British
TELECOM
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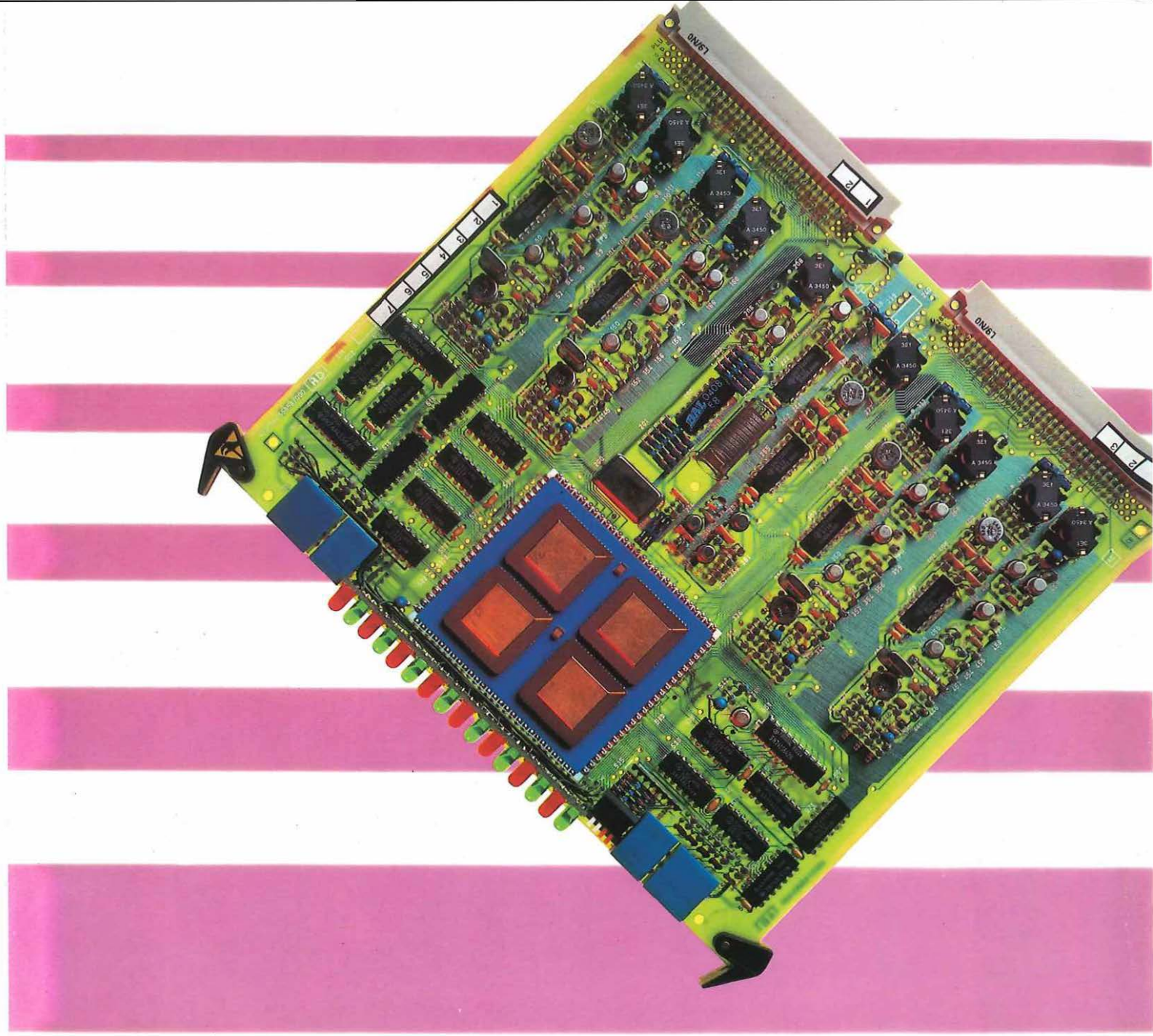
IN
TRANSIT
TELECOM



Giving you transmission speeds from 2 to 565 Mbit/s.

It's a range few if any companies can offer.

Plessey can. The latest addition to the Plessey range is a 565 Mbit/s system. It will operate on the UK's Nottingham-to-Sheffield link—believed to be the world's first commercial contract for a 565 Mbit/s optical fibre transmission system.

Plessey single-card muldex use the latest custom-designed LSI circuitry which means you can now have a smaller product that gives higher speeds, uses less power and keeps costs down too.

You can fit eight 2nd/3rd order or four 4th order muldex plus power units, or any equivalent combination on a single shelf of a Plessey equipment rack.

And it is standard Plessey practice to design signal units that interface with any type of exchange or signalling system.

For applications in fibre optics, coaxial or radio systems at data speeds up to 565 Mbit/s—people around the world trust one name for a wide range of muldex.

That's Plessey in transmission. Giving you more.

Plessey Public Networks Limited, Transmission Division, Beeston, Nottingham, United Kingdom NG9 1LA. Telephone Mike Hocking for information on: Nottingham (0602) 254831 Ext 3542. Telex: 37201.

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Performance, versatility — and it looks good.

Precision, engineering excellence and strong aesthetic appeal are the accepted Schroff trademarks but when it comes to 19" cabinets we like the word 'versatility' too. Versatility to build a system at exactly the size, cost and complexity you perceive it. Consult us early in the design cycle — the better your system works, the better we look.

All Schroff 19" cabinets conform to DIN 41 494 and IEC 297-1/-2. For the most comprehensive range of cost effective, quality cabinets, such as Minirack and Eurorack, see Schroff first.

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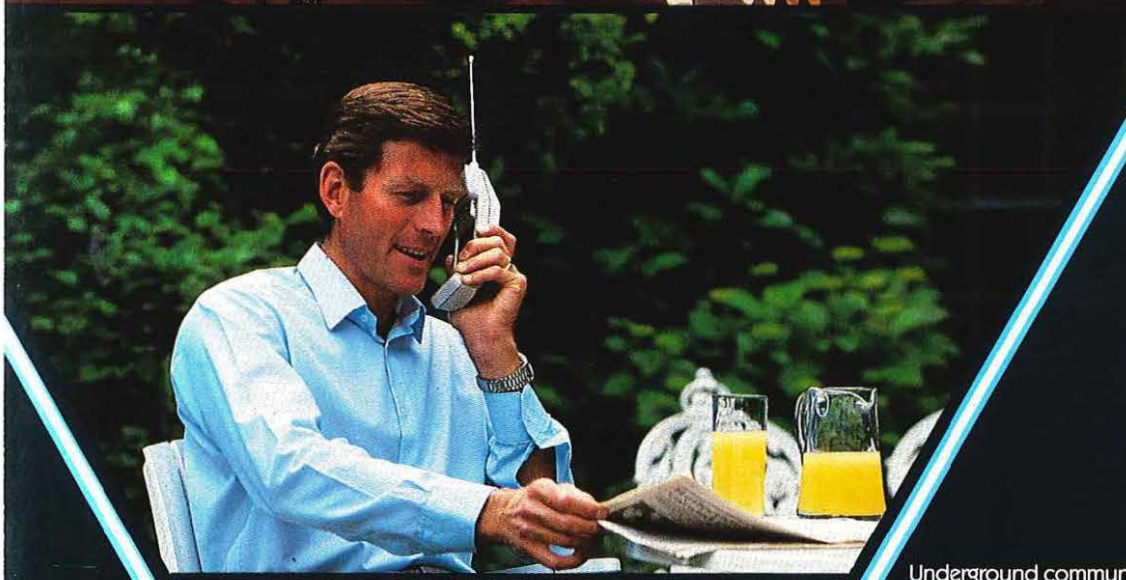
Manufacturing and distribution

From talking in depth to talking at length



Underground communications in mines are subject to stringent safety regulations. A far cry from the cordless telephones which are becoming increasingly popular. Two aspects of communication. Both very different, yet both requiring a dependable and safe power source. Varta provide the power.

Varta produce Europe's largest range of batteries in a diverse range of primary and secondary technologies. Consequently, the advice we give is unbiased by any production limitation.

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VARTA

Today's power source

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.

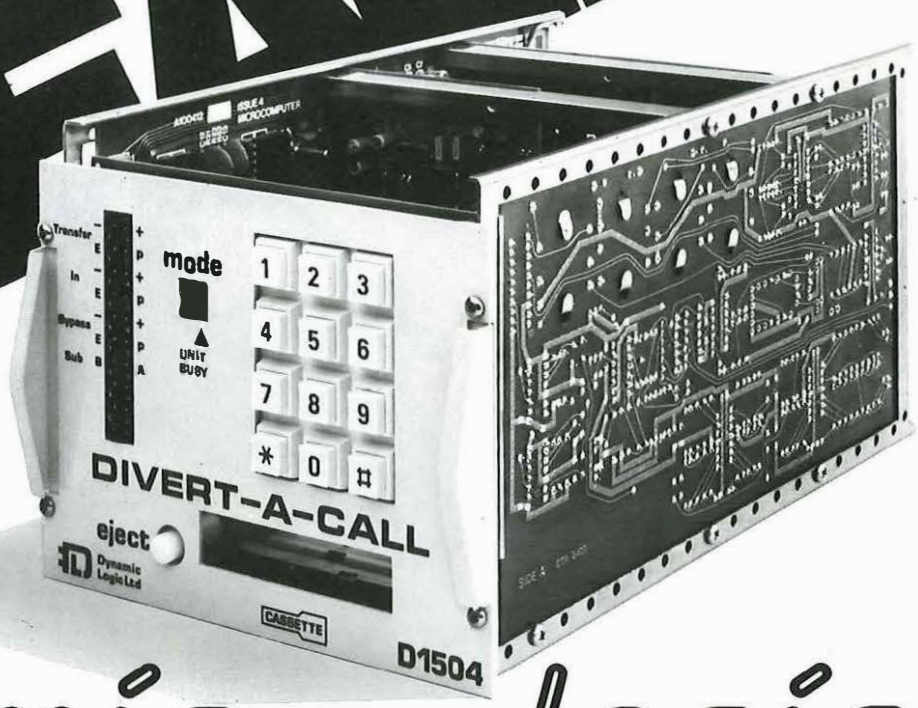
The subscriber can select or change destinations from any location within the telephone network using a synthesised speech facility which is protected by a security code.

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.

Dynamic Logic's Divert-a-Call heralds many new and exciting approaches to marketing and business administration.

PHANTOM OFFICE BECOMES A REALITY



dynamic logic

Dynamic Logic Limited
The Western Centre Western Road Bracknell Berkshire RG12 1RW England
Telephone (0344) 51915 Telex 849433

AUSTIN ROVER

Good news for weight watchers.

BY APPOINTMENT TO HM THE QUEEN MANUFACTURERS OF ROVER CARS AND AUSTIN CARS AUSTIN ROVER GROUP LIMITED COVENTRY

The new range of Austin Vans carry more weight in more ways than one.

To start with, the Austin Metro Van has a usable load space of over 38 cu. ft. allowing it to carry a payload of 310 kg.

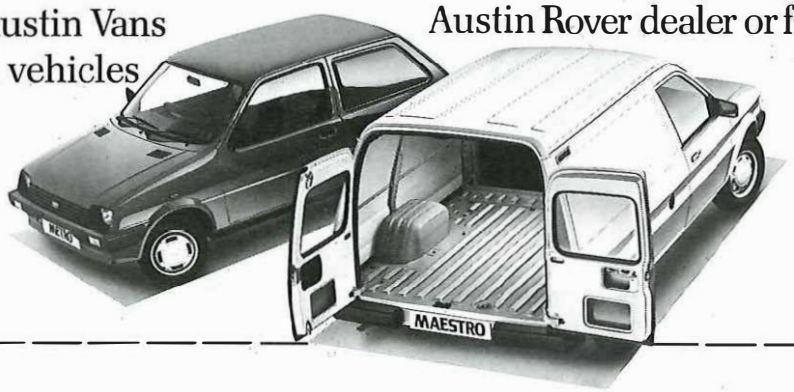
Whilst the Austin Maestro Van has over 85 cu. ft. of load space and, depending on which model you choose, a payload of either 500 or 700 kg.●

Impressive figures, which look even better when you consider that the Maestro costs less than its nearest rival.

And your savings don't stop here, because the front wheel drive Austin Vans deliver excellent mpg. The Metro 1.0 litre will go 59.7 miles on one gallon and the 1.3 Maestro 500 can achieve over 45 mpg.②

Vans that mean business.

The new Austin Vans are commercial vehicles in every sense of the word.



For instance, the Maestro is fitted with heavy steel bumpers, securely recessed headlamps and slam-lock rear doors opening through 180°.

Whereas the Metro has a wide and deep tailgate that gives clear access to a strong flat payload floor.

What's more, both vans share most of the benefits of Supercare, Austin Rover's complete customer care plan.

Passenger car comfort.

Although the Austin Vans have been built for business, we haven't forgotten the people who drive them.

In fact, you have a choice of City or 'L' models with the high standard of comfort, equipment and handling that's usually reserved for passenger cars.

To find out more, just visit your Austin Rover dealer or fill in the coupon.

The Austin Vans from £3,879 to £5,557.

For brochure and price list, send this coupon to The Advertising Dept., Austin Rover Group, Sales and Marketing Division, Canley Road, Canley, Coventry CV5 6QX.

Name_____

Address_____

County_____ Post Code_____

AUSTIN VANS
From Austin Rover

B.T.J. MAY 85

①Manufacturer's data. ●Metro 1.0 L simulated urban cycle 45.7 mpg (6.2 L/100 km), constant 56 mph 59.7 mpg (4.7 L/100 km), constant 75 mph 40.2 mpg (7.0 L/100 km), Maestro 500 HC simulated urban cycle 35.2 mpg (8.0 L/100 km), constant 56 mph 45.7 mpg (6.2 L/100 km), constant 75 mph 32.3 mpg (8.7 L/100 km). Models shown Metro 310 1.3 L at £4,361 and Maestro 700 L at £5,557. Prices correct at time of going to press, excluding number plates and delivery.

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"The fastest, most versatile, multi-user, multi-processor, micro computer system presently available!"

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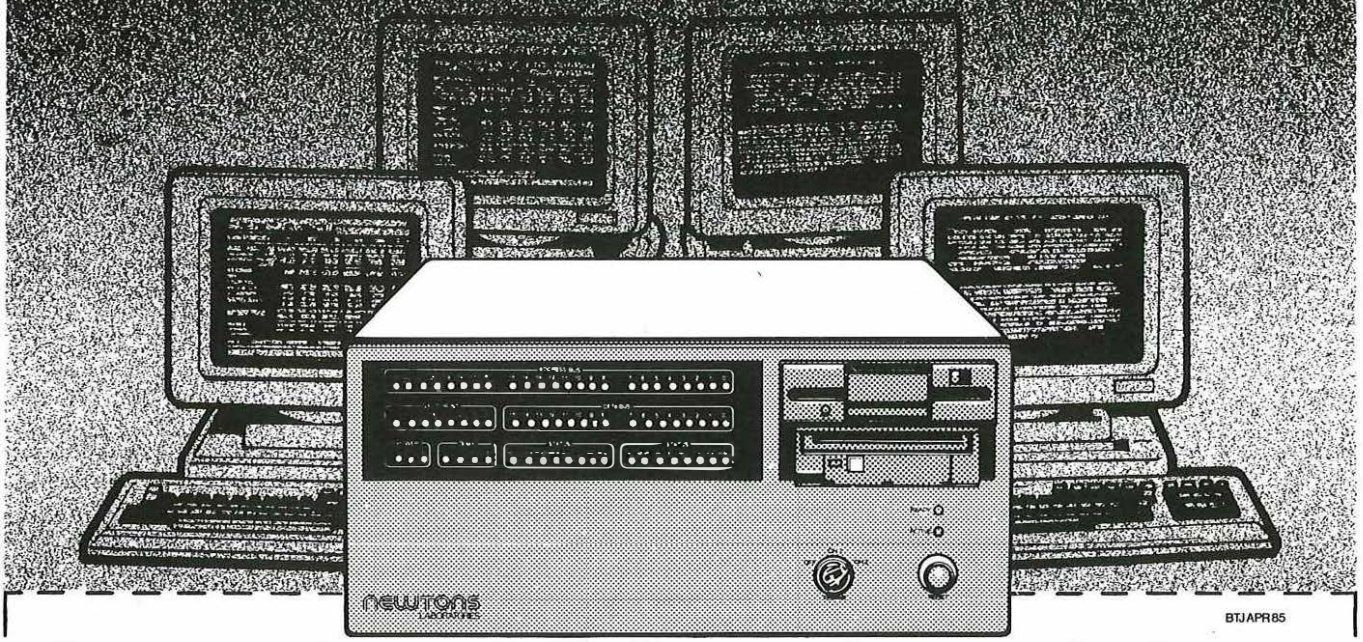

BTJAPR85

NEWTONS
LABORATORIES

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London SW18 4JB.
Telephone: 01-874 6511.

