

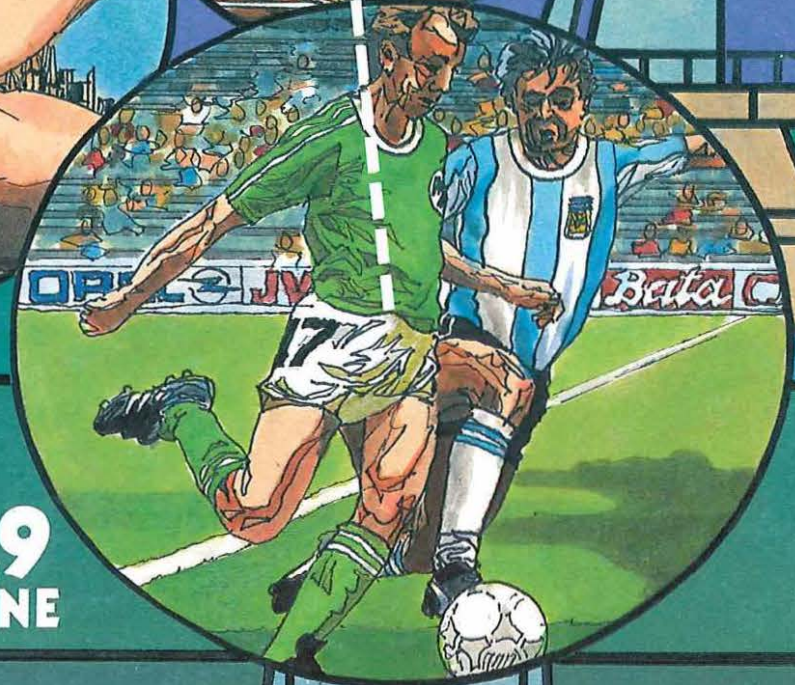
British

Price to BT staff 68p
Summer 1986 Volume 7 Number 2

TELECOM Journal

24
JULY

23
JULY



29
JUNE

Now Plessey System 565 goes live at home and abroad.

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

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

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

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

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



And notches up a string of fibre optic firsts.

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

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

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

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



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

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

 **PLESSEY**
The height of high technology.

Driving forward to success . . .

British Telecom's first full financial year in the private sector is marked by a number of significant achievements.

The year has seen major strides in the network modernisation programme – a System X exchange is now commissioned each week; nearly 150 small digital rural exchanges are already in service while the Company has a greater proportion of optical fibre in its trunk and junction networks than any other comparable network worldwide. A steady growth in demand is borne out by a 3.2 per cent increase in residential lines during the year while business lines grew by 5.3 per cent.

Determination

The Company's Report and Accounts, published in mid-July show that British Telecom spent about £422 million on the digital conversion programme and to allow for growth. The Company is well on course to achieving a fully digital trunk network by 1988. The programme not only highlights British Telecom's determination to invest in a long-term profitable future but also bodes well for the large

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number of mainly British contractors involved.

For business users, the year also saw the launch of an integrated digital access facility, by which customers can be connected to advanced network services. There was strong progress, too, in international services.

In terms of hard cash, the Company's turnover was £8,387 million and pre-tax profits were £1,828 million – 20 per cent higher than achieved last year.

All these achievements are good news indeed for British Telecom's vast army of supporters. There are still more than 1.5 million small investors backing the Company to the tune of 12.6 per cent of its total equity and 221,900 employees belong to the employee share scheme. Millions more small investors are represented by the pension funds, insurance companies and banks which hold 36.7 per cent of the equity.

Political

The Chairman, Sir George Jefferson, has described the Board's job as to go on running the business and to continue driving forward to develop and improve services irrespective of future political uncertainties.

The need to 'drive forward' is immediately pressing, not for any political reasons but to combat growing commercial competition. Sir George has said that British Telecom wants Mercury to become a 'credible competitor' and is not in the business of responding by protecting market share at all costs. Competition, he said, would stimulate further growth but there is clearly no room for complacency despite the year's excellent results.



Cover: British Telecom played an important part in focussing world attention on three major events this summer – the Royal Wedding, the Commonwealth Games and the World Cup. Any event of international significance provokes diverse comment and opinion but without hard, patient work behind the scenes to provide effective communications, much of the social and political importance of the three spectacles would have been lost. Cover design and illustration by Raygraphics.

British Telecom Journal costs 48p per issue for staff. External subscribers pay £15 for two years including post and packaging. Full details on page 75.



British Telecom Journal
Summer 1986 Volume 7 Number 2

Published by British Telecom plc
 To promote and extend knowledge of the
 operation and management of the
 telecommunications.

THIS IS A PLUG FOR OUR TEST EQUIPMENT

Plug into efficiency

To improve performance of exchange switching units you need optimum efficiency in management, and modern management needs modern equipment. Many managers consider a computerised approach to routine surveillance and maintenance of the PSTN as essential as the telephone itself.

The Rotadata Automatic Network Analyser ANA 8432

(BT Tester 376A item code 314626) operates under computer control making test calls from up to 32 exchanges, immediately alerting engineering staff to plant and route failures once a preset threshold is exceeded. Performance is recorded over almost a thousand route codes, yet it is remarkably easy to use, and like all Rotadata products is backed by a complete after sales service.

Tester 355A (BT Tester item code 314534) is a low cost microprocessor-controlled hand held test call sender incorporating sophisticated NOISE detection facilities. Sends and stores test numbers up to 80 digits with battery backup of stored data. Simple to set up and use.

Rotadata MAC Printer (BT Printer 10A item code 314627) is designed around a single chip microprocessor with software developed specifically for printing call failure details and exchange daily cumulative totals for all sequences at MAC monitored units. Translates MAC data into an intelligible format on standard 2¼in tally rolls. Can cost less than a repair to your old printer.

Supply Details

All items are available for supply within British Telecom from BT Procurement Executive M6323 Swindon. Please use item code numbers listed above. Contact Mr. S. Carroll. Telephone 0793 484226.

Design and Development Facility

Plug into Rotadata and benefit from the company's total service approach. Design, Development and Production with backup service support and training facilities. A company, dedicated to its customers who can operate safe in the knowledge that Rotadata are fully committed to supporting them.



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MARGAUX MAKES TELECOM BUILDINGS SMARTER THAN EVER

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

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

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

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

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

4 Security

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



5 Network Protection

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

Entry to buildings, or parts of buildings, can be restricted to access card holders only.

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

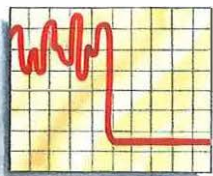


6 Economic Benefits

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

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

Call Chris Jackman on 0784 31101 or Steve Dillon on 061-428 7356 to find out more.



1 Energy Cost Control

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

Each micro controls its own building – and reports by exception to a Central Control. This makes it feasible to make geographically dispersed buildings "smarter" – responding to central management.

Light intensity, humidity, power consumption and ambient temperature; electricity usage and fuel consumption – all can be fine-tuned for optimum conditions, and improved performance.



2 Monitoring

Power supplies can be constantly monitored – even down to individual pieces of equipment, and if need be, within them. Costs can be analysed, attributed – and reduced.



3 Maintenance Management

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

MARGAUX

ESTATES MANAGEMENT SOLUTIONS



Rusham House, Rusham Road, Egham, Surrey TW20 9SL Telephone (0784) 31101

**“The London number
you are calling
has been changed.
Please call 0344-761317.”**



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you are calling
has been changed.
Please call
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Introducing the TEAM-32, our new Telephone Exchange Announcer Module that complements the field-proven DCI-270 Digital Changed-Number Interceptor. Designed for economic and flexible changed-number announcements, serving between 16 and 48 subscriber lines, the TEAM-32 uses the same line interface modules as its “big brother” the DCI-270. These allow efficient interchange to manage both large and small installations. In addition, both systems can accept our “Common Announcement Card” and provide up to 60 seconds digital storage for service announcements to any number of callers.

Build on the proven reliability and speech quality of the DCI-270. Consolidate with the TEAM-32, the compact solution.

- modular construction • digital voice reproduction
- clear speech quality • choice of introductory message
- field-proven reliability • cost effectiveness
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“DCI-270 ... British Telecom's choice. In service throughout the United Kingdom.”

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TADIRAN 

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Dynamic Logic Ltd., The Western Centre, Western Road
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TELECOM HAS A NEW WORD FOR ESTATES MANAGEMENT...

Word's getting round in Telecom.
Word about a highly effective new way of solving the problems of power and building services – a new partnership in controlling current account costs.

What's the word?

The word is Margaux.

Margaux Building Management Systems automate and control a Buildings Power and Building Services. Each Margaux system is capable of managing all the most vital estates management needs:

Fault Control reporting – maintenance – security – card access – energy management.

Together, Margaux and British Telecom have applied systems which are already bringing improvements to the Current Account, with rapid returns on investment, at levels similar to Margaux's experience with Bell in the USA. Margaux solutions also give savings on the Capital Budget! District Power and Building Services Engineers are finding out that Margaux systems come up with all the right solutions...

Whether retrofitting or re-fitting in existing buildings – or undertaking a new construction programme, Margaux meets the need.

Yet installation is trouble-free: and Margaux service back-up goes deep.

We can supply not only the remote building control units themselves, but the central Fault Control hardware and software based on the IBM-PC.

It's a complete "hand-holding" operation.

Before installing, we analyse your equipment in depth, and examine operational practices. Then we submit a report with full projections of the return-on-investment.

It all adds up . . .

Margaux handles all this:

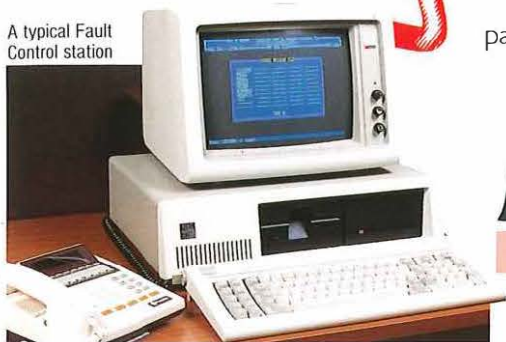
- Energy targeting and cost control.
- Electricity and service usage monitoring and reporting.
- Equipment usage and maintenance scheduling – alongside AMPERE.
- Automatic alarm routing to defined fault control locations.
- Security of buildings – and the network.
- Card access systems.

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



Remote unit

A typical Fault Control station



MARGAUX

ESTATES MANAGEMENT SOLUTIONS

Rusham House, Rusham Road, Egham, Surrey TW20 9SL Telephone (0784) 31101

BRITISH TELECOM

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American yet British?

Is what it isn't and isn't what it is?

Simple: Telex Computer Products. A company that prides itself on being "big enough to count yet small enough to care".

We're part of the Telex Corporation, one of the largest computer companies in the world, and a rising star in the Fortune 500.

But, while we have American roots, we're undeniably British – as our extensive UK field

engineering and manufacturing facilities amply prove.

As BT well know – having just invested in our equipment – a producer of telex machines, is just what Telex isn't.

A computer supplier dedicated to product quality, prompt delivery and customer care?

That's exactly what it is.

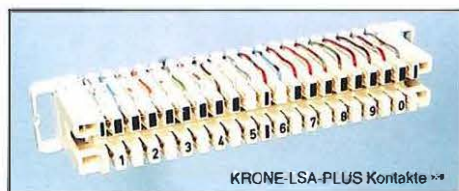


BIG IN COMPUTERS. AND IN CARE.

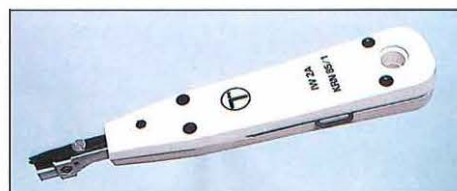
Telex Computer Products (UK) Ltd., Telex House, Prescott Road, Colnbrook, Slough SL3 0BE. Tel: 0753 685787 Telex: 848077



EXTERNAL CHOICE



KRONE LSA-PLUS MODULE



ONE SIMPLE TOOL

As external plant engineers, you'll know that cabinet locations can be the source of a high proportion of faults and line management problems.

Knowing this, you'll be looking for quick, reliable terminations, easy jumpering, test and disconnection access, clear designation and good housekeeping.

Now the answer to all these problems is here with the KRONE LSA-PLUS System.

Designed by KRONE specifically for use in external locations, the system has proven its performance in the most testing environmental conditions in the world – from the bitter cold of Norway to the scorching heat and humidity of Africa and the Far East. In the United Kingdom, the system is familiar as the basis of the British Telecom Rapide System, in service since 1978.

The insulation displacement connection – with its unique torsional restoring force – provides a gas-tight connection, requires only one simple tool – the Inserter Wire 2A – to make connections or reterminate, and has an unbeatable reputation for speed and reliability.

The system is modular and can be mounted in a wide range of cabinets and enclosures, including:

- Existing cast-iron cabinets
- GRP Cabinet No. 4.
- Sheet steel cabinets, currently on trial
- KRONE heat pressure polyester cabinet, with its unique thermal insulation and pressure-equalisation features to defeat condensation.
- A wide range of weatherproof boxes

The pedigree of the KRONE LSA-PLUS System is well-established, with total availability of all the facilities you could wish for. The way you make the best of it is your choice.

Phone us now, and make that decision.

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Links span the world of sport

The communications operation at the Commonwealth Games in Edinburgh was the culmination of careful planning which began as soon as the curtain fell on the previous Games in Brisbane four years earlier. It also resulted from close co-operation between British Telecom, the BBC, Games organisers, media representatives, the police, army and security personnel by way of the Communications Committee, chaired by Bob Fraser, British Telecom's Territorial Marketing Manager for Scotland and Northern Ireland.

A wide range of modern technologies and services – including digital switching, optical fibre cable, satellite and microwave transmission, cellular radio, facsimile and radiopaging – were used in providing national and world-wide links for teams, officials, press, broadcasters and the public.

This year's event was not an entirely new venture for either Edinburgh or British Telecom – the city had hosted the 1970 Games – but the scale and complexity of the operation were far greater. For the first time, British Telecom seconded two full-time managers for over three years to help plan and liaise – John McLeod and Mrs Betty Hetherington. The Company also helped early planning decisions by providing, through sponsorship, the Games Headquarters accommodation whereby the Games Executive, the BBC and British Telecom were all located together from the very outset.

The ten sports, for example, were held at 14 different venues, some nearly 50 miles from the city centre. Altogether, nearly 50 different locations in and around Edinburgh were >

Unprecedented communications efforts were made by British Telecom this summer to support two of the world's top sports events, the Commonwealth Games in Edinburgh and the World Cup in Mexico, and to help bring press and live broadcast coverage to an international audience.

The colourful spectacular at the last Commonwealth Games held in Edinburgh in July 1970



British
TELECOM
Journal



XIII COMMONWEALTH GAMES
SCOTLAND 1986

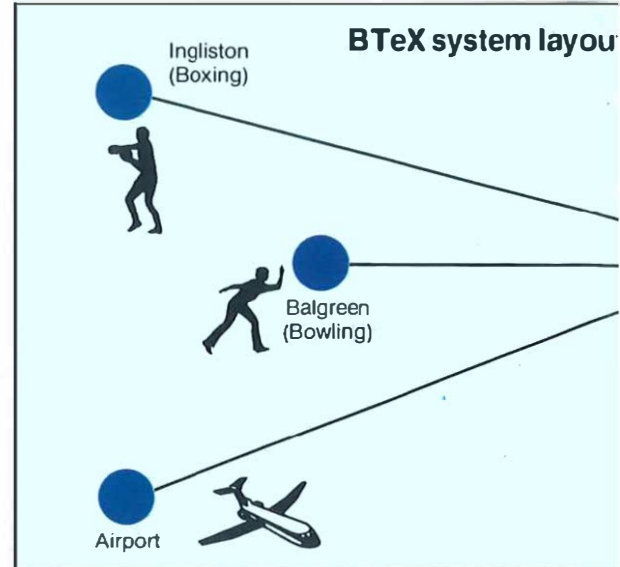
involved. Planning also had to take into account the needs of 2,500 competitors from about 50 countries, as well as 6,000 officials, administrators and helpers.

An estimated 1,800 press and broadcast representatives and 500,000 spectators and visitors to the city, added to the size of the task facing those responsible for assessing, arranging and providing the main communications facilities.

One of the first priorities of the Games Communications Committee was to select a telephone system that would best serve the varied needs of a multi-venue operation. The Committee decided on a large, central switch with a single telephone number. British Telecom provided a BTeX digital private automatic branch exchange and call management system that was capable of both meeting the needs of the Games headquarters and its main communications centre and of linking most locations.

The BTeX switch was served by Scotland's first System X exchange, Fountainbridge, and linked to two Remote Peripheral Exchanges near the Commonwealth Pool and Meadowbank Stadium. A large percentage of the 800 or so extensions on the switch had Direct Dialling-In. Voicebank, British Telecom's automatic telephone message service, was linked to the

Cable jointers John Rogers (foreground) and Richard Findlay working on the main feed cable for press coverage of cycle races at the Velodrome.



BTeX to receive calls on the main incoming PSTN line during the switchboard's closedown periods at night.

With several sports taking place at different venues, and the media looking for fast results, a comprehensive network of data and exchange lines was needed to serve the Results Centre at Meadowbank Stadium.

A computer system was used consisting of a central database at the Centre and local CPUs working at the main sports venues, all linked by data lines. At some venues, where results were less complex, a terminal and printer or facsimile were used to transmit results over public exchange lines.

Programme

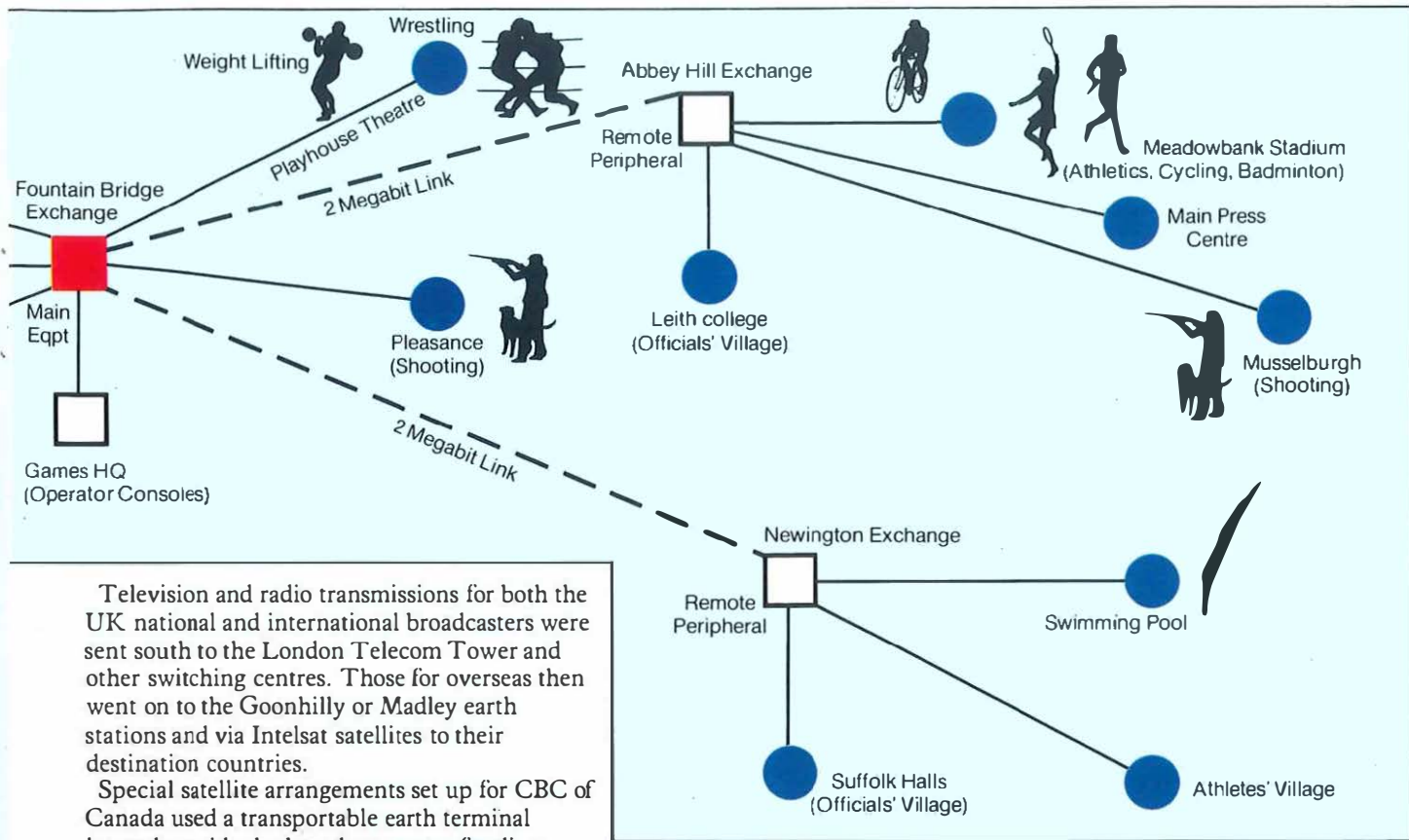
British Telecom's Business Systems Support Unit in Birmingham designed a computer-controlled programme for the Ceremonial Committee - one of 43 committees set up for the Games. The programme enabled medal presentations, national anthems and flag raising procedures to be controlled from Featurephones in the Control Centre at Meadowbank Stadium.

Probably the most demanding communications requirements, however, were those for the media. Planners estimated that the ten-day event would be watched by some 600 million television viewers around the world, and that another billion would hear radio broadcasts or read reports from the correspondents.

As the host broadcaster for the event, the BBC was responsible for providing TV and radio studios in Edinburgh for the national and international broadcasters, and for organising commentary positions at the sports venues. A special centre to house the studios was constructed next to the Capital telephone exchange in Edinburgh.

The BBC and British Telecom worked together to supply sound and vision links from almost every sports location into the Centre. A total of about 350 local broadcast circuits were provided, and the links included a 20-mile optical fibre cable running from the Centre to the main network at Kirks O'Shotts.





Television and radio transmissions for both the UK national and international broadcasters were sent south to the London Telecom Tower and other switching centres. Those for overseas then went on to the Goonhilly or Madley earth stations and via Intelsat satellites to their destination countries.

Special satellite arrangements set up for CBC of Canada used a transportable earth terminal located outside the broadcast centre for direct transmission from Edinburgh, via Intelsat, to Toronto. This terminal, built specially for British Telecom International broadcast operations, comprises a three-metre dish and electronics cabin installed on a road trailer, and provides two television channels and up to eight high-quality audio channels.

For the vast army of journalists covering the event, extensive telephone, telex and facsimile facilities were provided in the main Press Centre at Meadowbank, at another centre near the Commonwealth Pool and at the various sports venues. BTI's Special Events Unit – which provides on-site press communications bureaux for most major sporting and political events in the UK – played a vital role supplying equipment and staffing to ensure UK and foreign press reporters could file their stories.

Automatically

To simplify telephone use for members of the press, an automatic bureau-type facility was set up. Served by the BTEx switch, it enabled reporters to make cashless calls from specially installed telephones.

To use the service, accredited journalists applied for a Personal Identification Number and either paid a cash deposit in advance or arranged to pay by credit card. Using the PIN number, calls could be dialled direct, and were logged automatically by the BTEx for the production of itemised accounts at the end of the Games. Ordinary payphones were also available for the media, with BTI and District staff present at the main Press Centre to help callers, provide change and issue Phonecards.

The huge task of providing and installing most

of the communications links and facilities for the Games was largely the responsibility of British Telecom staff in the East of Scotland District. A Games Committee was set up to plan and co-ordinate the District's involvement drawing upon experience of the previous Edinburgh Games. A West of Scotland committee similarly looked after the provision of the requirements at Strathclyde Park for rowing and canoeing.

Among the lines and circuits the Districts had to provide were some 600 exchange lines, 180 payphones, 170 PBX exchanges lines, 900 PBX extensions, 100 lines for the press telephones and more than 350 local broadcast circuits.

Altogether more than 3,000 pairs and 1,700 pair miles were provided; internal and local



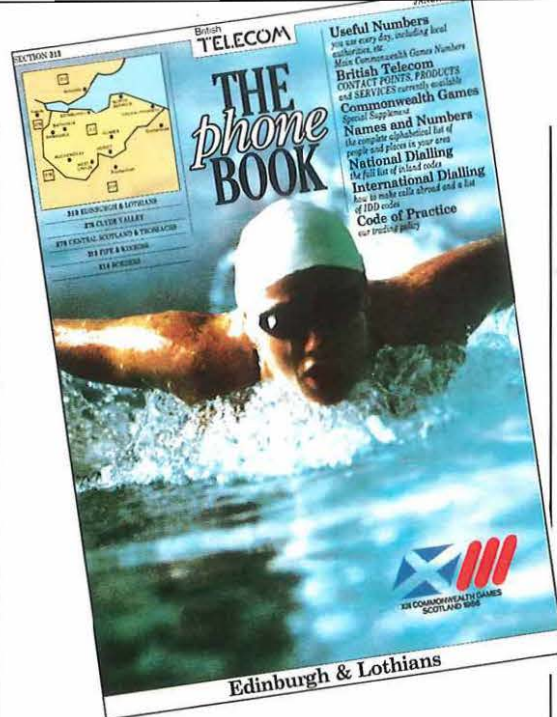
British Telecom engineers fitting telephone lines inside the press box at the Meadowbank Stadium, Edinburgh.



British Telecom Journal
Summer 1986

Links span the
world of sport

A special supplement
was included in the
Edinburgh and Lothians
phone book to mark this
year's Games.



Senior technician Ricky Wilson working on a PBX built under Meadowbank Stadium to receive a 1,200 pairs cable from nearby Abbeyhill exchange.

distribution cabling totalled 16 miles. Special duct and cabling was also laid around the athletics track in Meadowbank Stadium for the electronic timing and trackside communications.

To ensure a high level of service, most sports venues had back-up circuits. For some of the shooting events held at Kippen, over 40 miles from Edinburgh, a microwave link was set up to the nearest exchange about four miles away.


Communications for the public were not overlooked. A programme was put in hand to install British Telecom's new-style payphones in the city centre and at sites adjacent to venues in time for the Games. BTI's Special Events Unit installed and staffed their mobile payphone units to provide additional phone facilities at some of the busiest locations.

