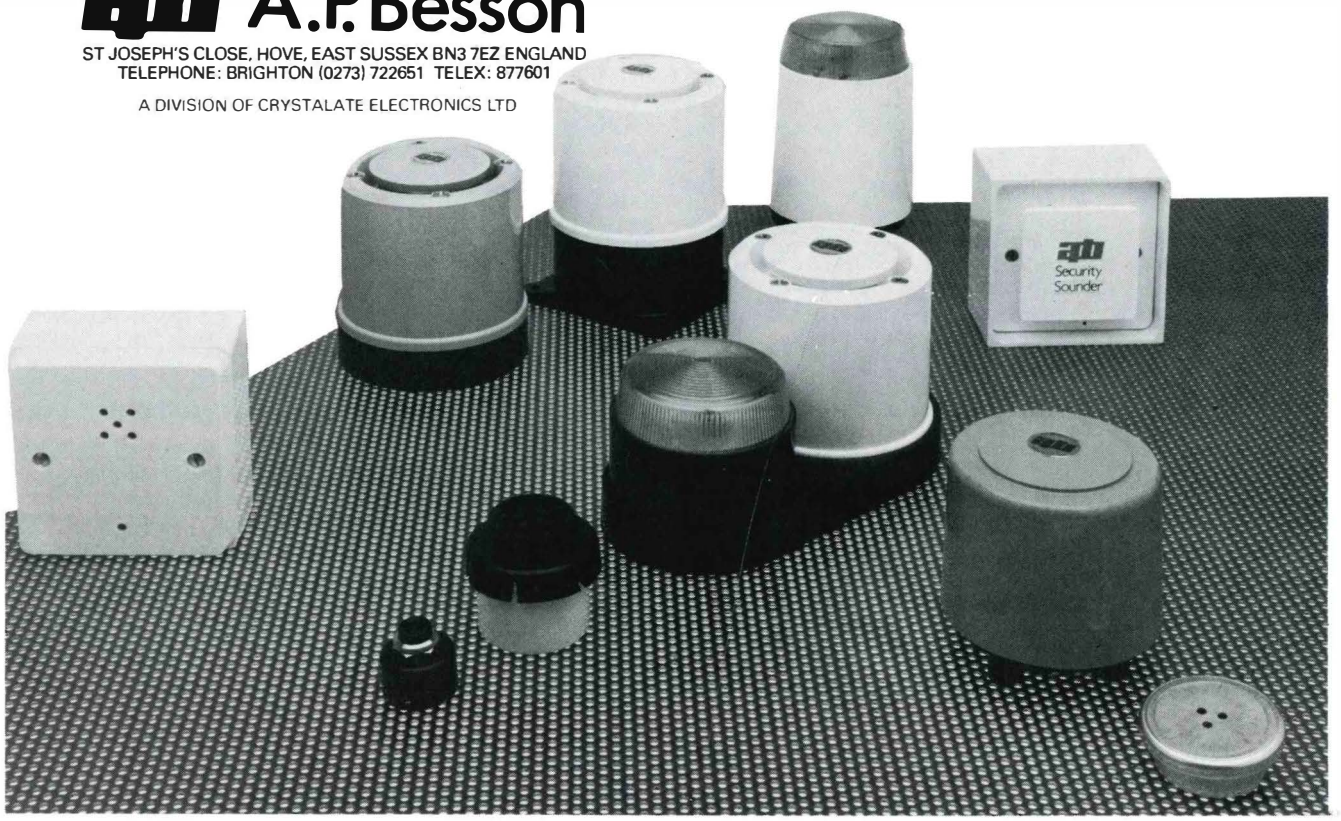

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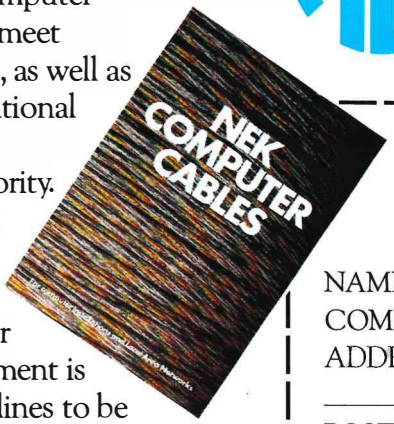

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A bouquet for progress

Interflora, the world's leading flower relay service, has launched floristry into the 21st Century with the announcement of a £2 million investment in computer technology – the British Telecom 'Messenger' system.

Customers are encouraged to 'say it with flowers' but until now the process has involved tedious paperwork and telephone calls for Britain's florists. By the end of the year, however, each one of Interflora's 2,500 UK members will be fitted with a brand new terminal to enable them to transmit orders with maximum speed and efficiency.

Minimising paper work, the 'Messenger' system allows orders to be effortlessly prepared on the unit's display screen and automatically transmitted over the public telephone network to the Interflora member nearest the order's destination.

The receiving Interflora member gets a printed message clearly setting out the order details and the type of arrangement, preferred colours and flowers, and, most important, who it is to be delivered to.

British Telecom created the system especially, and solely, for Interflora and now over 1,000 Messenger terminals are installed in Interflora shops across the UK. Another 1,500 are on order putting Interflora's total membership on-line for direct communication between other members' shops and Headquarters in Sleaford, Lincolnshire.

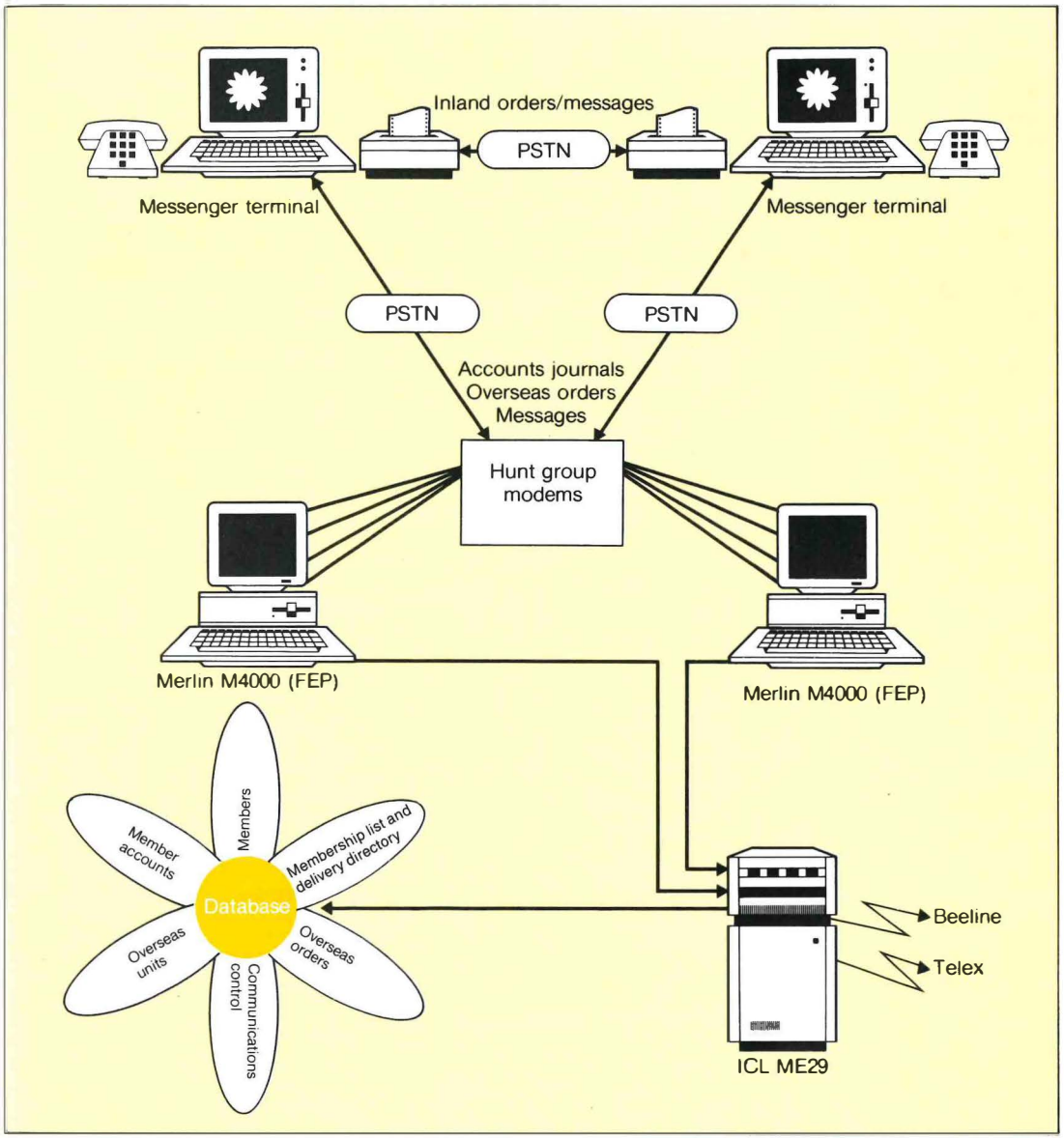
The system uses BT's M2105 terminals which comprise a microcomputer with built-in communications features suitable for direct connection to normal telephone lines, together with VDU, keyboard and dot-matrix printer. The terminal software provides editing features and help information to assist in the selection, completion and sending of forms.