I would like a Newtons representative to contact me ☐ I would like to see the ACCRON Fast/Net demonstrated ☐ I am especially interested in _____

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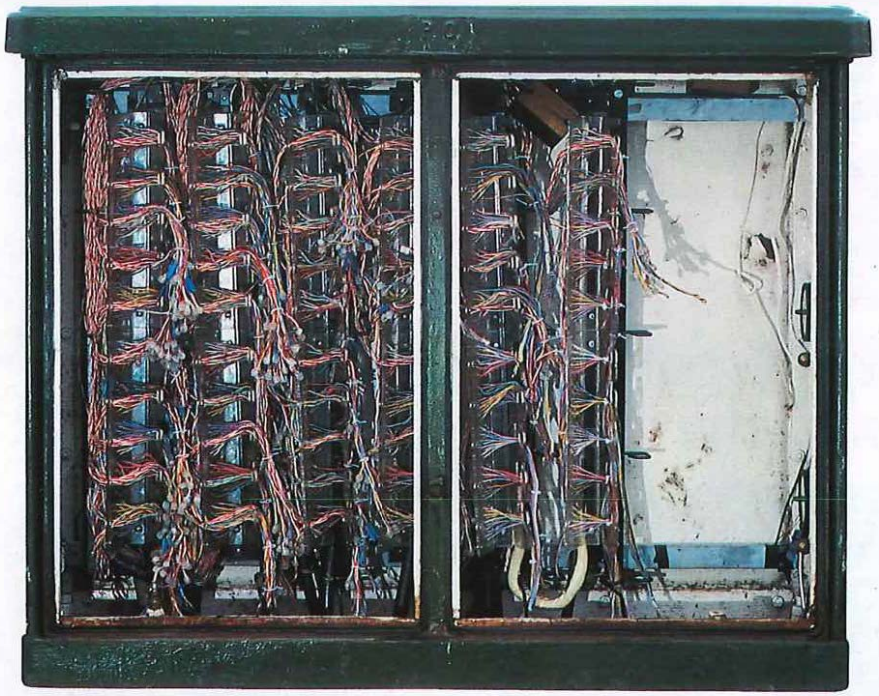
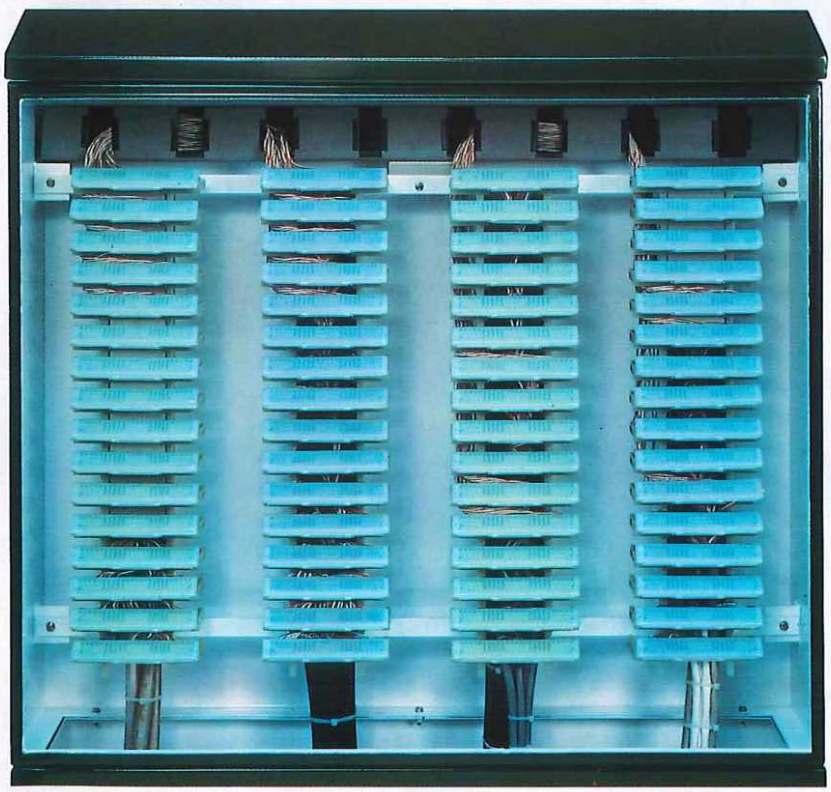
○All trademarks are recognised ○Newtons reserve the right to change specifications without notice

3M and MS² are trade marks.



Spaghetti Junction.



The new cabinet cross connection illustrated has been designed and engineered by Austin Taylor.

Urban Clearway.

A tangle of wires in a cabinet cross connection is a thing of the past.

The MS²® Cross Connect System from 3M brings a new order to your lines.

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

Easier to work with and practical to use, the MS²® Cross Connect System is a simple, reliable way to provide a better service.

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

MS²® Cross Connect System.

3M Telcomm Products
QUALITY THAT GOES BEYOND TOMORROW

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BAUD RATE COUNTER ● Measures data rate accurately £184 (Not applicable for DC VI)	**VOICE FREQUENCY MONITOR** ● Tap into the analogue side of the signal £93 (Not applicable for DC VI)	**V.24 MONITOR** ● Allows monitoring by V.24 devices £138	**V.24 CONVERTOR** ● For interactive working between standards £157

CAE GROUP

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Associated Companies Teleprinter Equipment Ltd. Communication Accessories and Equipment Ltd.
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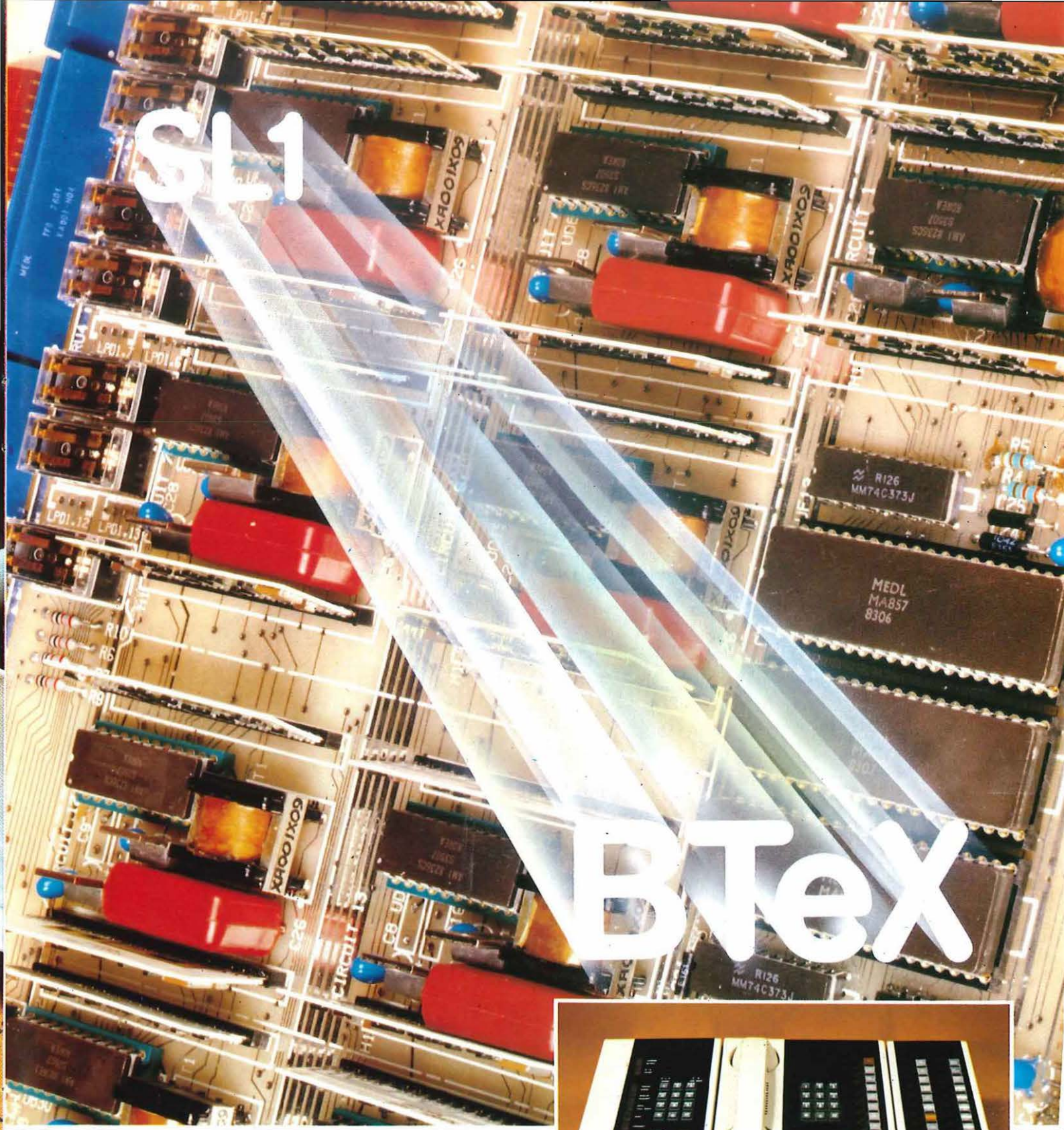


The name in advanced telecommunications

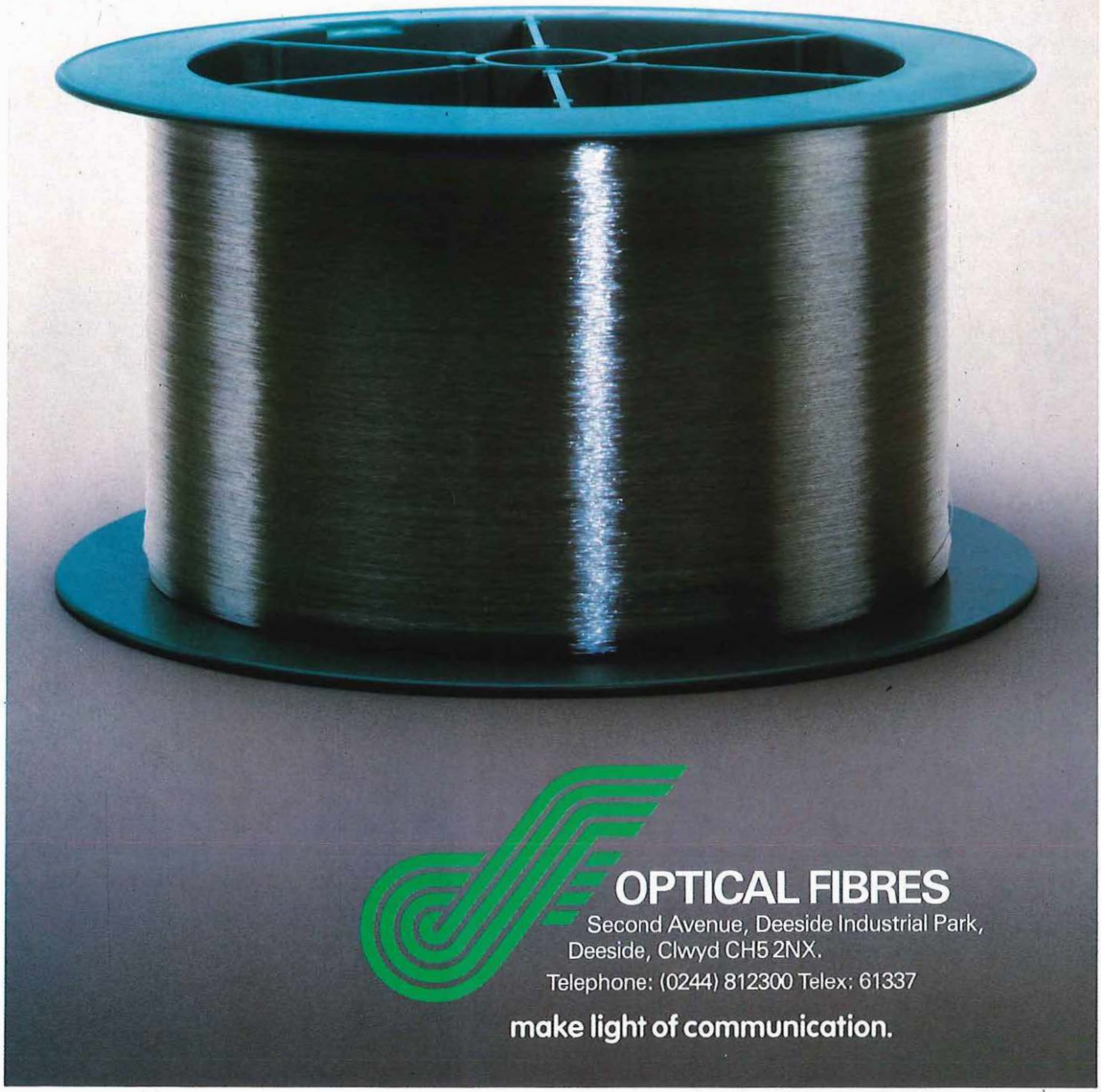
When British Telecom wanted a new 10000-line integrated voice and data network for its headquarters operations in London it naturally chose the world's leading digital PABX – the SL-1/BTeX made in Britain by GEC.

GEC is working closely with the BTHQ Communications Section in the design of the network that will embrace the new BTHQ building in Newgate Street and other main office sites in central London. GEC is supplying six SL-1/BTeX total communication systems, combining voice and data switching with the latest digital PABX developments, for main and satellite operation, and a seventh operating as a tandem exchange.

GEC

GEC Telecommunications Limited
A Management Company of The General Electric Company, p.l.c. of England
Private System Division, P.O. Box 6, Coventry CV1 5PU
Telephone: 0203 554400

One reel from the 50000 being supplied in 1985 by Europe's largest manufacturer.



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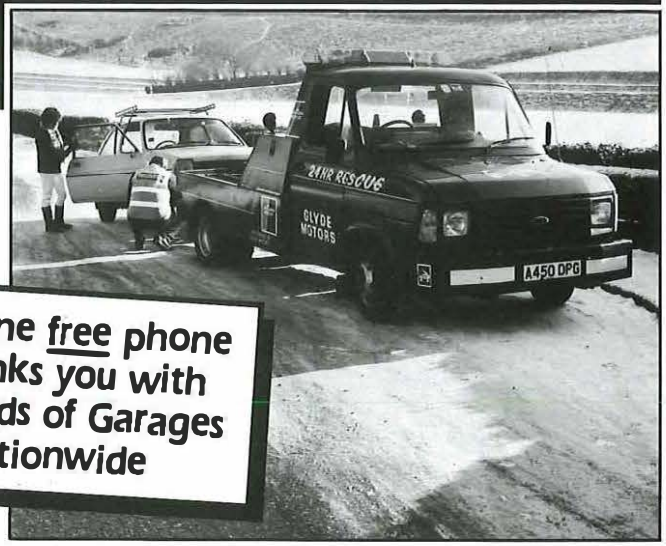
make light of communication.

The CSMA's own 24-hour Road Rescue/Breakdown Service

BRITANNIA RESCUE

There when you need us



Only one free phone call links you with hundreds of Garages Nationwide

Britannia Rescue – the CSMA's own 24-hour Road Rescue/Breakdown Service – operates from hundreds of garages throughout Great Britain. It's the finest, most economical service of its kind available and there are exclusive rates to CSMA members.

When you need urgent assistance, a single phone call to the control centre brings an immediate response. You will receive personal and priority attention wherever you are in the country – 365 days a year.

With the Recovery Service, if you have a major breakdown or accident, we'll take you, your vehicle, up to 5 passengers and your caravan as well to your home or destination.

Britannia All-Roads Assistance will bring you rapid help for even minor problems. If your car or motorcycle can be repaired on the spot, we'll fix it and get you back on the road again.

If your vehicle fails to start at home, Britannia House-call Attendance brings the necessary expertise right to your very doorstep.