A commemorative edition of the Edinburgh and Lothians Phone Book was produced, containing an eight-page supplement which included flags and dialling codes of the Games Federation



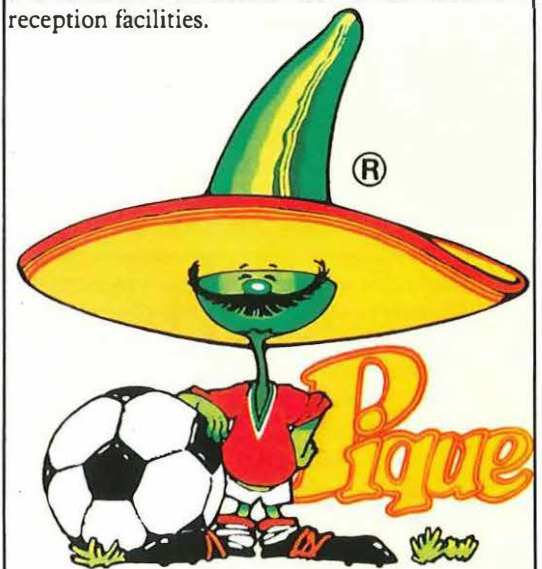
countries, the programme of events and Games numbers. A Guideline telephone information service provided news leading up to the Games and results from the opening day.

The days leading up to the start of the Games saw threats of boycotts and mounting political pressure by a number of Commonwealth countries. The range and efficiency of British Telecom's communications helped to take both the event, and the stories behind it, to the rest of the world.

As a tail note, British Telecom did not forget its social obligations. Despite the pressure of work during the Games, Bob Fraser arranged for 40 handicapped children to see the Games at the company's expense with Brian Wherry, director B.T.S.N.I., and Ken Borthwick, Games Chairman, lending a helping hand to make the day out for the kids a great success. 

● British Telecom International mounted one of its largest-ever satellite services for broadcasters during the World Cup championship in Mexico.

BTI provided the BBC and London Weekend Television with their own 24-hour satellite links from Mexico to bring football action to TV screens in Britain and Europe. BTI's Eurovision satellite link also took match action to Europe and to some African countries without their own reception facilities.



© SPORT-BILLY PRODUCTIONS 1984
OFFICIAL MASCOT FIFA WORLD CUP 1986

The special links were designed to give broadcasters greater flexibility and unlimited air time. Three small satellite dishes were set up at the major football grounds and TV signals were beamed to BTI's Madley Satellite Earth Station in Herefordshire through a series of satellite hops. The signals were then transmitted to the London Telecom Tower for distribution to the TV companies.

Radio links were provided for other transmissions and a total of eight wideband carriers were used for match commentaries and interviews. A further 24 narrowband carriers were also used for programme coordination and data transmission.



British Standards from

SMITH CASES

We have British Telecom approved sales and service kit cases for the systems listed below, and others for more specialist applications. Our cases are purpose built for each system.

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Our cases have been supplied to British Telecom districts which have been successful in obtaining BS5750. All cases are fitted with earthing facilities where appropriate.

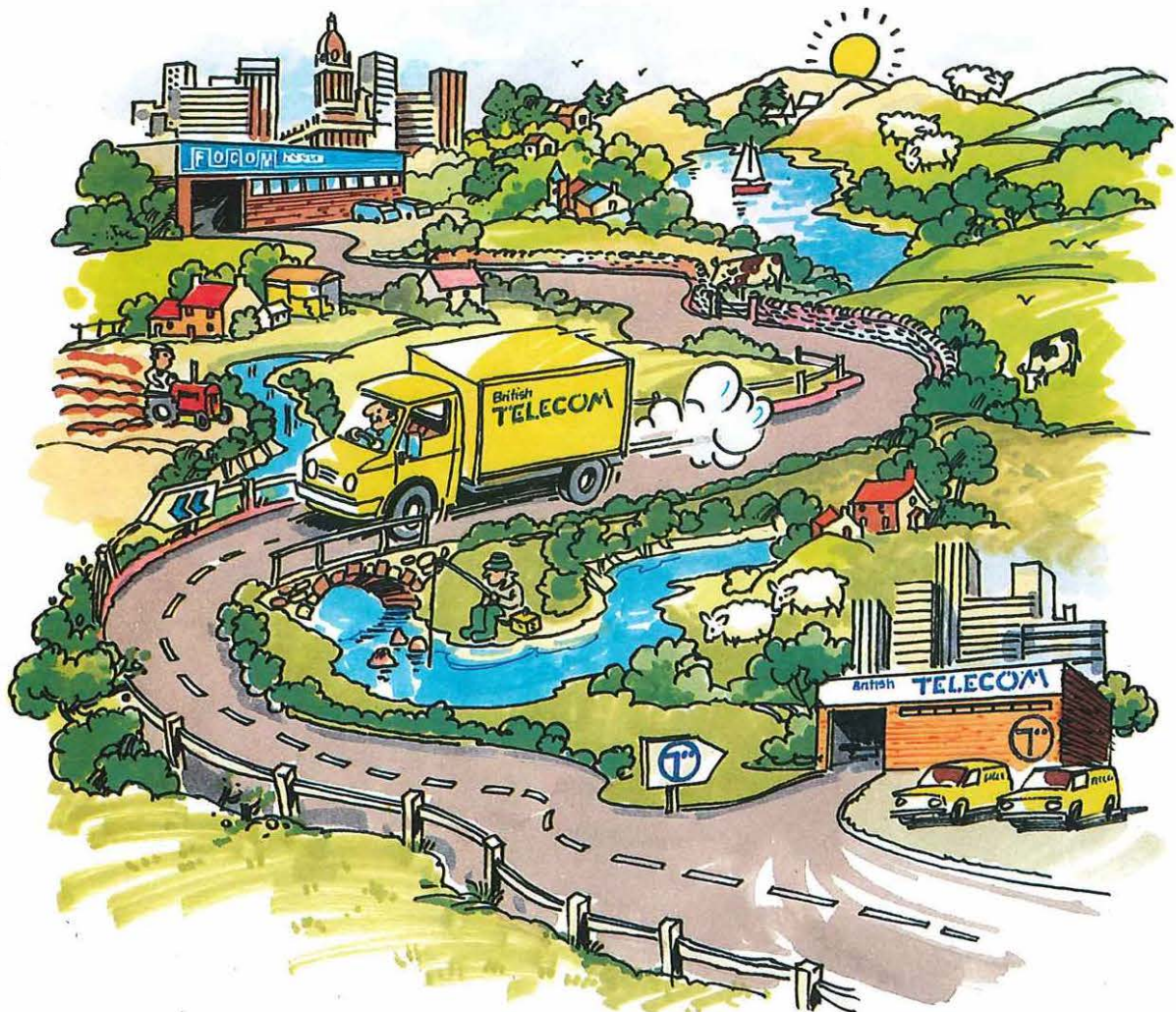
<i>Monarch PCB Diagnostic</i>	<i>Plessey IDX PCB Diagnostic</i>
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<i>Monarch 56508 Mk2 Kit</i>	<i>Viceroy Powerpack Kit</i>
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<i>IBM System Tray</i>	<i>Kinsman/Regent 245/247 Console Kit</i>
<i>Herald 'A' PCB Diagnostic</i>	<i>Kinsman PCB Diagnostic Kit</i>
<i>Herald 'C' PCB Diagnostic</i>	<i>Regent PCB Diagnostic Kit</i>
<i>Merlin 52616</i>	<i>Rhapsody Kit</i>
<i>Merlin 56022</i>	<i>Ensign Kit</i>
<i>Cheetah T1 x Monitor/Keyboard</i>	<i>Senator Kit</i>
<i>Cheetah T1 x PCB Diagnostic</i>	<i>TEP-1E Transit Case</i>

For further information contact:

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Martlesham Heath Industrial Estate
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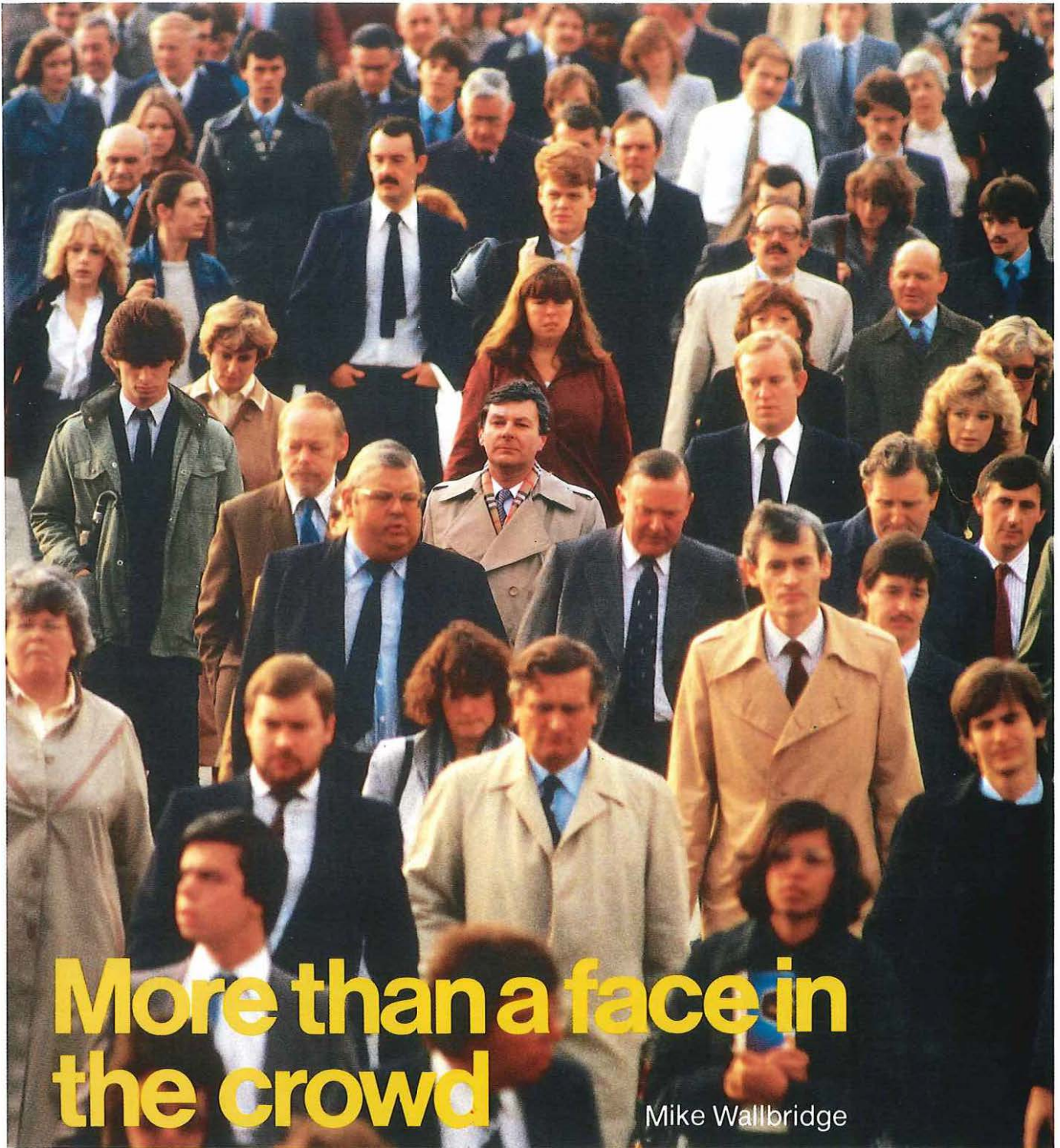
Name

Company

Position

Address

Tel. No.



More than a face in the crowd

Mike Wallbridge

The last few years have seen unprecedented changes in the structure and development of British Telecom. One of the most fundamental and far-reaching has been in the company's approach to its customers, for it is this area which holds the key to unlocking the door to long-term prosperity.

Successful marketing, of course, has a vital role to play and it is essential that British Telecom understands and satisfies the needs of its customers. To enable it to do this accurately, Inland Communications – the company's largest major division and the one with which customers normally deal – is introducing a Direct Marketing System (DMS).

The system is much more than just another set of initials. Behind those three letters is a significant marketing innovation which will affect all marketing and sales staff in the field and the office, in the Districts and in Headquarters and it will change the way customers perceive British Telecom and how the company does business with them.

Direct marketing is aimed at helping British Telecom reach that ideal position of two-way communication with each customer so that individual needs are known and satisfied.

DMS will provide Districts with a powerful marketing tool by automatically handling customer enquiries from campaigns in a

A new marketing initiative aimed at getting to know its customers better and dealing with them more efficiently is now being introduced by British Telecom's Inland Communications Division.





Main picture: a customer inspects the wares and services available at a modern business centre.

structured but personal way ensuring that customers quickly receive the information promised in the advertising. From the beginning there will be immediate and tangible benefits to the customer and to the Districts, the latter in reduced overheads and better targetting.

There are, of course, times when too much contact can be worse than no contact at all. So the DMS has a system which, operating across Districts and Divisions, ensures that all campaign activities are scheduled. This is possible as the DMS enables accurate selection of individual customers for targetting messages appropriate to the customers' needs.

DMS also lets customer needs determine how little or how often contact is made. It will also help ensure that products and services on offer are what the customer is most likely to be interested in and make it easy for him or her to find out more. It will improve the speed of response to enquiries that follow on from advertising and will also make it easier for customers to buy in the way that suits them best, either direct through District sales offices or perhaps mail order.

Districts will be able to pursue their strategic objectives faster and more effectively because, from DMS data, they will get more and better market intelligence. This will help in developing more effective sales and marketing plans. A further bonus is that the customer information available from DMS will improve the effectiveness of British Telecom's advertising and telemarketing by enabling advertising and sales campaigns to be tested and results measured more accurately. Successful campaigns can be rapidly expanded.

Captured

The key to the success of DMS is its database which is constantly 'live'. Every customer contact captured – and there could be up to 20,000 a week – will update the information held on file the instant it is recorded and through the database customers will be able to tell Districts what they want from British Telecom.

Direct marketing works when the right people are contacted through the right medium, at the right time, with the right offer, expressed in the right way. But the relationship with customers is only fulfilled if there is 'follow-up' with the right



Right: business installation manager Adrian Attwood (right) with a client from British Aerospace.

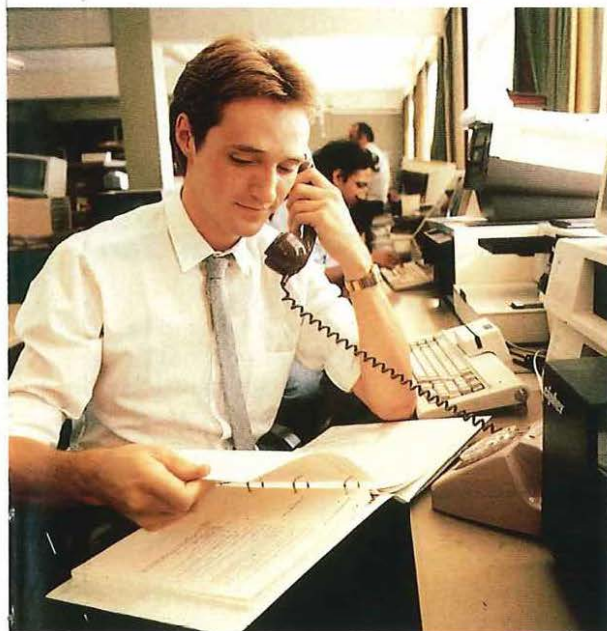


Installing exchange equipment at a customer's premises.

response. That response might be a sales visit, a literature package, or a mail order sale.

The major day-to-day task of DMS is to handle customer enquiries which result from campaigns. But it will do more than simply record and pass on details of customer interest in a product or service. The system recognises that enquiries are not of equal worth in that some customers may only be seeking general information, others will have expressed a particular area of interest, while a third group may be ready to buy.

Fundamental to DMS is a process which enables British Telecom to assess the contact according to the likelihood of a sale and the



DMS database will provide a unique combination of co-ordinated marketing and local flexibility. But to achieve full benefit for Districts and customers, disciplined use of the system will be required as follows:

- ★ database is used to identify opportunities for promoting particular products and services to particular groups of customers;
- ★ opportunities result in a promotional plan to which particular campaigns can be related;
- ★ each campaign is planned and implemented to project customer benefits;
- ★ responses from a particular campaign are fulfilled according to customer needs;
- ★ campaign results are analysed and fed back into the database;
- ★ quality of information in the database improves and so does the effectiveness of the next direct marketing campaign that it supports.

As long as the cycle is unbroken British Telecom's direct marketing becomes an upward spiral of better results. If this cycle is broken the result will be wasted resources, a less effective database and less capable customer response.

A further significant problem, which DMS will help to address, is that British Telecom is such a large organisation that someone somewhere is probably re-writing, re-designing, re-photographing, and re-printing campaign material which already exists. This is the reason for the introduction of ASP Helpline, a special manned advisory telephone number for advertising and sales support needs. This is a new creative co-ordination service for Districts.

British Telecom-appointed advertising agencies and suppliers will find Helpline invaluable and for Districts embarking on a campaign it will keep costs down by avoiding duplication. The Helpline Literature library will hold samples of all current British Telecom literature and will make emergency supplies available on a 'hotline' service. It will hold a library of professionally written text by copywriters who have turned the product features into benefits. The copy will also have been commercially and legally approved.

This, then, is DMS. The next step is a wide ranging internal communications exercise which will make known the benefits of the system to sales, marketing and communication staff.

Training courses are already underway. ●

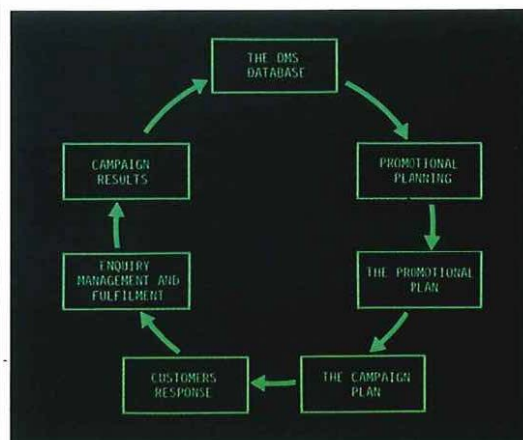
Left: Tim Crey, of technical support (computers) talks to a customer.

Mr M J Wallbridge is head of direct marketing with Inland Communications.

system then recommends the ideal follow-up strategy. For a low likelihood of sale this might be literature. Better prospects might warrant immediate literature, a subsequent telemarketing contact and in due course follow-up by a District salesperson. Excellent prospects for a potential sale would receive immediate literature and a high priority follow-up which could be a recommendation for top priority District sales follow-up action, or a mail order.

Whatever the level of potential, within 24 hours DMS will have sent a District full details of the contacts made from their area, the action taken, and recommendations for further action.

Having Districts in constant contact with the



How the DMS cycle works.

In confidence...

Peter Strawson



PRINCIPLE 1

"The information to be contained in personal data shall be obtained, and personal data shall be processed, fairly and lawfully"



PRINCIPLE 2

"Personal data shall be held only for one or more specified and lawful purposes"



PRINCIPLE 3

"Personal data held for any purpose or purposes shall not be used or disclosed in any manner incompatible with that purpose or those purposes"



PRINCIPLE 4

"Personal data held for any purpose or purposes shall be adequate, relevant and not excessive in relation to that purpose or those purposes"



PRINCIPLE 5

"Personal data shall be accurate and, where necessary kept up to date"



PRINCIPLE 6

"Personal data held for any purpose or purposes shall not be kept for longer than is necessary for that purpose or those purposes"



PRINCIPLE 7

An individual shall be entitled -

- (a) at reasonable intervals and without undue delay or expense -
 - (i) to be informed by any data user whether he holds personal data of which that individual is the subject; and
 - (ii) to access to any such data held by a data user; and
- (b) where appropriate, to have such data corrected or erased



PRINCIPLE 8

Appropriate security measures shall be taken against unauthorised access to, or alteration, disclosure or destruction of, personal data and against accidental loss or destruction of personal data



It is now two years since the Data Protection Act came on to the Statute Book but its roots can be traced back more than 20 years. Two reports commissioned in the 1970s largely governed the final shaping of the Act. The Younger Report, published in 1972, was the first major effort by Parliament to tackle growing fears about the security, control and use of personal information - especially on computers. Six years later the Lindop Committee was to report specifically on data protection.

As a member of the Council of Europe, the UK was compelled to introduce such an Act to abide by the Council's convention on data protection, whereby data will be able to flow freely between the UK and the other signatories. Without this Act other countries may have felt that it was not safe to allow data to be transferred to the UK and this could have resulted in an adverse effect on international trading.

The Data Protection Act is an ambiguous title which does not fully explain the purpose or the scope of the legislation. The most common misunderstandings are that the Act is solely about personnel information, that it is meant to tighten computer security, and that it is merely an attempt to pay lip service to the Council of

Europe Convention. In fact, it covers all in that its true purpose is to safeguard the confidentiality and accuracy of personal data which is processed in computer systems.

Basically, the Act calls for the compulsory registration of all automatically processed data files which contain personal information identifying a living individual. This could be taken to refer to computers in the everyday sense, but other programmable devices such as word processors or electronic mailboxes, for example, can, in certain circumstances, come within the scope of the Act.

Responsibility for registration falls to the 'data user' who may be an individual or a corporate body and it has to include such detail as the use that is made of the data and where the information is obtained or disclosed. A fee of £22 is payable for each registration, which covers a period of up to three years.

Each registered entry will be contained in a register to be published by the Data Protection Registrar, which will be freely available for examination, probably at public libraries.

With effect from November next year the 'data subject' will have the right to request access, and apply for a copy of the information stored about him or her. This request will have to be met

The Data Protection Act is designed to protect the confidentiality and accuracy of personal data processed by computer systems. As a major data user, British Telecom and its staff are much affected by the legislation.

within 40 calendar days. If the information is found to be incorrect, the 'data subject' will have the right to have the data corrected or erased. It is already possible under this Act to claim compensation, through the courts, for any damage or distress caused by incorrect data.

The Act is based on a set of eight principles (see opposite page) which dictate how the 'data user' behaves and how data is treated.

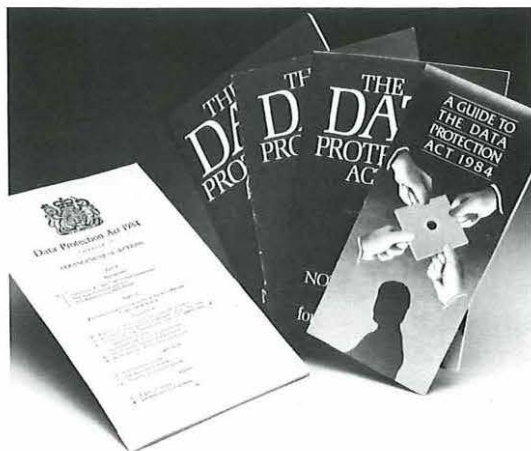
Data files should ideally be able to indicate that the validity of a statement has been challenged by the 'data subject' and that an item of data has been obtained from a third party. While it will not be a criminal offence to fail to have included the indicators, their non-existence will render the 'data user' liable to pay the 'data subject' compensation for damage caused by incorrect data. Compensation may not have to be paid by the 'data user', however, if it can be proved that he or she took such care as in all circumstances was reasonably required to ensure that the data was accurate.

Offending

Regardless of the use of indicators, where data is found to be inaccurate, a court may order the correction or erasure of the offending data but even where the indicators have been properly used, the court may make an order requiring the insertion of a statement without the erasure of any inaccuracies. This will make it essential for all personal data files to have the ability to include a supplementary statement as ordered by a court of law.

Procedures will have to be devised to allow staff to respond to the request for access within the 40 calendar days. For example, the 'data user' must ensure that the person requesting the information is in fact the 'data subject' or has a right to request it by virtue of being a parent, legal guardian or otherwise possessing power of attorney. British Telecom must also be sure that the information provided refers exclusively to that person, and, where a third person is or could be identified, that information is omitted, if the third party's permission has not already been sought for disclosure.

The mechanics of subject access are still in an embryo state, but several suggestions are being considered about how this could legally be achieved.



The first part of the Act came into force in September 1984. From that date, the 'data subject' has had the right to compensation for damage or distress due to loss, or unauthorised access or disclosure of personal data. This means that although subjects are not lawfully entitled to access at present, they can claim compensation for damages from the 'data user'. British Telecom's open policy for customer billing and personnel queries, for instance, makes this possible already.

As far as security of data is concerned all procedures should be reviewed now, as it is stated in the Act that a defence in law would be to prove that all 'reasonable' care was taken to ensure the security of data. The word 'reasonable' is undefined, however, so it should not be assumed that existing procedures are necessarily adequate.

Since the Data Protection Act became law, two subjects have come under discussion - word processor applications and the need for registration of electronic mailboxes.

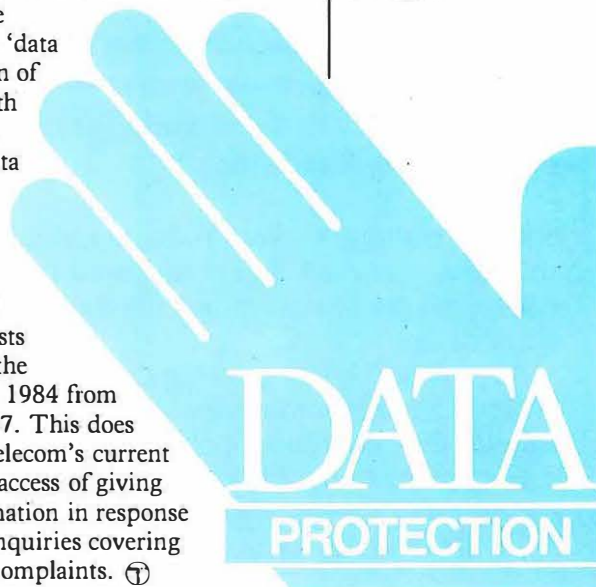
As far as word processors are concerned if the personal data is stored and can be retrieved by reference to an individual's name or other identifier as sender, receiver or mentioned in the text, then the data is capable of being automatically processed by reference to the 'data subject' as the Act specifies, and must be registered. If the data is held solely for the preparation, by use of the editing facilities, of text for a letter or document, the data does not have to be registered.

With electronic mailboxes if the messages are always deleted or destroyed after being sent or received and read, then data is not being stored and registration is not required. But, if after receiving or sending a message, it is then stored for future reference and the system allows retrieval by name or other personal identifier, then this is processing by reference to the 'data subject' and the relevant mailbox files must be registered.

British Telecom has already responded to the Act with widespread internal publicity and it has formed a network of Local Data Protection Co-ordinators whose function is to advise 'data users' on registration of files and to liaise with the Data Protection Registrar via the Data Protection Group.

Registration of existing files was completed earlier this year and subject access requests can be made under the Data Protection Act 1984 from 11th November 1987. This does not affect British Telecom's current policy on customer access of giving full and clear information in response to a wide range of enquiries covering billing, orders and complaints. ⑦

Mr P H Strawson is
British Telecom's
Corporate Data
Protection Group
Manager.