Storage is provided in the terminal for all standard forms, each type being called by key selection from the screen menu. When a terminal is initially installed, a registration process is carried out using the terminal to communicate with Interflora headquarters. When this is satisfactorily completed the forms package is downloaded from headquarters to the registered user. This is one of the security measures to prevent fraudulent access to the network, since only registered terminals can inter-communicate.

Automatic dialling and answering features are built into the terminal. When a connection is established, information is transmitted using British Telecom T-Link protocol. This provides error detection and retransmission of blocks of data received with errors, thus ensuring accuracy of information sent.

To overcome the problem of encountering a busy line, the terminal will retry a call up to five times. Should the call not be completed in five attempts, the order is printed out at the sending terminal with

A terminal in the florist's shop enables orders to be transmitted quickly and efficiently.



an indication that it could not be sent.

In addition to the various forms used in Interflora service the terminal can be used for preparation and sending of free text messages. In this mode the text editing feature is available to ensure accuracy of text before sending.

The Messenger system has already brought many benefits to Interflora. By cutting down on paperwork the florist not only saves time but money normally spent in regular postage to Headquarters. There are also savings on costs because less time is spent on the conventional telephone in addition to the greater speed and accuracy achieved when relaying orders.

Furthermore, the accounting details are automatically sent at intervals to Interflora Headquarters, thus reducing the administrative workload and paper in each shop using Messenger.

From British Telecom's point of view, the success of the system demonstrates the company's ability to provide a custom-built solution to a complex problem. The florists' customers, on the other hand, should find 'saying it with flowers' even easier when their messages are backed by the latest in communications technology. ■

A growing concern

Interflora, the worldwide flower delivery service, was founded in 1923 by a group of florists who met in London to discuss how they could best make use of an invention which was growing in popularity everywhere - the telephone!

By telephoning orders to other members of their newly formed association, they could arrange to send fresh flowers to other parts of the country. Today, about 2,500 florists throughout the UK are members of Interflora and the service now extends to over 55,000 Interflora members strategically located in over 130 countries.

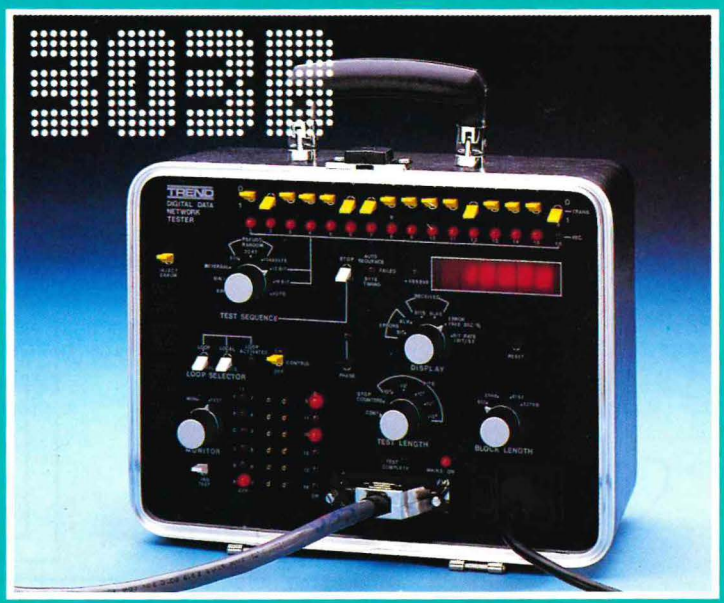
Orders are sent to, and received from, other countries every day - from members of FTD (Florists Transworld Delivery Association) based in Michigan, USA, and from those in Fleurop, the European group based in Zurich.

Founded as a result of the telephone, the organisation is now moving forward by using the latest telecommunications technology.

When your efficiency's on the line trust in Trend

HEXTAS X21

303B



260

As public and private communications systems grow ever more complex, Trend continues to respond with a complete range of test equipment that's increasingly intelligent, versatile and easy to use.

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Trend puts matchless micro-processor technology and software capability up front. And backs you up with unrivalled customer support and training. That's why installers and operators in over 50 countries consider Trend test equipment the natural partner to their communications investment.

Technical data is available on request from:

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> **"Ultimate Compatibility – IBM or DEC environments – full colour"**

Take our **MC279** for example. Designed for use in mixed mainframe environments, it offers two of everything. **IBM 3179** and **DEC VT220** compatibility, asynchronous and synchronous communications modes, parallel and serial printer ports, 80 and 132 column operation, plus a viewdata option. Its unique keyboard combines the best of the **IBM 3179** and **DEC VT220** layouts – so operators won't have to re-learn new symbols or function key sequences. Another model, the cost-effective **MC179**, shares all **MC297**'s features except **DEC** compatibility.

For serious **DEC** and viewdata users, we recommend our **MC200.** This full colour, high resolution VDU features a multipage option which allows up to seven pages to be stored locally. In viewdata mode, this number doubles. You can even compare a couple of separate **Prestel** pages by displaying them simultaneously. Pages can be updated without being rewritten, and hard copies printed in full colour using our low cost, ink-jet, **MX100** printer. Nothing could be simpler. The **MC200** is fully compatible with **DEC's VT220**, but separate protocols can be provided for mixed mainframe environments.

In addition to high performance and flexibility, our products feature the highest ergonomics standards. Flicker-free screens which tilt and swivel into the most comfortable position, adjustable brightness and contrast, and ergonomically designed detachable keyboards are all standard on Pericom products.

> **"Ultimate Ergonomics – page white monochrome"**

But two of our models excel even by our high ergonomics standards. On **MT300** and **MT350**, we've completely eliminated screen flicker, provided a choice of negative and positive 'page white' displays and attained characters of absolute clarity by utilising a 20 x 16 cell. Pixel phasing and overscan techniques combine with ultra high refresh rates to produce a display beyond comparison. These models represent the pinnacle of ergonomic design and easily meet – even sometimes exceed – the most exacting European ergonomics standards. The operator benefits are immediate and employers soon appreciate how ergonomics can lead to increased efficiency, reduced staff turnover and lower absenteeism.

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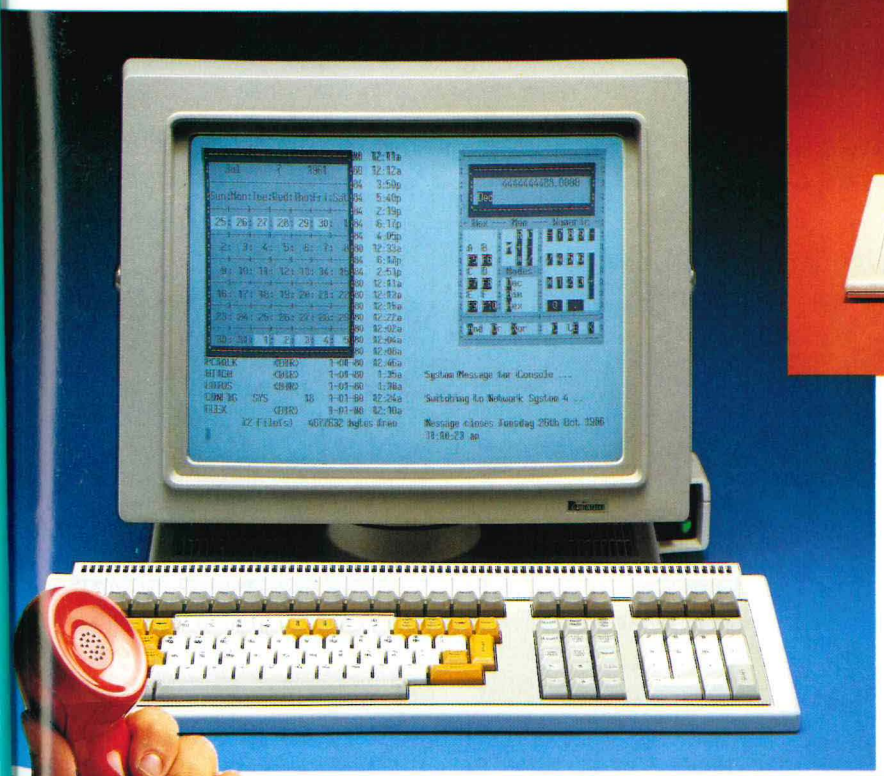

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B.T.J. 5.87

Panellists from all over the country meet at a seminar to discuss the work of the Consumer Liaison Panels.