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A remarkably modest subscription makes Britannia Rescue one of the major reasons for joining the CSMA.

Go on. Fill in the coupon now and find out more. We'll send you a free colour brochure.

CSMA Membership is available to all past and present BRITISH TELECOM PERSONNEL

DRIVE WITH A WINNING TEAM

CSMA BRITANNIA RESCUE

FRIZZELL

Norman Frizzell Motor & General
A Division of Norman Frizzell Insurance Brokers Ltd., Lloyds Brokers and a member of the British Insurance Brokers' Association.

CIVIL SERVICE MOTORING ASSOCIATION LTD.
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YOU COULD SAVE MONEY HERE AND NOW

I would like to know more about the benefits of joining the CSMA without obligation.
I am eligible for CSMA membership.
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On what date did you pass the UK motor car driving test?

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How many years no claim discount do you expect to receive at next renewal?

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MOTOR PREMIUMS BY INSTALMENTS ☐

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Or for your immediate motor insurance quotation
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You can also contact one of Frizzell's Branch Offices:
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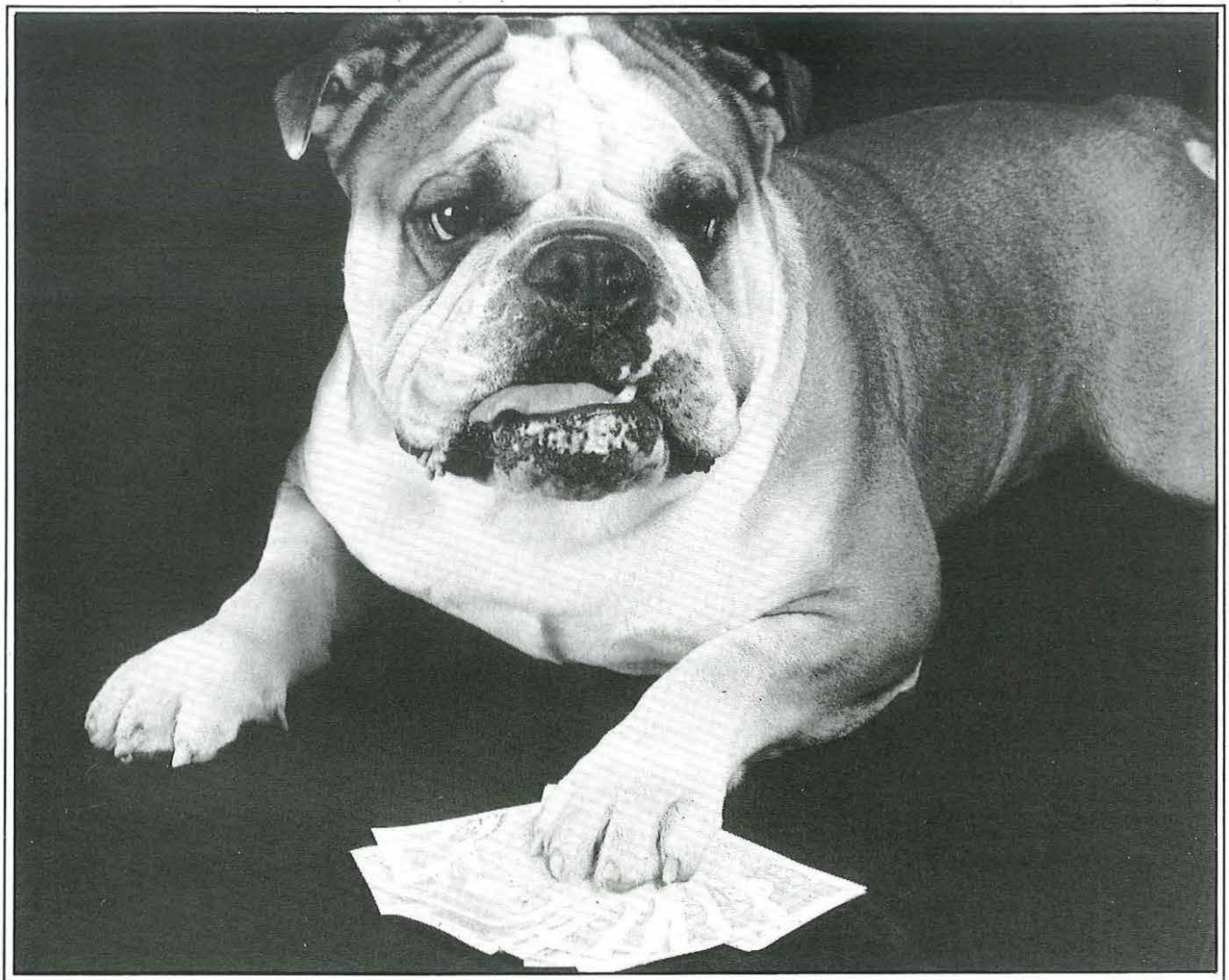

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Resist the temptation to write off small balances!

Use our letter service to augment your own in-house recovery efforts. Three solicitor's letters, of increasing severity, will be sent by us on your behalf.

The procedure is simple: send us an instruction form, ticking the relevant box to indicate the particular letter you wish us to send.

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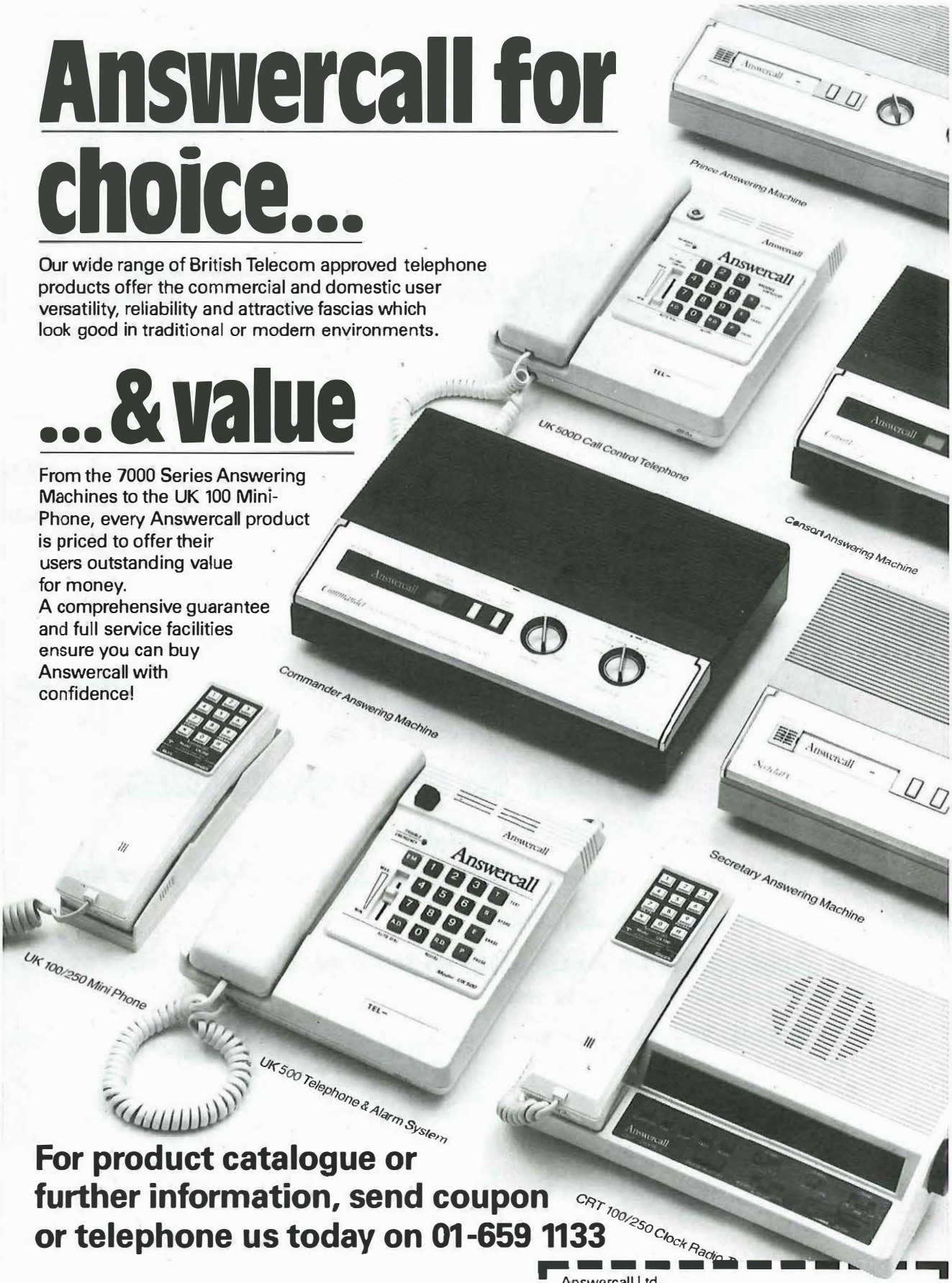

For product catalogue or further information, send coupon or telephone us today on 01-659 1133

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Answering your needs – the ELF terminal

Already in use within British Telecom, supporting the ANSWERS project, the ELF miniaturised visual display offers:

- compatibility with ANSWERS and SEQUIN projects and Newbury 8009 terminals
- reduced viewing fatigue from the extra large display, 40 characters wide, 12 lines deep
- 50 volt dc option, permitting operation from existing switchboard power supplies – reducing power cabling requirements and operator hazard
- compact numeric keypad, easily accommodated in CSS1 and COARD type switchboards
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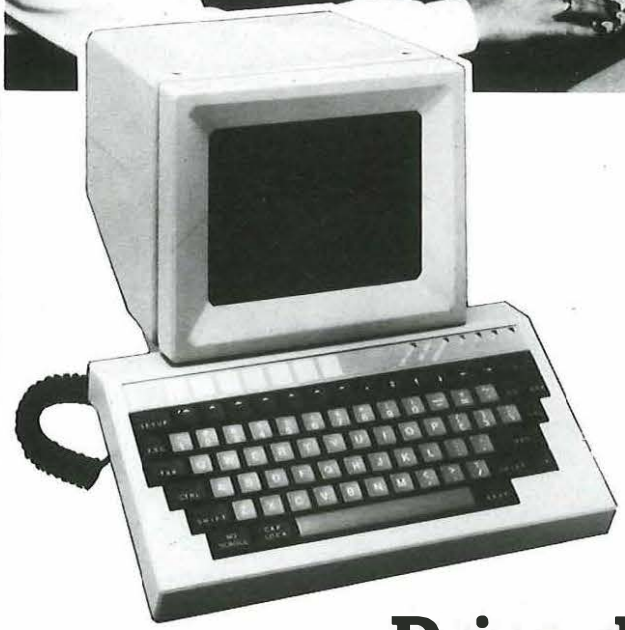

Drive data to your desk – economically

Liberate terminals and printers from the confines of the computer room

Access data from any on-site office

Reduce cabling costs by transporting up to seven channels of data over a single twin twisted pair cable with

- **Datatruck short haul multiplexers**

  4 & 7 channel asynchronous and 7 channel synchronous/asynchronous

For single channel high speed links

- **The DataExpress Line Driver**

  56/64bps full duplex synchronous link, with optional kilostream buffer and data rates to 125kbps

Versatile and reliable with 'fit and forget' installation

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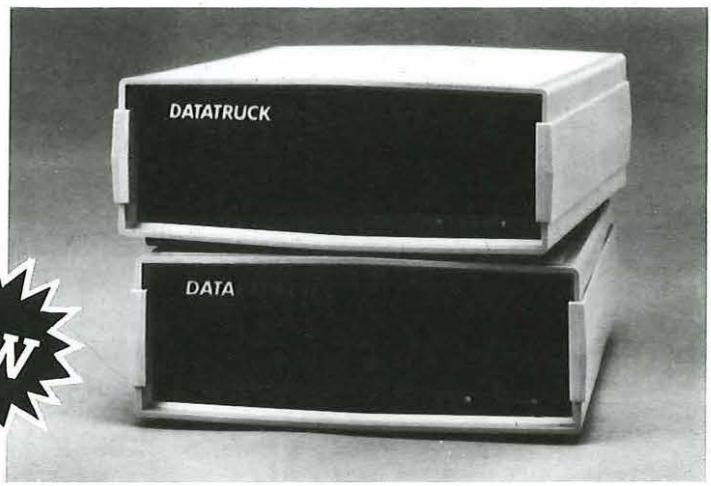

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eMargin what A harrised teLex opeRater could do to yoUr set of 5igures.

No matter how good your telex operator is, there will always be times when the demand for outgoing and incoming calls will exceed the 'cool' of the operator.
And mistakes occur.
Trouble is, it's likely that mistakes will happen when you have a load of complicated figures to send down the line to head office — bad news!
But if you are equipped with a PC or WP or even an electronic typewriter you can now prepare your data/message in the normal way and when you are confident all is correct, press a button and send it through to Trend's new Puma Telex Terminal.
The telex operator is calmly getting on with more routine messages whilst a clever little device inside the Puma called the "Mailbox" sorts out the priority, routing, dialling and transmission of **your** call.
The "Mailbox" option when fitted to the Puma Telex allows business computers and modern office systems simple access to the international telex network.

WORD PROCESSOR

ELECTRONIC TYPEWRITER

PERSONAL OR BUSINESS COMPUTER

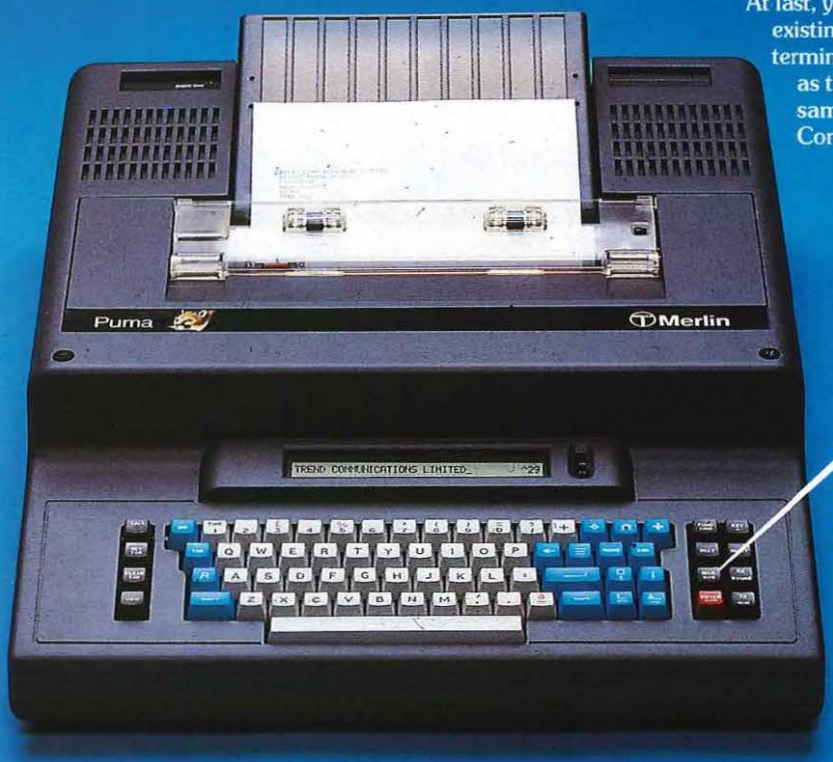
PUMA TELEX PLUS 'MAILBOX' OPTION

1½ MILLION TELEX USERS WORLDWIDE

Features such as:

- An enlarged memory of 40K characters (plus an extra 40K with "Mailbox")
- A strip display of 40 characters for message preparation, editing and display of incoming calls
- Global memory search for individual words
- Timed message release - with automatic insertion of time and date
- Automatic dialling and repeat of last number called
- Battery back-up in case of power failure.

At last, you can combine all the features of your existing office systems with the most flexible telex terminal available — with the same compact size as the original Puma Telex — all for virtually the same price, so switch to Puma and be sure.
Contact Trend or your local BT Sales unit for full details.



Switch to Puma and be sure!