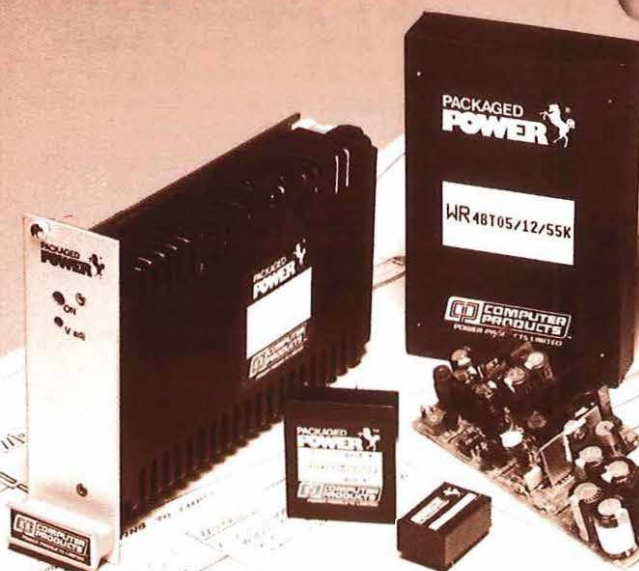


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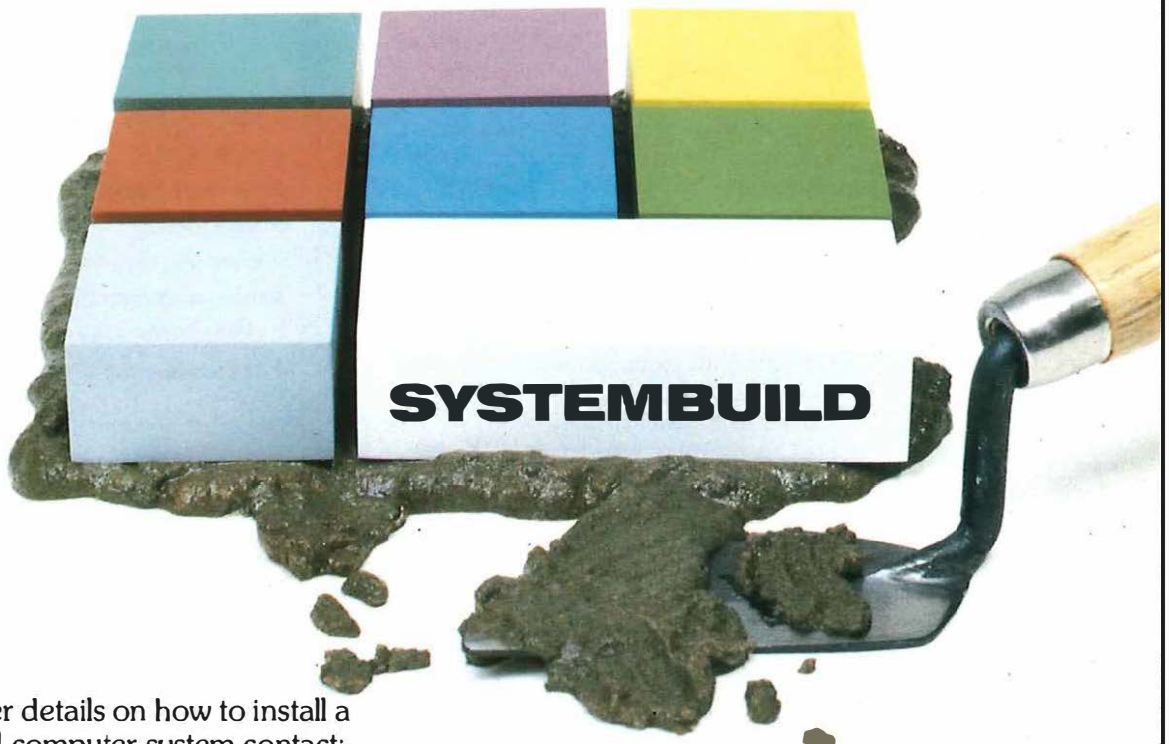
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Tim Haigh



A computerised exchange planning and review system (EXPRES) has been introduced by British Telecom to ensure that every exchange, whether in a country village or a city centre, has enough spare capacity to meet the needs of new customers.

Above: the EXPRES computer control room at British Telecom's Ipswich computer centre.

British Telecom's Inland Communications (IC) reaches out to its customers from a network base of about 6,000 local exchanges. These range from small exchanges serving as few as six or seven customers in a rural community to massive, complex, multi-unit exchanges in city centres serving as many as 50,000 customers.

District planning staff ensure that all these exchanges, small or large, have sufficient spare capacity – including digital services – to provide the services required by new customers. To achieve this, the planners monitor three key features in each exchange – the existing capacity; the actual number of customers, and the forecast for future numbers of both customers and services.

They also need to create an ordering programme which will cater for the needs of growth as well as taking into account the modernisation programme, which will eventually replace all existing local exchange equipment with digital plant.

The mechanistic task of monitoring the changing relationship between the three key features and merging these with the demands of modernisation can now be safely left to EXPRES, leaving the planners free to concentrate on the type of strategic decisions which cannot be made by a computer.

EXPRES is a dynamic model which provides the most up-to-date view of the IC network of exchanges. It also shows future proposals for the

ADVANTAGES OF *expres*

- Up to date database
- Ease of input
- On-line system
- User friendly
- Designed for modern systems
- Interfaced with other planning programmes
- Designed for ease of continuous development
- Locally useable summary information



Right: an extensive tape store holds the range of EXPRES data.



Top right: systems analyst Cheryl Deitch working at an EXPRES terminal.

network and creates an ordering programme. The system enables District and Headquarters staff to operate an on-line procedure for managing the exchange ordering programme. Planning staff operate from desk terminals linked by private circuits to a mainframe computer at British Telecom's computer centre in Ipswich.

EXPRES replaces and greatly expands the facilities offered by a previous off-line system – the Exchange Equipment Review (EER). It also does away with the vast quantities of paper returns associated with EER.

In addition to forecasting the need for new exchange equipment and producing an ordering programme, the system also monitors the progress of an order and provides a wide range of statistical information.

EXPRES starts with its knowledge of existing exchange capacity and achievement and builds on to this the growth requirements in terms of the latest forecast. It also embraces the modernisation needs from the Network Master Plan.

Predictable

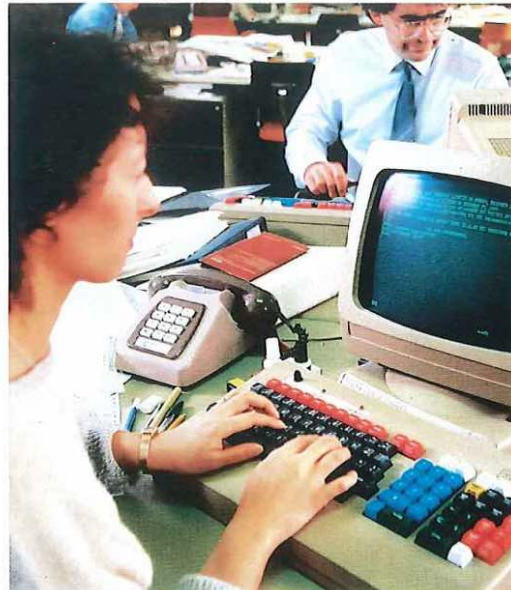
The system initiates a 'review' process to predict the dates on which an exchange will exhaust its capacity and then generates an order for that exchange on the basis of expected manufacturers' lead times, so that extra capacity will be in service when required. Orders are geared to provide a further four years of capacity and include details of costing key dates such as the precise order date, the date the manufacturer will start and complete installation and when the new equipment will be available for service.

EXPRES can run the 'review' process for individual exchanges, groups of exchanges or every exchange in the country. When it does a review, it considers the circumstances within an exchange over an eight year period creating orders as necessary. It currently holds details of 21,000 orders.

Computer programs have been developed with the specific intention of being 'user friendly', allowing ease of input and having evolutionary potential. Many future developments are in hand to improve the efficiency of local exchange planning by making EXPRES interface automatically with other planning data-bases.

Significant efforts have been made to ensure the system's successful implementation. British Telecom's Training Division created a dedicated training course and, assisted by a team of experienced exchange equipment planners, toured District offices earlier in the year. The training team also assisted in the huge task of converting the exchange data from the existing system, the EER, to EXPRES.

During the transitional period, close liaison was maintained between the District users, the National Strategy and Digital Exchange Department (NSD) planning team and the team of programmers at Ipswich. This ensured that the many suggestions made by users, as they became familiar with the new system, could be programmed and introduced prior to full national working.



EXPRES has 77 screens of information, 25 of which are repeated for each exchange in the country. Some screens are used for inputting new data or for changing existing data whilst others display particular types of information such as lists of orders or costs.

Each screen has an easily accessed 'help' message detailing the data items displayed and explaining the processing associated with them. There is also an extensive user guide for further advice. EXPRES is now supported by the NSD operational group who provide a 'help desk' for all users. ▶



Right: one of the smallest, but nonetheless sophisticated exchanges in the country receives the approval of the village community at Brechfa, South Wales.



Even the largest exchanges can benefit from computerised exchange planning and review.

Below: a PT7 controller links a number of terminals at the District offices to the EXPRES computer centre at Ipswich via a private wire (PW).

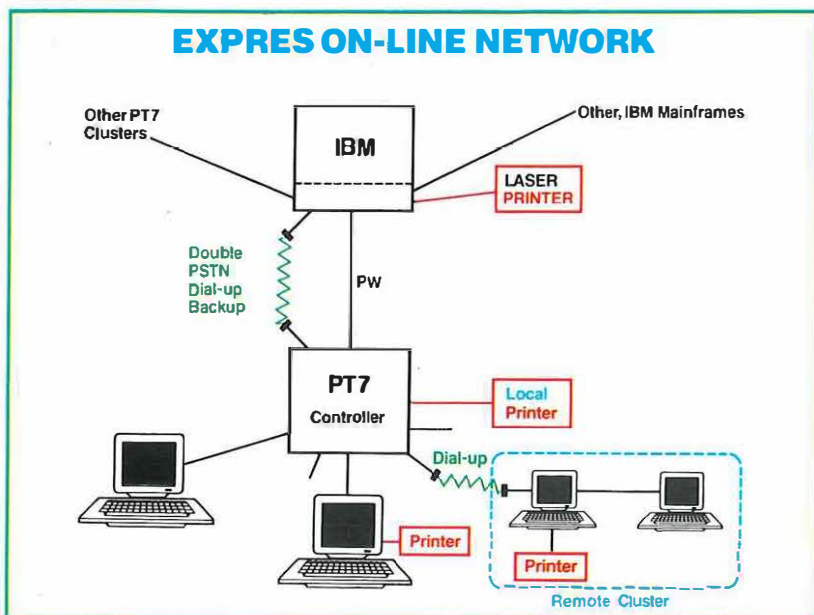
Mr T C Haigh is EXPRES development and implementation manager.

The system is able to undertake a wide range of national statistical investigations, such as connections in service by system type and total year by year costings for the ordering programme. Anyone requiring such information can now extract it directly without having to laboriously contact all Districts because the use of a single on-line database for all exchange planning activities ensures a consistency of up-to-date information throughout the business.

A very active user group maintains the impetus

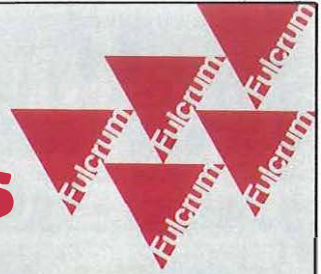
for further development work as more ways of exploiting the huge range of information on EXPRES are found.

For the first time in the history of British Telecom, the relevant details of all local exchanges are available on one single consistent on-line data base. As the advantages of this become more apparent, EXPRES will grow rapidly to become the major IC Network Planning database and the prime source of information. Ⓢ



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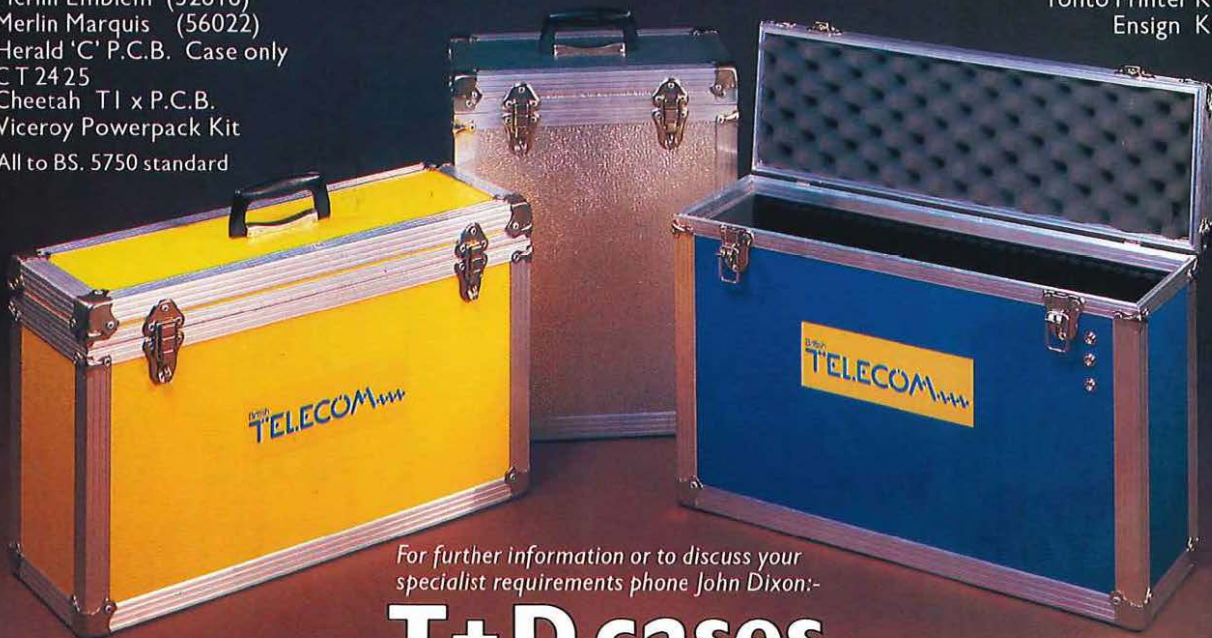


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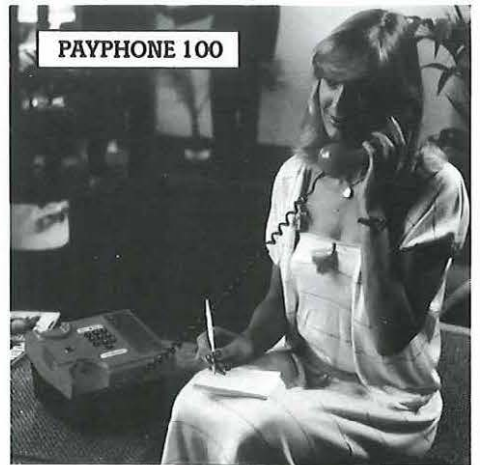
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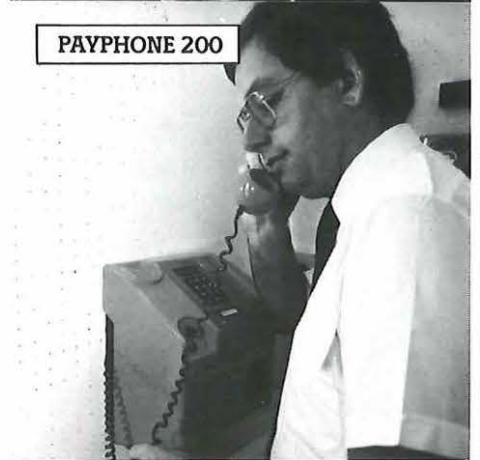
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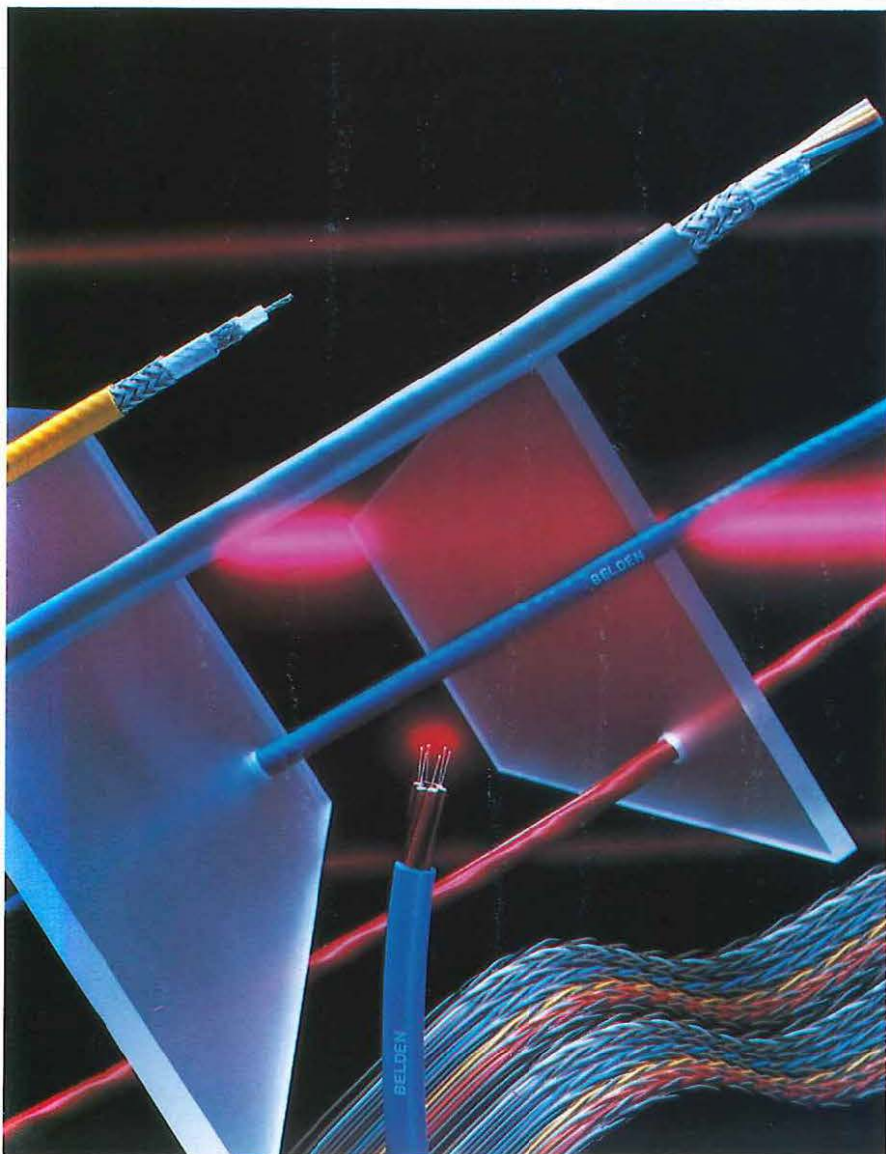


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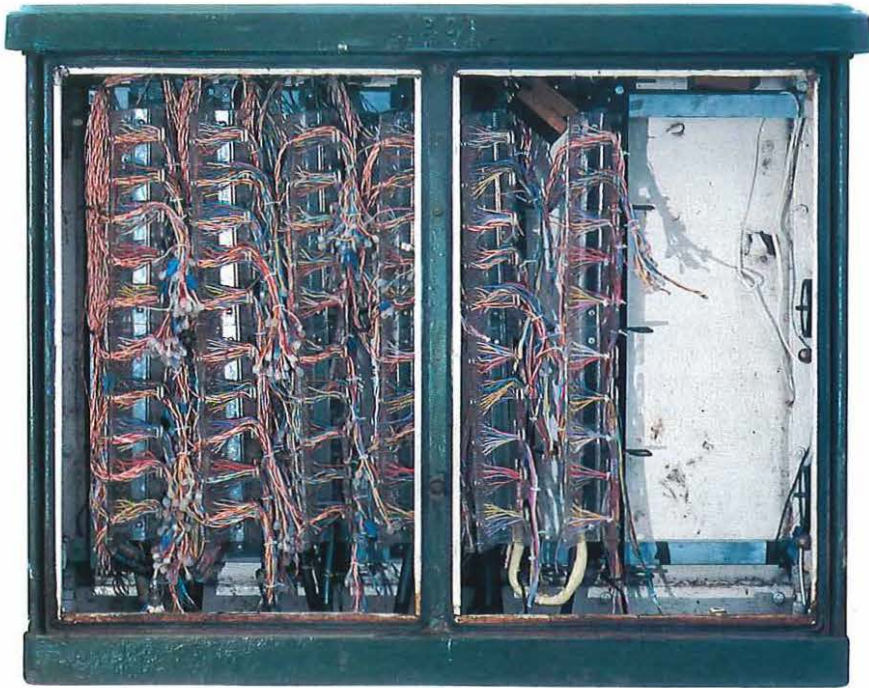
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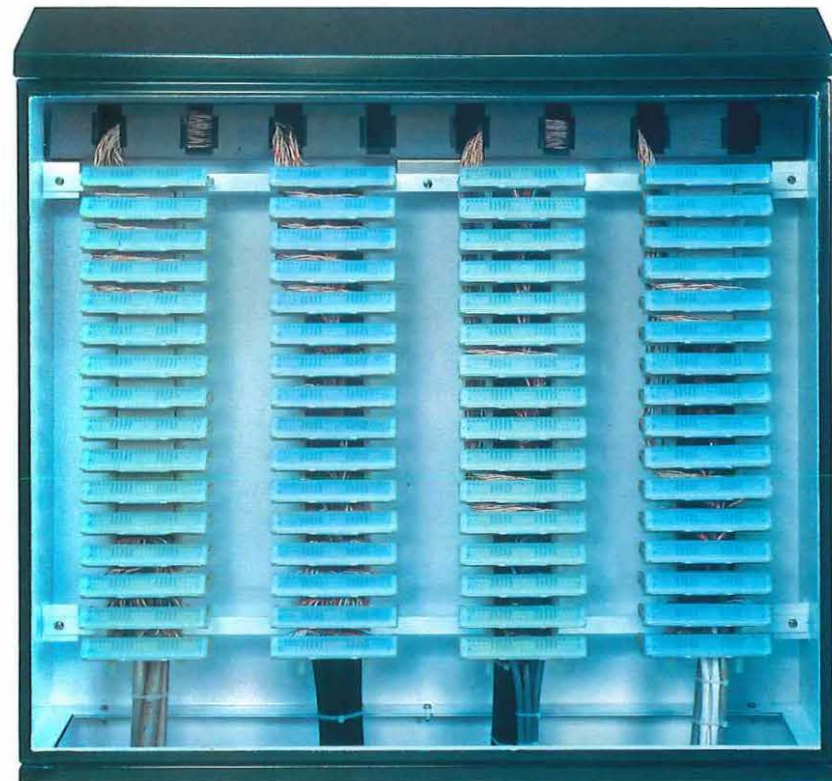
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QUALITY THAT GOES BEYOND TOMORROW

Accurate vehicle location is essential to fleet management and to tackle the growing problem of vehicle hi-jack. Pinpoint, a new system from British Telecom Radio Tracking, promises to give security firms, taxis, couriers, and bus operators an effective business tool.

Right: beacons have a coverage area of 50 metres.

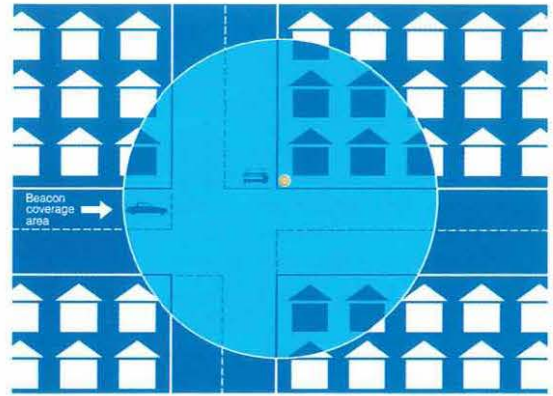
Below: vehicles can now be tracked to journey's end.

The need to know where a vehicle fleet is at any given time has long since been a transport industry requirement, particularly in the security field, and whole fleet management techniques have been devised as an alternative to not having precise details of vehicle location.

If vehicles and drivers could be located instantly, most transport companies would approach the business of collecting and delivering on a more effective basis. Most city-based courier companies make highly efficient use of two-way radio but are still plagued with unavoidable delays.

The security industry frequently suffers from hi-jack and attack with little chance of catching the thieves, but, if a vehicle's position was known immediately it would be possible to summon police help within seconds rather than minutes or even hours.

Pinpoint, a low-cost system, has recently undergone user trials in the City of London using a small number of beacons and a two-way radio system. The results have been as expected with a typical accuracy of 50 metres.

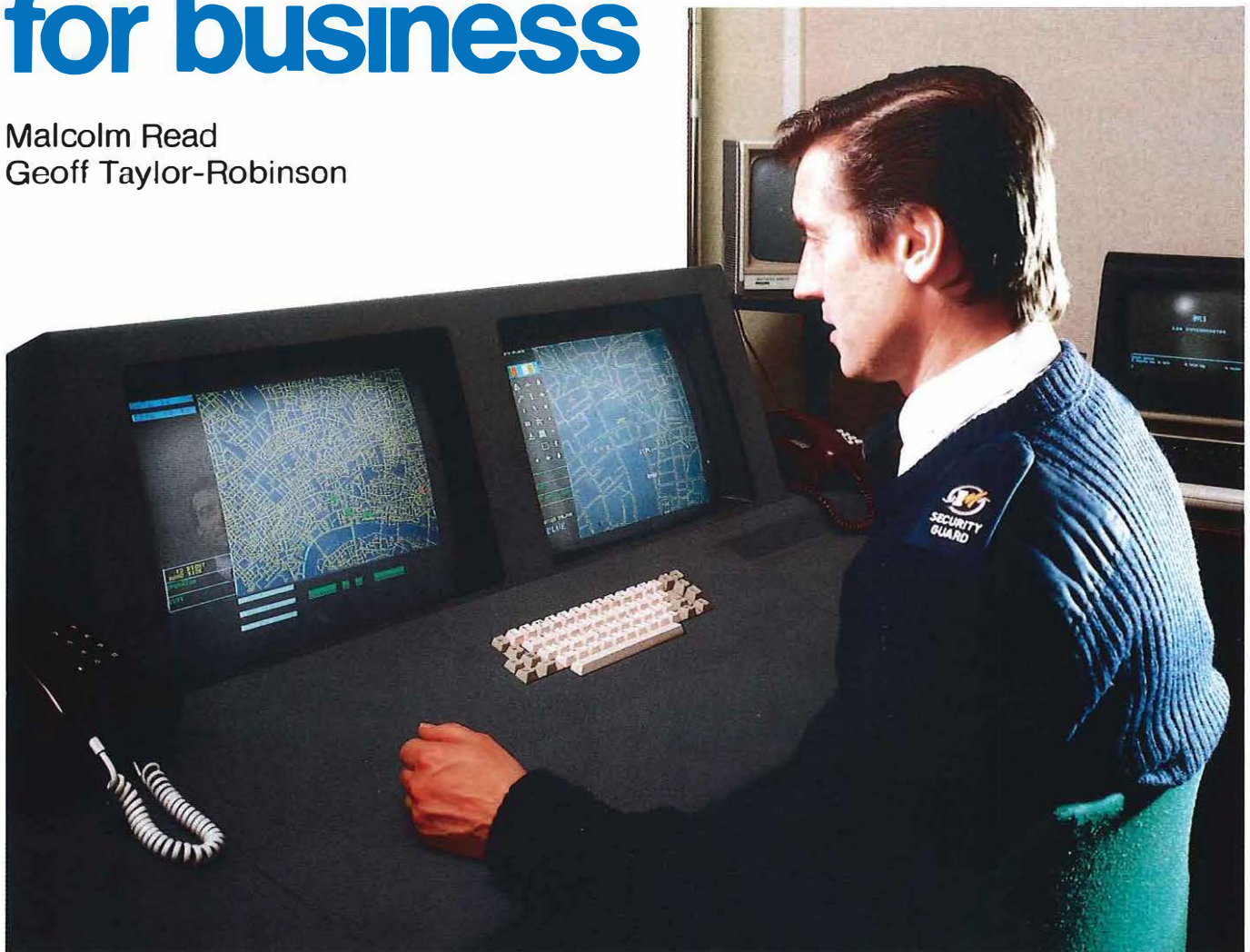


The system enables vehicles to be monitored from a control centre. Each vehicle in the fleet is fitted with a Vehicle Location Unit (VLU) which, in conjunction with a network of low power radiolocation beacons, enables the vehicles to track their current position. The vehicles are also fitted with a two-way radio with data capability, linked to the VLU.