British Telecom has to take a keen interest in the concerns of its customers if it is to keep one step ahead of the competition. Since privatisation, the company has adapted an American idea and has set up a network of Consumer Liaison Panels to gather intelligence from the public and to explain its policies on matters ranging from complaint handling to do-it-yourself wiring.

Listening and learning to stay ahead

Jan Walsh

In the early sixties when President John Kennedy said that it was the duty of companies to give customers what they wanted, when they wanted it, at a price they could afford, he could hardly have known that he was starting the customer service revolution.

Twenty years later, realisation is dawning that customer care is not an ephemeral public relations exercise but an essential ingredient in the marketing mix, and one which maximises a company's profit making potential.

In the days when telecommunications fell within the Public Sector, customer relations activities tended to be conditioned by the public service ethos. Today, in the new, competitive, customer-driven climate, British Telecom faces the challenge of generating customer satisfaction and responding to ever-changing customer expectations.

The first consumer advisory panels were formed in America in 1977. The impetus for introducing them came from the need to avoid consumer/corporate confrontation in the media, regulatory and judicial arenas. Panels were seen as a means of opening up communication with consumers and providing a forum where consumers and corporations could reach mutually acceptable compromises before issues became the focus of public concern.

Following a study of consumer advisory panels in the United States, the first four British Telecom consumer liaison panels were established in 1984 in Cardiff, Southampton, Liverpool and Canterbury. Leeds and Aberdeen have since followed with Thameswey and the West End small business panel coming on stream early in 1987.

The panels discuss matters relating to residential

and small business users and provide a forum whereby members of a community can exchange and discuss ideas with British Telecom management. This enables the customer view to be reflected in British Telecom policies and an understanding of these policies to be conveyed to the public.

Objectives

The objectives of the panels are to provide a two-way exchange of views between the company and its customers; to reflect customer concerns and recommend solutions; and to act as agents for change. The panels are not intended to replace or mirror existing external consumer organisations, neither are they intended to replace existing internal methods of communicating with customers, but rather to enhance them. They will not always suggest revolutionary new ways to solve problems, but may validate existing opinion or suggest a reorganisation of priorities.

Members of the local community are invited to join a panel following extensive discussions between the local British Telecom manager, a consultant in consumer affairs and the UK Communications Customer Relations Manager. They are selected from people with skill and experience in representing the views of others or those with particular experience of value to the panel.

Panel members are not nominated by any organisation to which they might belong and therefore cannot be mandated by that organisation to air a particular hobby horse. Positive, well-balanced discussions are sought.

Three places are reserved for British Telecom managers. The manager with relevant knowledge of the issue in debate usually makes the main presentation to the panel, participates in the discussion and takes the necessary follow-up action. The leading British Telecom panel members are the District General Manager (Southampton), Customer Service Area Manager (Leeds), or the District Marketing Manager (Aberdeen).

The chair is usually taken by an independent specialist, highly skilled in managing group discussions and drawing from them the consensus view. In order to maintain confidence and credibility in the panel concept, the chair should not, in general, be identified with, or be selected ▷

Vandalised phone boxes, facilities for the disabled and the public's reaction to Phone Books are regular topics for discussion at the Consumer Liaison Panels. Do-it-yourself phone wiring, represented by British Telecom's new furry mouse mascot, is another topical item which has generated diverse opinions.

from either British Telecom or community members of the panel. Independent consultants have generally been found to chair the panels most effectively.

The agenda is drawn up by the panel chair in conjunction with British Telecom, following suggestions made by the panel and can contain any topic of concern to British Telecom customers. Members undertake not to discuss issues presented to them in commercial confidence outside the meeting and have maintained that trust since the panels were first established. Agenda items have included:

- complaint handling;
- phone books;
- itemised billing;
- DIY wiring;
- contracts;
- payphones;
- Customer Service Systems.

Members receive no remuneration other than out-of-pocket expenses but their interest and motivation remains constant with little absenteeism at meetings.

Technology

An exciting recent development has been the introduction of Prestel for consumer panels. Operating within a closed user group, the database contains minutes and agendas, the latest new releases, mailbox facilities, information on products and services and plenty of opportunity to 'talk back' to British Telecom as well as to use the many services offered on Prestel's main database.

Using British Telecom's own technology, a highly sophisticated communications network is being developed to help the panels' work. Members are able to communicate with colleagues, members of other panels or with British Telecom management.

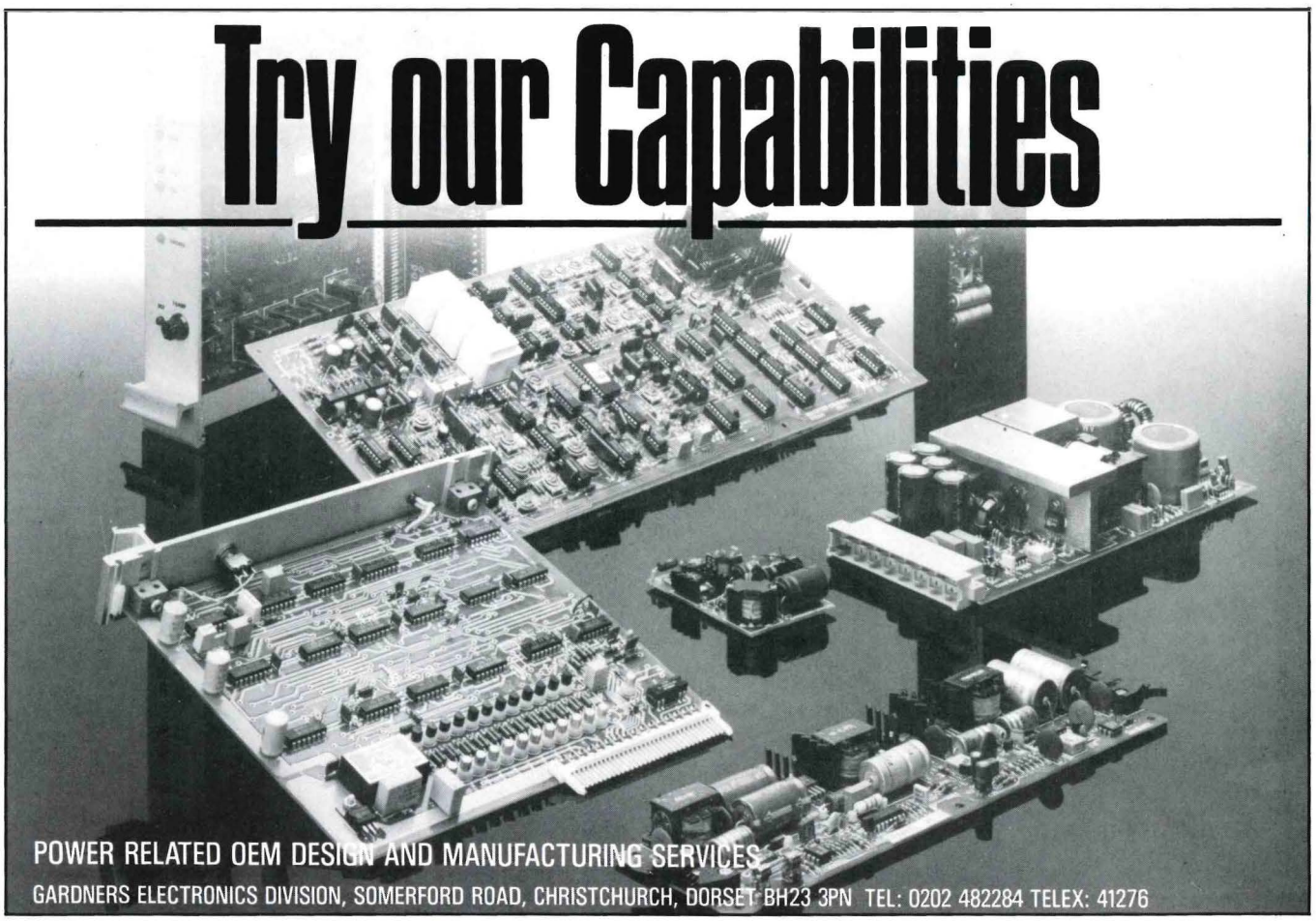
By using Prestel, panel members are eased into the world of information technology and are encouraged to view British Telecom as a communications business rather than a phone company. The Prestel Forum, which meets quarterly, was established to bring together representatives from each panel with the appropriate technical and design experts. The database is constantly under review and new graphics and a wider range of topics are just two of the subjects under discussion.