® PUMA – trademark of British Telecom

TREND®

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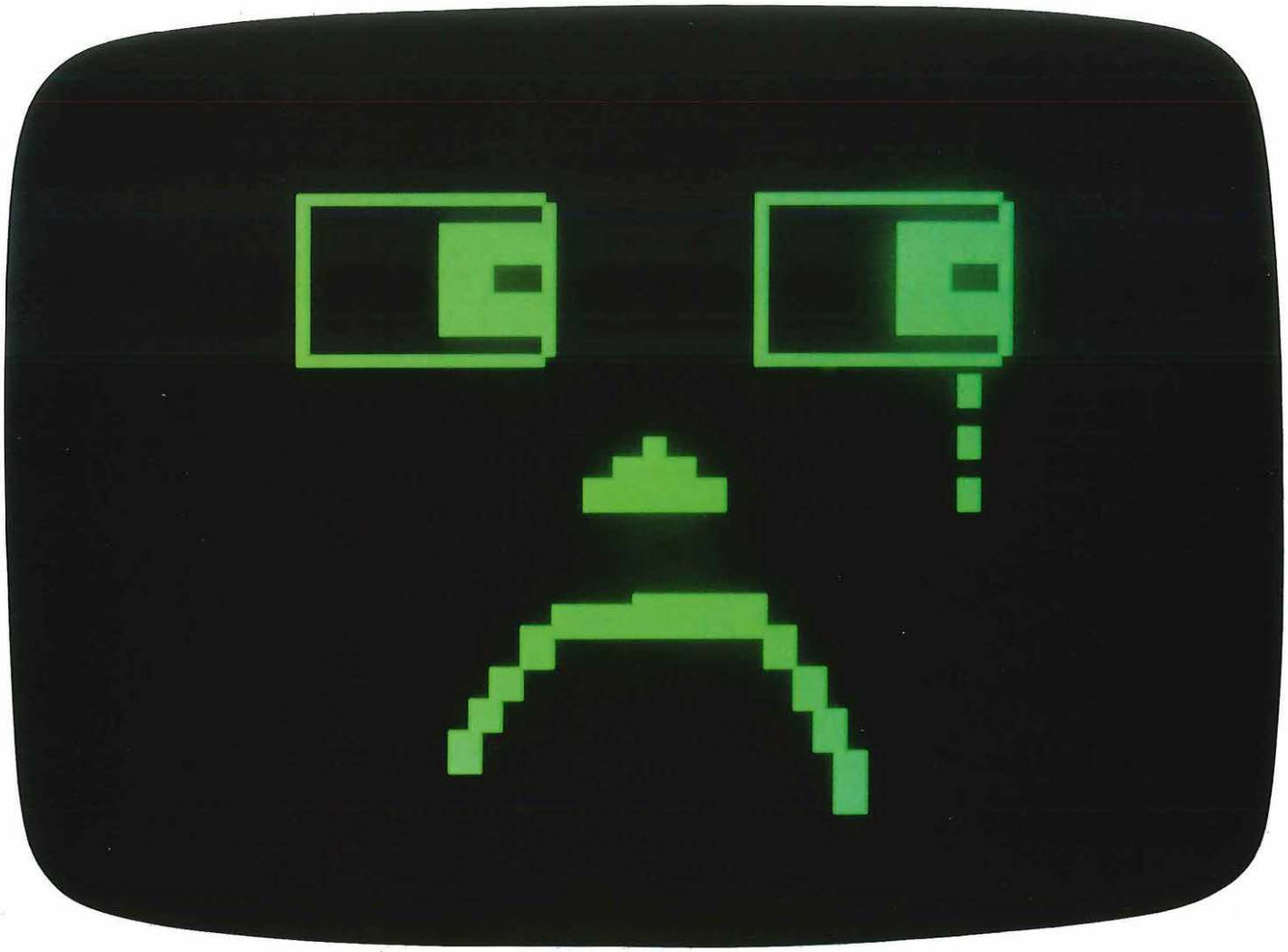
PHICOM applied technology DATA COMMUNICATIONS DIVISION

...and distributors throughout the world.



OTHER LINE-TESTERS ONLY GIVE YOU THE PROBLEMS.

The problem with some automatic line-test systems is that they're designed to do nothing but test lines.

Some will give you a rough idea of fault conditions, hut some only display test results. Not the LRS-100. It goes quite a few steps further.

As a complete test system it is, of course, able to perform all of the standard functions you'd expect it to.

Such as demand-testing, when faults are reported. Routine-testing groups of lines overnight, to locate potential problems.

And it'll even carry out follow-up tests ('Robot Testing') on problem lines at regular intervals, to find intermittent faults.

But the difference is in what the LRS does with all the information after it's been collected.

For example, it cross-references reports, to build up patterns and recognise common faults.

Also, the LRS compares the condition of the line it's testing with other available information, and produces a System Recommended Action.

And in its full configuration LRS-100 will even keep an exact record of the total workforce available and its current workload, and assign each repair (according to priority) to the appropriate faultsman.

It can carry out the whole operation, from line-testing to assigning the repair, so quickly that you're able to make firm appointments with customers as and when they report faults.

This enables you to speed up clearing times

THE LRS-100 GOES ON TO GIVE YOU THE ANSWERS.

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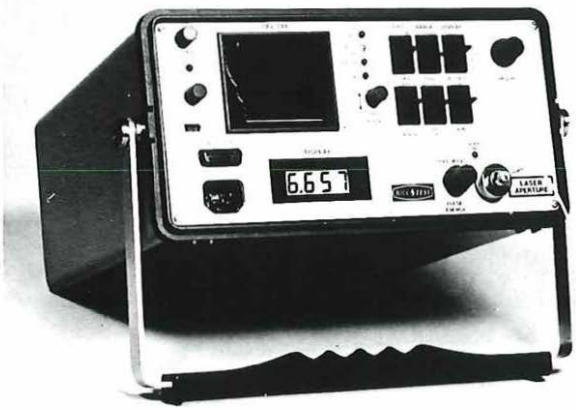

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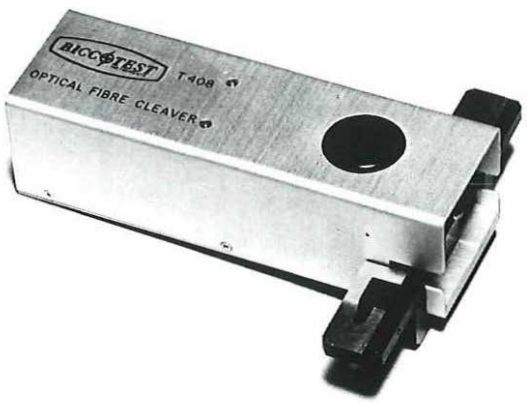

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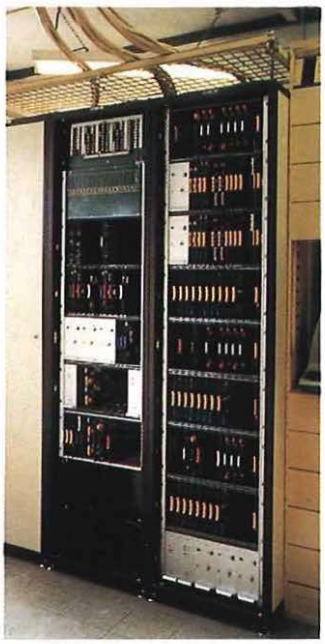

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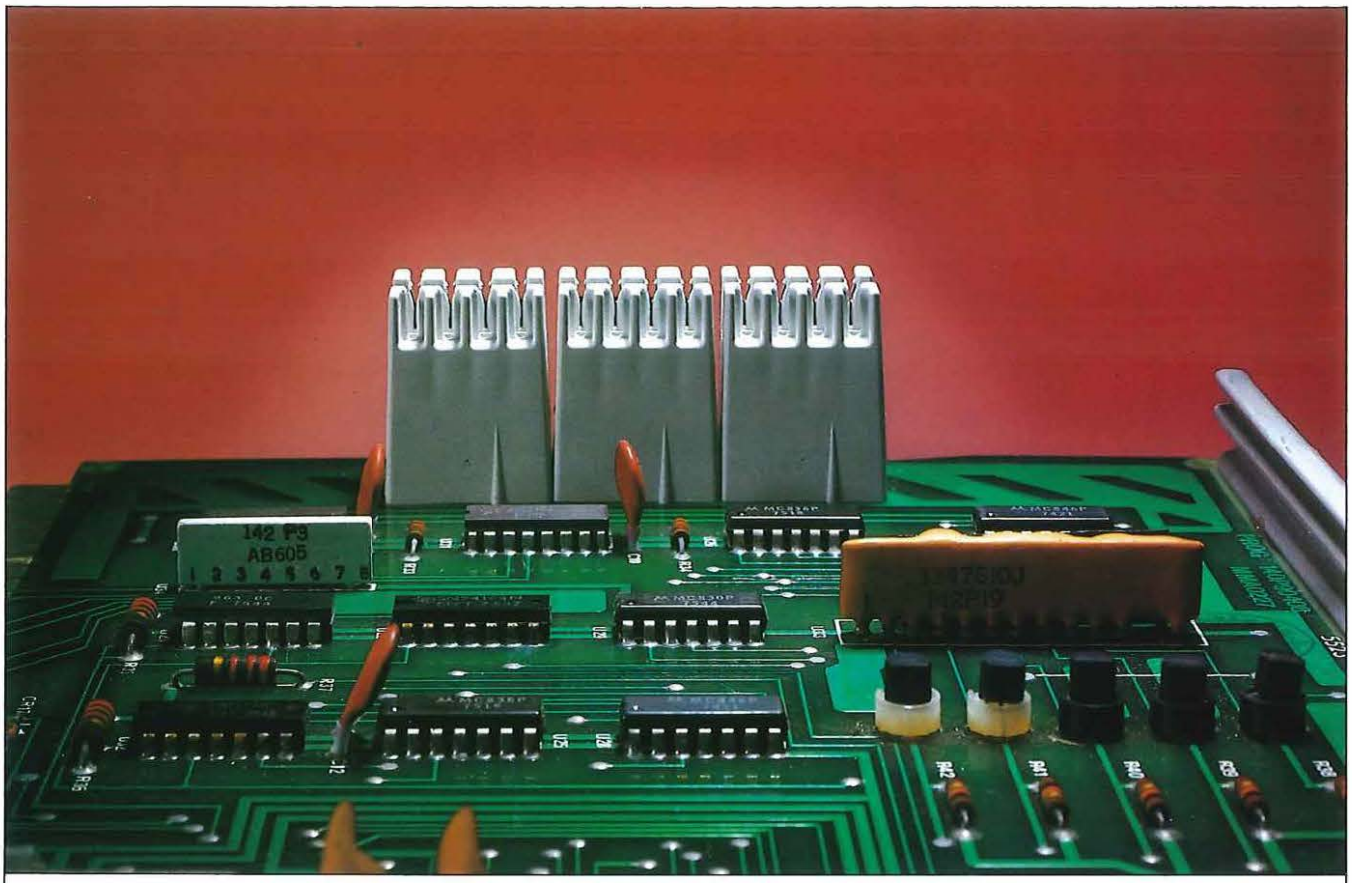

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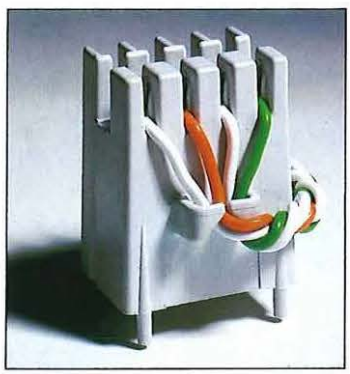

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British Telecom Journal
Spring 1985 Volume 6 Number 1

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'X' v 'Y' – no contest

British Telecom's decision to place a £100 million order with Thorn Ericsson Telecommunications for AXE 10 digital electronic local exchanges – dubbed 'System Y' – has caused a flurry of reaction throughout the industry and become the subject of an Office of Telecommunications (Oftel) investigation.

Under the contract Thorn Ericsson – a joint company formed by Thorn EMI and LM Ericsson of Sweden – is due to start delivering 100,000 exchange lines in the second half of next year and continue with between 300,000 and 500,000 lines during 1987.

Critics claim that the decision to buy a second range of digital exchanges will reduce the UK market for System X, harm its export prospects and jeopardise jobs in the UK electronics industry.

Professor Bryan Carsberg, Director General of Oftel, is to consider the matter following a number of protests, including one from an all-party delegation of MPs concerned that their constituencies could be affected by a reduction of System X orders. British Telecom will co-operate in the investigation and is confident that it is acting in the public interest.

The decision is definitely not a change of heart about the future of System X. In the current financial year, British Telecom has ordered 376 local System X exchanges, with a total of about 900,000 lines. These follow orders for 261 exchanges with 660,000 lines, placed non-competitively up to March last year. The total value of these orders is more than £400 million. By the end of 1987, British Telecom expects to have ordered local exchanges with a total of more than five million lines and 62 trunk units of System X design.

A second exchange system is necessary, however, to boost the network modernisation programme and to provide an insurance against the unlikely prospect of major fallbacks or problems in the System X industry. It will also give an alternative view of the technological evolution of digital systems and, in turn, alternative services and facilities for customers.

Commitment

Sir George Jefferson, chairman of British Telecom, says the decision underlines British Telecom's commitment to modernising the network as rapidly as possible. The new order is in addition to the large orders already placed, and continuing to be placed, for System X which will remain the major digital exchange in the UK network. He also pointed out that a high proportion of the 'System Y' equipment would be manufactured in Britain.

The Thorn Ericsson package was, in British Telecom's view, the best both commercially and technically of a short-list of three different systems. And the best mixture of equipment is essential for the company to remain in the vanguard of the drive towards the integrated digital network Britain needs for its future economic prosperity.

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Cover: It was a case of the new and the not-so-new coming together on the British Telecom stand at the Ideal Home Exhibition in London. With a little help from Canterbury Area's Karen Moore, Chelsea Pensioners John Letchford and Albert Woolls get to grips with the latest in telephone technology.

British Telecom Journal costs 42p per issue for staff. External subscribers pay £15 for two years including post and packaging. Full details on page 47.

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Spring 1985

Space age link for

Michael Astbury

Aerial 4 – an important role in the new Eurovision network.

The latest aerial at Madley satellite earth station near Hereford has been built to provide digital telephony links to and from Europe and a new TV service which will augment the 30-year-old Eurovision Network.

Mention Eurovision and most people will immediately think of the annual song contest. But for British Telecom staff at Madley there will soon be much more to it than that. Following the signing of a contract between BTI and the broadcasters, they will be at the heart of Britain's new 'space age' link with the continent.

The European Broadcasting Union (EBU) intends to give control of the system to the broadcasters and this means that radio equipment at a BTI satellite earth station will for the first time be under the devolved control of a customer. Master control, however, will be retained at the earth station by the use of remote control equipment on a scale never before seen.

The video and sound equipment consists of switching, monitoring and testing equipment. Switching of the video signal path is done by a solid-state video switching matrix (VSM) which has 16 inputs (sources) and 16 outputs (destinations). Two satellite channels and one terrestrial channel are provided in each direction, but facilities are incorporated for expansion.

As well as setting up the required connections by push button and alpha-numeric display, the matrix can also be interrogated to check which source, if any, is feeding any destination. All 16 outputs of the VSM are connected to the monitor switch matrix (MSM) and fed, together with waveform analysis information, to the video monitors in the TV control room at the earth station.

In the past, sound commentary channels were provided separately from the video circuits. Consideration was given to providing multiple sound channels over the satellite but, due to complications, it was decided to have one channel coded into a digital form and sent during the video line synchronising pulse period – a system known as Sound In Sync (SIS). All other co-ordination and commentary channels will be provided by terrestrial links, in the same way as before. The main advantage of SIS is that it can be switched with the video signal and no separate sound switches are required. To monitor the sound channel of each video signal, two SIS decoders are provided and Madley is also equipped with an SIS coder to enable test tones to be transmitted to other stations.

The basic configuration of the radio equipment is conventional but a remote control system has been added to enable the broadcaster to change transmission parameters. The need to change the transmitted or received frequencies means that the converters, which change the signal to and from microwave, have to be equipped with frequency synthesisers and an interface card to program them. These interface cards are capable of selecting one of six pre-programmed frequencies on command from the control system.

Waveguide

The system can transmit, or receive, on either polarisation by motor driven waveguide and co-axial switches. There are two chains of both transmit and receive equipment which can be operated either separately or as a main with standby to provide a backup in the event of failure.