Vehicles within a fleet are automatically interrogated in sequence over the radio data link by the control centre base station and respond ▷

Bad for bandits—good for business

Malcolm Read
Geoff Taylor-Robinson





with their current location and status. At the control centre, the location and status of every vehicle is shown on a visual display unit. In an emergency, a speech link can be established with a vehicle, using the same radio equipment.

The network of beacons continuously transmit their National Grid reference co-ordinates (Eastings and Northings) which are then received by any suitably equipped vehicle passing within 50 metres.

The beacon was developed by British Telecom's Research Laboratories, at Martlesham Heath near Ipswich. They will be located at major road junctions and the first network will be installed in London to cover the areas within the M25 motorway ring.

Sophisticated

The micro-processor based Vehicle Location Unit is activated when a vehicle first passes a beacon. The unit contains a magnetometer – a sophisticated electronic compass – and an odometer which records distance travelled via a magnetic sensor in the vehicle's speedo cable. Once distance and direction are established, the VLU can calculate the vehicle's position well away from the beacon.

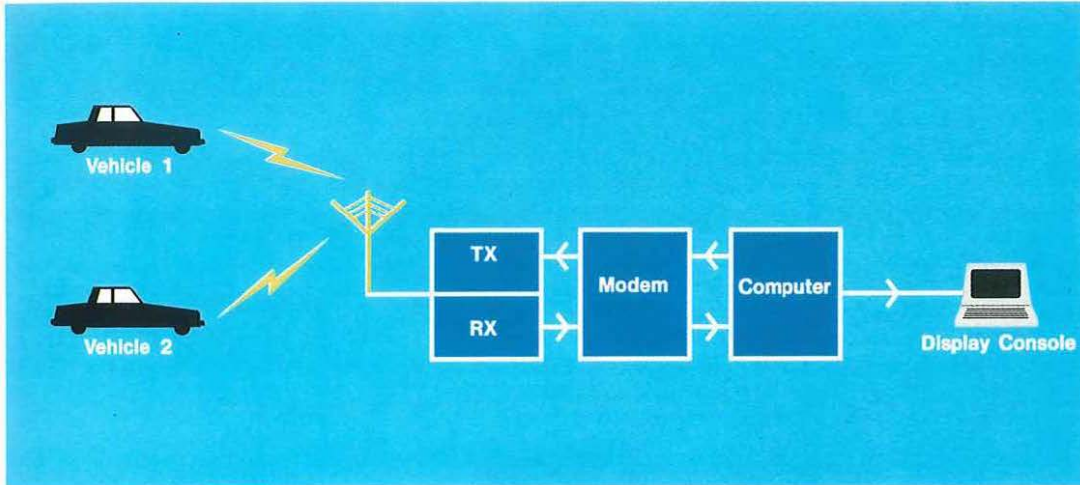
But the accuracy of the calculated position is limited by the accuracy of the magnetometer and to maintain an acceptable level it is necessary to position the beacons with a nominal spacing of 2km. The VLU holds the current position of the vehicle in non-volatile memory so that the location details are stored even when the unit is de-powered.

A Control Unit (CU) provides an interface between the VLU and the two-way radio. It contains a speech band modem and a microprocessor to decode and identify requests to relay vehicular data to the Control Centre. It also encodes the vehicle's positional co-ordinates and status information into speech band data in a form suitable for relaying over radio, using Fast Frequency Shift Keying (FFSK) of an audio sub-carrier at a rate of 1200 baud. Error detection and correction are provided for within the standard data protocol used.

At the control Centre, the data is received via a radio base station, equipped with a modem similar to that used in each vehicle. The base station will normally be remote from the Control Centre, linked by private wires. Data from each vehicle is processed and the format used to display the location and status of the vehicles can vary in complexity from a simple text list to a full colour computer generated map, with vehicles shown as moving symbols, the colour of the symbol showing the status of the vehicle.

Since a bi-directional data link exists between the Control Centre and each vehicle, it is possible to relay other data, such as text, to a vehicle mounted display or printer.

A system called Pinpoint Despatch uses information on the location of vehicles to allocate work to individual vehicles within a fleet. The nearest suitable vehicle to the pick-up point can be quickly selected, thus minimising vehicle mileage. In addition, Pinpoint's data



capability enables job details or other messages to be transmitted to the vehicle and permanently stored, using a screen or printer to display driver information.

The Control Centre uses similar radio equipment but needs more powerful computing facilities. Typically, a number of operating terminals will be required to input job details. Data retrieval terminals and a voice capability are also required to deal with job queries.

Pinpoint Despatch uses the same Vehicle Location Unit as the Pinpoint vehicle monitoring system. The Control Unit is, however, more complex as it has to store and

process a considerable amount of additional data. The driver's information display and control console is also necessarily more complex.

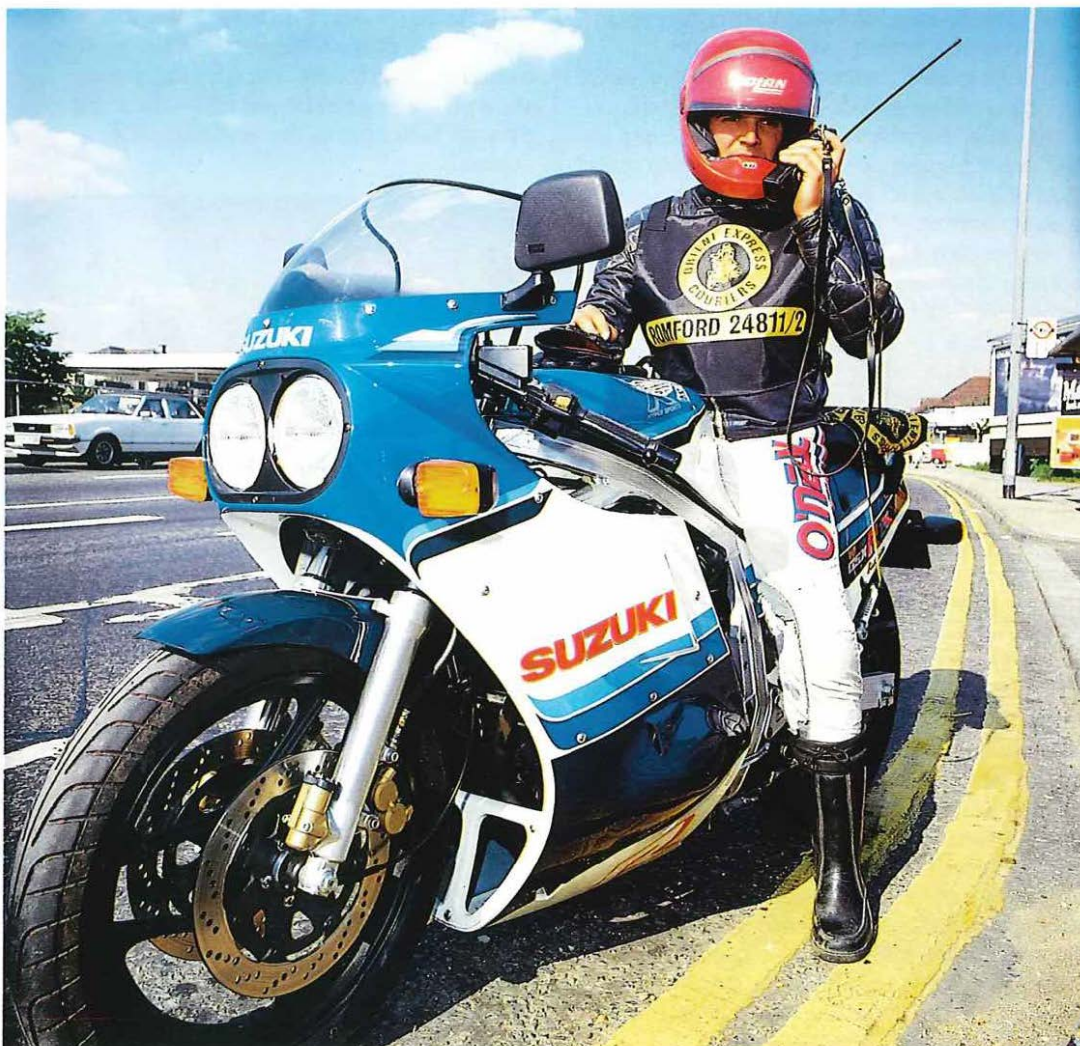
It will be possible to extend the Pinpoint approach at relatively low cost. Other navigational techniques, which become usable outside a city environment, have not been excluded.

The next stage of development will be the implementation of a London-wide beacon network over the next six months, and Pinpoint's advantages of accuracy coupled with low-cost could lead to many applications in the future. ①

Opposite page: an engineer fits one of the Martlesham-developed radiolocation beacons to a lamp post.

Technical representation of how the control centre receives signals from vehicles.

Mr G Taylor-Robinson
and Mr M Read work for
BT Radiotracking.



Far left: once installed, the radiolocation beacons are anonymous and unobtrusive.

Left: Pinpoint will help courier companies who already use two-way radios but are still plagued by delays.

In touch on the move

Jonathan Banks

Baselink is also seen as a natural environment for the development of fast and efficient data communications.

The system can be integrated with computers so that reports, orders and instructions can be sent from one user to another whether at base or on the move, or they can be sent directly to a central computer.

Data messages provide greater efficiency, accuracy and cost effectiveness than speech and as the radio spectrum is limited, they make more efficient use of scarce resources. When used in conjunction with Baselink, data messaging allows more users to be served at lower cost through better use of the available radio channels.

A localised two-way radio service which will enable businesses to keep in touch with their mobile workforces has been introduced by British Telecom. Called Baselink, the system also offers exciting possibilities for mobile data communications as well as voice.

Baselink, British Telecom's entry into the private mobile radio market, has been designed to boost communications between people within any company or organisation which has sales teams, maintenance engineers, messengers or other mobile staff out on the road. It enables 'base to user' or 'user to user' conversations between a control unit and a range of both vehicle-mounted or hand-portable radio equipment.

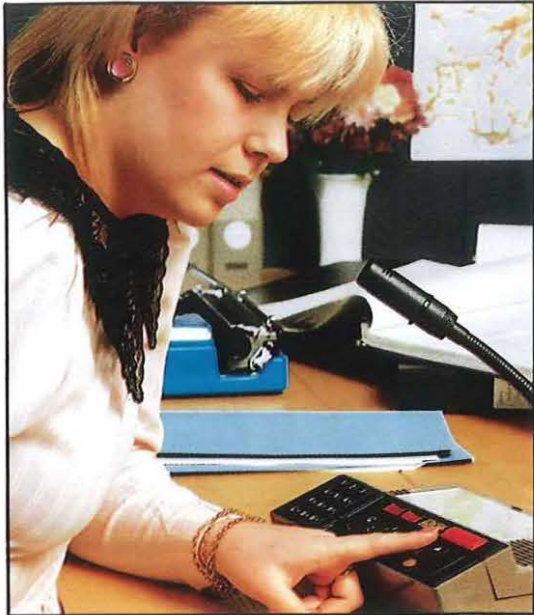
The base control unit is installed in a company's offices and linked to a local transmitter by an aerial fixed on the roof in the same way as a TV aerial. The system does not normally use the telephone network and customer organisations can speak directly to their staff without the use of an operator.

Calls are usually heard by all the staff using a mobile radio but a selective calling facility enables one or more receivers to be selected for specific or confidential instructions.

Customers can choose to be served by one of a large number of shared radio stations, each with a radius of about 25 miles, which are already installed throughout the country. Alternatively, a complete Baselink system can be provided for the exclusive use of one company and tailored to suit individual requirements. It is planned to expand local coverage areas to provide complete regional services, with national coverage available next year.

Baselink has been designed to provide a complementary but totally separate service to the successful cellular radio service from British Telecom Mobile Phone and British Telecom's Radiopaging Service. All are designed in different ways to overcome the problems of keeping in touch whilst on the move.





Data transfer is one of a number of value added services available to Baselink customers through British Telecom Mobile Communications. Others include vehicle monitoring – a system allowing vehicle fleet controllers to know their vehicles' exact location at all times. See separate story on page 31.

As local businessmen are now more aware of the value of mobile communications than ever before, Baselink looks set to become a popular service. In addition, it is proving to be a useful service for a number of British Telecom staff and future potential users include External Plant Maintenance Control (EPMC) groups, service and maintenance engineers as well as customer service and sales staff. With support from



British Telecom Mobile Communications, Baselink customers are offered a complete package including supply, installation, service and advice together with up-to-date information about technological developments.

Baselink is presently being sold through British Telecom Mobile Radio's own direct sales force and the Mobile Communications sales force. (T)

Left: mobile staff are never out of earshot from control centre.

Mr J Banks is marketing manager for BT Mobile Radio.



Baselink helped to keep Sport Aid's Race Against Time running when over 250,000 people gathered in and around London's Hyde Park in May to witness the biggest race ever held with over 90,000 people running the six mile route for Bob Geldof's African Appeal. Before the race nobody knew exactly how many entrants to expect and people were still sending in their applications the day before the start.

British Telecom Mobile Radio loaned race director Andy Ridler four hand-held Baselink two-way radios to link key organisers, positioned along the beginning of the route in the park, to the race starter.

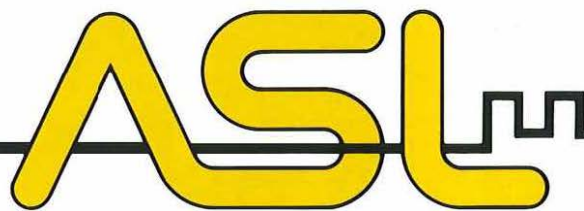
It was crucial to get the race started on time in order to synchronize with millions of other runners taking part in the charity event throughout the world. Race starting times also had to be co-ordinated so that the route through London would not become clogged.

In the end, it took precisely one hour and 18 minutes to get everyone started. The organisers borrowed two-way radios from several companies but later claimed that the Baselink radios were by far the best with a 'phenomenal' difference in the quality of reception.

Centre: Baselink enables staff, whether out in the field or out on the road, to keep in constant contact with their headquarters.

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Romance on the air



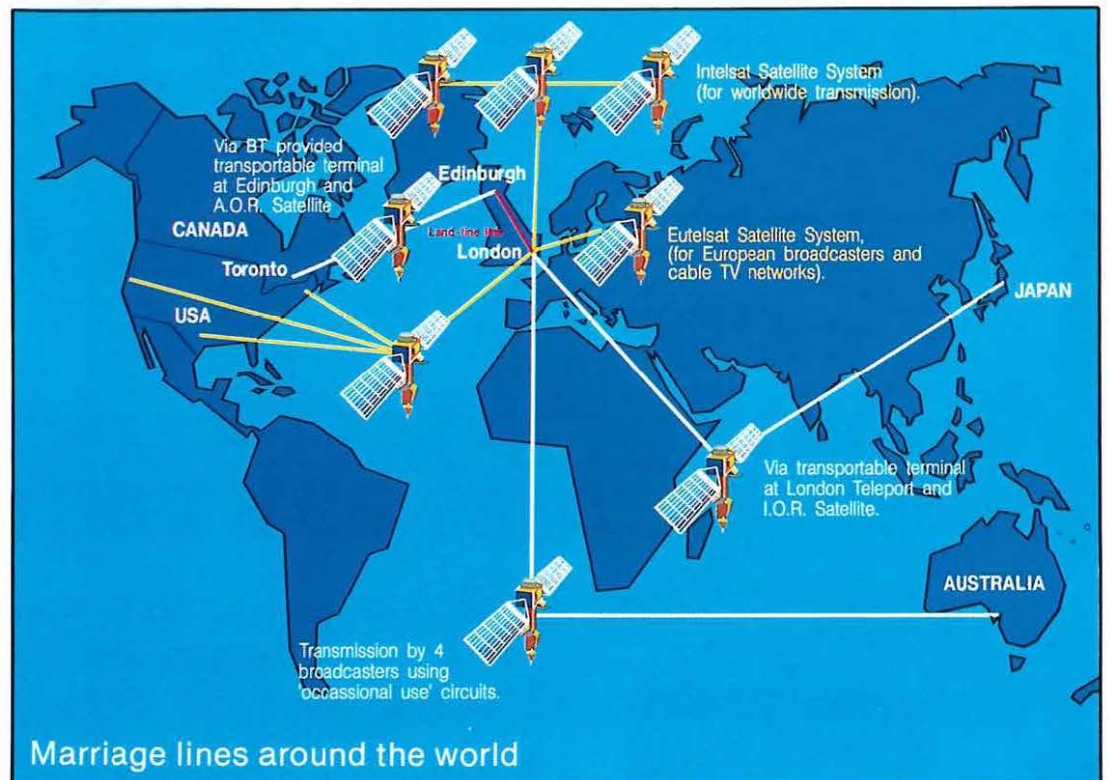
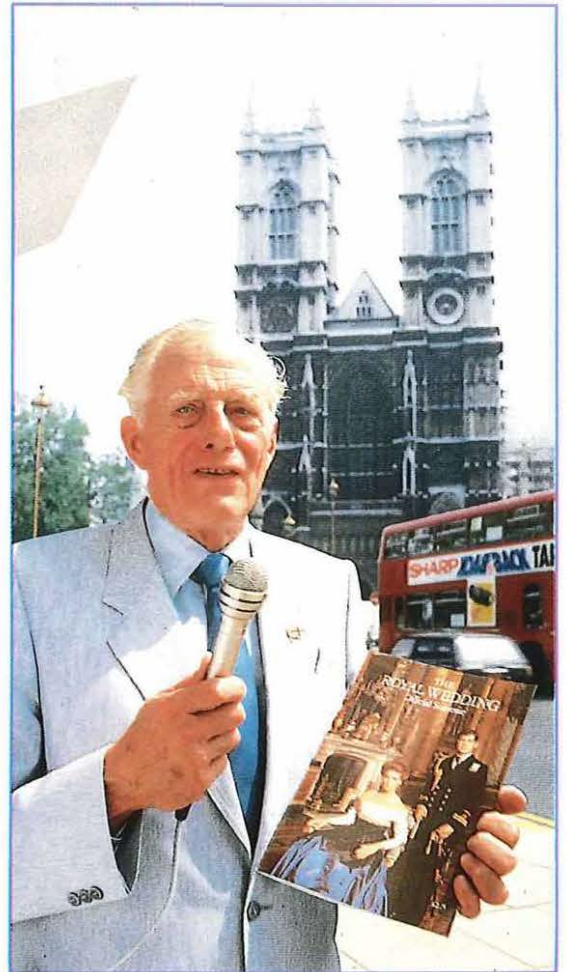
British Telecom's national and international network resources were 'buzzing' at the end of July when two events of world-wide interest took place in Britain within just 24 hours of each other. The wedding of HRH Prince Andrew to Miss Sarah Ferguson at Westminster Abbey on 23 July was followed by the opening of the Commonwealth Games in Edinburgh see page 11.

Almost the entire international television and sound programme network of satellite, microwave radio and cable facilities were devoted to the coverage of the Royal Wedding of Prince Andrew and Sarah Ferguson to allow the simultaneous transmission of TV programmes to many parts of the world.

Some overseas broadcasters, including ABC and CBS of America, have their own leased TV links from London, but for other companies British Telecom had to make special arrangements.

Transportable terminals were provided for the Japanese and Canadian broadcasters. As the terminal for the Canadians was already based in Edinburgh in readiness for the Games, 'The Wedding' transmissions were routed there via landline from London.

'Occasional use' circuits were in heavy demand from NBC (USA) and four Australian broadcasters. Fortunately, the Australians were covering the event at different times of the day and so their requirements were met by careful sequential planning.



Above: millions of Americans were able to phone British Telecom's special Wedding Line number to hear the latest news and background from former BBC Court Correspondent, Godfrey Talbot, who has reported Royal occasions for more than 40 years.

Opposite page: transportable terminals were used to relay transmissions around the world.

The BBC sent their coverage to virtually every other country in the world using Intelsat and Eutelsat satellites and over 30 additional sound circuits were provided by British Telecom for TV and radio commentary.

Outside broadcast links were required at many prime sites in the heart of London. The coverage followed routes from Buckingham Palace down the Thames and included pre-wedding topical items from Windsor Castle and other locations to ensure that no part of the big day was denied the eager watchers. With 300 music and control circuits to be provided and maintained, staff were brought in from Wales and the Midlands to help British Telecom's London-based outside broadcast team.

International interest, particularly American, was very high and broadcasting facilities had to be carefully co-ordinated to ensure none of the listening and watching millions missed a moment of the marvellous day. ①



*British Telecom Journal
Summer 1986*

Romance on the air

British Telecom's involvement in an event such as a Royal wedding is considerable as this picture shows of the team – headed by Chairman Sir George Jefferson – who helped to put the marriage of the Prince and Princess of Wales in an international spotlight.



Reach for the sky!

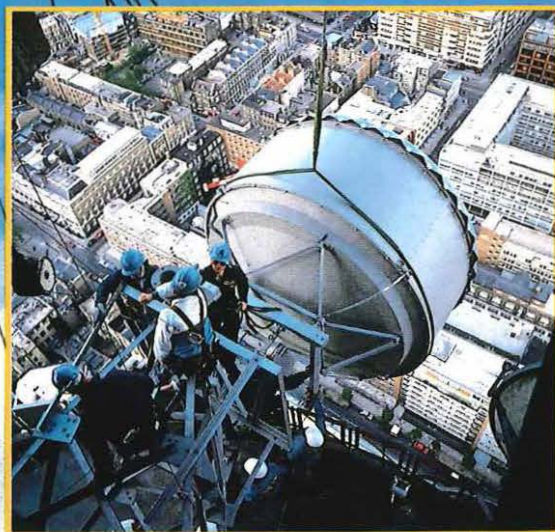
A mammoth 800 ton crane was used to lift four new aerials to the top of London's British Telecom Tower as part of a programme to replace the distinctive horn-shaped aerials 400 feet above street level with modern dish antennae. The new dishes – 3.7m in diameter – will take up far less space than the old aerials, installed as part of the tower's original equipment.

While the horn aerials carried analogue circuits, the new microwave dishes will be able to support digital circuits carrying both speech and high speed data transmissions. They will form a vital link in Britain's fast-expanding digital trunk network, providing customers with the modern communications infrastructure so important to the country's future economic prosperity.

The photographs show a two-day operation to mount the new dishes on the Tower which cost more than £100,000, and involved 60 men working for British Telecom and contractors. Three cranes were used in the operation and were brought to the site on 28 lorries. Roads surrounding the Tower were closed by the police for the weekend.

British Telecom contracted Grayston White and Sparrow Limited, the specialist crane hire company, to supply suitable lifting tackle and labour. It was the company's highest lift to date. ①





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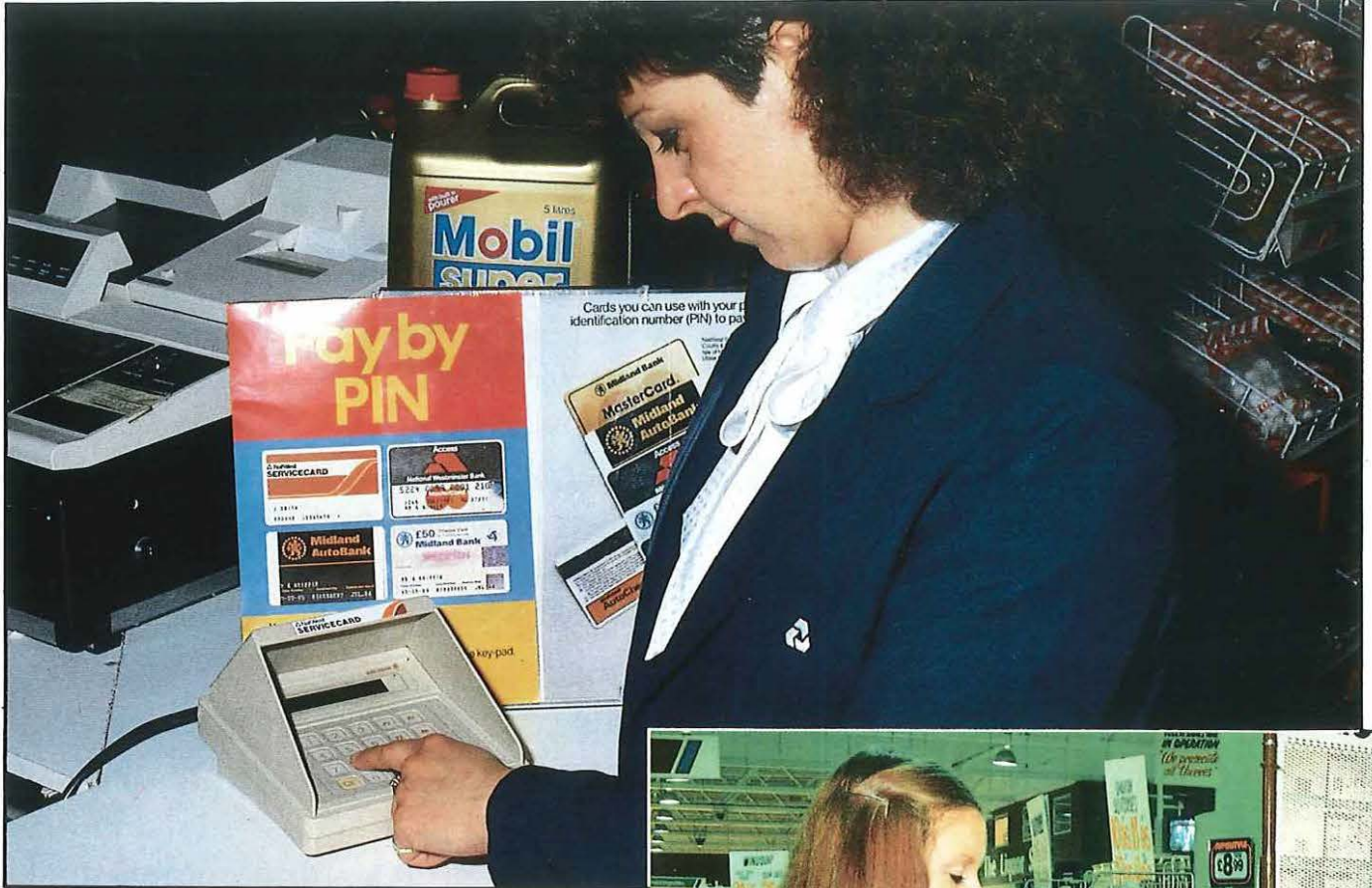
These systems are backed by the corporate-wide resources and experience of Teradyne, plus a commitment to total system support.