Much has been learned about Consumer Liaison Panels since their formation two years ago and in order to respond effectively they need:

- relevant, appropriate and timely information;
- professional presentations;
- commitment and response;
- clear and agreed objectives.

British Telecom can serve its customers more effectively when it is aware of their concerns. It must be innovative and flexible in order to respond to rapidly changing conditions. The panels are helping the company to maintain dependable service and to be more responsive to its customers than ever before.

Mrs J E Walsh is customer relations manager in British Telecom's Organisation Development Unit.



Mitel are more than just a major designer and manufacturer of business telephone systems for British Telecom. So much more that in 1986 BT bought a 51% stake in the company for over £180 million.

What did you get for the money?

A partner. One that does business all over the world – and who's already a number one supplier of PBX's in the highly competitive US market.

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ECTRONICS firm
el, who employ 900
ole in Gwent, are set
ign a massive con-
t with British
om which could

News of the contract comes three months after the Telecom takeover of Mitel.

British Telecom. We a
obviously happy becaus
it keeps us busy," sh
said.

The order will be fo
Mitel's SX2000 exchange
— the largest in the
company's range — and
the work will be

'HE MITEL
GO AHEAD

APPROVED

One of the curious anomalies of Government is that it has to establish mechanisms to protect the citizenry from acts against the public interest even when those acts are committed by itself. One of those mechanisms in the commercial and industrial sector

Monopolies and Mergers Commi
blished by Act of Parli

telecommunications users who might expect re
choice and higher prices.

One member, Mr D.P. Thomson, considered th
merger should not be allowed to pr
the undertakings pre
Commi

BT gets OK on Mitel

com has received

been tremendously important
they will continue to be major
products," he added.
Mitel staff

Q. Just who are Mitel anyway?

A. Well, since you asked . . . . .

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The big name in British Telecom's cabinet reshuffle.

More and more BT engineers are specifying the MS² 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.

Easier to work with and very reliable, it's no wonder the MS² Cross Connect System is becoming the big name in British Telecom's cabinet reshuffle.

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

MS² Cross Connect System.

3M Telcomm Products
QUALITY THAT GOES BEYOND TOMORROW

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INCREASED PROFITS

British Telecom has announced a pre-tax profit for the nine months to December 31, 1986 of £1,512 million — £158 million higher than in the corresponding period last year. Profit for the three months to December 31, at £506 million, was £54 million higher. These results represent increases of 11.7 per cent and 11.9 per cent respectively over the corresponding periods last year.

Earnings per share at 15.3 pence and 5.1 pence for the nine months and three months were 20.4 per cent and 21.2 per cent higher.

Turnover for the nine months at £7,009 million was £849 million or 13.8 per cent higher than in the corresponding period last year. On a comparable basis, excluding sales of £201 million relating to subsidiary companies acquired recently, mainly CTG, Dialcom, International Aeradio and Mitel, turnover grew by 10.5 per cent.

Rental income increased by 12.5 per cent to £2,289 million for the nine months. This reflects in part the strong growth in demand for business exchange lines and private circuits, to some extent influenced by the formal deregulation of the London financial markets.

Telephone call income at £3,678 million grew by 10.2 per cent compared with the first nine months of last year. Telephone call volume (turnover stripped of the effect of price changes) increased by seven per cent for inland calls and by 11 per cent for international calls.

'Talking' bills

British Telecom has launched 'talking' telephone bills for its blind and partially sighted customers.

Customers who have difficulty reading their telephone bills have, in the past, had to rely on the help of sighted friends or relatives. This initiative from British Telecom's Action for Disabled Customers in conjunction with the Royal National Institute for the Blind (RNIB) will help these customers gain greater independence and self respect.

Instead of bills being sent through the post in the normal way, they will first be sent to one of British Telecom's local area offices who will phone the customer, give details of the bill and advise on the ways of paying it. The bill will then be forwarded to the customer by post. There is no charge for the service.

Customer focus

A new British Telecom division has been created by a merger of the former Inland Communications and Business Services divisions.

Called the UK Communications Division, it is headed by Mr Mike Bett, formerly Managing Director of British Telecom Inland Communications.

Mr Ron Back, former Managing Director Business Services, is due to retire as a full-time Corporate Director in August. Mr Back, aged 61, will remain as a part-time executive director of the company for a further year.

The new division creates a single focus of management responsibility for customers in the UK. It provides network services to all business and residential customers and supplies equipment for use on customers' premises.

ICL test results

ICL has successfully completed the stringent performance and networking tests set by British Telecom for the two-node Series 39 Level 80 systems ordered for the operation of its new Customer Service Systems (CSS).

As a result, the ICL two-node Series 39 Level 80 has been officially accepted by the company and the first operational system was delivered to BT's Edinburgh computer centre in February. When implementation is completed, it will provide a comprehensive information processing service for BT's East of Scotland District.

Functional, performance and resilience targets set for the ICL two-node Level 80 were all exceeded. Sixteen individual networking trials designed to test every component of the ICL CSS network system were completed to schedule.

ICL has a contract from British Telecom, valued at £50 million, to supply seven two-node Series 39 Level 80 systems for the CSS project.

Japanese exchange

British Telecom and Nippon Telegraph and Telephone Corporation (NTT) have signed a memorandum on collaboration for the exchange of personnel and information over a three-year period.

The memorandum was signed on behalf of British Telecom by Chief Executive, Mr Iain Vallance, and on behalf of NTT by Dr Hisashi Shinto, President.

The memorandum represents an expansion of exchanges between the two telecommunications leaders which have been taking place over many years. The new relationship includes mutual exchanges of personnel and reciprocal visits by executives and middle managers, plus the sharing of business experiences after the privatisation of the two companies.

The plan is designed to promote increased business activities of both firms.

On the line

British Rail has signed a contract with British Telecom Mobile Communications to install 200 trainphones using the Cellnet cellular system on their InterCity train services.

British Rail plan to install the phones, which will use British Telecom's familiar green Phonecard system, on InterCity routes over the next two years.

British Telecom have already supplied nine System 4 trainphones to British Rail on InterCity Pullman trains serving London, Liverpool, Manchester, Leeds, Newcastle and Blackpool, and these will be converted from cash to Phonecard payment.

The sale of Phonecards from train buffet cars is currently being trialled on some InterCity routes, and it is hoped that this will become a national service.

▷

Bleep . . . to the rescue!

British Telecom's Radiopaging service took to the water to demonstrate its new Rescuepage — designed to help the Royal National Lifeboat Institution.

The tailor-made communications system means faster call out times for lifeboat crews — which could save lives.

Mobile Communications is supplying 2,000 of the specially adapted Radiopagers over the next two years. The first batch of 1,000 is going to lifeboat stations which are hampered by poor communications or cumbersome call out procedures, such as the use of explosive flares.

The new system was demonstrated in a mock rescue on the Thames.

With Rescuepage, when the Coastguard makes the initial call to the RNLI all members of the lifeboat crew are simultaneously 'bleeped' on their pagers to put them on alert.

When the RNLI launch authority has verified the call and decided on a course of action it again uses Rescuepage to summon which lifeboat crew is required. Rescuepage has different patterns of signal which can be identified by the receiving crews.

Our picture shows a 'rescuer' with pager on his lifejacket tending a 'victim'.

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Channel Measuring Set PCM-4

If you're testing and commissioning second or third generation Multiplex equipment our compact, easy-to-use PCM-4 tester offers you reliable results - fast. And when it's combined with the MU-30 scanner, the PCM-4 Multiplex analyser provides the perfect package for most system testing needs.

If you would like to know more, why not call us today!

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Megastream Testers

Frame Analyser PRA-1

If you have Megastream test problems during or after commissioning, our PRA-1 will solve them. Equally suitable for both in-service and out-of-service testing, the PRA-1 can be transparent in your Megastream circuit, whilst identifying alarms and errors on the system. Two receivers and a built-in printer provide an extensive monitoring capability.