Broadcasters will be able to initiate a transmission to the satellite but with only two satellite transponders available it is vital that

Eurovision

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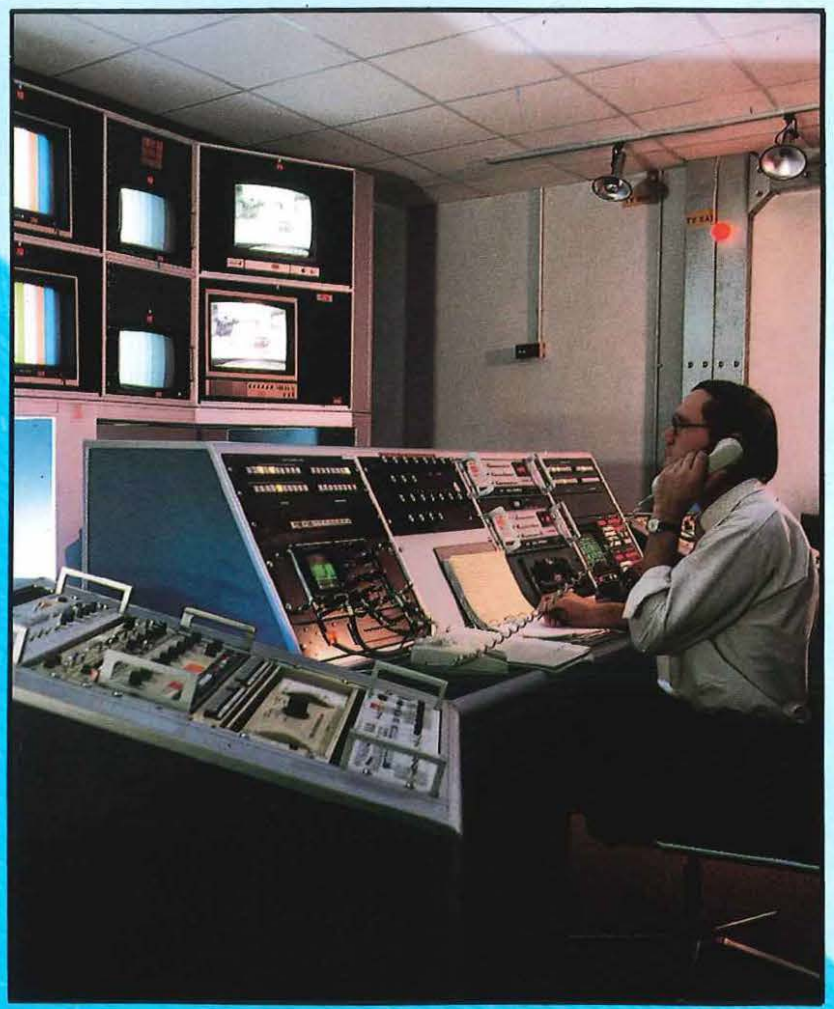
they should not transmit on a frequency which is already carrying a transmission from another earth station. This is achieved by a channel occupancy monitor which will inhibit the microwave converter from operating if it detects a transmission on the selected channel.

A microprocessor controller is at the heart of the control equipment and is housed in the TV modulator/demodulator suite in the central building. It remotely operates the radio and switching equipment and can itself be controlled from other places by means of a serial data link. The controller is operated by a key pad and alpha numeric display on its front panel and is also connected to the radio equipment and the VSM via interface units.

The selection of transmit and receive parameters and signal paths can be made from one of four locations which have been designated 'local', 'remote', 'instation' and 'distant'. Local control is exercised at the radio equipment module and only affects the module itself.

Remote control is carried out from the suite of TV racks in the central building which contains the modulators, demodulators, switching matrices and microprocessor controller. A similar facility exists on the other aerials at Madley, but this is the first system to give remote control of preselected transmission parameters. The instation location is operated from the TV control room and offers the fullest degree of control over signal routing. ▷



Below: Shift engineer Bill Grimes watches monitors in the new television control room at Madley to assess picture quality for the next transmission.

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Below, right: Author Michael Astbury studies a print-out from the microprocessor controller. In the foreground are panels for transmit/receive radio equipment and video switching matrix.

Mr M L Astbury is a member of the contract supervision team at Madley satellite earth station.

Map showing the permanent links in the current Eurovision network which have handled transmissions for so many years.

A story of growth

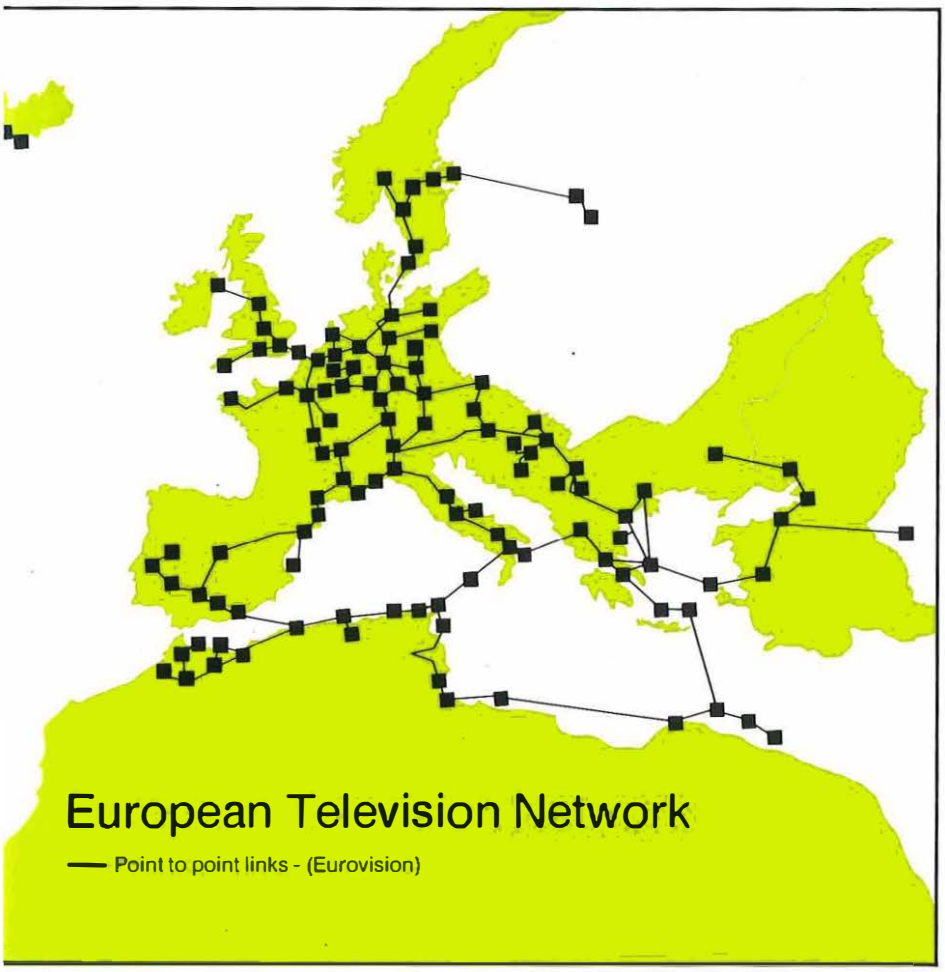
The Eurovision Network was set up in 1954 after a number of countries had exchanged television programmes on a one-off basis. During its first year it carried 55 transmissions but since then the figure has grown steadily to about 14,000 a year. Eurovision's permanent vision network has grown to meet demand and now consists of 17,500km of international video circuits carried by cable and terrestrial microwave links.

Some transmissions are made on a multilateral basis and include football matches, ski events and short news flashes which are transmitted from one country for reception by other countries on the network. Multi-origin news broadcasts are also handled in this way and each country sends its transmission to Brussels for distribution. But the system is wasteful on links, and this increases the risks of distortion and degradation of the picture quality.

Point-to-point unilateral transmissions form the bulk of Eurovision transmissions and demand is increasing. These use video circuits joined together to form a single path from source to destination and the system's success depends upon the co-operation of all the countries through which the link will pass, even though they are not recipients of the programme.

The entire network is to be supplemented, by the European Communications Satellite 2 (ECS 2), which will function as a single relay station 22,300 miles out in space. The European Broadcasting Union has rented two of the satellite's transponders for their own exclusive use. They will each receive signals from an earth station, amplify and change the frequency used and transmit them back to earth stations all over Europe.

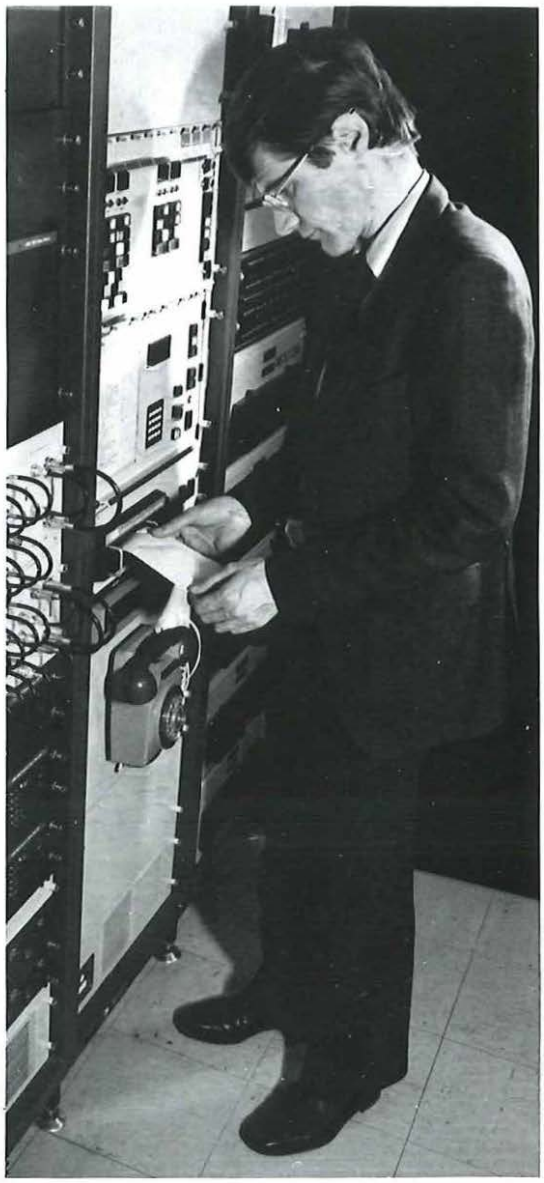
The satellite's remaining transponders will be used for telephony links to European countries and will feature a digital transmission technique called Time Division Multiple Access. The television signals, however, will be analogue as no agreement has yet been reached on international standards for digital television.



Distant control is vested in the broadcaster and the control panel is located at the BBC Control Centre in London. A serial data link is used via a data modem, a leased private wire and another modem. A second pair of modems are provided, connected to the public switched telephone network in case of failure of the private wire. The terrestrial video links also go to the BBC and can be extended to ITN when they wish to transmit or receive. Control of the system can also be transferred to ITN.

Normally operation will be under distant control, but BTI can take over for maintenance or in an emergency. The distant end cannot take control from Madley, however, to prevent the customer from trying to use equipment which is being worked on. The software in the microprocessor controller and the hardware with which it works is designed to prevent incorrect operation of the system and to ensure high integrity.

The new system will mean a new way of working for the broadcasters and the EBU Network Control Centre, but the more direct routing of pictures and the consequent reduction in relay stations should result in better quality pictures and easier setting up.



Modern aids give training boost

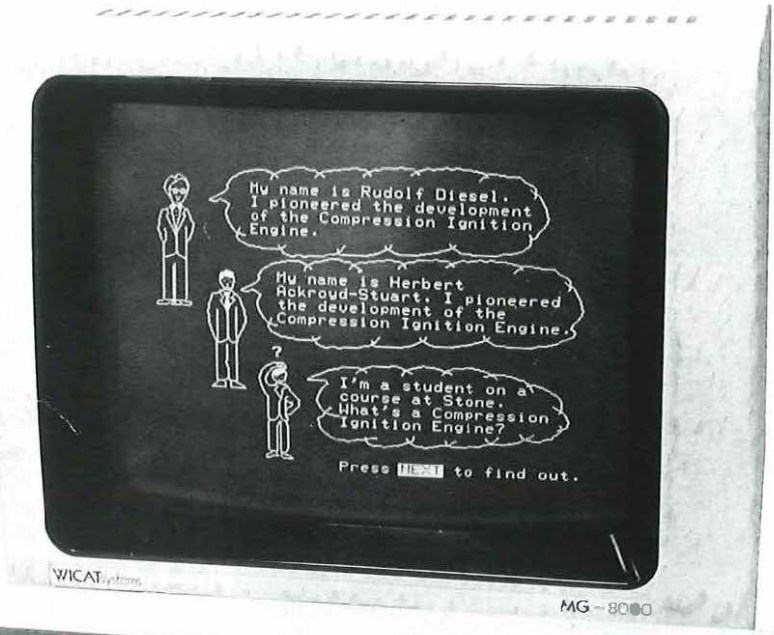
Stewart Berry

The recent spectacular changes which have seen British Telecom move from a nationalised industry into a private company have had a profound effect on the structure of the organisation. Training of engineers, however, remains a vital element and new techniques are increasingly being used.

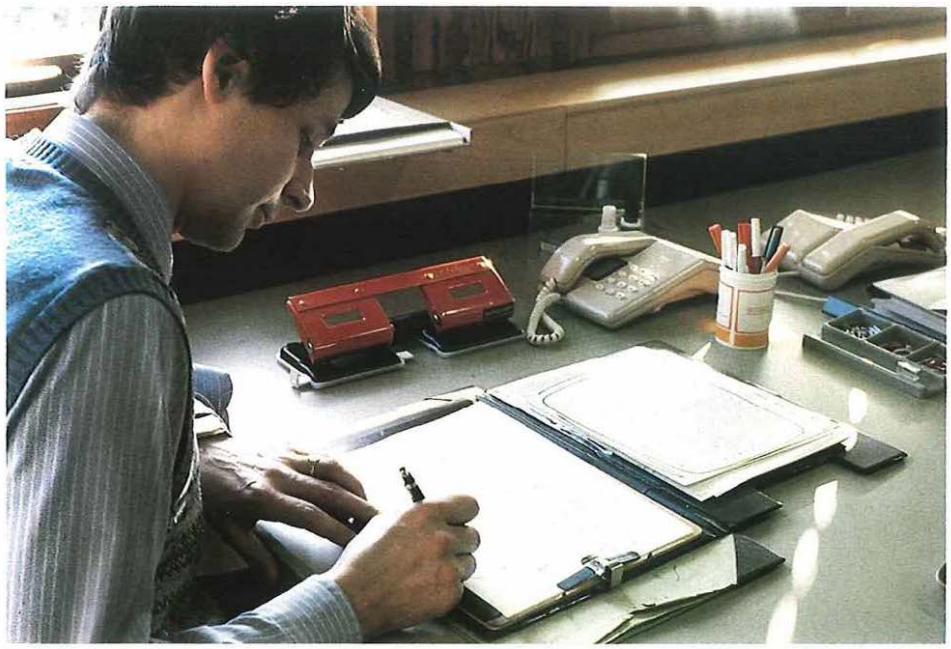
British Telecom's basic philosophy is that the training and development of individual staff is the responsibility of line managers who should exercise their responsibility largely through tutoring and coaching, but seek specialist help from the training department as necessary. Training department's role is to respond to the needs of British Telecom's operational departments who sponsor the design of the training provided. Training department is responsible for designing and producing cost effective training which meets the needs of the business.