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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EFTPOS— that'll do nicely sir!

Philip Marlow-Mann

An electronic method of buying goods which is faster, simpler and less prone to fraud than cheques or credit cards is rapidly finding favour. Called EFTPOS, the system depends on British Telecom's communication network.

Already there are shops and petrol stations from London to Scotland that are offering a new alternative and more convenient way for customers to pay for the goods they buy.

Electronic funds transfer at the point of sale (EFTPOS) utilises a plastic card, card reader and personal identification number (PIN) to enable a deal to be concluded in seconds — quicker than cash and without the frustrations of paperwork or credit authorisation.

Banks and retailers find present systems costly and cumbersome to operate. Fraud costs over £40 million a year, and with over 10 million cheques and credit vouchers having to be returned every day by van to bank and credit card offices for processing, it is no wonder that they are looking to modern technology to come up with better solutions.

The main elements of any EFTPOS service are

shown in the diagram at the end of the article. An EFTPOS terminal, in the retailer's shop, must accept all credit or debit (the cheque replacement) cards offered by the customer. At the other side, there is the service provider, who will deal with the transaction when it is delivered. Service providers could be banks, credit card companies, building societies, or even third parties acting as their agents. The various parties are linked together through British Telecom communication networks.

The requirements of EFTPOS, however, put some special demands on the network provided. Firstly there is the sheer size of the operation involved. Potentially, every shop which accepts credit cards or cheques could adopt EFTPOS and that gives a network size of over 250,000 terminals from conventional retailers alone. Potential users such as pay phones or service industries like dentists where payments by

cheque or credit card are becoming more commonplace could result in a mature network of over 1 million connections.

The network supporting these terminals will need to be able to handle the high volume of traffic which arises at shopping peak times, at speeds that will allow the overall EFTPOS transaction to be completed in the same, or less, time than that for a cash transaction. A high degree of security and availability is required because, once in place, there will be increasing reliance on the service. A loss of information, or failure of equipment serving a shopping centre on a busy sales day could be disastrous. Finally, the service must be provided at a cost which even small shops will find attractive.

Present design work has shown that the Public Data Network is eminently suited for this application. EFTPOS facilities on MultiStream can provide low cost access to PSS (Packet

SwitchStream) to carry short duration messages between retailers and service providers.

Once an EFTPOS link into the Public Data Network has been provided, it can also be used for the numerous other data applications emerging in the retail world including direct stock ordering and invoicing, and electronic mail communication.

Significant

British Telecom is central to most of the emerging services and trials currently taking place. The most potentially significant service is the national initiative through the CLSB — The City of London and Scottish Clearing Banks. After a period of study and review, the CLSB, in liaison with the retail consortium, together announced a national EFTPOS service using British Telecom networks.

Under the control of APACS (The Association of Payment and Clearing Services) which controls all banking activities in the United Kingdom, an EFTPOS company has been established and is working towards a service launch date of 1988. British Telecom is working closely with this company to ensure that their requirements for a national system are met in the developing managed networks for EFT traffic.

In order to gain marketing and operational experience prior to the national service, a number of trials have been sponsored through member banks of the CLSB. Midland Bank is operating its 'Speedline' service in Milton Keynes, and National Westminster Bank is conducting a trial involving a number of petrol stations in the Thames Valley and in Sheffield, called 'Streamline' using an extension of the service run by its subsidiary Centre File. Both these trials allow credit and debit cards to be used, and reciprocity agreements between banks mean that a number of cards can be accepted. ▽

*British Telecom Journal
Summer 1986*

*EFTPOS — that'll do
nicely sir!*

Far left: a number of petrol stations in Sheffield and the Thames Valley are using National Westminster Bank's 'Streamline'.

Left: the check-out at a Norco Superstore in Aberdeen equipped with the successful 'Counterplus' system operated by the Clydesdale Bank.

Below: Midland Bank's 'Speedline' service in operation at a Milton Keynes store.



EFTPOS – that'll do
nicely sir!

Right: Barclaycard are operating the biggest EFTPOS trial with 1,000 terminals – this one demonstrated by Sandra Hands at the Miss Selfridge store at Brent Cross Shopping Centre, London.

Mr P Marlow-Mann is British Telecom's EFTPOS marketing manager.

The largest trial is being organised by Barclaycard, and involves data capture for their credit card services through over 1,000 terminals installed in Brent Cross and Central London shopping areas.

Also of interest are the other services operated outside the banks' national EFTPOS strategy. The Clydesdale Bank has been operating a successful system called 'Counterplus' in Scotland for over two years in a number of BP petrol stations, and Northern Co-operative supermarkets. The Anglia Building Society has initiated its own trial in Northampton, offering EFTPOS payment facilities to its Anglia card holders in many shops, using a variety of communication methods.

As well as supporting the national EFTPOS initiative, British Telecom through its Enterprises division, is offering a bureau service called CRAFTS – Credit Authorisation and Funds Transfer Service. This provides credit card clearing and other management applications to retailers through a service which is at present marketed by Cresta Communications.

Details from credit cards used at Cresta TELTRAN terminals are passed to the CRAFTS computers where they are checked against information supplied by the major credit card companies. After authorisation, CRAFTS supplies details of the transaction to the credit card companies, eliminating the need for the retailers to send a paper voucher, and arranges settlement of the retailer's account through the Bankers' Automated Clearing Service (BACS).

Other retailer services, including messaging and financial management, are available through the CRAFTS bureau. This system has a promising potential, particularly if delays in providing a national EFTPOS service keeps the market window for credit, rather than debit services open.

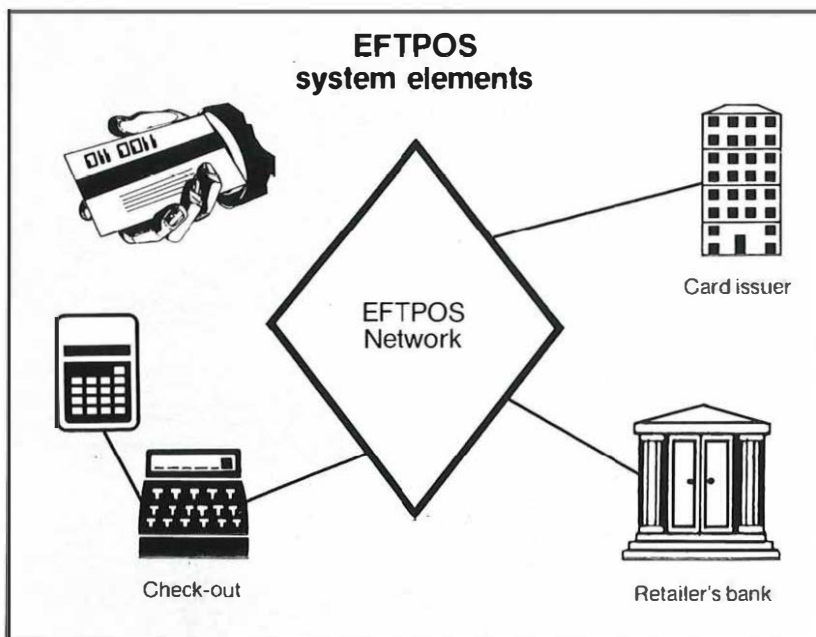
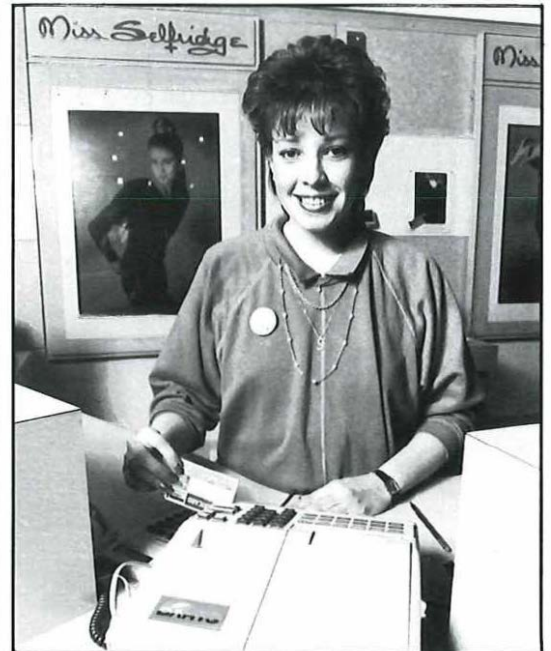
Although full national EFTPOS services are still a few years away, British Telecom currently provides a service known as 'T-Pad' which supports the credit authorisation systems

required by credit card companies. It automates the referral call which retailers have to make if the value of the credit card purchase is over the 'floor limit' amount the retailer is allowed to sanction locally.

Three main variations of the service exist:

- * T-Pad dial-up provides PSTN access to the Public Data Network which then delivers the transactions to the credit card companies' computers
- * T-Pad multiplexers can be installed in large shops where a concentration of credit authorisation phones exist
- * A new service is being introduced which allows connections from the retailers to be concentrated on to the T-Pad multiplexer avoiding dial up delays from the PSTN.

The last service currently called Quick Connect is being used by Barclaycard and Access for data capture, in trials sponsored by the CLSB, to gain marketing and operation experience in advance of a national service. Data capture



allows information normally recorded on the credit card voucher to be sent electronically to the credit card company when an authorisation request is made. It also represents the next stage in the evolutionary path to full EFTPOS, which will include current account debit cards as well as credit cards.

British Telecom will benefit from the emerging EFTPOS systems in a number of ways. Clearly, there is the additional network traffic which would arise from a large and growing transaction market and the additional business from the provision of local lines, access facilities, and management functions on the networks provided. EFTPOS will also provide an opportunity to offer new services such as the provision and maintenance of terminals.

Happily, whether it is credit card data capture or full national debit and credit EFTPOS, British Telecom is well placed to supply the communication and service needs of the electronic payments market. ①

Keeping the customer satisfied

Edward Fowler

Current development of British Telecom's management organisation is aimed at creating a structure better equipped to respond more efficiently and effectively to customers' needs.

The changes to British Telecom's management structure announced earlier this year, together with developments in corporate organisation mark a further important step in the evolution of the Company as an international group. The latest moves recognise a distinction between the operation of the network, and the services it provides within the United Kingdom (UK TelCo) and the rest of British Telecom's activities. Figure 1, at the bottom of this article, shows the new reporting structure.

The activities outside UK TelCo are, as far as possible, grouped into self contained managerial units. Some of these, like British Telecom International (BTI), were already in existence and therefore continue as before while others, such as International Products, are new units created from appropriate elements of the previous organisation.

Within UK TelCo a matrix organisation has been developed in which Districts provide services and products in an efficient, cost-

effective manner, whilst Business Units are responsible for the development, procurement and supply of suitable products and services to different customer groups.

The main thrust of the reorganisation affects the responsibilities until now covered by:

- * LCS Marketing (LCS/MK)
- * LCS Operations and Management Audit (LCS/OMA)
- * British Telecom Enterprises (BTE)
- * National Networks (NN)

Figure 2 shows how fundamental parts of these units have been realigned to form the new 'customer facing' Business Units:—

- Residential Network Services
- Customer Premises Equipment
- Business Marketing Operations
- Business Network Services

The development side of BTE, together with manufacturing subsidiaries, forms part of the International Products group and the remainder becomes a new BTE unit responsible to the Managing Director Engineering and Procurement. Trunk Services, formerly with NN becomes part of Inland Communications and loses its marketing responsibility to Business Network Services.

Although not shown in figure 2, Business Planning, formerly in LCS, is strengthened to become Business Development; the role of the Quality Director is widened to include the monitoring of field performance and Materials Management becomes the responsibility of Inland Communications Finance.

The rest of the operational responsibilities within the former LCS, NN and BTE stay the same but support functions of finance and personnel, have been restructured. A more detailed structure of UK TelCo is shown in Figure 3.

Digital

Inland Communications has the responsibility for operating the trunk and local networks. The national trunk network continues to be managed separately from the local networks, but the common direction of the inland network as a whole will make it easier to harness British Telecom's new digital technologies to meet the needs of the market.

Residential Network Services is responsible mainly for the product management of network services for residential customers. This includes calls, star services, payphones, bitstream and operator services as well as general support for Customer Rental Records, Mechanised Order Handling and computerised maintenance systems.

Figure 2 Realignments

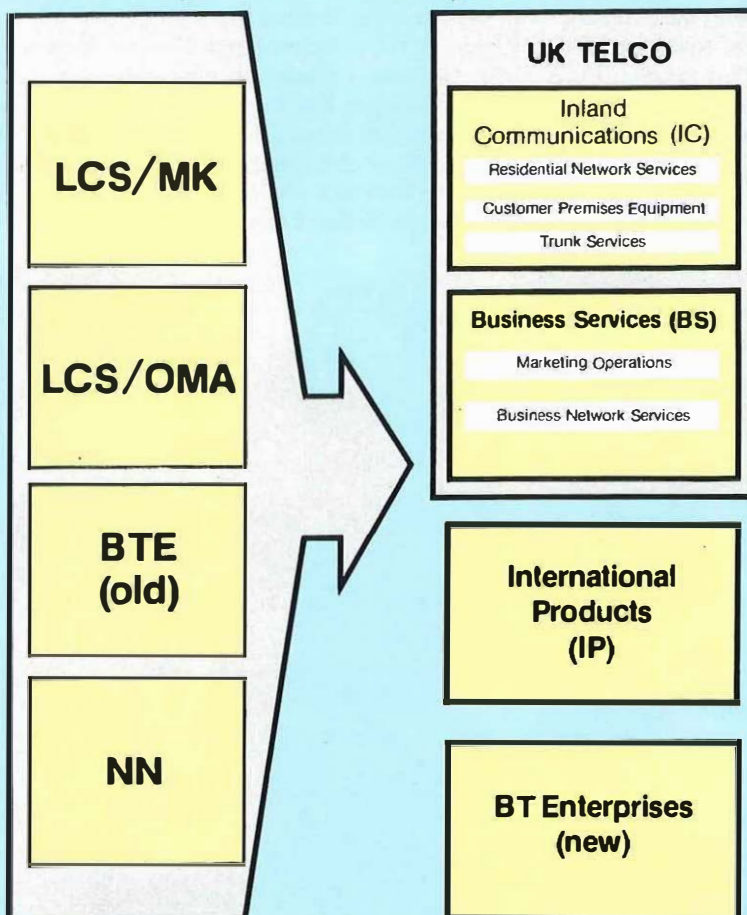
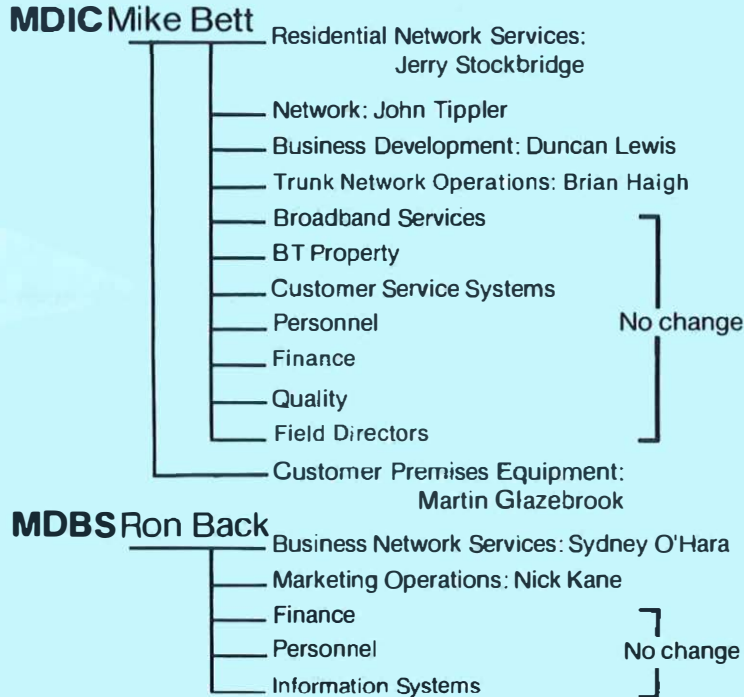


Figure 3 UK TELCO Organisation



Top right: catering for the customers' needs is the driving principle behind British Telecom's management re-shuffle.

The Customer Premises Equipment business brings together the management, distribution, installation and maintenance of equipment for use at customers' premises. This means using a range of sales outlets including Districts, who will continue to provide the support services as previously. Aspects covered by Customer Premises Equipment are Business Systems Support Unit, Consumer Products, Business Equipment

and Information Technology products. Business Services has taken on the task of running the complete range of network services for business customers including the specialist needs of larger business customers. There is also an additional role for the Managing Director as co-ordinator of the longer term planning of the UK network as a whole. Business Network Services looks after the

Right: British Telecom has a long history of caring for customers with special needs.

Left: the Company provides a service even for customers in difficult situations.



product management of the full range of UK network services for businesses. These include the Integrated Services Digital Network (ISDN), private services, centrex, call forwarding, LinkLine and other specialised services.

Marketing Operations covers the requirements, in both a marketing and selling sense, of major business customers including direct control of an expanded Major Account Management force together with a specialist group to design and manage networks for these customers. There is also the functional responsibility for the whole of the field sales force.

International Products Division reflects the move of British Telecom into overseas markets for apparatus supply. It draws together into a coherent framework the company's in-house design and development activities in this field, the manufacturing activities of its Fulcrum, Consumer Electronics and City Business Products subsidiaries, the overseas trading activity of Teletrade and the shareholdings in Mitel and CTG Inc of Canada.

Some parts of the old British Telecom Enterprises – those concerned with the design and supply of customer premises equipment – have moved to International Products or to the Customer Premises Equipment business.

Responsibility

Mobile Communications, Value Added Systems and Services and Applied Technology continue as separate businesses within the regrouped BTE. In addition, Applied Technology now has responsibility for the National Data Processing Service, together with the software development side of TALLIS, the remainder of which is now with Business Network Services.

Central to the continuing theme of development of the UK network business, is the desire to be more fully aware of the needs of customers, to interpret these as suitable products

and to deliver those products efficiently.

From this springs the notion that individual managerial groupings should be established separately to be concerned with customers, products and delivery. These groupings may merge and tend to overlap at the higher levels but lower down the groupings become more specialised so that specific customers or particular products are considered by individual groups.

Although separate, the three facets of the organisation come together to form the complete entity. At the interfaces between product and customer lies product suitability; between product and delivery – availability and reliability of products; between delivery and customer – quality of service.

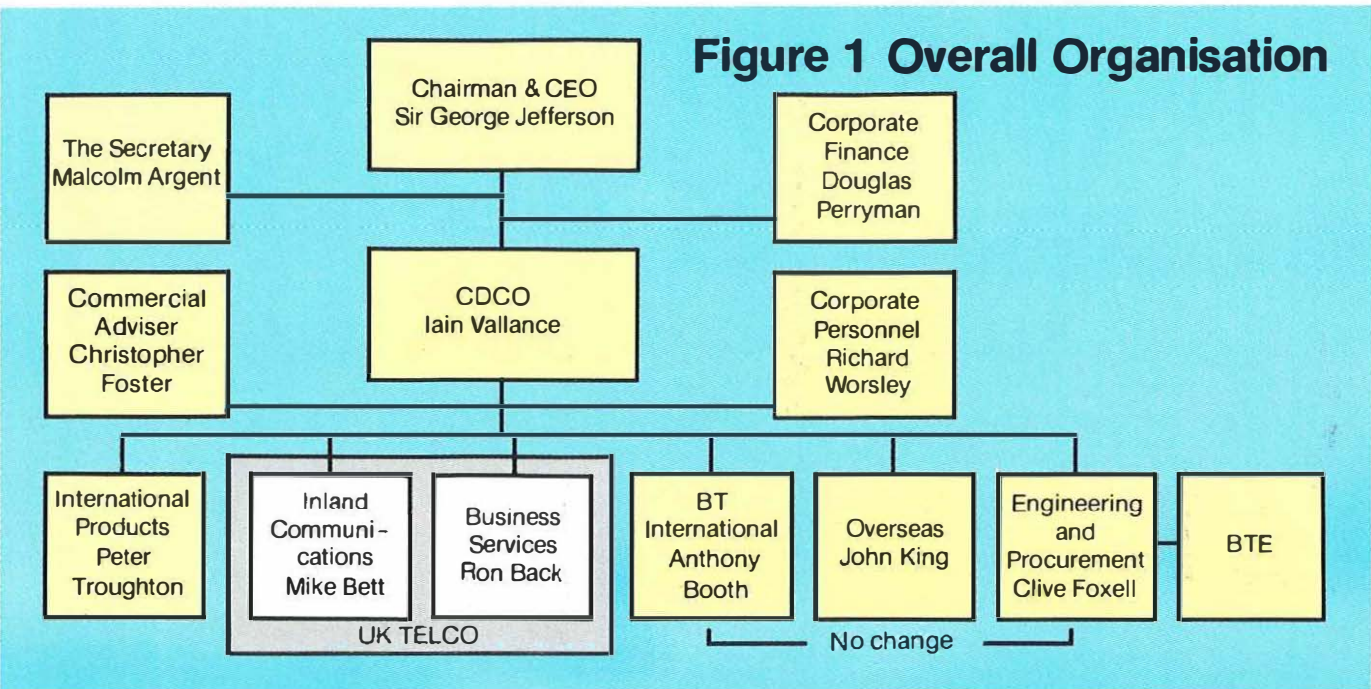
Most of these elements already existed but in a less effective way. The supply of customer premises equipment, for example, was split between BTE/Consumer Products, BTE Business Systems, LCS and NN whereas the new organisation places the responsibility clearly and solely with a single Director. Moreover his influence pervades directly right through to the installation and maintenance of his products in the field. He is responsible for managing those products from the establishment of a portfolio through to field operations.


Districts are responsible for product delivery, but it follows that they must work closely and co-operate with the product managers at headquarters. Similarly where there are account managers not under the direct control of Districts a high level of co-operation is required.

The three facets of product management, account management and delivery resource management must therefore form a matrix of control that, given good co-operation between the elements ensures swift delivery of good products. The establishment of such a matrix is the intention of the present and future stages of the organisational development. ①

Mr E Fowler has been seconded to the British Telecom Secretary's Office to work on the management reorganisation programme.

Figure 1 Overall Organisation





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

The British telecommunications industry has witnessed a cellular radio explosion during the last 18 months, and British Telecom Mobile Phone is committed to making portable telephones as popular as the pocket calculator.

On the road to pocket phones

Trevor Harvey



Above: Cellnet coverage is set to extend nationwide but disguising the aerials can sometimes be a problem. Here, the vicar of Holy Cross Church, Knutsford, stands next to the real flagpole on the church tower – the other four are Cellnet aerials.

By the end of its first year Cellnet, the cellular mobile radio network run jointly by British Telecom and Securicor, had over 26,000 subscribers – more than double its original forecast. Current estimates suggest that by the end of next year there could be as many as 200,000 car and portable telephones in Britain.

In the past, however, the demand for radio phones was relatively small and British Telecom Mobile Phone never sold more than 3,000 or 4,000 units a year. Competition has been the key to the new climate which began in 1983 when the Government granted licences to two operators – Cellnet and Racal Vodafone – to provide cellular networks. The two could not sell mobile phones direct, but appointed a number of accredited retailers to tackle the job for them.

As the largest retailer of mobile phones in Britain and the largest accredited Cellnet retailer, British Telecom Mobile Phone has played an important part in developing the

market and went from a 'standing start' straight into an intensely competitive environment. It sells the widest range of mobile phone products in the world through a network of nearly 50 independent dealers and 35 Inland Communications districts. To date, the independents have the edge achieving two-thirds of sales and Inland Communications' performance has been disappointing. Salesmen have found that selling mobile phones needs more time and commitment – a job perhaps for the specialist without a broad product portfolio.

Price is important but it is vital to bring other factors into the customers' decision to buy. The original Telecom Diamond range consisting of three in-car phones, a transportable and a hand portable phone has been extremely successful. Bought off the shelf, they were however more or less the same as the product which other suppliers were offering.

Exclusivity is the theme behind a new range of phones launched this year. The new transportable Telecom Bronze, made by



Mitsubishi, is a totally exclusive model. Not only is it the smallest and lightest transportable phone on the market, but it features speed dialling and a 30-number memory and has facilities for data transmission. The in-car Telecom Cobalt is another exclusive product.

Designed

The new transportable, Telecom Steel, has an exclusive British Telecom designed handset, whilst the hand portable Telecom Pearl also has unique design features and can transform into a car phone available with 'hands free' operation by using a special vehicle adaptor.