If you have a testing problem at 2Mbit/s, contact us - now!

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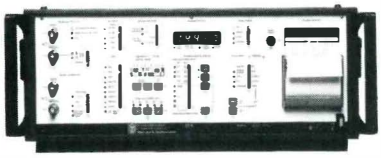

Bit Error Measuring Set PF-4

Bit error rate testing at 2Mbit/s, 8Mbit/s, 34 or even 140? Then the PF-4 is the tester for you. Well established within British Telecom, this instrument now incorporates the new G.821 Availability Specification as standard.

If you would like to know more, ask for a demonstration!

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Wandel & Goltermann of course!

The right line for more data is: 01-575 3020

Wandel & Goltermann Ltd, Progress House, 412 Greenford Road, Greenford, Middlesex UB6 9AH.

'Oscars' for BT

A real-time telephone management system is helping improve customer service in five British Telecom districts throughout the UK. The Oscar units are now being used at 14 departments concerned with sales and engineering services.

Designed and manufactured by Sension Ltd., of Cheshire, Oscar operates on an existing switch and provides a real-time feedback usually associated with Advanced Call Distribution (ACD) systems, but at a fraction of the cost. By monitoring all incoming telephone traffic, the unit gives immediate information on queue lengths, customer waiting times and abandoned calls.

As well as promoting efficient call handling, the system records the percentage calls answered within a specified time (PCA) and the percentage of time when all incoming lines are engaged (Busy Factor). The unit formats the relevant information into easily understood graphical reports that are produced automatically, or on request.

Costing between £3,000 and £6,000, the system simply plugs into a telephone socket at one of the operator positions and will work on most exchanges, including key and lamp systems, Heralds and digital PABXs.

The picture shows Oscar in action at BT's West End district.

HM the Customs!

British Telecom's Applied Technology (BTAT) computer services division is to develop and supply a new automated cargo control system for airlines, agents and H M Customs based at Gatwick, Heathrow and Manchester Airports.

The new system, worth about £10m over the next five years, will be known as Air Cargo Processing for the 90s (ACP90). It will run on large new IBM compatible microframes and will be developed from the current ACP80 system, also produced by BTAT.

In addition to providing automated customs entry and clearance facilities through Customs DEPS computers (which BTAT runs for Customs), ACP90 will enable users to control and manage freight inventories and send messages to other users.

Phones take off

In-flight trials of the first worldwide satellite telephone service for air travellers will start this autumn, following an international agreement announced today by British Telecom International (BTI).

BTI and the telecommunications authorities in Norway and Singapore are to work towards providing global coverage for the 'phones on planes' service, which BTI will launch on transatlantic routes next year.

BTI's Skyphone service will allow passengers to make their own telephone calls from planes, paying by credit card only. It will also offer telephone and data message facilities for airline operations.

High Street sales

British Telecom is to open 60 new retail shops in Britain's major high streets and shopping precincts over the next three years.

Extensive trials have proved the value of making available all of British Telecom's services to the domestic customer through top quality retail outlets, situated in prime retail locations.

The shops will be run by specially trained managers recruited from established high street retailers, and retail assistants recruited both externally and from within British Telecom.

All the shops will be in thriving ▷

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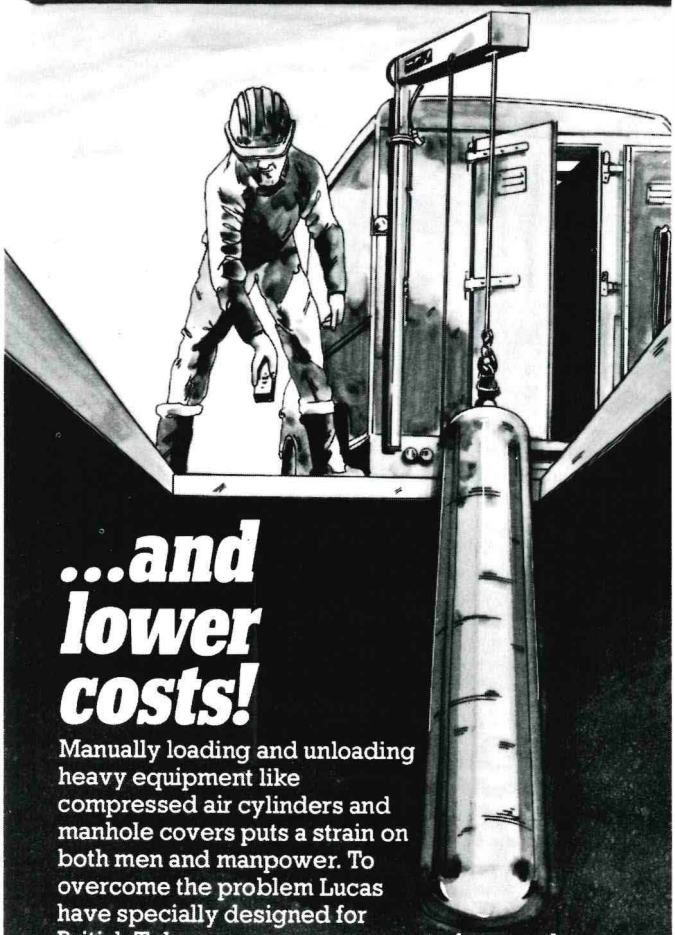

...and lower costs!

Manually loading and unloading heavy equipment like compressed air cylinders and manhole covers puts a strain on both men and manpower. To overcome the problem Lucas have specially designed for British Telecom a one-man operated crane, the Swinglift Telecom Special Mk II, which offers a cost effective solution by reducing the risk of injury and improving productivity of both vehicle and driver.

Also available are the standard Lucas Swinglift and Foldaway cranes which can be installed in box vans, pick-up, drop side and flat bed vehicles. All are powered by the vehicles own 12v or 24v batteries and can be easily transferred between vehicles.

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shopping areas serving a population of more than 100,000. Each will provide the public with a wide-ranging service for their communications needs. The latest range of telephones will be on open 'live' display allowing customers to listen to ringing tones and pre-recorded messages before they choose the product they would like to buy or rent.

The shops will offer the full range of British Telecom telephones, answer/record machines, accessories and DIY extension kits, as well as products from other leading manufacturers. Customers will also be able to pay bills and a service point will answer enquiries about all types of British Telecom services.

Within the same premises a business centre — aimed at the smaller end of the business market — will display a wide range of equipment such as small switch systems, telex and facsimile machines, cellular phones and radiopagers.

'DIY' telex move

Any business with a personal computer will be able to send and receive telex messages using its own dedicated telex number with a new service launched by British Telecom International (BTI).

TextDirect provides a link between the telex network and most word processors and personal computers. The only additional equipment that users may need is a modem to enable terminals to communicate over the telephone network, and the appropriate communications software.

Messages can be typed direct from the keyboard or prepared off-line in advance before being sent over ordinary telephone lines to the TextDirect computer in London. Messages are delivered to the Telex network via BTI's Telex Plus service, which provides store-and-forward facilities.

Users of TextDirect will need no special operator training. The cost of the service is a registration fee of £20 and £25 quarterly charge. Connection to the TextDirect computer is charged at 10 pence a minute: normal charges apply for the telephone call to the computer, and the normal charges for Telex and Telex Plus messages are also made.

Europe calling!

British Telecom is to play a major role in the development of a Pan-European digital cellular radio network following an agreement made in Bonn between the United Kingdom, France, West Germany, and Italy.

Mr Geoffrey Pattie, Minister for Information Technology, who has responsibility for telecommunications in the UK, met with his counterparts from France, West Germany and Italy to endorse a narrowband standard for the new network.

The four countries have now agreed to work towards a commercial service on the new network by 1991. This will allow customers to use their phones wherever they are in each of the four countries.

Secure deal

British Telecom has acquired 90 per cent of the shares in Telecom Security Limited, the fast-growing home security company.

This closer association of two companies already involved in the communicating alarms business will bring the assurance of personal and property protection within reach of many more households in the UK.

Telecom Security Limited (TSL) supplies an affordable comprehensive package of burglar, fire and personal protection. A complete system can be installed for £95 and £14.50 (plus VAT) rental per month.

Freephone expands

British Telecom is extending its international 0800 freephone service to cover most of Western Europe.

Finland, Italy, Norway, Belgium and Spain will join Denmark, France, the Netherlands, Sweden, West Germany, Switzerland, Australia and the USA, where the service is already available.

Reciprocal freephone arrangements will be available between the countries taking part, and it is intended the service will ultimately be available across the whole of Western Europe and other major markets abroad.