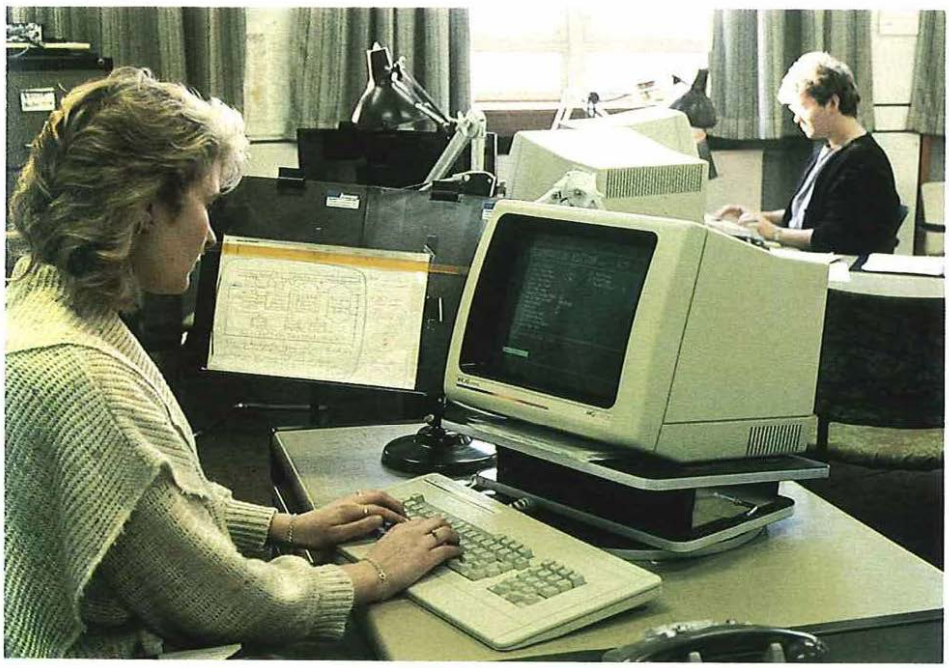
To do this it has adopted a systematic approach to training design which aims to:

- confirm that training is the correct solution to the operational problem
- ensure that the training provided matches the needs of the job holder
- select the most appropriate means to carry out the training
- select the most cost effective media to present the training material ▷



British Telecom Training Centre at Stone. Computers and other modern technology are becoming increasingly important in training.





- introduce the means to check if the training has been successful
- evaluate the effectiveness of the training.

Evaluation is taking on an increasing importance as a monitor of the quality of the training and will ensure that line management gets cost effective training which meets its needs.

To aid the presentation of cost effective training, several new techniques and developments are being used or are planned for the near future. Computer Based Training (CBT) is a technique which makes use of a computer as a teaching and learning resource and for the management of learning. It will allow a student to progress through the course at his own pace.

Each student will be routed through the course material in the most effective way, allowing the student to skip the parts of the course with which he may already be familiar. CBT courses will usually contain texts, practical work, computer-presented lessons, video, tape/slide, and the system will direct the student to the appropriate learning resource to suit his needs.

CBT was tried in British Telecom as long ago as 1976 with a maintenance technician's course on customer telephone apparatus sponsored by the National Development Programme for Computer Assisted Learning. CBT was found to be effective as a training method but at that time was not cost effective.

The next venture into CBT was in 1979 when the British Telecom Technical College (BTTC) began a major evaluation in vocational engineering training which lasted for two years. Its main aims were to:

- establish whether using CBT would shorten training time
- investigate student reaction to CBT
- determine the economics of providing training on a CBT system
- establish the best method of designing courses for a CBT system
- investigate the possibility of using CBT to

present training remotely from the BTTC.

Five existing courses were converted to CBT. The disciplines involved ranged from electrical fault finding on a motor vehicle to the maintenance of British Telecom's latest transmission system. A CBT learning centre was set up and a proprietary CBT system was used. To assess student reaction a comprehensive questionnaire was developed. The findings of the evaluation were that significant savings in training time could be achieved, CBT could be a cost effective method of delivering vocational engineering training and was acceptable to students.

Installed

Following this a CBT system was installed at the BTTC two years ago and last Spring the first course was running. Currently there are seven CBT courses running at the BTTC which are all multi-media and managed by the CBT system.

In association with CBT a low cost, yet sophisticated simulation system has been developed based around the Nascom microcomputer. This allows the simulation of highly expensive 'real' equipment and as well as cost benefits it uses less space.

Training using video can be attractive in that it can be used to show the student equipment and situations which would be otherwise difficult to provide and it can also be an interesting, stimulating and forceful media.

But the major snag with conventional video cassettes is that the programme is linear and runs straight through from the beginning to the end. Interactive video, however, goes much further. Using computer control, branches can be programmed into the video and if a student has understood something, or needs to find out more about it, the programme will either skip sections or go into more detail, as appropriate. Conventional video cassette players can be used for interactive video but videodisc players can access sections of video rapidly and the picture and sound quality are far superior.

British Telecom's training philosophy always involves management and tries to counter the old idea that training is carried out away from the workplace. The latest training design procedure considers the training school as a last resort where 'hands-on' experience is essential.

Distance learning is not new, for many years people have been using correspondence courses for a whole range of educational courses and the Open University is a good modern example of the technique. The latest distance learning techniques, however, have progressed a long way and include video film, CBT, practical, interactive videodisc, audio cassette and printed text.

An evaluation of the remote delivery of CBT has just been completed by the BTTC and the courseware delivered used printed text, computer aided lessons and practical work. The evaluation which was conducted in five areas around the country, ran smoothly and has been welcomed by both students and line management.

In the future the business will move at an increasing speed with new products and services being introduced with shorter and shorter lead times. Distance learning techniques will help to ensure that the training needs of these new products and services will be met.

Techniques

A strategy is being formulated for the introduction of the new distance learning techniques across the business and it seems likely that each District will provide a centre to meet its own needs. Distance learning centres could involve one or more work stations and advice is available about environmental and economic design aspects and the hardware and software standards required. Training department is constantly looking to reduce the cost of training while maintaining high standards. In the quest to keep costs down, new methods of design and delivery have been implemented. The drive towards providing training at the workplace is currently gaining momentum and is likely to proceed with increasing speed.

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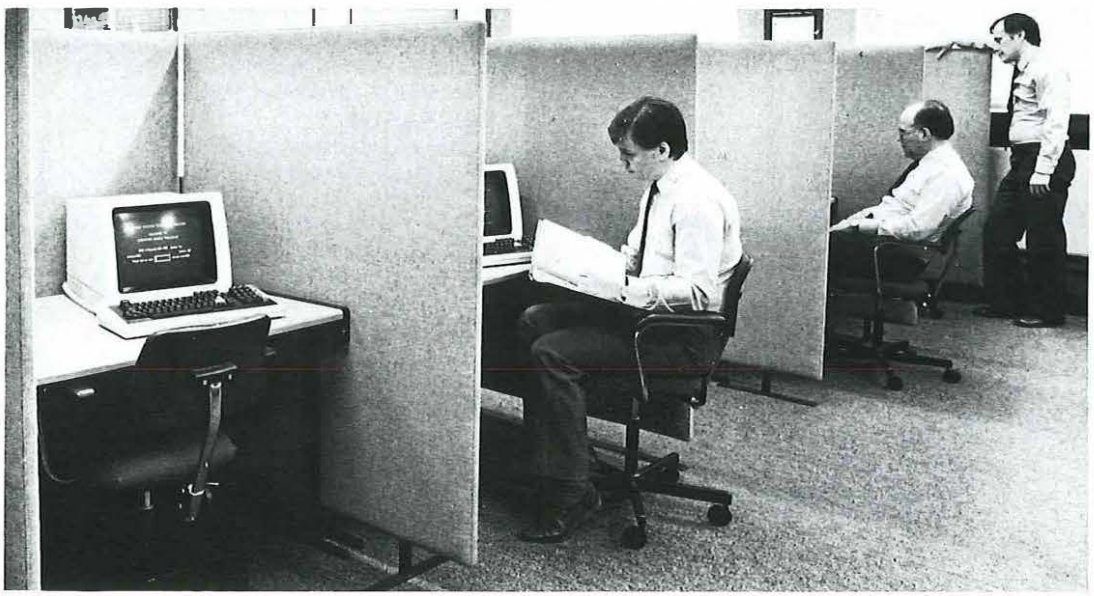
Modern aids give training boost

Opposite page: Chris Adams, a CBT designer works on producing a computer-aided lesson . . . which when complete is transferred from paper to screen by Mandy Meek, specialist typist, for later access by students.

Mr S G Berry is a CBT design manager at BTTC, Stone.



Far left: Course designer Dennis Smith (left) and author Stewart Berry with a selection of distance learning media.

Left: A general view of the learning centre at BTTC.

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Spring 1985

Providing a solution

Brian Oxenbridge and Ray Cheung

A 40-year tradition of specialist advice for business customers is being maintained by an organisation set up by British Telecom a year ago. It comprises Tallis Consultancy for independent guidance and Tallis Systems for computing and communications skills.

In the early 1970s a growing number of customers were faced with the complexities of planning the replacement of their old Strowger telephone equipment and the confusion caused by the variety of different crossbar, common control and early electronic systems then on the market.

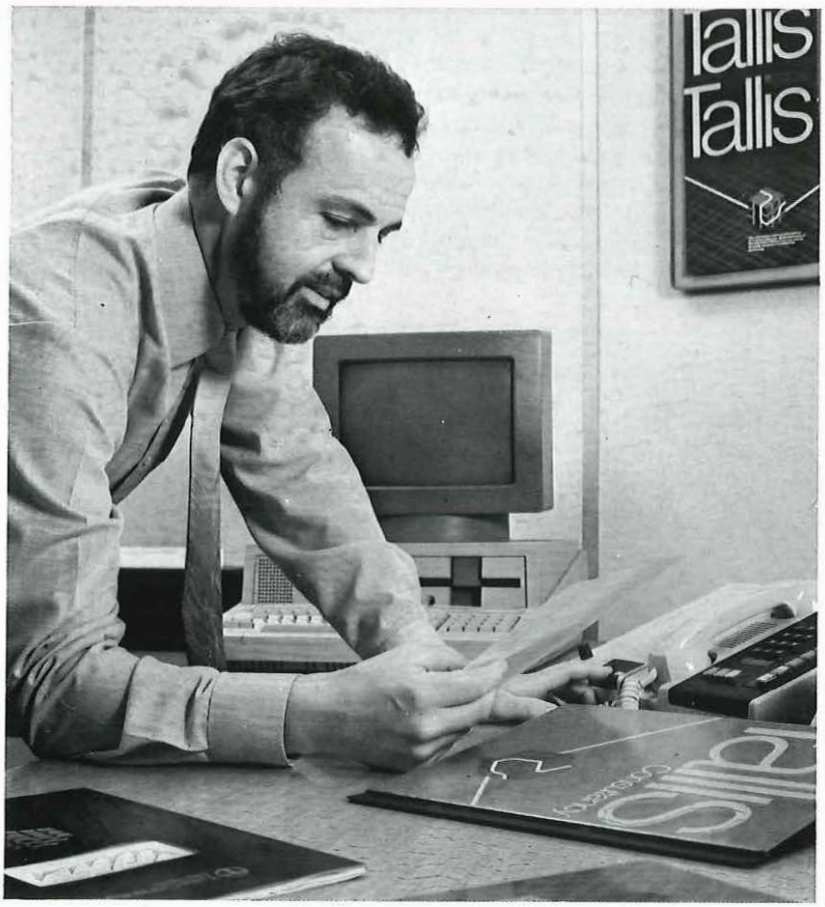
To help, the Post Office's Telecommunications Advisory Service, originally set up in the 1940s, was expanded into the Telecommunications Consultancy Service (TCS), and this offered full consultancy advice and reports using a team of specialist experts based at Telecommunications Headquarters in London but able to travel throughout the UK.

The market for consultancy continued to expand, and began to include requests to improve the efficiency of existing systems as well as for advice on new ones and private telephone networks. A specialist group offering the facilities of Call Information Logging (CIL) equipment was added which gave TCS the ability to analyse a client's telephone traffic in great detail and to make appropriate recommendations for networks, cost savings and reduction of abuse and mis-use of the client's telephone system.

With the advent of new technology such as packet switching, stored program controlled digital PBXs, digital private circuits, microcomputers and electronic mail, a need was seen to adapt TCS into a total Information Systems House to compete with similar organisations outside British Telecom. The Tallis organisation evolved from TCS to meet the challenge and has the additional skills to:

- analyse both speech and non-speech communications problems and advise large organisations on the best route towards the integration of voice and other services
- offer custom-designed computer hardware and software solutions and packages to meet a client's information system requirements.

Both specialist needs are now met by 'sister' organisations Tallis Consultancy and Tallis Systems respectively. They can take on and solve a wide range of communications problems and if necessary have access to the full resources of British Telecom. These range from telephone exchange design to network appraisal; from message switching to electronic mail; from data transmission to facsimile and from packet switching to office and factory automation. The organisation is not only equipped to understand



Head of Consultancy David White at work in his office.

Tallis Consultancy

- Voice systems and network design
- PBX design, and preparation of specifications for tender
- Evaluation of tenders and system recommendation
- Call Information Logging surveys
- Information Systems analysis
- Office and factory automation and control
- Data systems analysis and design
- Project management
- Specialist staff recruitment
- Network management
- Customer tailored training courses in a number of high technology subjects

Tallis Systems

- Analysis of computer systems
- Analysis of new computer requirements
- Providing complete computer systems, designed and built for clients' applications and supplied on a turnkey basis
- Developing systems and applications software
- Tailoring existing software to suit the clients' needs
- Supplying and supporting a range of software packages
- Office, factory and warehouse automation
- Specialising in mini and micro-computer systems
- Specialising in real-time and communications systems

all a client's problems in these fields, but to handle them in such a way that the client is freed from the detail of project investigation and management.

The need for consultancy has never been clearer and any organisation planning its future development, should consider the implications of such changes on its total communications requirements. Few businesses employ specialist staff who are sufficiently well-informed about changing technology and the market place to be able to make the right decisions on such long-term and expensive issues.

Tallis Consultancy continues to operate one of the largest call information logging services in the country. It carries out short term surveys – normally one or two weeks – monitoring various types of PBX, processing the results and presenting them to clients with an appropriate report if required. CIL Studies often reveal scope for improvements in the efficiency of call routings and PABX management which can show immediate cost-reductions. It should also be made clear that the call loggers only record call routings, durations and destinations on to magnetic tape for later processing by computer: they cannot record speech.

A similar service for assessing the performance of packet switching data systems is also provided using Microflood, the most sophisticated tester of its kind in the world. Developed by British Telecom engineers, the tester has been used not only in the UK but also for assessing the performance of several foreign administration packet switching networks.

Tallis Systems has the expertise to tackle all the problems involved in analysis, specification, design, implementation and support of today's high technology systems. It specialises in developing and supplying custom-built computer systems, supplying and supporting software packages and designing systems to automate offices, factories and warehouses on a turnkey basis.

The organisation usually responds directly to customer enquiries or invitations to tender. Alternatively, staff may provide a system in response to a report from their consultancy colleagues.

Tallis now seeks to build on the excellent reputation enjoyed by TCS and British Telecom to offer the best and most comprehensive Consultancy and Systems House service in the UK to major users of telecommunications and computing facilities.

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Mr B L Oxenbridge is general manager of Tallis Consultancy. **Mr R C H Cheung** is general manager of Tallis Systems.

Above: Karen Ashton and Mark Brandish use computer and telex equipment for the processing and analysing of call logging results for a client's report.

Left: General manager and co-author Brian Oxenbridge (seated) discusses the final draft of a report prepared on behalf of a client with head of Consultancy, David White.