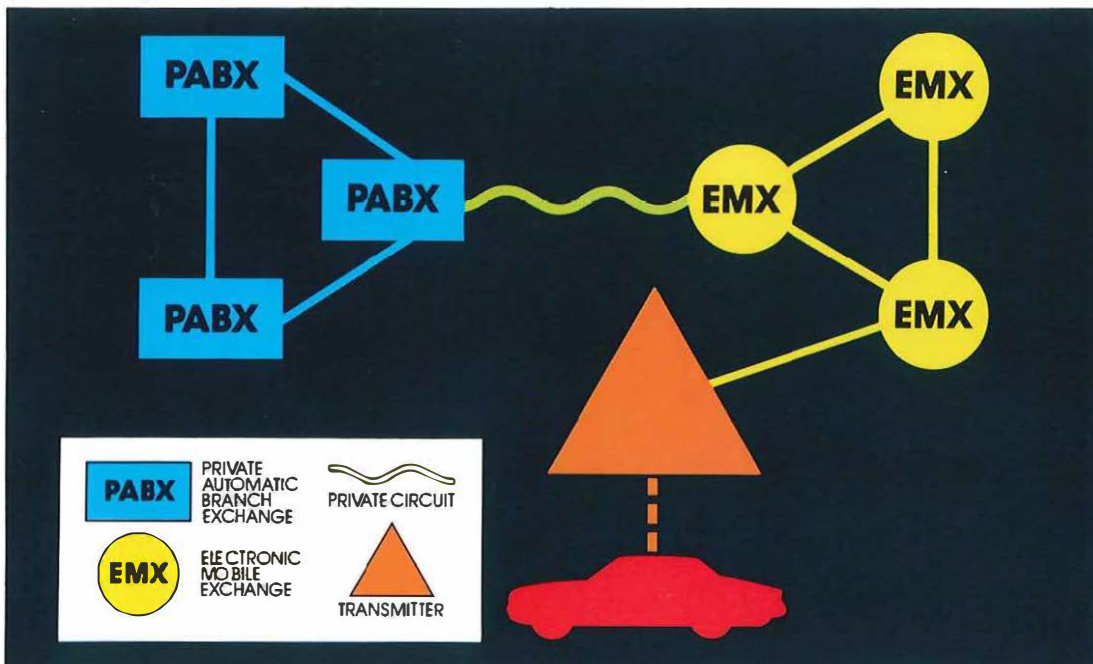
Effective after-sales service is another way of adding value and attracting customers. Every British Telecom Mobile Phone customer automatically becomes a member of the Telecom Diamond Club, which offers 12 months' free warranty. An extended warranty scheme has been recently introduced and, for £120, gives

another year's cover for any remedial maintenance plus the cost of repair, including parts and labour.

The Club publishes a list of approved service centres around the country where customers can get their phones repaired and receive a replacement whilst their phone is out of action. It also offers free membership of the RAC Rescue Service and discounts on holidays and business travel. It provides special Cellphone insurance and publishes a quarterly 'Telecom Diamond' magazine, which keeps customers up to date with the latest from Cellnet and Mobile Phone.

Cellphones installation is another area where a service opportunity arises. Here it is gratifying to see the success of the British Telecom Motor Transport garages in developing the necessary expertise and creating a specialist niche for themselves as the installation experts for the Inland Communications Districts. ▷

Wherever you are 'out in the field', mobile phones keep you in touch.



Cellnet's Direct Access service provides an economic link between a Cellphone and a company's switchboard or computer centre without using the public telephone system.

Marketing activities have to reflect the changing needs of the customers themselves. An initial popular misconception was that mobile telephones were only for the wealthy tycoon in his Rolls-Royce. Nothing could be further from the truth. Mobile phones are moving rapidly and a growing number of users are now finding the benefits of efficient mobile communications translated into profits.

Accessible

One customer who runs a small haulage company is now doing three to four times as much business because his drivers are always accessible for incoming calls. Small companies have tended to be more willing buyers than large, and about 60 per cent of Diamond Club members have fewer than 20 employees.

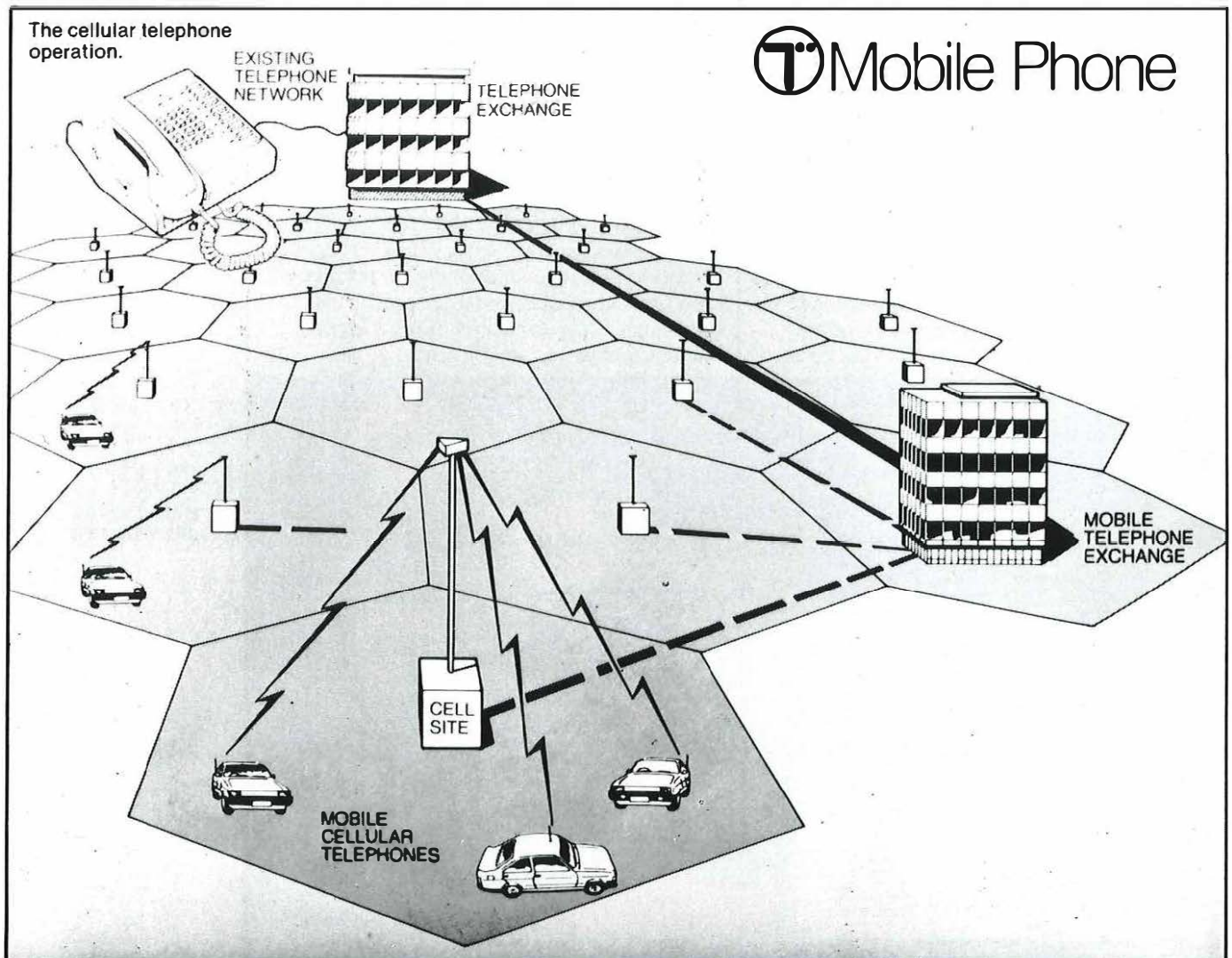
Larger companies however are now moving into the market and facilities such as Direct Access will encourage greater demand. Direct Access enables a company with its own private telephone network to set up an economic link between its Cellphones and its switchboard and/or computer centre without accessing into the public telephone network. The major benefits are fixed access rental charges and low call costs with an internal communications system which can, nevertheless, make calls anywhere in the world.

Another technical development which will be increasingly in demand by large companies is mobile data transmission. The facility already exists and British Telecom Mobile Phone has been testing specific equipment for use by its customers. A 1200 bit modem is now available and a product is being developed for high speed data transmission. Customers can now send or receive a facsimile; send a telex or message via Telecom Gold; access Prestel or other public databases and communicate text for mobile to office word processing. A piece of equipment to 'scramble' conversations for total security is also under development.

The cellular market will continue to be a buoyant one albeit intensely competitive. Sponsorship is important and the British Telecom Vauxhall Astra GTE rally car, driven by Pentti Airikkala has forged vital links with General Motors dealers. Sponsorship of the Trevor Banks showjumping team has also given entry to an area where sales potential is high.

Mass markets are opening up and Cellnet coverage is set to extend to virtually all areas of the country, so the pattern of spectacular growth is certain to continue. The Division already has System 4 Radiophones for areas not covered by cellular radio to ensure that communications on the move are available to everyone and an accepted part of everyday life. T

Mr T Harvey is General
Manager, BT Mobile
Phone Division.



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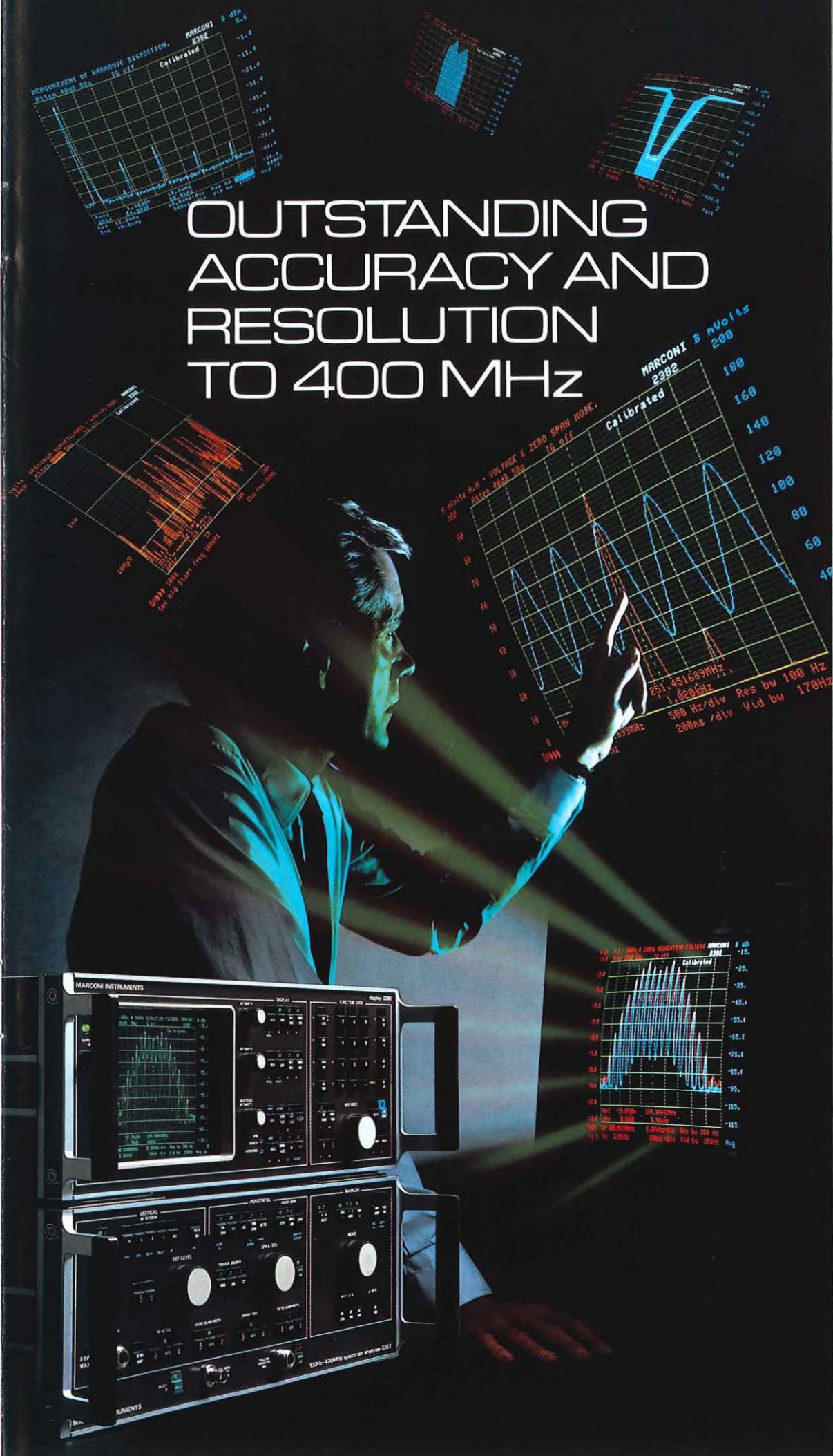
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The phantom office* comes sharply into focus with Divert-a-Call. The first in a range of automatic call forwarding equipment which forms the basis of a whole new family of British Telecom Services.

Divert-a-Call has been designed and manufactured by Dynamic Logic, a British company using experience gained from more than a decade at the forefront of PSTN telemetry.

Based on advanced microprocessor technology, the Divert-a-Call range is fully software driven, enabling calls to be remotely diverted to 10 different destinations from a single exchange based unit.

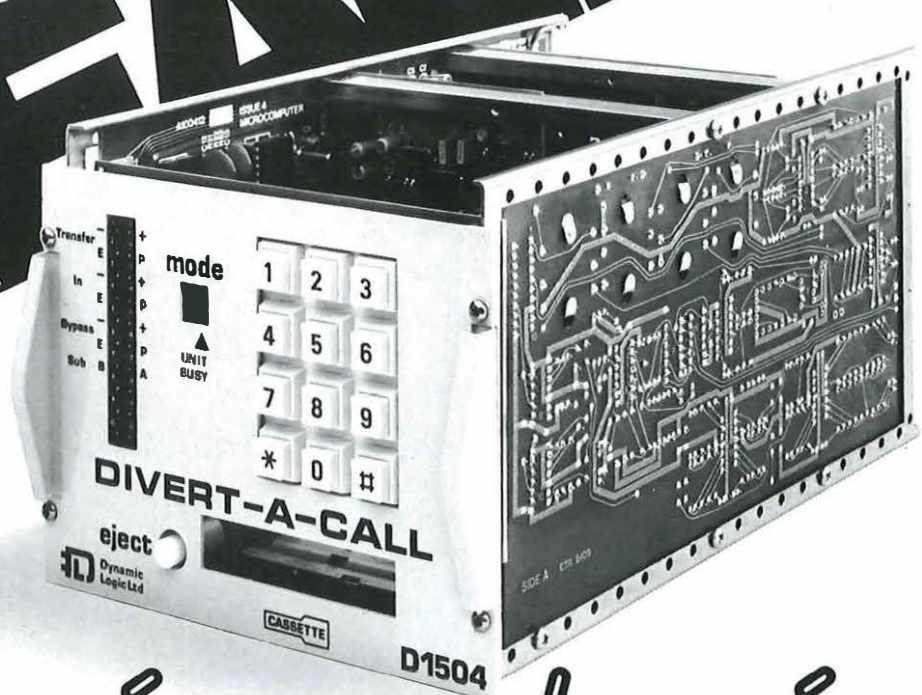
The subscriber can select or change destinations from any location within the telephone network using a synthesised speech facility which is protected by a security code.

Divert-a-Call incorporates a hybrid amplifier to compensate for the variable transmission losses encountered within any telephone network.

Diversions can be transparent or the caller can be informed using the personalised announcement facility.

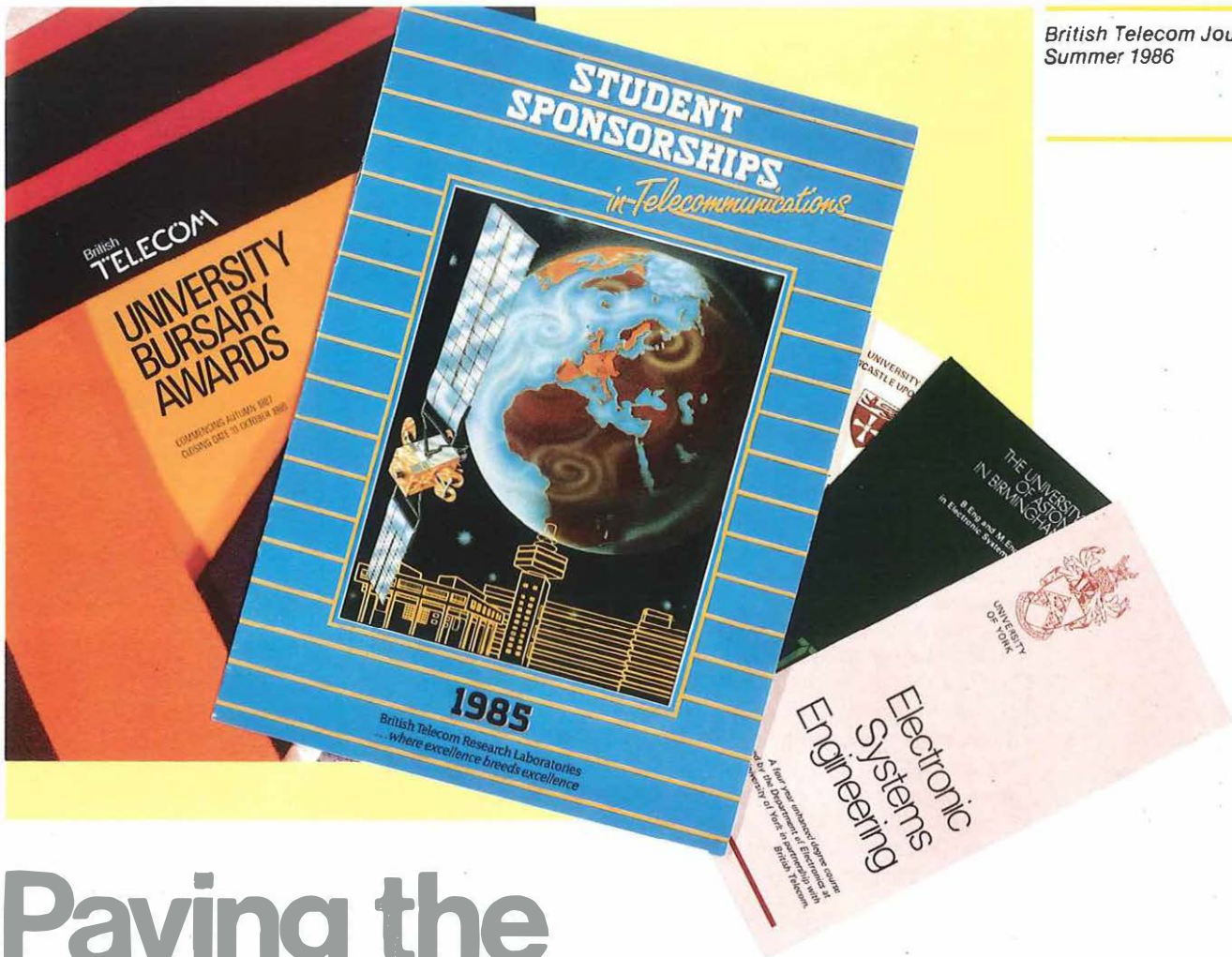
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Paving the way for future skills

Ted Hackett

The influence of technological change is being felt by everyone in the country, and most people realise that labour intensive industries are being reduced in size or replaced by service industries. Because of this, educational changes have to be introduced so that the young children of today are better prepared for the jobs of tomorrow.

Teachers and members of the public are already seeing some of those changes being introduced. The GCE 'O' Level and Certificate of Secondary Education (CSE) syllabuses are being replaced by the General Certificate of Secondary Education. At a higher academic level, new university courses have been set up to educate the research and development engineers that British Telecom will need in the 1990's. The accompanying tables give an indication of the interests that British Telecom has in academic matters at all levels, and gives an

outline of the links that have been established with local and national bodies.

For example, at primary, middle and secondary school level, British Telecom's Education Service provides useful information to catch the students' interest in telecommunications. A recent article, 'Schools get the message' (*British Telecom Journal* Summer 1985) considered the comprehensive range of learning packages produced for the schoolroom. Links with various bodies such as Understanding British Industry (UBI), and Young Enterprise have been established to make the science curriculum more relevant to industry. Gifted students who go on to complete 'A' Level studies may then be sponsored by British Telecom to pursue a relevant degree.

While it is possible for a student at any university or polytechnic to be sponsored in this way, by far the most important initiatives are ▷

British Telecom has an important and growing role within the academic community and as the information explosion gathers pace the Company needs to be in a stronger position than ever to influence the debate on the changing skills that the industry will require.

Top left: Dr Colin Day of British Telecom's Research Department (left) discusses the manufacture of optical fibres with Dr Gordon Kegg of Woking College.

Top right: British Telecom offices at Euston Tower, central London, were used by art students to draw the West End skyline.

Centre left: physics teacher Tim Balls demonstrates one of the software programs produced by British Telecom's Education Service to his pupils at Garforth Comprehensive School, Leeds.

Centre right: this 'still' from a British Telecom Education Service video about satellite communications shows teacher David Grace with two of his sixth form pupils.

Bottom left: teacher Ann Patterson used a secondment to British Telecom's Research Laboratories, Martlesham Heath, near Ipswich, to help her prepare teaching materials for 'A' level physics.

Bottom right: Donald Cremer, British Telecom's Chief Officer Administrative Services, welcomes 'A' level sociology students to his office at BT Centre, Newgate Street, London, and explains the workings of a big company's head office.

those at the universities of Aston, Newcastle-upon-Tyne, and York where four-year courses have been developed leading to M.Eng. Even this is insufficient to meet the demand for undergraduate recruits, so other opportunities are being developed for sponsorship of students who have completed one or more years of study at degree of Higher National Diploma (HND) level at a university or polytechnic.

British Telecom, Cellnet and British Telecom International (BTI) are, for example, collaborating with the Design Council and three London-based design consultancies to sponsor students in industry. Design students are being invited to compete for a total of six sponsorships. Each offers the winning student financial support and advice through the final year at college, followed by a year's placement with one of the three design consultancies — Pankhurst Design and Development Ltd, Design in Action, and Office Planning Consultants.

Sponsorship schemes demand a high level of commitment from the staff running them, as they usually include a training element approved by institutions such as the Institution of Electrical Engineers and the British Computer Society. British Telecom's role is to ensure that the training given is relevant to a career with the Company. Project work is used to develop practical and communicative skills and the concept of team working.

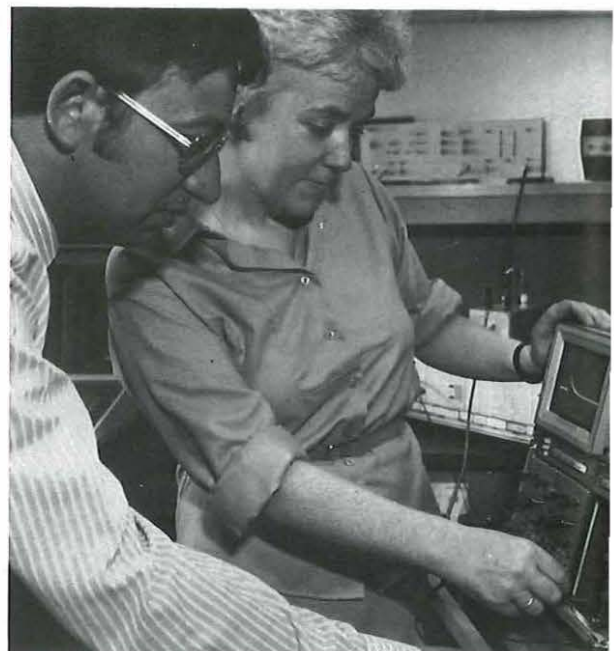
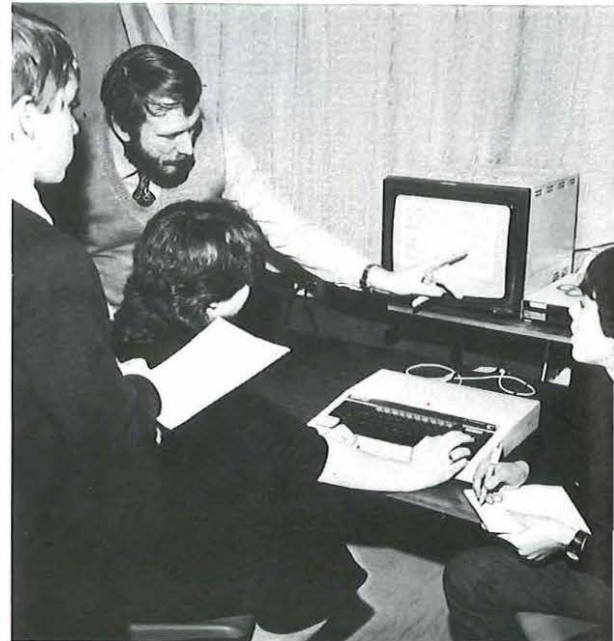
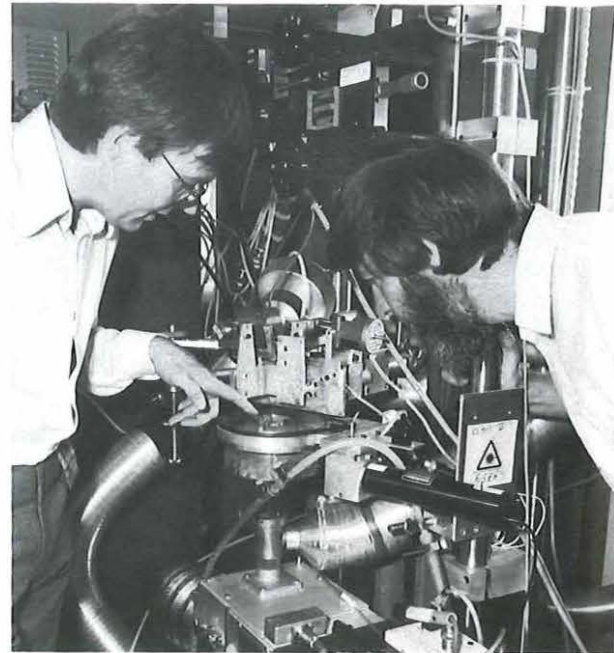
Apprenticeship

Only a small number of young students go on to 'A' level studies; most leave school after 'O' levels and find work. Some of those are employed by British Telecom in engineering, and enter a three-year apprenticeship which includes an educational element in the Business and Technical Education Council/Scottish Vocational and Educational Council (BTEC/SCOTVEC) studies in telecommunications. Alternatively, young school leavers can be employed on clerical or other duties, in which case BTEC/SCOTVEC courses in Business Studies may be attempted. Both of these qualifications can lead to a degree.

Engineering staff can be sponsored to study towards an engineering or scientific degree through the Major/Minor Award Scheme, while sponsorship for other subjects is possible through the Districts.

In some cases, students with potential who do not have the academic qualifications to enter an engineering or scientific degree level course can be sponsored on a 'bridging' course. In recent years about 40 students a year have attended the Post Technician University Orientation course, organised with the Essex Institute at Chelmsford.

Occasionally, a prospective student may be unable to study full-time, so that an Open University degree should be considered, while for research or development students a collaborative degree is a possibility. All of these result in a commitment on the part of British





Telecom, and the investment can be quite considerable.

British Telecom has assisted the universities and polytechnics, with both cash and equipment. Financial help ranges from support of lecturing and professional staff to the funding of the Chairs of Optoelectronics at Southampton University and University College, London. Research contracts have also been placed with many establishments throughout the country which ensure that modern aspects of telecommunications are under review.