The participating European countries are all members of the European Conference of Postal and Telecommunications Administrations (CEPT).

For businesses in the UK and abroad, who pay for incoming calls on their special freephone numbers, the service offers novel marketing opportunities.

Known in continental Europe as the 'Green Number' service, International 0800 serves a wide variety of business needs including retail sales, travel and hotel reservations and easy telephone access for contacts and employees calling from overseas.

Undersea links

A £5.7 million contract has been awarded for the world's longest unboosted undersea optical fibre communications cable.

The cable will run 135km (84 miles) between Guernsey and the South Devon coast near Dartmouth. When it comes into service in the spring of 1989, its laser light pulses carrying speech, data, text, graphics and facsimile will travel the entire distance without regeneration.

The contract has been awarded jointly by British Telecom and the Telecommunications Authorities of Guernsey and Jersey to STC Submarine Systems.

The new cable will have six fibre pairs of which two will be in use immediately the cable comes into service. The system will operate at 140Mbit/s which will give each pair a capacity of nearly 2,000 simultaneous phone calls.

A £3.7 million contract has been signed for an undersea fibre communications link between the United Kingdom mainland and the Republic of Ireland. ▷

The City Business System in action in the dealing room of the London branch of Chase Manhattan Bank NA.

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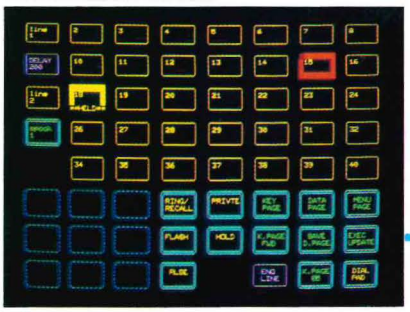

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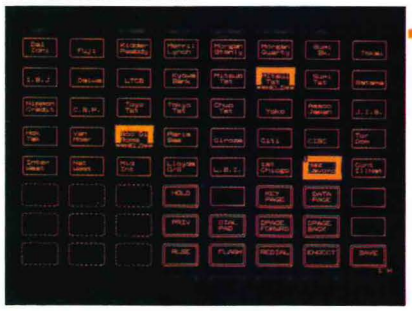

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The CBS is not only a fully comprehensive and very modern phone system, providing anything up to 5000 lines, it is also capable of storing and displaying thousands of pages of data that can be accessed simply using a VDU touch-screen.

Already well established in over 200 companies using 8000 screens in 22 countries, the CBS is proving to be the dealers choice for very good reasons – primarily because of the system's ability to be tailored exactly to the customer's communications needs, and because the CBS is built with the future in mind, users are confident that their system will always be right up-to-date.

For example, today's CBS offers enhancements such as:

- full colour monitors to help clarify the function of each key;
- slim and totally flicker-free 'plasma screens';
- 'turbo units' allowing faster handling of messages through an existing system;
- line display modules which let controllers see at a glance the status on up to 160 lines;
- the CBS Call Management unit which provides an output to an optional call logger.

And, with world networks of CBS terminals, more and more companies are making the concept of 24-hour world trading a reality.

For further information on CBS and the key-based system KBS, call British Telecom today.
UK enquiries: John Welch (01) 626 7796 (telex 892391 MASYM) or write to: British Telecom London City, 24 Creechurch Lane, LONDON EC3A 5EQ.
International enquiries: James Leech on: (01) 747 1414 (telex 894017 BTCBS G) or write to: International Sales, British Telecom (CBP) Ltd., 1-4 Capital Interchange Way, Brentford, Middlesex TW8 0EX.

The cable will run 126km (80 miles) between Holyhead, on the North Wales island of Anglesey, and Port Marnock in the Republic.

The contract has been awarded jointly by British Telecom and Telecom Eireann to Submarcom.

The cable will be laid by a British Telecom cable ship using the company's submarine plough which will bury the cable about 1 metre below the seabed to avoid the risk of damage.

British Telecom and Manx Telecom have jointly placed a £3 million contract with Standard Telephones and Cables to provide a 90km optical fibre cable link to the Isle of Man from Cumbria.

The new cable is the latest step in converting the Isle of Man network to digital operation by 1990. Manx Telecom, the British Telecom subsidiary responsible for running the Island's telecommunications services, has already started installing optical fibre land cable to link its exchanges.

Contracts

GEC Telecommunications, Plessey Major Systems and **Thorn Ericsson Telecommunications** have received orders worth more than £73 million from British Telecom for more than 500,000 lines of advanced digital local exchange equipment.

The orders are the tenth in a series placed competitively at approximately quarterly intervals.

Since May 1984 Plessey and GEC between them will be supplying 455,000 lines of System X equipment worth a total of more than £64 million. Thorn Ericsson has received orders for more than 70,000 lines of AXE10 exchanges valued at about £8 million.

Hovair Material Handling has supplied British Telecom with nine M500 Dandy lifts to handle pallet loads of coin stillages from public telephone kiosks.

Motorola has won an order worth £16 million to supply Cellnet with specially developed transceiver and switching equipment to operate on the new frequencies which will be freed for cellular communications within London by the Department of Trade and Industry towards the end of the year.

STC Submarine Systems has been awarded a £3 million contract by British Telecom and Manx Telecom to provide what is believed to be the world's longest commercial unrepeatered underwater optical fibre link — a 90 kilometre system between Millom, Cumbria, on the UK mainland and Douglas, Isle of Man.

STC Telecommunications is to supply British Telecom with a £4.7 million Eltex V gateway exchange for the international telex service.

The exchange, with 10,000 lines, will be installed in the City of London and it will be the world's second largest international telex exchange, after BTI's Keybridge House installation.

The company has also received a £40 million contract for Phase 2 of the new fibre network in the City which will be in place in the middle of next year.

Unisys has won a £2 million contract to supply British Telecom with an A10F mainframe for use by the UK Communications Division. Called the Trunk Network Data Collector, TNDC, the system will use X. 25-based communications protocols and link into 64 major trunk exchanges around the country to gather information about the use of the telephone system.

Listed kiosks

British Telecom has welcomed a decision by the Department of the Environment to list a further 400 telephone kiosks as being of special architectural and historic interest.

The Department of the Environment and British Telecom are to work with English Heritage to identify a representative sample of post-1939 kiosks worthy of preservation.

The extension follows the Department of the Environment's recent decision that listing can be given to buildings 30 years old and more. Previously only pre-1939 buildings qualified for listing.

To qualify for listing, the 400 extra boxes will have to be judged to enhance their surroundings or be sited near listed buildings or in attractive town and country locations. See article on payphone modernisation on page 60.

Cutting costs

Major cost savings in the support of computer software are made possible by Axion, a new product from British Telecom.

The Axion range of software tools has been developed specifically to simplify software maintenance, which can account for up to 70 per cent of the total cost of a large system.

Axion allows designers of real-time control systems to concentrate on specifying and designing software, because it produces clear, high-quality documentation and language code automatically.

Developed at BT Research Laboratories, Martlesham Heath, the range has already proved its value on major software design projects such as the programming of System X and Monarch telephone exchanges.

But Axion can also be applied to other real-time systems in industry, ranging from embedded micros to large industrial control systems, enabling a wide range of organisations, as well as the increasing number of private computer users, to share its benefits.

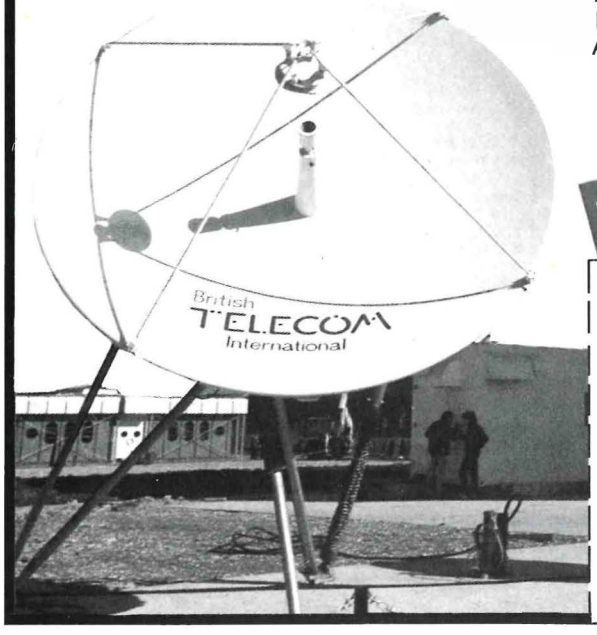
Appointment

Dr John Spackman, formerly Director of Operational Strategy in the Department of Health and Social Security, is to join British Telecom on July 1 as Director of Computing.