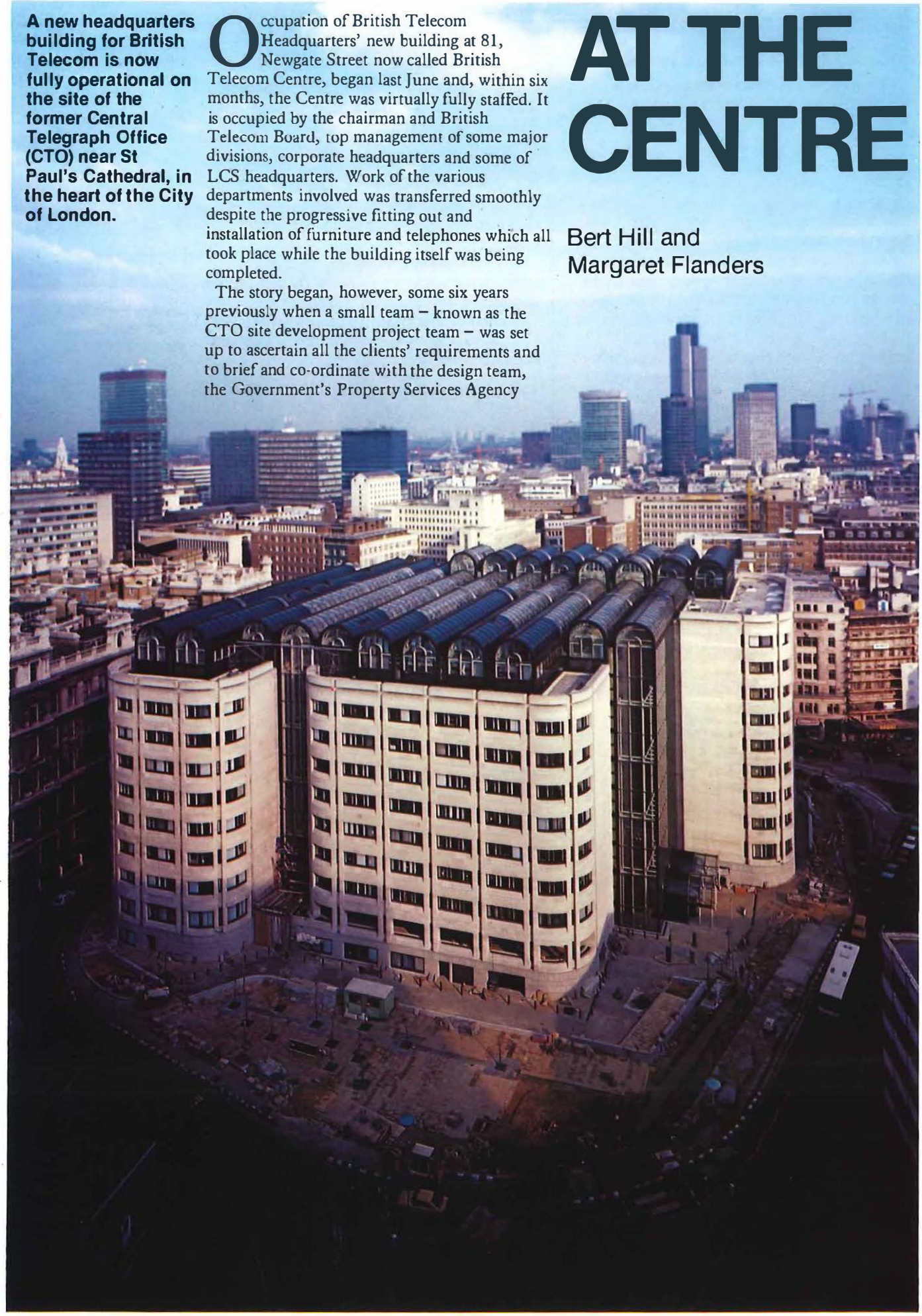
AT THE CENTRE

A new headquarters building for British Telecom is now fully operational on the site of the former Central Telegraph Office (CTO) near St Paul's Cathedral, in the heart of the City of London.

Bert Hill and
Margaret Flanders

Occupation of British Telecom Headquarters' new building at 81, Newgate Street now called British Telecom Centre, began last June and, within six months, the Centre was virtually fully staffed. It is occupied by the chairman and British Telecom Board, top management of some major divisions, corporate headquarters and some of LCS headquarters. Work of the various departments involved was transferred smoothly despite the progressive fitting out and installation of furniture and telephones which all took place while the building itself was being completed.

The story began, however, some six years previously when a small team – known as the CTO site development project team – was set up to ascertain all the clients' requirements and to brief and co-ordinate with the design team, the Government's Property Services Agency



(PSA). PSA's brief was to provide the maximum useable office space in a good quality building which would be in keeping with the up-to-date image of the business. The building had to reflect a commercially-orientated and cost-conscious company and needed to be architecturally acceptable to the City of London planners.

Planning permission was granted by the City of London Corporation in September 1979 and after further detailed discussions with all the interested parties – including the surveyor responsible for the fabric of St Paul's, the Royal Fine Arts Commission and the City Architect – final approval of the design details and financial estimates was given in July 1980.

Meanwhile, a management contract was let to Higgs and Hill Building Ltd and the site was cleared and other preliminary works carried out to enable construction to begin in August 1980 with the laying of a two-metre thick concrete raft to serve as a foundation.

A management contract was chosen for speed and flexibility throughout construction. Its worth was proved when, in addition to the problems that always seem to arise in any large and complex project, the gradual transition from the Post Office to British Telecom plc imposed its own design changes on the building. Construction continued while the designers worked to incorporate the changes without delaying progress.

The completed building – clad in Portland Stone and with a granite plinth – has curved corners to offset its mass and a glazed entrance screen which stretches the full height of the building to provide a sharp contrast to the solid stonework.

Left: The curved corners of the building, the bridges between the blocks and the attractive spiral staircases are clearly seen in this view.

Three office blocks have been designed round an 'atrium' – a glazed courtyard that lets natural light in while keeping the elements out. This area is used for circulation between the office blocks and is terraced, landscaped and bridged. It provides a pleasant environment, similar to many of the small courtyards and protected spaces which are a traditional feature of the City. Four glass-panelled, wall-climbing lifts provide views of the atrium and these, together with seven conventional lifts, comprise the main lift service for the building.

Building in the City, especially so near to St Paul's, imposes restrictions not normally encountered elsewhere. Distant views of the Cathedral's dome had to be protected and this meant that the building height was limited to 30 metres and that the western part of the site could not be built on at all. This area is landscaped and planted with trees, but still gives the public a view of St Paul's from the corner of King Edward Street and Little Britain. ▷

Far left: A modern, bright environment is created by the building being designed around an atrium. This picture shows the glazed main entrance, the terracing and part of one of the main blocks.

A long history is attached to the site of the new British Telecom Centre and before construction started in 1980, permission was granted for an excavation by the Department of Urban Archaeology at London Museum. Archaeologists found remains of Saxon, Roman and Mediaeval London and evidence of burning dating to the Boadicean revolt of 61 AD.

In 1874, the Central Telegraph Office (CTO) building was completed on part of the site, and initially it also housed the offices of the Postmaster General. The first telephone service to Paris was inaugurated from equipment based in the CTO in 1891. During the First World War, the building was struck by a bomb, a foretaste of what was to come in 1940 when the CTO was severely damaged by fire bombs and telegraph services were maintained by transferring work to the outskirts of London.

After the war, two floors of the damaged building were restored and continued in use until 1962 when staff were transferred to new premises in London's Farringdon Street. The old CTO building was demolished five years later for safety reasons.

The site made the headlines a few years ago with a heartwarming tale about a pair of Mallard ducks. Residents and office workers regularly fed the birds and one even made a temporary pond for them with tarpaulin. When it was decided to develop the site, arrangements were made for the ducks to be moved to St James' Park.

Opposite page: The distinctive glass roof of British Telecom Centre provides a new point of interest on the City skyline.

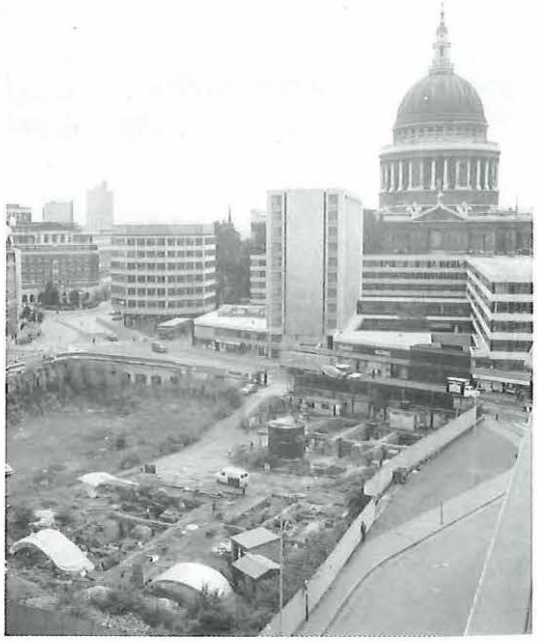
As the building is on an island site – bounded by St Martins-le-Grand, Newgate Street, King Edward Street and Angel Street – all external windows are double-glazed and sealed to keep out noise and pollution. The main office and welfare areas are also fully air-conditioned with units positioned every 4.5 metres for maximum flexibility of operation.

About 1,700 staff work in the building and many more from other parts of the company visit it each day for meetings with colleagues, customers, suppliers. There are discussion rooms throughout the building and conference facilities on both the lower ground and second floors to accommodate 200 or more people for seminars and presentations. The building also meets all current legislation for the disabled including ramps and toilet facilities.

Modern office areas are formed by the use of full-height partitioning and 'system' style office furniture, acoustic screens separating banks of desks and supporting overhead filing units. Offices are fully carpeted with anti-static material which, together with the partitioning, system furniture and chairs were chosen after detailed research and staff consultation by Buildings Management Division (BMD).

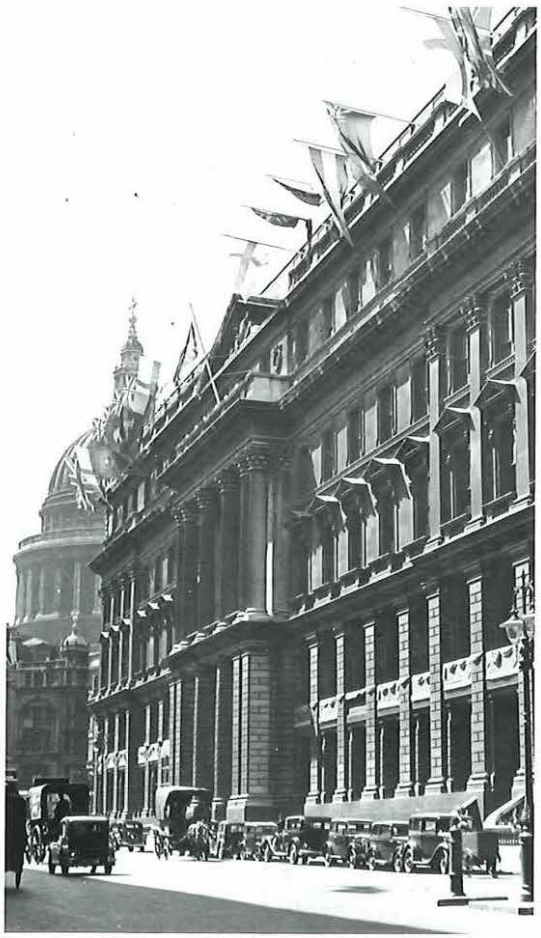
Fully remountable partitioning was used to provide flexibility of office layouts to cope with rapidly changing business requirements, and to ensure that future layout alterations can be completed in a weekend to make the best use of expensive floor space. The building engineering services are designed so that partitions can be dismantled and re-erected in new locations without any re-arrangements of the electrical wiring or the need for major changes to the air conditioning.

Excellent communication facilities include a comprehensive underfloor and perimeter trunking system with a modern PABX and speech network and an office automation system provided by a Local Area Network (LAN). Power, telephone and data outlets mounted in trunking units clipped on to the partition screens can be simply and cheaply removed or augmented as required. ◑



Little more than a hole in the ground . . . the scene at the site of the old CTO before building work began.

Mr A F Hill and **Miss M L Flanders** have been part of the project development team since its formation latterly working as project controller and deputy controller respectively.



Then and now . . . these pictures were taken from a similar position but 50 years apart. The first shows the old CTO decorated for King George V's silver jubilee in 1935 while on the right is the British Telecom Centre as it is today.

Spreading the message

On line to spread the British Telecom message throughout the West Country is this specially painted diesel multiple unit (dmu) seen here about to cross Brunel's famous Royal Albert Bridge linking Devon with Cornwall at Saltash.

The train represents one of the largest advertisements ever commissioned by British Telecom. As well as their distinctive external markings, the coaches - hand painted by craftsmen at BR's Laira depot at Plymouth - contain comprehensive details about British Telecom's products and services. The slogan reads "It's Telecom on the Line Making Fast Connections" and there are also three-foot high colour pictures of various aspects of the business including Telecom Tower, CS Iris, an ea th station dish aerial and the undersea cable laying tractor.

Known as the Westward Colortrain the train is operating on the Plymouth-Gunnislake, Truro-Falmouth, Par-Newquay, Liskeard-Looe, Newton Abbot-Paignton, Exeter-Exmouth, Exeter-Crediton-Barnstaple and St Ives-St Erth lines. It is expected to cover about 150,000 miles during next year. Ⓣ

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Spring 1985

High speed links for PAYE network

Brian Winkler

A pilot scheme to computerise Pay As You Earn income tax (PAYE) at Telford in the West Midlands is to be extended nationally and will also include Schedule D, the taxation of the self-employed.

According to Sir Lawrence Airey, chairman of the Inland Revenue Data Processing Organisation, the benefits will include:

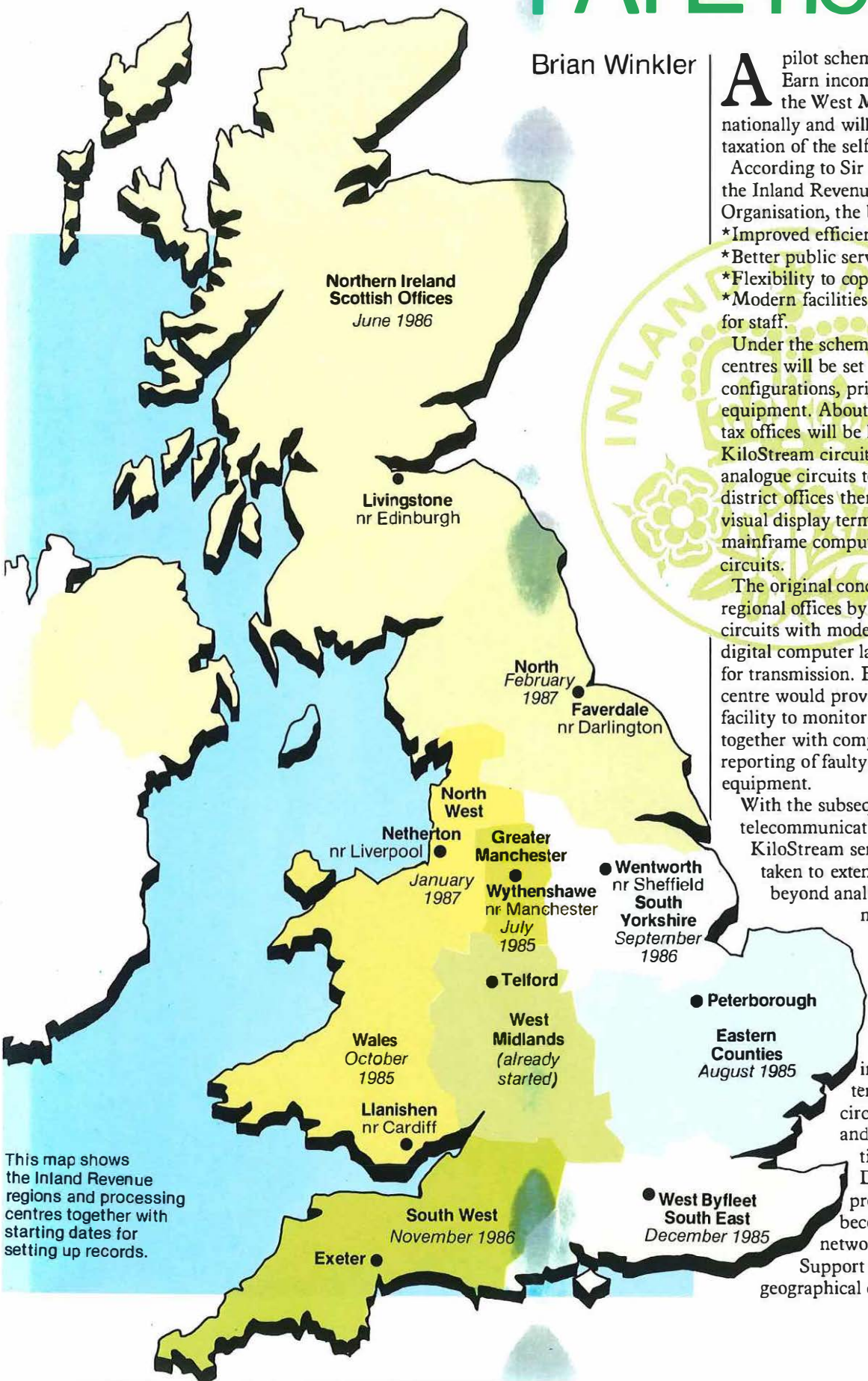
*Improved efficiency
*Better public service
*Flexibility to cope with change
*Modern facilities and increased job satisfaction for staff.

Under the scheme, 10 regional processing centres will be set up each with ICL computer configurations, printers and output handling equipment. About 80 per cent of the 600 district tax offices will be linked via British Telecom KiloStream circuits; the rest will be linked by analogue circuits to these centres. Within the district offices there will be more than 25,000 visual display terminals conversing with mainframe computers over 900 British Telecom circuits.