Facilities at Martlesham Research Centre, near Ipswich, have been made available to ensure that academic staff are kept up to date with industrial changes. Institution of Electrical Engineers summer schools also enhance the contact between British Telecom and the educational establishment.

The Company also helps the education of foreign nationals by training small groups of students in the UK. This may involve studies in telecommunications, vocational training to BTEC or university standards and practice in ordinary and technical English.

For the future, British Telecom is heavily committed to the development of academic ideas that are industry related, so it is reasonable to assume that developments will involve more contact with primary, middle and secondary schools. British Telecom's Education Service will continue to produce pamphlets, reflecting the technological changes of the last few years.

New ideas are being developed which include a one year bridging course for women staff to prepare them for scientific or engineering degrees at university. Further help on teacher training is likely, as there is a severe shortage of skills in mathematics and physics. Liaison between industry and education will continue to develop. ①

*British Telecom Journal
Summer 1986*

*Paving the way for
future skills*

Mr E Hackett is British Telecom's undergraduate training manager.

Sponsorship — the targets

Primary, Middle, Secondary Schools

- British Telecom's Education Service.
- Links with Understanding British Industry, Young Enterprise, Industrial Society, RSA, Association for Science Education.
- Production of teachers' and students' notes on communications.

Intermediate Studies

- Higher National Diploma
- British Telecom Fulcrum sponsorships.

University or Polytechnic degree level studies

- British Telecom Bursary Studentship
- Student sponsorships in Telecommunications, British Telecom Research Laboratories, Various Districts, including Manchester, and Lancs and Cumbria offer similar sponsorships.
- British Telecom Studentship
- School Leavers
- Those employed by British Telecom, also have opportunities for further study towards useful qualifications.

Sponsorship — the goals

Certificates, awards, degrees

- BTEC/SCOTVEC Certificates and Higher Certificates in Engineering, Telecommunications and Business Studies.
- Post-Technician University Orientation Course sponsorships for students without the

academic qualifications for university entry.

- Major and Minor Awards in science and engineering for degree level studies.
 - Collaborative degree level studies.
 - Open University.
- For the already qualified**
- Postgraduate studies.
 - Case awards.
 - Collaborative Postgraduate studies.
 - Business Education Scheme, full-time or part-time.
 - Seminars.
 - Occasional attendance at specialist lectures.

Sponsorship — British Telecom's support

Where most of the money goes

- Several universities including Aston, York, Newcastle, Essex, Oxford and others.
- Support for university chairs and lecturing/professional staff at Aston, Newcastle, York, Cambridge, Southampton, U.L.C.
- Equipment: General support to many universities from many parts of the Company.

Other support:-

- Short term fellowships for academic staff.
- Research contracts with some 23 universities and polytechnics.
- British Telecom staff involvement with lecturing, examining, IEE summer schools, course design.

SDX 40

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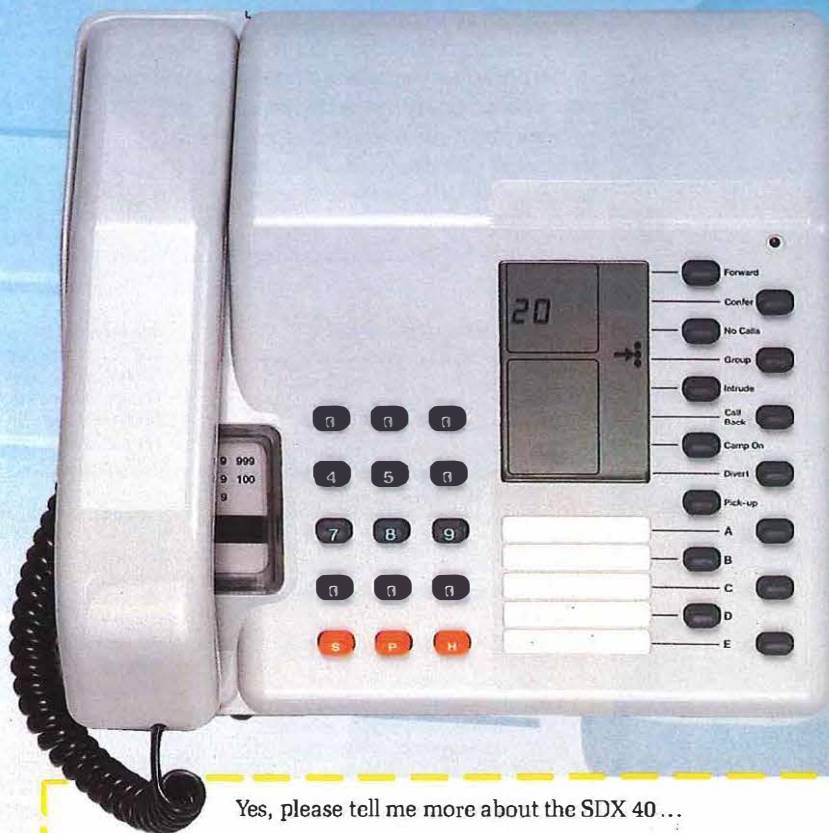
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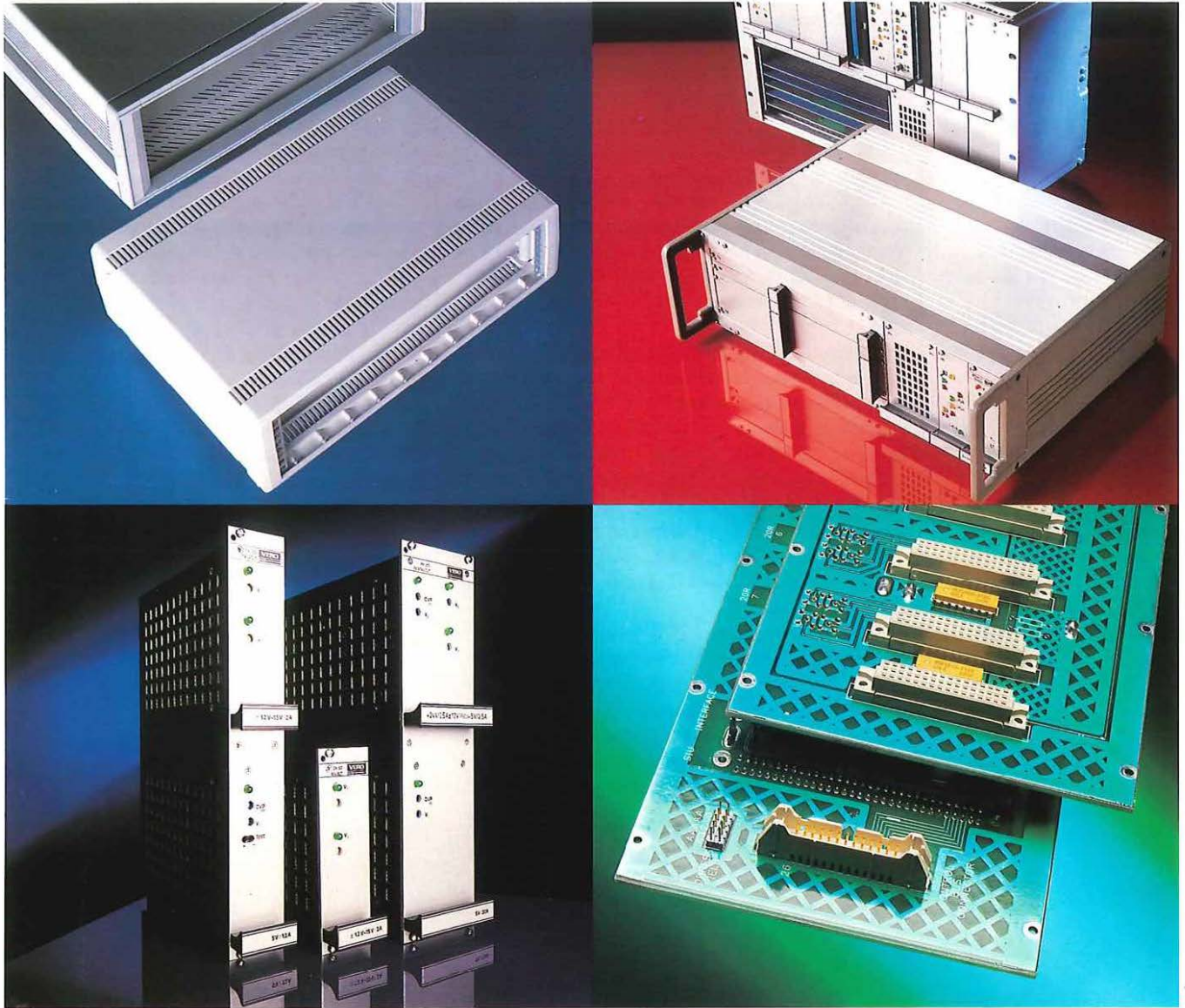
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LEADERS IN ELECTRONIC PACKAGING TECHNOLOGY.



In a fast changing environment, British Telecom depends on its own Occupational Health Service to keep a close eye on the ways in which new equipment and working practices could affect staff. The OHS works alongside management and unions to ensure that the company remains a safe and healthy place to work.

In any branch or speciality in medicine there are two main ways in which good health may be promoted – the preventive route and the therapeutic or curative route. In everyday life most people are more familiar with the latter route when they visit their family doctor or a hospital for treatment.

The Occupational Health Service has primarily a preventive role and does not attempt to compete with the National Health Service, but it does provide treatment at work from time to time in emergencies or other exceptional circumstances.

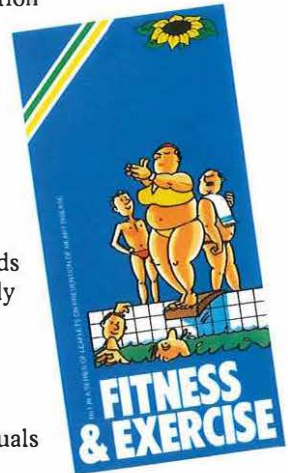
To function effectively and to give a continuous and reliable service, the OHS needs the combined expertise of several different but related professions. It employs over 50 occupational health nurses, 16 full-time doctors, known as occupational physicians, and a team of occupational hygienists. With the exception of the Occupational Hygiene Group, which is based at BTHQ in London, the OHS nurses and doctors are located on a Territory/District basis throughout the UK.

The OHS co-operates closely with colleagues in British Telecom's Safety Division and the Welfare Service and should additional information about an employee's health or progress after illness be required it can, with the employee's permission, join forces with the family doctor or hospital specialist involved.

Consultation with the OHS, whether through a self referral or through a referral by management, is always a voluntary act. Great pains are taken to ensure that confidential medical information about an employee is only seen by properly qualified professional staff and is kept in secure storage.

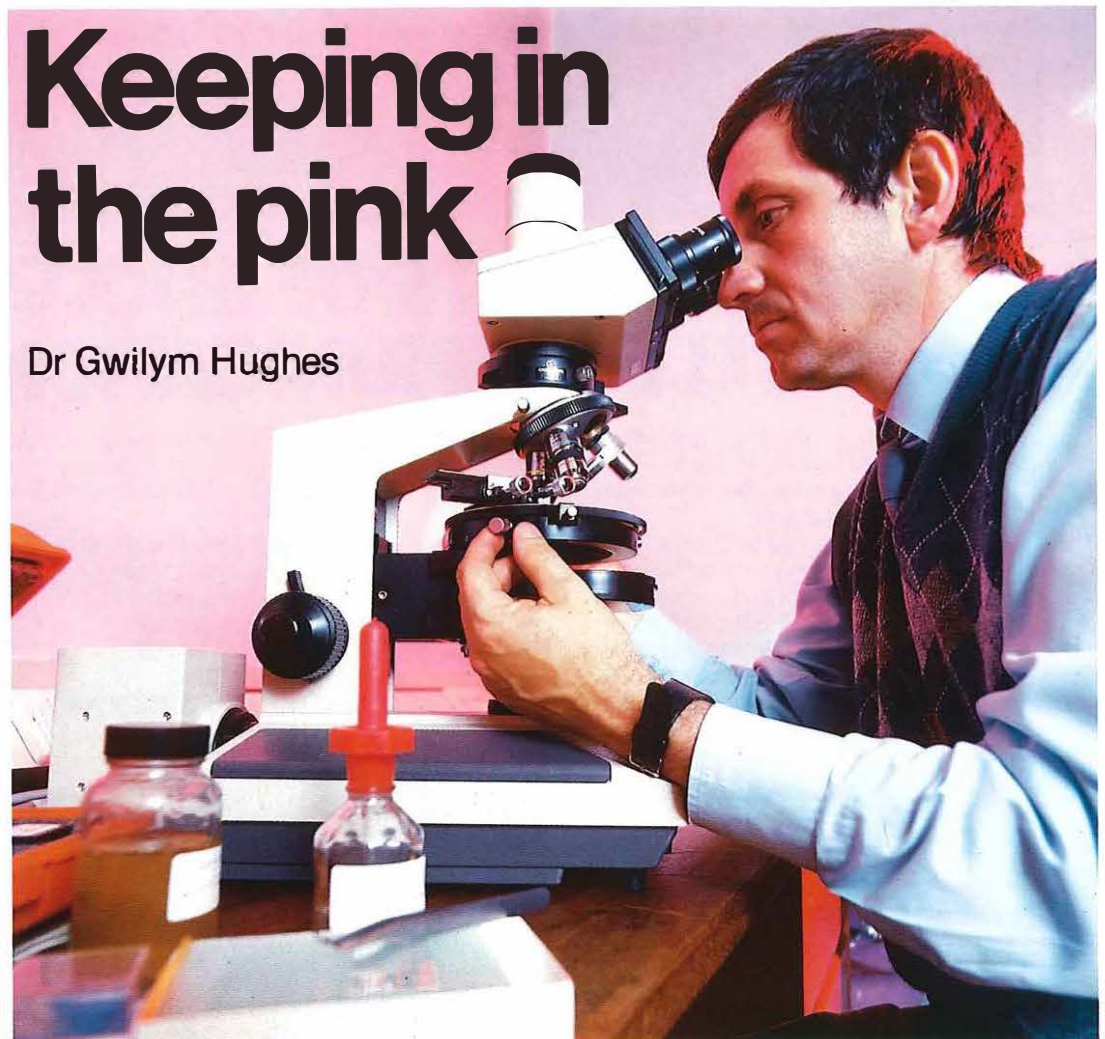
The first contact point for most staff is a meeting with an occupational health nurse who normally holds the title of Senior Nursing Officer. To achieve this status the nurse will have undergone a period of specialised professional study and passed the examination for the occupational health nursing certificate (OHNC). This is in addition to the State Registered Nurse qualification (SRN) achieved after the standard period of study which all nurses undergo at an approved hospital.

An occupational health nurse's specialised knowledge of health trends amongst employees locally and knowledge of local work practices makes her especially well qualified to advise both management and individuals on health matters.



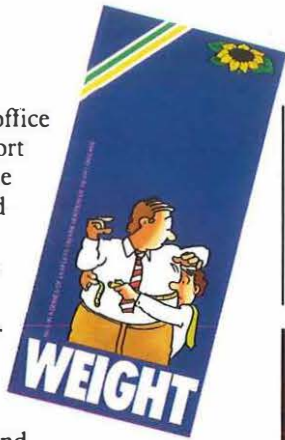
Keeping in the pink

Dr Gwilym Hughes



Tony McSweeney of the occupational hygiene group uses a high-powered microscope to identify asbestos samples.

Nurses regularly visit office buildings, motor transport workshops and telephone exchanges to inspect and monitor environmental conditions and to advise corrective procedures when these are required. They also offer health education either to groups of employees or on an individual basis, and are often consulted by representatives of local branch unions requiring information on health matters on behalf of their members.



based in London – mainly chemists who have taken special training and obtained the MSc degree in occupational hygiene. They are responsible for taking specialised environment measurements such as asbestos fibre counting, monitoring noise levels and conducting thermal comfort studies. ▷



An infra-red gas analyser, used here to check solvent vapours from products which British Telecom staff may encounter, is one of a number of sophisticated instruments used by the occupational hygiene group at laboratories in Studd Street, London.

Consultation

Employees who have either long-standing health problems or recent acute problems are always given the opportunity by management to consult the OHS. In the majority of instances the consultation is with the occupational health nurse who, through her specialised local knowledge and general experience, is able to resolve a large proportion of such problems and advise management accordingly.

Nurses, however, have the professional support of their Regional Medical Officers – full-time doctors who have specialised in occupational medicine in addition to the standard medical training. Each Territory has at least two doctors, all with hospital experience and many have spent time in general practice before joining the Company. Some have also worked as specialist occupational physicians in other industries and nearly all hold a diploma or other special qualification in occupational medicine.

Each RMO leads a team of occupational health nurses based in separate Districts and sees employees who are referred by the nurses or those who come directly either by management referral or by the employee's self referral. The RMO will often need to make professional contact with local GPs, community physicians and hospital specialists to be fully aware of health trends in the general population.

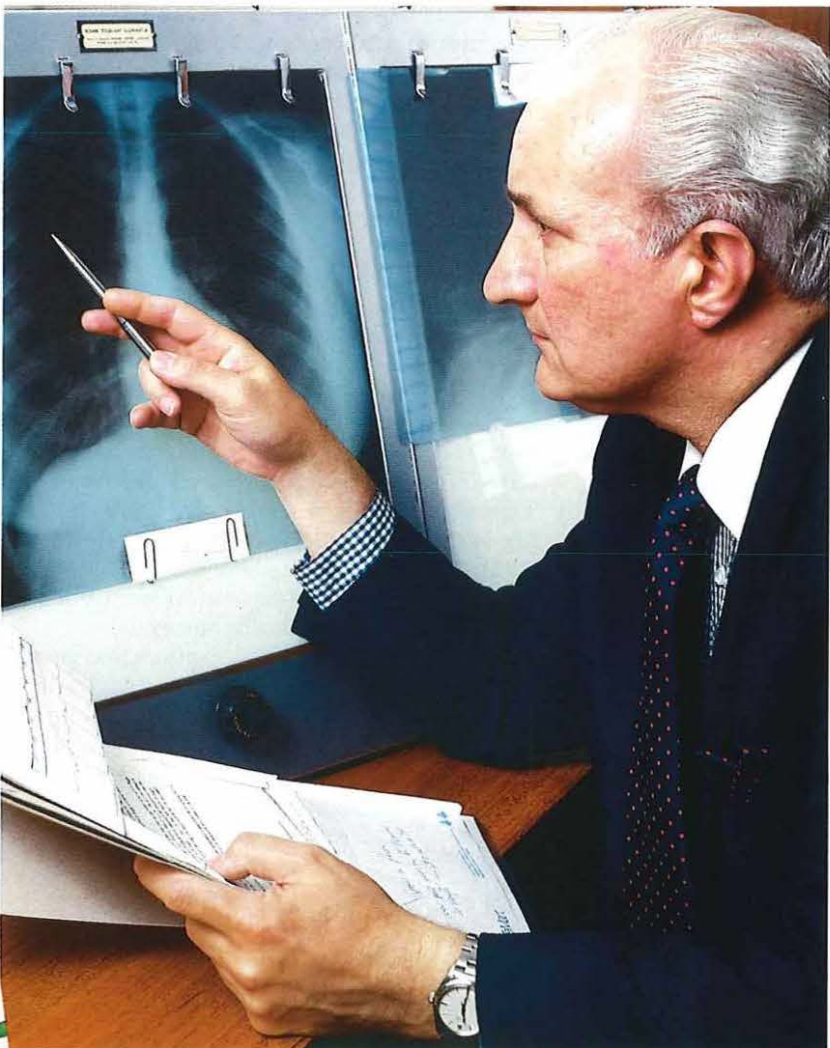
Each RMO spends a good deal of time travelling to various locations in the Districts and regularly meets managers, safety advisers and welfare officers to help formulate an accurate picture of any health problems which might exist in a given location.

Should an employee become too ill to continue working, the RMO advises management on eligibility for early retirement on ill health grounds.

In addition to the full-time RMOs, British Telecom also employs part-time doctors, usually GPs, to assist in more remote locations and in highly populated conurbations where employee numbers are high. Many of these part-time doctors also have specialised experience in occupational medicine.

A team of hygienists is

Below: Chief Medical Officer Dr Gwilym Hughes examines a chest X-ray.



How to stop smoking for you and your baby



Blood pressure checks could play a vital role in improving health amongst staff aged over 40 and Chief Nursing Officer Gillian Evans demonstrates the procedure involved.



In addition, the hygiene group assesses the suitability of substances intended for general use such as resins used in cable jointing, cleaning materials, chemicals used in photocopiers and a variety of similar substances. Unsuitable materials which could harm the health of employees are banned from use if rejected by the group.

Professional

The national policy of the OHS is determined by the Chief Medical Officer who has overall professional responsibility and advises the Board on all matters relating to the health of employees. He is based at BTHQ and has the support of the Chief Nursing Officer and the OHS Technical Administrator. All British Telecom doctors have a professional reporting line to the CMO and the Occupational Hygiene Group reports directly to him. The Chief Nursing Officer has professional responsibility for the occupational health nurses in conjunction with the RMO who is their local health team leader.

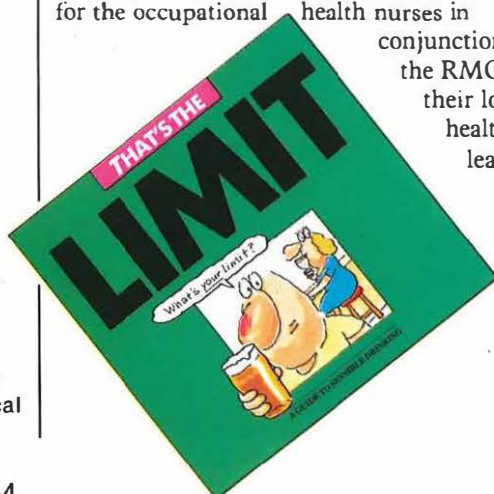
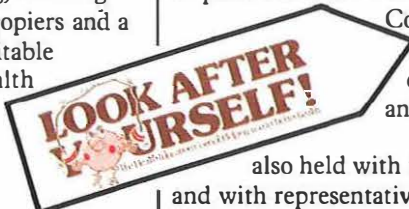
The Chief Medical and Chief Nursing Officers advise on all health problems with national implications and meet senior members of Corporate Personnel, Inland Communications and other divisional personnel, and Welfare representatives.

Regular meetings are also held with the Chief Safety Officer and with representatives of the British Telecom Union Committee to discuss matters relating to the health of employees.

It has long been realised that one of the biggest killers of men and women between 40 and 60 is coronary heart disease. Important factors for the development of this kind of heart disease are a diet high in fat, lack of exercise, cigarette smoking and raised blood pressure.

For many years the OHS has had health education programmes for reducing the effect of the first three factors. In the very near future the OHS, with the agreement of the British Telecom Board, will be offering all employees over the age of 40 the opportunity of having their blood pressure measured by the OHS staff. The test will be voluntary and the results will remain confidential. Individuals requiring treatment will be referred to their own GPs.

The programme is at present being considered by BTUC and awaiting their agreement before the OHS begins the national programme for blood pressure checking. It is to be hoped that this positive intervention into preventive health care by the OHS will be a significant factor in helping to reduce heart disease and blood pressure problems in 40-plus employees. ①



Dr G Hughes is British Telecom's Chief Medical Officer.

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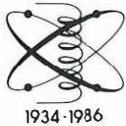
Power Supplies

Converters

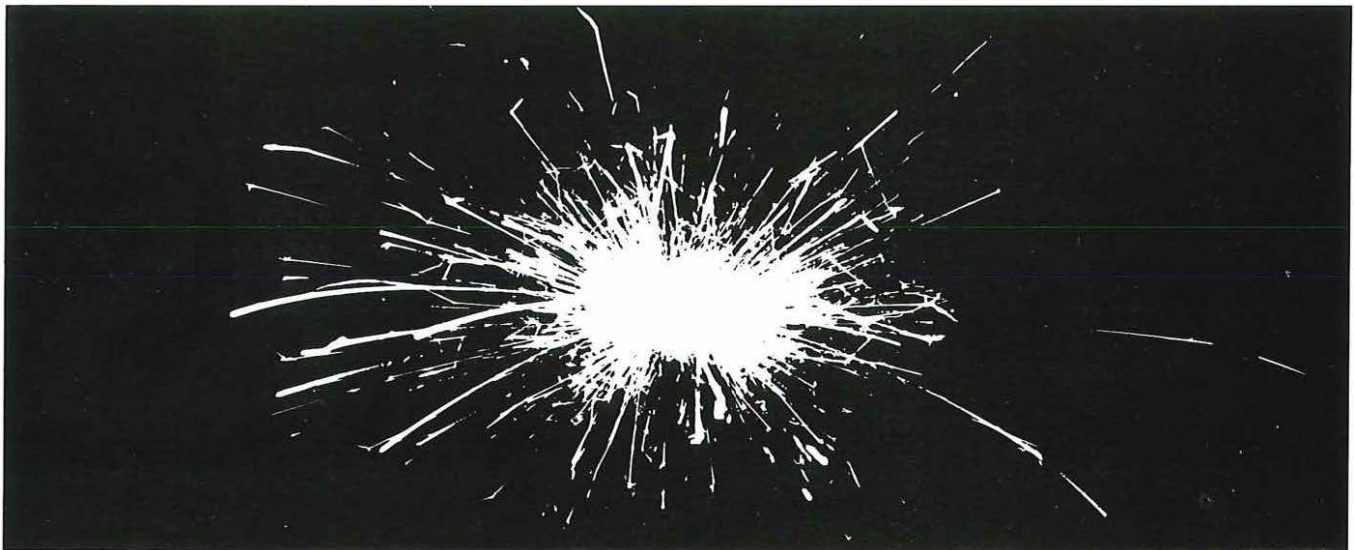
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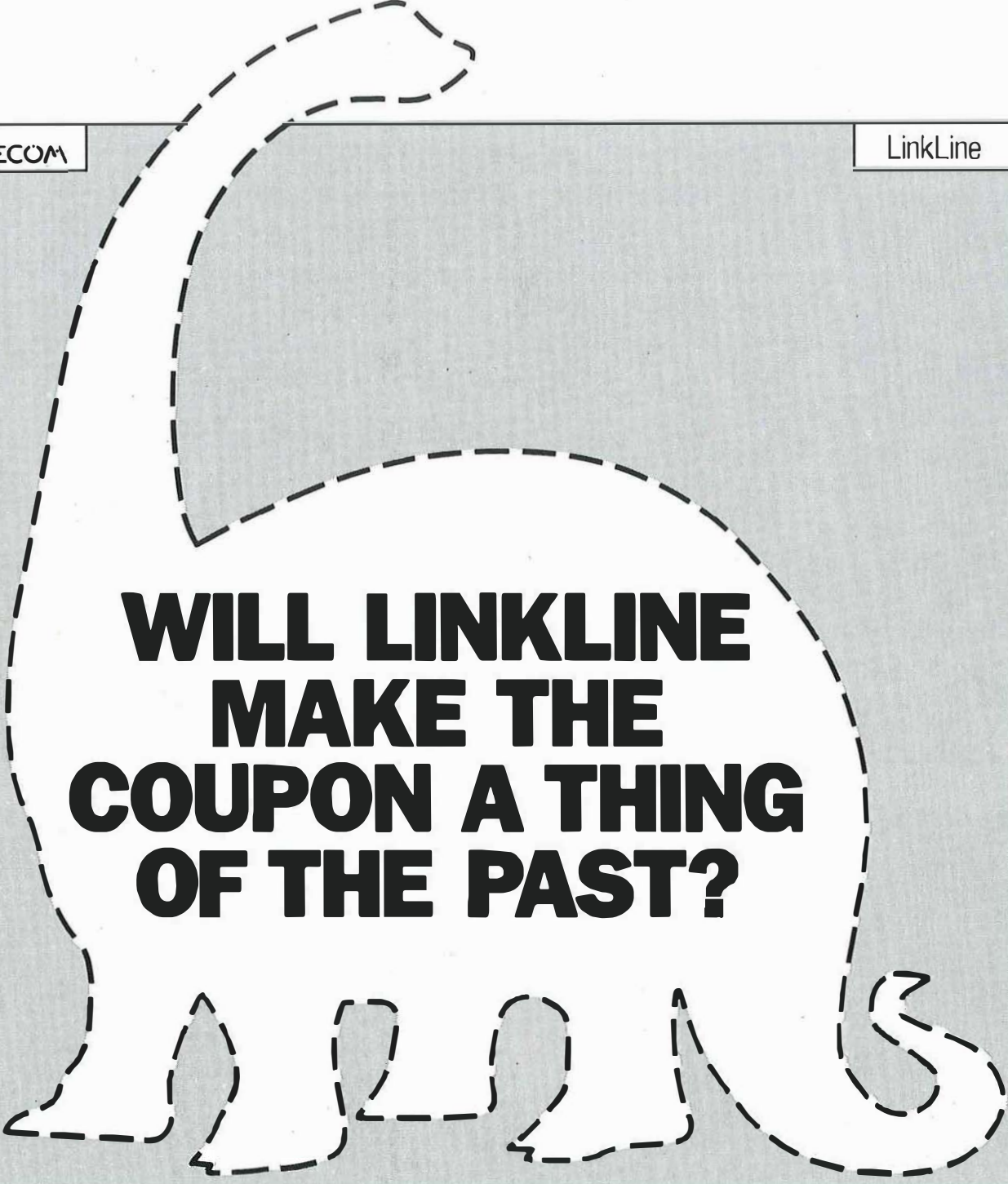
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Two-way fibres

A new technical achievement by British Telecom enables pulses of laser light to be sent along long-distance optical fibre both ways at once to keep down the cost of long distance calls.