This is a new appointment in which Dr Spackman will be responsible for British Telecom's internal computing systems needs as a whole. He will formulate policies and progress the programme of commercial systems development.

Dr Spackman, aged 55, will also have line management responsibility for computing in British Telecom's newly-formed UK Communications Division.

PUT YOURSELF IN THE PICTURE



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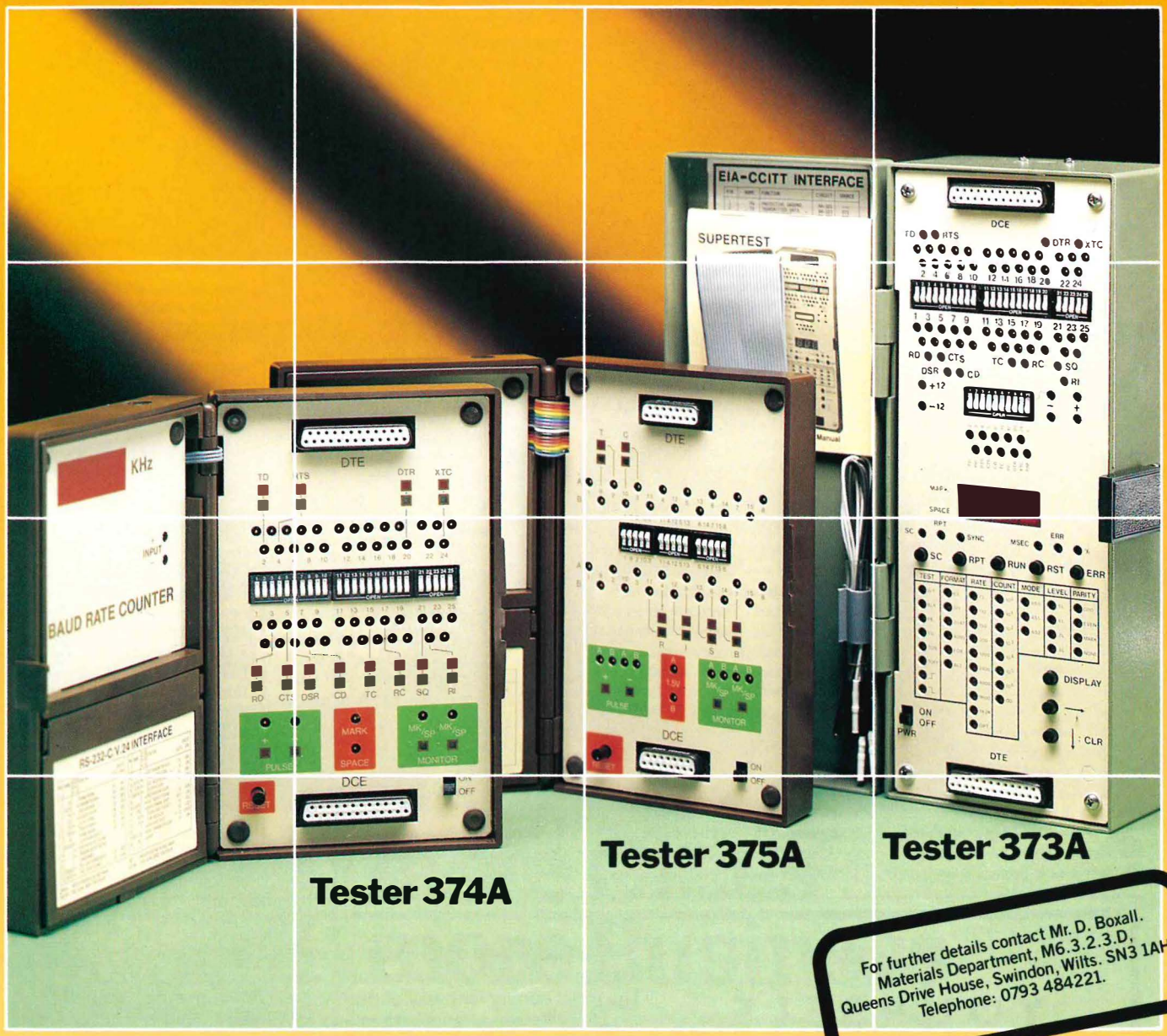

For further details contact Mr. D. Boxall.
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The Datacheck 3 is fully compatible with the RS-422/RS-423 interface and with the CCITT's X.26/X.27. The unit has access to 15 DCE and DTE conductors, 15 breakout switches and 12 LEDs. Both Datacheck models feature mark, space, clocking and Off indication on all interface leads, and high impedance sensing circuits ensure transparent operation. They also offer an optional voice frequency monitor and Baud rate counter for greater versatility.

The SuperTester takes power and performance even further. It offers bit and block error testing, parity errors, distortion measurements, interface timing and transition detection for intermittent faults. FOX test messages and ASCII code set takes can also be handled.

The full Navtel range is available from GADC. For full details, just phone Tring 4011.

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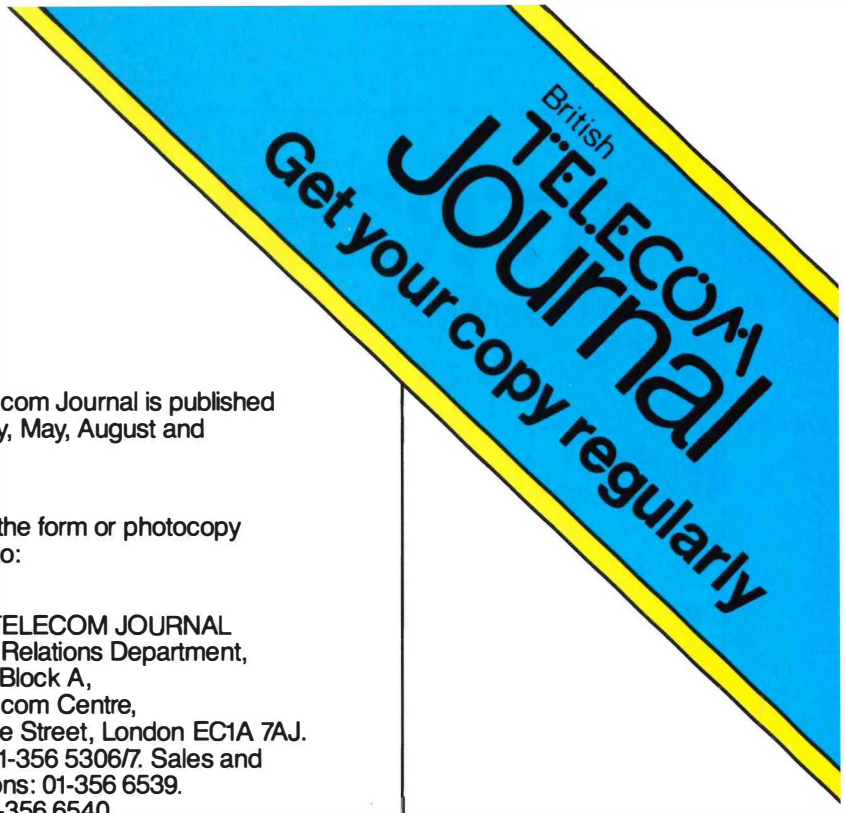

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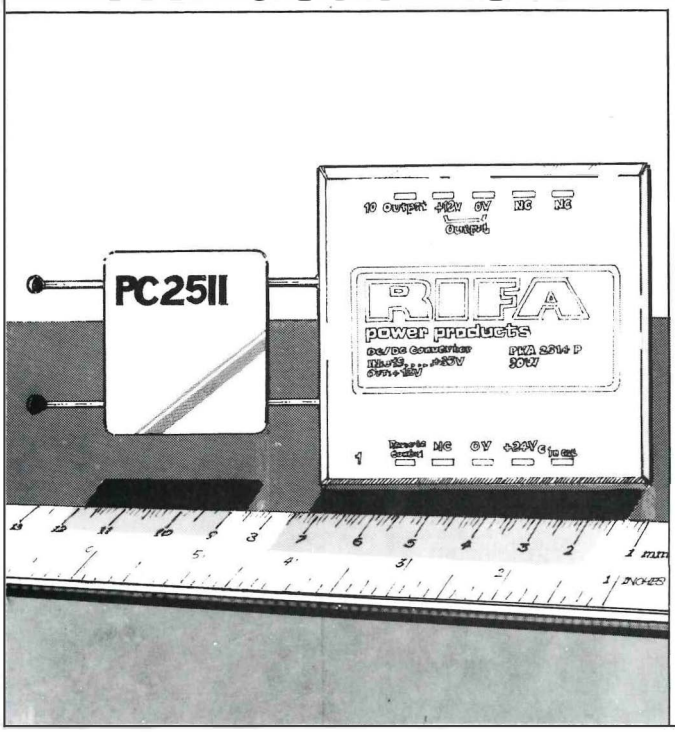