British Telecom is the first operating company in the world to accomplish this feat in a commercial cable installed as part of its public network.

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

Engineers from British Telecom's research laboratories at Martlesham Heath, near Ipswich, established simultaneous or duplex transmission over a 77km optical fibre system between Birmingham and Derby. The link previously featured as one of the first in Britain to support higher capacity optical transmission and includes a record-breaking span of 45km.

Electronic sales

An electronic extension of British Telecom's Yellow Pages Directories is to be launched enabling information on advertisers, held on a central database, to be accessible at the cost of an ordinary telephone call to anyone with a suitable communicating terminal.

Electronic Yellow Pages (EYP) will initially contain information covering the London, Reading and Guildford areas. Any company currently paying for advertising at semi-display level or above in the ordinary Yellow Pages covering those areas will qualify for a free listing on the database.

The EYP database is divided into geographic areas and subject classifications as in the printed directories, but EYP offers significant advantages to users.

Searches can be made either through a comprehensive keyword search or a special numbering scheme, and the boundaries between different directory areas can be crossed easily.

The database for some of the 1987 London Directories is now being prepared. Electronic Yellow Pages will be launched in January 1987, and will spread to other coverage areas later in the year.

LinkLine takes off

British Caledonian Airways has become the first UK airline to switch on to British Telecom's LinkLine system for its telephone reservations and enquiries service.

LinkLine is being introduced by B-Cal in a major upgrading of the airline's reservation system, enabling callers from anywhere in the UK to contact one national number for the cost of a local call.

The system will be particularly beneficial for travel agents, regular



A 'date' with progress

Computer-dating for cows is no joke - it's a serious business for farmers and now technically possible through Prestel's Farmlink Service and the Milk Marketing Board.

A new service, called Dairyfax, includes a computer-matching

bureau for farmers to find the best stud bull for their cow herd with pages called Bullpower, full of prize bull statistics.

As well as receiving all the latest information on the dairy industry direct from the MMB's main computer at Thames

Ditton, Surrey, dairy farmers can now use Dairyfax to call up their own production, veterinary and farm management statistics.

The picture shows Devonshire farmer Ray Hawkins using the system to find the 'right match.'

callers and the general public who use B-Cal's wide range of flight services.

It also allows centralisation of the airline's reservations functions at its base near Gatwick Airport. An easily remembered number, 0345-600 700, will help regular callers.

Micronet support

British Telecom has increased its shareholding in Telemap Limited, the operating company for the Micronet 800 service on Prestel, from 25 per cent to 40 per cent.

Prestel is seeking greater involvement in the development, operation and promotion of branded information services and its association with Telemap has led to the development of Micronet 800, the market leader.

Increasing the share of the equity will allow Telemap to build on the strengths of the three shareholders - British Telecom, East Midland Allied Press and Bell Canada.

Data demo triumph

Successful transfer of data between the computers of five major manufacturers has been achieved using British Telecom's

£100 million public data network.

The firms exhibited file transfer between their computers using software based on open systems interconnection (OSI) standards, at a demonstration at Imperial College, London.

The five firms which took part in this 'Eurosinet' internetworking project were Digital Equipment Co, Hewlett Packard, Honeywell Information Systems, Intel and International Computers Ltd.

Mr Clem Jones, head of British Telecom's Public Data Networks Division, said that the Eurosinet project was created to show how far the computing industry, working closely with British Telecom, had gone along the road towards implementing full OSI in Britain.

The ability of different machines to talk freely to each other, which full OSI will make possible, is seen as essential for the long-term growth of information technology in Britain.

Successful claim

British Telecom is to provide equipment and services to allow the Department of Health and Social Security's central offices and its 500 local social security offices to access benefit systems as part of a plan to streamline the DHSS service.

The plan will eventually ▷

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For supply within British Telecom, the CL250 may be obtained as tester 360A, item code 314 552 from BT Procurement Executive M6.3 2.3 B. Swindon. Contact Mr. Carroll. Tel: 0793 484 254.

For supply within British Telecom, the PT250 may be obtained as oscillator 174A and the Oscar 250 as Level Measuring Set 246A. Both available from BT Procurement Executive M6.3 1.2.A. Contact Mr. D. Lifford. Tel: 0793 484549.

enable any claimant to discuss and obtain benefits and entitlements from any Social Security Local Office or Unemployment Benefit Office in Britain.

Under the contract, British Telecom will provide a complete, fully integrated terminal system, known as the DHSS Strategy Terminal System (STS).

This will potentially include the supply of up to 1,000 minicomputers and 28,000 terminals under a seven-year installation programme.

It will also involve extensive software design, implementation, and support for the project into the next century.

The first installation – for accessing the Retirement Pension System at Newcastle – is due to be brought into regular use by the end of this year.

Martello control

Martello, a range of industrial computer control devices developed at British Telecom Research Laboratories, Martlesham, near Ipswich, is to be marketed commercially by Dean Microsystems Limited.

The range has been designed for process control and instrumentation applications including broadcasting, robotics, oil production and power generation.

Martello can be used both as a development system and embedded into target products. The hardware comprises a rack case of standard Eurocard boards, 8085 CPU card and twin 3.5" disc drives.

The software environment provides disc filling, screen editor, assemblers, debugging tools, all written entirely in FORTH-83 a versatile programming language. Documentation and full customer support are also provided. Prices depend on the precise modules ordered, but a complete development system can be obtained for less than £2,000.

Contracts

BICC, TCL and STC

Telecommunications Limited are to produce optical fibre cables worth £8.5 million for British Telecom. More than half the cable ordered is of the high-capacity singlemode variety, which due to cost reductions is now economic to use for short-haul routes. All future cable orders for the junction network will be singlemode.

British Telecom is the first telecommunications authority in Europe to deploy singlemode optical fibres on a large scale between local exchanges and now has more than 100,000km of optical fibre operational in its network.

Ericsson Fiber Optics AB, Sweden, has received a £1 million order from British Telecom for equipment to fusion splice optical fibres.

The splicing system consists of the fusion splicing machine FSU 850 and its accompanying equipment.

GEC Telecommunications has won a contract for British Telecom's Monarch/CDSS1 digital PABX requirements for 1986/7 covering 480 systems. Since 1985 British Telecom has ordered over £5 million-worth of similar equipment from GEC and more than 13,000 Monarchs are now installed in the UK, at least half of which have been supplied by GEC.

Marconi Radar Systems, Gateshead, has received an order from British Telecom International to provide a new satellite antenna at one of BTI's major international gateways at Madley in Herefordshire. The new antenna worth £575,000 will be the ninth at Madley and will be used within the Intelsat system.

STC Telecommunications has been awarded a further £25 million contract by British Telecom for computerised directory enquiry equipment.

The company has also been awarded a large contract to supply

the next generation of access equipment for British Telecom's Integrated Services Digital Network (ISDN) for business use.

The network will, by the end of next year, enable British Telecom to offer combined voice and data facilities on a single telephone line in compliance with international telecommunications recommendations.

TMC Limited has won a further order, worth £21 million, from British Telecom for the successful PENTARA telephone system.

The PENTARA was launched by British Telecom just over a year ago and orders totalling £18 million have already been placed.

The follow-on order calls for several thousand central control units plus operator consoles and a range of low-profile user terminals.

Telex Computer Products (UK)

has won an order worth over £4 million to supply British Telecom with several thousand colour terminals over the next 12 months. The terminals are plug-compatible alternatives to IBM and will be made at Telex's new manufacturing plant in Irvine, Scotland.

Torch Triple X Unix supermicrocomputers worth £500,000 are to be bought by BT Fulcrum, a wholly-owned subsidiary of British Telecom, for supply to other divisions within the company.

The Triple X complements BT Fulcrum's existing range of small computers based on the Unix operating system, which BT Fulcrum makes in its Birmingham factory under a licence agreed with Bleasdale Computer Systems Ltd last year. Similar rights to manufacture the Triple X have been negotiated with Torch Computers Ltd.

Tri-Test has received a contract worth £52,000 from British Telecom, for the development and preparation of board test programs, ancillary hardware and

documentation for British Telecom's Factron testers located at repair centres.

The company has also been awarded a separate contract for the preparation of repair centre test programs.

Live TV at sea

The first live satellite television programme from a ship at sea has been broadcast from the QE2 using a satellite link operated by British Telecom International (BTI).

Millions of viewers in the United States were able to tune into the transmission on ABC's 'Good Morning America' breakfast TV programme whilst the QE2 was in mid-voyage from Bermuda to New York.

On board, a small satellite dish aerial was mounted on a special stabilized platform to allow the aerial to track the satellite despite the pitching and rolling of the liner.

BTI was given overall responsibility for the transmission because the QE2 is regarded as British territory and because of British Telecom's expertise in satellite TV operations using transportable terminals.

BT record beaters

New generation telex terminals supplied by British Telecom helped Virgin Atlantic Challenger II to break the world record for a surface crossing of the Atlantic.

British Telecom's West End District provided three 64k memory Cheetah telex terminals, telex lines and a dedicated radio telex link to keep owner Richard Branson in touch with his London communications centre and the rest of the world.

At times during the voyage, telex provided the only means of communication between the boat and the 2,000 back-up staff involved in the bid.

The attempt, Branson's second to bring the record back to Britain,▷

On the Touchline

An advanced telephone system for receiving, queuing and dealing with large volumes of calls has been launched by British Telecom.

Called Touchline, the system has been specially designed for businesses which take orders, bookings or service requests from the public. It uses touch-screen video terminals to allow operators to type customers' details on to the screen and, avoiding repetition, transfer these together with the call to another department if required.

Operators also have fingertip access to other useful information stored on the firm's mainframe computer, and can respond instantly to queries about products, prices and services.

No computer experience is

required to operate Touchline technology and the screen can display up to 10,000 pages of information.

Touchline systems can be expanded up to almost any size and can interface with all common telephone and computer systems. Only three cables are required to connect each work-station, which simplifies wiring. Prices vary according to size and specification, but 30 stations and a processor would cost around £150,000.

Touchline is made by the City Business Products subsidiary of British Telecom from assemblies produced almost entirely in Britain.

In the USA, the system is to be marketed by Telex Computer Products, the major subsidiary of the Telex Corporation.



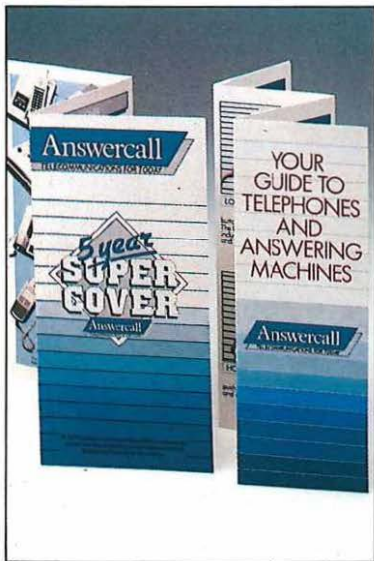
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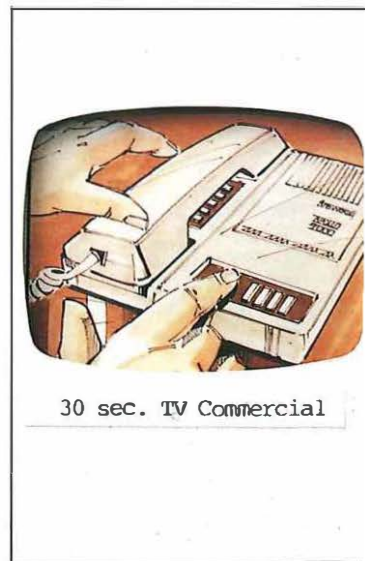
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was co-ordinated from Virgin's headquarters in the West End of London. British Telecom West End District completely recabled the building site and provided an engineer on standby throughout the voyage.

A Merlin Octara was also provided for the operations room by British Telecom Business Systems to provide voice communication during the voyage. The Octara phone system can handle up to 32 extension lines and 10 exchange lines with a host of easy-to-use features.

New appointments

Mr Clive Foxell has been appointed to the Board of British Telecom as Managing Director, Engineering and Procurement. As a corporate director, he replaces Mr John Alvey who has retired as the Company's Managing Director Development and Procurement and Engineer-in-Chief after a long and distinguished career.

Mr Foxell, 56, was Chief Executive of procurement and chairman of the BT subsidiary Fulcrum Communications Limited. He remains a director of BT & D Technologies Limited. Mr Foxell also takes over Board level responsibility for the regrouped British Telecom Enterprises – see story on organisational developments on page 47.

Mr Paul Graham Bosonnet, 53, deputy chairman of the BOC Group, has been appointed a non-

executive director of the Company. A chartered accountant, Mr Bosonnet is also non-executive director of Logica and vice-chairman of the Council of the Royal Holloway and Bedford New College.

Mr David Pentecost is to be British Telecom's new Chief Executive, procurement, in charge of the company's £1,900 million a year purchasing programme. He was Director of Major Systems Procurement and succeeds Mr Foxell. In addition, **Dr David Leakey**, currently Deputy Engineer-in-Chief, becomes Chief Scientist.

Mr John McMonigall has been appointed as Chief Executive of the Company's recently-formed International Products Division. He succeeds Dr Peter Troughton who is leaving British Telecom to join a leading venture capital group.

Mr McMonigall was recruited to British Telecom in January this year as deputy managing director of British Telecom Enterprises, headed by Dr Troughton.

Mr David Harrison has been appointed as British Telecom's Financing Manager. He will be responsible to the Corporate Treasurer for British Telecom's medium and long term financing, including the financing of acquisitions and joint ventures and British Telecom's involvement in its treasury management of overseas subsidiaries.

Mr Harrison, 34, is a Member of

the Association of Corporate Treasurers and joins British Telecom from Unilever where he worked in the economics department and the treasury.

New Merlin Switch

The Merlin SX2000 – a fully integrated voice and data switch – joins the family of big switches available from British Telecom to meet the needs of larger business organisations.

Flexible and adaptable to any combination of voice, text and data requirements the switch has a wide range of user features, further enhanced by featurephone options, and a capacity for up to 2,500 lines.

Backing for Jane

Voicebank, British Telecom's voice messaging service is sponsoring Jane Forrest, one of Britain's top women golfers this season.

A professional for eight years, Jane is now ninth in the European Order of Merit following her recent victory in the Dutch Ladies Open.

She regularly uses her Voicebank mailbox when travelling between tournaments all over Europe.

Going for Gold

Telecom Gold, British Telecom's electronic mail service, has been chosen by the Institute of Chartered Accountants in England and Wales (ICAEW), to provide electronic communications and computerised information, tailored specifically to the needs of chartered accountants.

Institute members will be invited to register for a Telecom Gold mailbox within the ICAEW's closed user group which has gateway links to two other databases of relevance to chartered accountants.

In addition, the Institute will make a wide range of information available via Telecom Gold including a regular bulletin of general and technical data, details of computer hardware and software discounts for members, and forthcoming courses and conferences.

● Telecom Gold is also offering a gateway to 'World Reporter', the English-language information database provided by Datasolve Limited.

World Reporter offers a cost effective method of obtaining international commercial, political, economic or technological information from a vast online database which is updated daily.

Whitehall on view

Foreign Secretary, Sir Geoffrey Howe, was the first to use British Telecom International's latest videoconferencing service, between Britain and Belgium, when he conducted a long distance press conference from Whitehall. Sir Geoffrey briefed European journalists in Brussels on the occasion of Britain's assumption of the Presidency of the European Community. The move follows video conferencing between London and Cardiff by The Welsh Office.

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TELEX: T15, T23, Puma, Cheetah, etc.

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Very simple, a fibre optic cable is a bundle of very thin and very flexible continuous glass cords, down which light pulses are passed bearing information or data. AT&T and Philips have played

a leading role in the development of fibre optics technology. Philips particularly has been for years a major supplier of sophisticated transmission equipment. And in recent years the thrust of their research and development has been aimed at advancing the state of optical fibre transmission systems.

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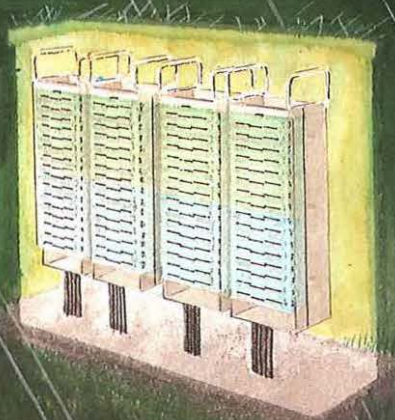
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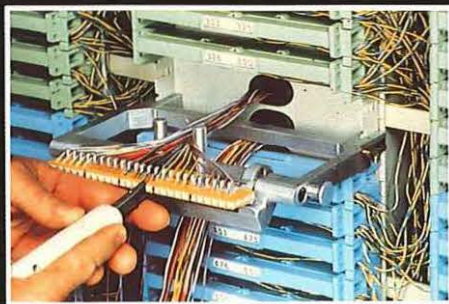


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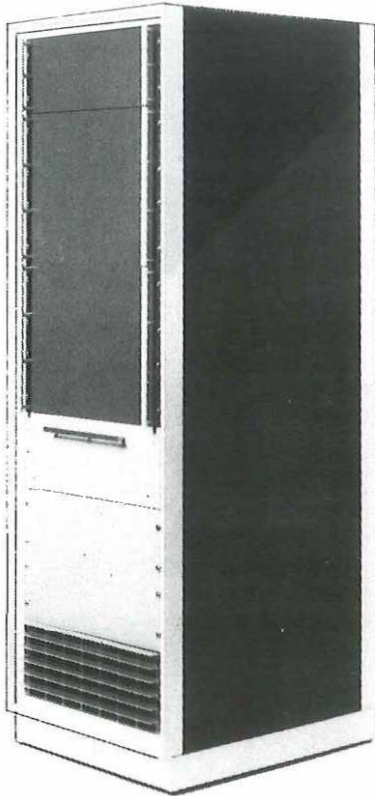
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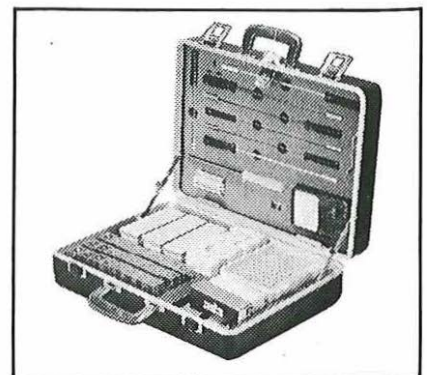
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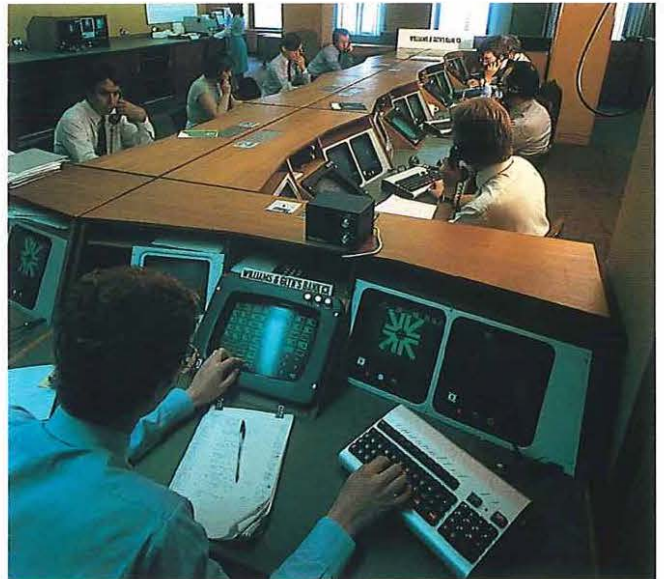
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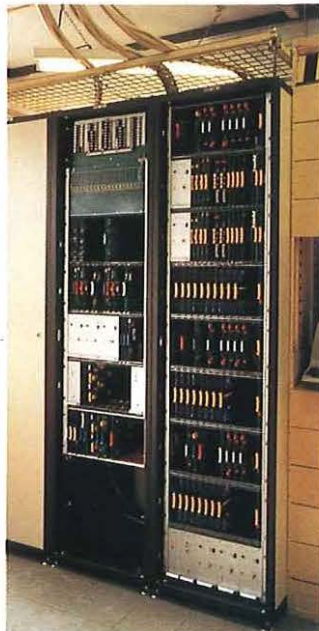
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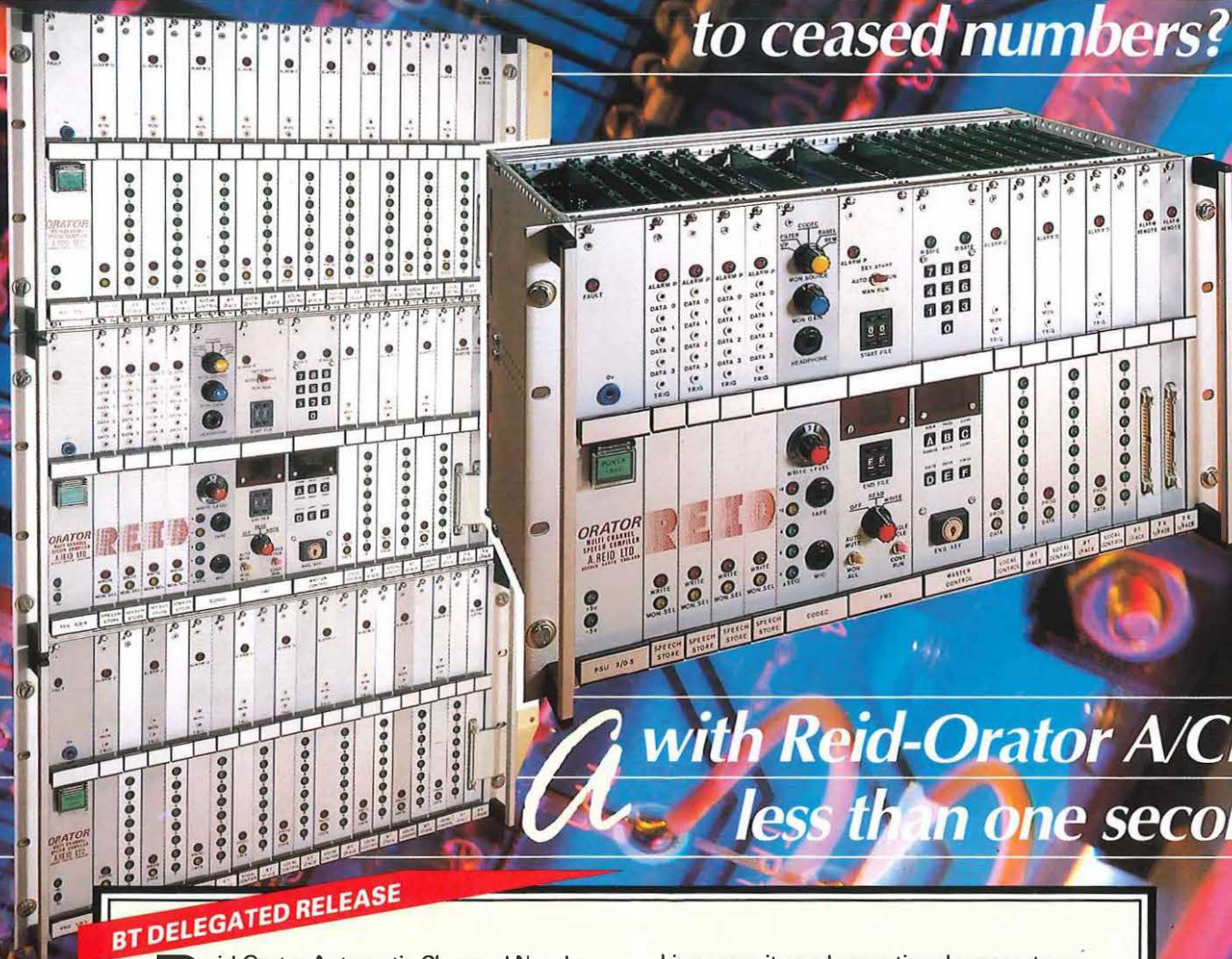
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