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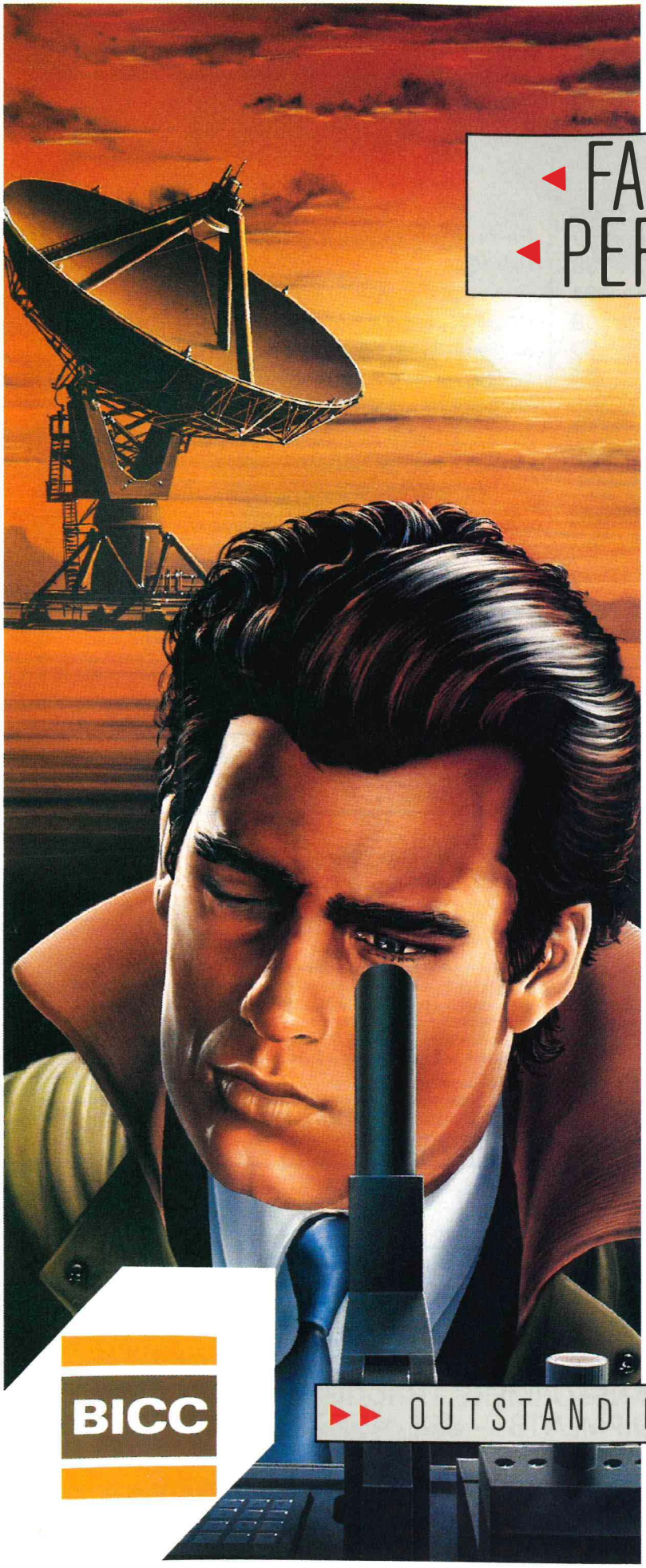

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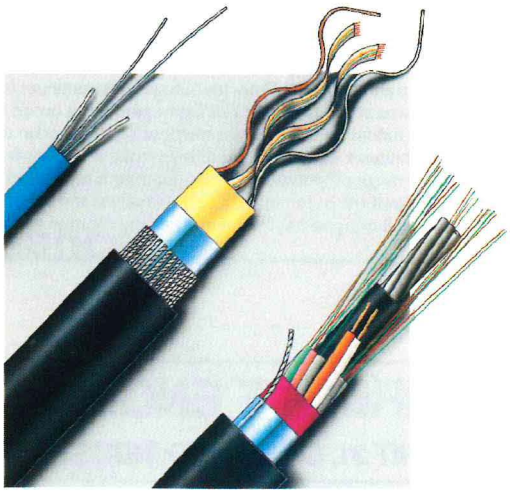

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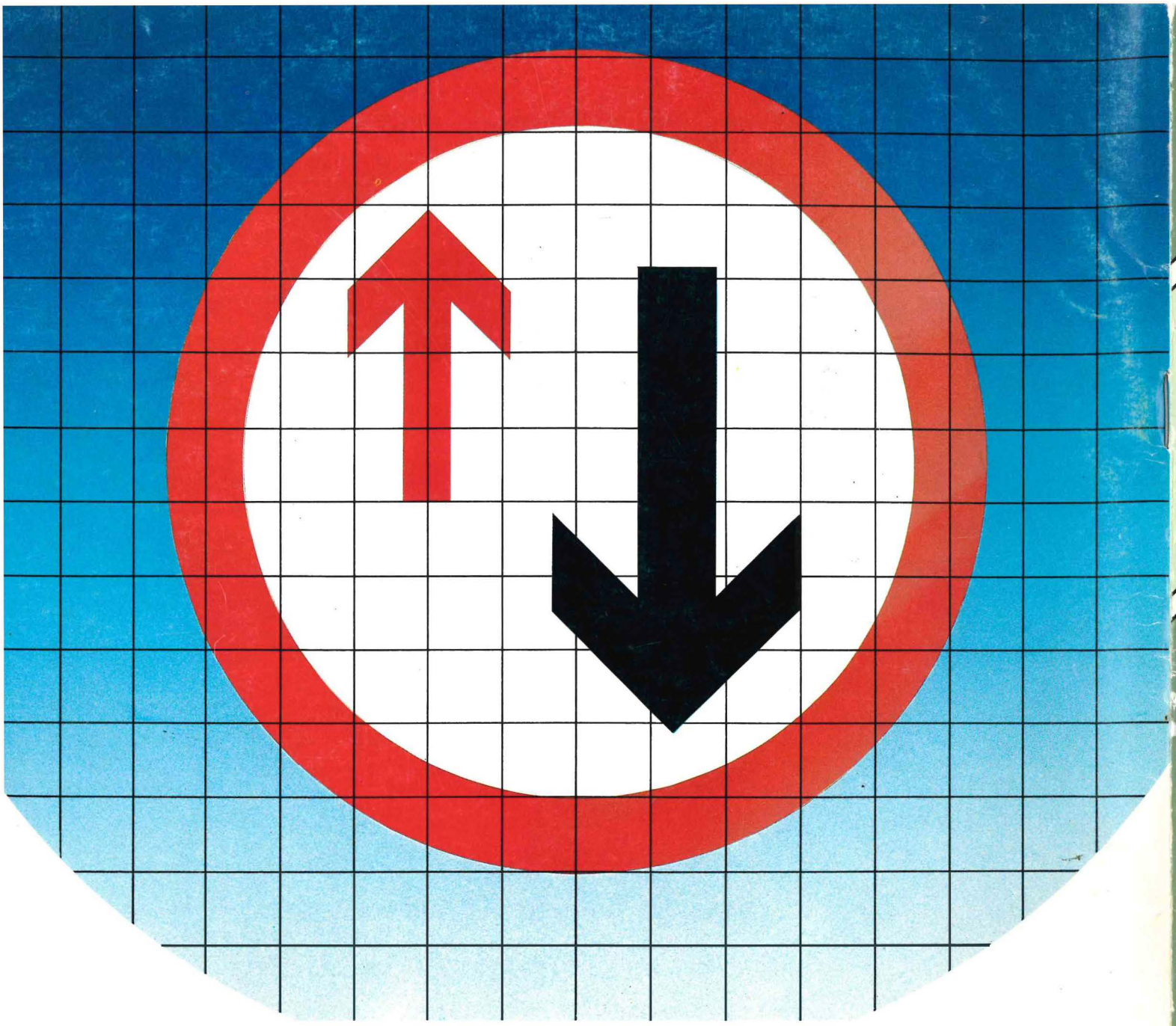

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