The original concept was to link district and regional offices by 9.6 Kbit/s analogue private circuits with modems at each end to convert the digital computer language into analogue signals for transmission. Each regional processing centre would provide a network management facility to monitor the quality of transmitted data together with comprehensive diagnostic reporting of faulty circuits and terminals equipment.

With the subsequent liberalisation of telecommunications and the introduction of KiloStream services, the opportunity was taken to extend British Telecom's role beyond analogue circuits and introduce multiplexing and high speed digital links.

The Inland Revenue was given a technical description of KiloStream together with its advantages including cost, speed of provision, the inclusion of network terminating units in the tariff, circuit management facilities and reliability. At the same time, National Networks Division agreed to support the project which will probably become the largest digital network in the United Kingdom. Support was required for the geographical distribution of KiloStream,



This map shows the Inland Revenue regions and processing centres together with starting dates for setting up records.

circuit availability, performance targets, and customised equipment.

The decision to install a KiloStream network was reached last summer and gave British Telecom the opportunity to submit a design for an inter-regional high-speed 48 Kbit/s network to enable the processing centres to communicate with each other. The design featured a single network management facility to monitor all inter-office communications links, including the network terminating units.

A Regional Network report was prepared by staff at British Telecom Research Laboratories, Martlesham, in October and included 14 computing centres drawing the Inland Revenue accounting and administration networks into a nationwide facility for the first time. The computing centres will become switching nodes for the high-speed KiloStream network with pre-determined switching of circuits carried out automatically at remote nodes by instructions from the equipment at Telford. To help with this, British Telecom intends to install high-speed digital multiplexing equipment at each node.

The project is further proof that British Telecom can respond to the most complex customer requirements, and introduce advanced digital equipment, backed up by sound network design, in a cost-competitive total package.

Financially, the network will have a revenue value of some £1.75 million a year for the next ten years.

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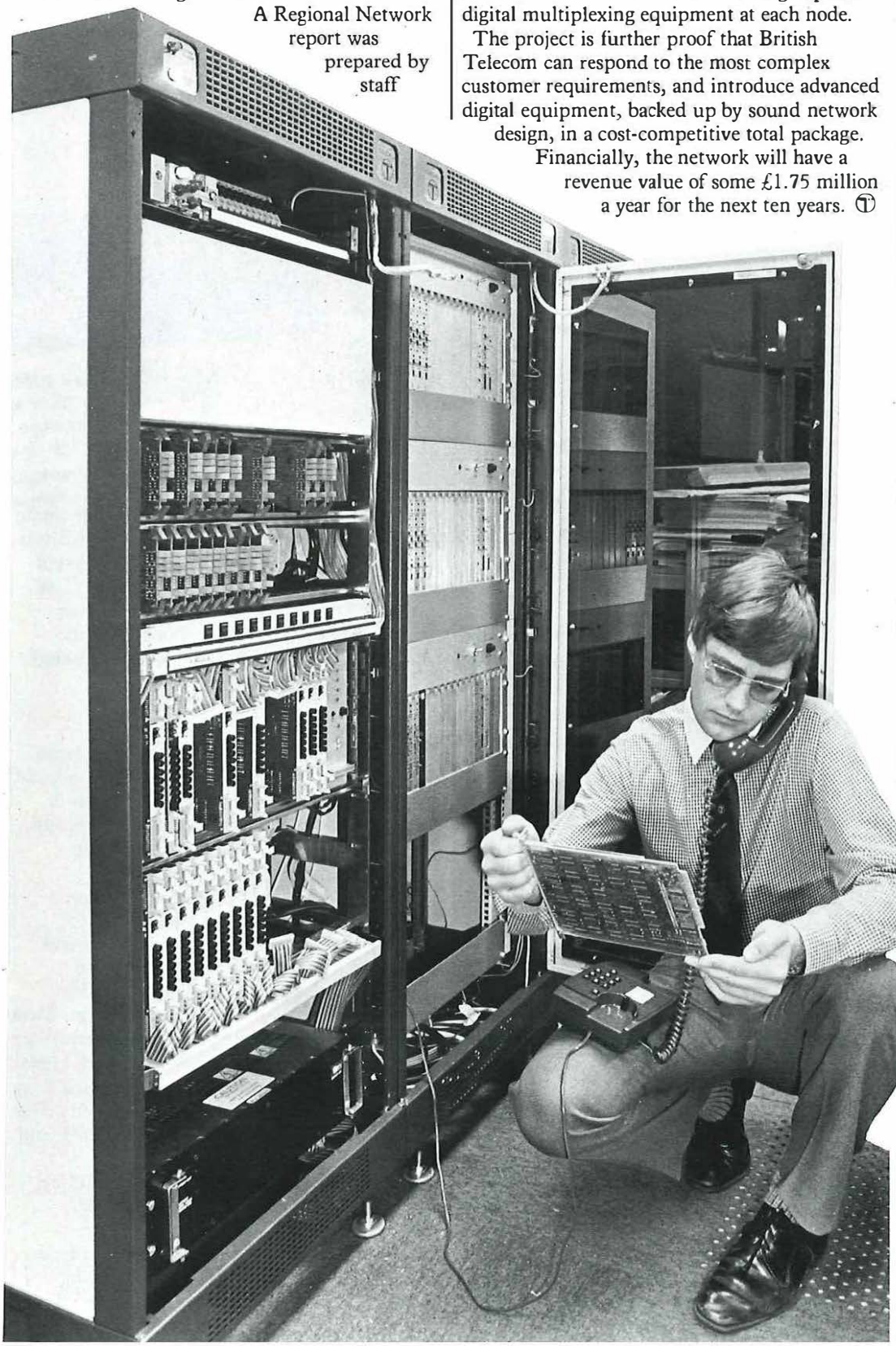
British Telecom's Kilostream Services are to play a crucial role in a government scheme to computerise the way most people pay tax. When fully operational in 1989, the Inland Revenue's Digital Data Network will be one of the biggest in the United Kingdom.



Shrewsbury Area technician Richard Smith runs a check on British Telecom's KiloStream equipment at the West Midlands Processing Centre at Telford.

Mr B K Winkler was formerly a major account manager responsible for the Inland Revenue project. He is now manager of the major projects group, Business Systems Division, South Wales District.

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Ten years at sea

The plaque presented to all crew members who served in the South Atlantic during the Falklands conflict.

Right: On a clear day in the South Atlantic a Sea King helicopter prepares to land on *CS Iris* to pick up vital stores.

The Ministry needed to use the 3,800 ton cable vessel *Iris* as a despatch ship to carry stores, mail and military personnel from the security f Ascension Island to the Task ce located on and around the land Islands. Volunteers among ne Division's complement not hard to find, and on 27 *CS Iris* left Southampton for Devonport where she ed extensive modifications ing a strengthened 30-ton pter deck. Two Oerlikon anti- ft guns were also mounted on

ship slid silently out of s later, the crew were from naval person- talled equipment. ension had its helicopter fuel over deck dur- ther problems of the newly- were eventually *CS Iris* arrived n Island. Im- ing stores by tary person- un. to be taken at' tracked the Royal As a giant helicopter ailing

Just three days after return International's marine division Defence. Its message . . . to ta Falklands conflict'. It was the British Telecom vessel had bee Alan Fulton who rece

Ten years ago, CS Monarch, the first of British Telecom's new twin cableships, took to the water. Since then the vessel, together with sister ship CS Iris – winner of Battle Honours in the Falklands conflict – have put to sea on countless occasions to maintain and repair Britain's undersea telecommunications links.

Chris Knight

The launching of CS Monarch in 1975 – CS Iris followed a year later – represented a major step forward in cableship technology. The vessels they replaced had been commissioned some 35 years earlier and were not fully equipped to deal with modern conditions.

The new 3,500 tonne ships, built at Dundee and working from British Telecom's Central Marine depot at Southampton, were intended mainly for operation on the UK Continental shelf. The hulls were specifically designed to provide a stable working platform and allow operations to continue in more severe weather conditions than had previously been possible. The success of the design has been well proven with the ships frequently completing repairs in winds in excess of forty knots (Gale Force 8 on the Beaufort Scale).

Each vessel is propelled by two 2,600 BHP diesel engines driving a single controllable pitch (CP) propeller giving a service speed of 15 knots. For manoeuvering purposes, a bow thrust unit and an active rudder are provided. (The active rudder can be likened to an outboard motor, consisting of a CP propeller mounted in the rudder and capable of providing thrust through an arc of 180 degrees.)

Transferred

Cable is carried in four main centerline tanks with additional space or cable and many miles of grappling rope in six auxiliary wing tanks. A helicopter deck aft enables essential equipment, stores or personnel to be transferred at sea without interrupting cable operations. Individual cabins for officers and crew give a degree of privacy during periods away from base. The latest satellite communications and navigational systems are fitted as standard.

During their ten years of service both ships have performed a number of unusual tasks. Most notable, perhaps, was CS Iris's seven month role in the south Atlantic during the Falklands crisis. She was among the last ships to be released from duty and was later awarded Battle Honours. Her captain and chief steward received the OBE and BEM respectively.

CS Monarch has, perhaps, become the more specialised vessel, having been modified to operate the BTI submersible (a 15 tonne, unmanned, remotely operated tracked vehicle used for burying and unburying submarine cables). The ship has also been fitted with a 'Carousel' – a rotating cable tank designed by

Stromness where she was to plate and angle iron left by troops. Indeed, this was th metal which had originally Argentine dealers to the isla the year – the event which the Falklands war. Ironically was now to be used to patch ships damaged in action.

By the following afternoon, c blems caused by half the jetty *Iris* returned to Grytvyken troops from the *QE2* to the *Ca* arrival, orders had been chang headed for the main Task Forc

In addition to Capt Fulton's ing the OBE, chief stewar Barrett was awarded the BE

Iris joined the main fleet on 30 began off-loading stores and ma *RFA Fort Austin* in deteriorating conditions with gale force wir poor visibility. And, to add to ficulty of these operations, the sh under air attack four times but m to avoid damage. On return to Asc via South Georgia, *Iris* encounte and icebergs. With the use of limited to a few seconds eve minutes, careful calculations were

By now, however, the ship was r short of fuel and an attempt to re at sea in the dreadful conditions 'Roaring Forties' from the Fleet Au tanker *Appleleaf* ended in failure ar no alternative but to wait for weather further north.

Reaching Ascension Island on 19 *Iris* underwent minor repairs to engine, and before

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Ten years at sea

Left: CS Iris made headlines when she served in the South Atlantic during the Falklands conflict.

Far left: CS Iris is equally at home on the quiet waters of a Scottish lock as in the North Sea.

Below: CS Monarch is specially equipped to work with this 15 tonne submersible.

Mr C Knight is chief cable officer of CS Monarch.

ing from an Arctic charter, the head of British based at Southampton received a telex from the M ke up the services of cableship *Iris* 'for operations d first time since the Second World War that a Post en needed for active service. Here, the master of th ived t following the South Atlantic campai

Marine Services for cables which cannot be handled from conventional cable tanks.

Conventional repair work has declined in recent years as old systems have been taken out of service to be replaced by a reduced number of high capacity systems. Being mechanically stronger, these new cables are less susceptible to damage from fishing trawls – the normal cause of cable faults.

To enhance protection for the new generation of fibre optic systems, a policy of burial during installation is being adopted which will further reduce the number of cable faults requiring the attention of both cableships. As a result, Marine Services is actively seeking alternative charters for both vessels of the type undertaken in 1983 when CS Iris was involved in a major cable installation in the Lower Gulf. (See *British Telecom Journal*, Winter 1983/84.) This involved modification to the cable tanks to increase storage capacity and also installation of a powerful air conditioning system.

Marketing effort

CS Monarch – with the submersible/Carousel combination – is being increasingly employed by the off-shore industry to provide, for example, communication links between oil and gas production platforms while a strong marketing effort is now underway within Marine Division to increase efficiency and adopt a more commercial approach. This should ensure the future of both cableships well into the 1990s.

British Telecom Journal
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On the right road

British Telecom's latest vehicles were highlighted in the last issue of *British Telecom Journal*, but a journey through the archives produces a collection of photographs to interest both students of transport planning and lovers of nostalgia. Deputy editor JUSTIN QUILLINAN acts as guide.

Wheels tend to turn full circle and when an organisation with one of the largest and most diverse vehicle fleets in the world looks back to the 'golden age of motoring' it may seem surprising but even the most modern transport concepts have been 'test driven' before.

The British Telecom fleet has a long history and over the years every possible step has been taken to improve its efficiency and maintain a high level of customer service in an ever-changing environment.

For example, the current enthusiasm over the future of electric vehicles is far from new. More than a decade ago, extensive tests were carried out on Harbill and Bedford electric vans but then, as now, the problems of size, weight and limited range meant that a large and slow vehicle was needed to perform a small van's duties and the idea was abandoned.

Experiments with liquid petroleum gas were also short-lived, but during the Second World War a number of telecommunications vehicles were run on domestic gas contained in a canvas bubble on the roof.

By today's standards, coal would seem an unlikely fuel for vehicles. But in the early 1900s, steam-driven traction engines were a common sight on the roads and they provided the motive power for the machinery used to cable-up the countryside at the dawn of the telephone age.

Some of the earliest vehicles were little more than 'horseless carriages' with exposed chain drives before reliable differentials were developed to transmit power to the rear wheels without tyre-scrub on bends.

Other strange contraptions have taken to the road . . . and water. An amphibious car was equally happy on both, but perhaps one of the most bizarre was a 20-horsepower Fordson tractor fitted with an 'Automower' front winch, an open cab, giant chaincase, rubber-bulb hooter and cranking handle at the front. The tractor was used to draw armoured cables into the ground to avoid cutting trenches and, according to a transport efficiency report written in 1935, cost 8d (3½p) a mile to run and 11d (4½p) an hour to use on site.

Motorcycles have enjoyed a recent renaissance, though for many years combinations were the standard vehicle for skilled staff on maintenance duties and the inspectors who checked their work. The inspectors, however, complained that their wet clothing could hamper the working of telecommunications apparatus and that riding the machines meant a 'loss of prestige' when

Above: Probably the best known of them all – the Morris Minor 1000 van was in use for years after the Second World War.

Right: An Albion 30cwt utility vehicle used by local line construction gangs in the 1930s. Note acetylene lamps.

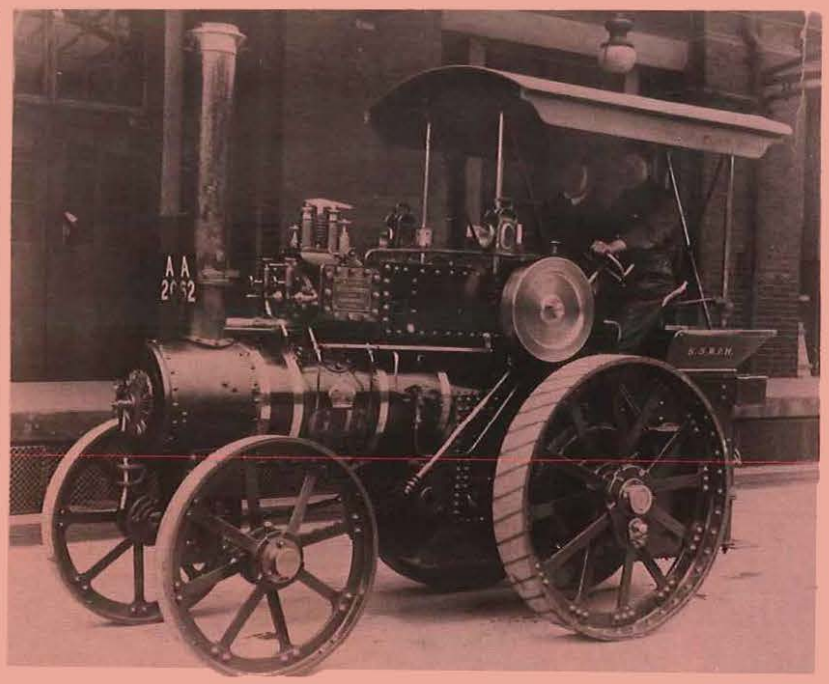
An exhibition celebrating 80 years of telecommunications vehicles runs until 12 July at Telecom Technology Showcase in Queen Victoria Street, London.

interviewing and dealing with customers!

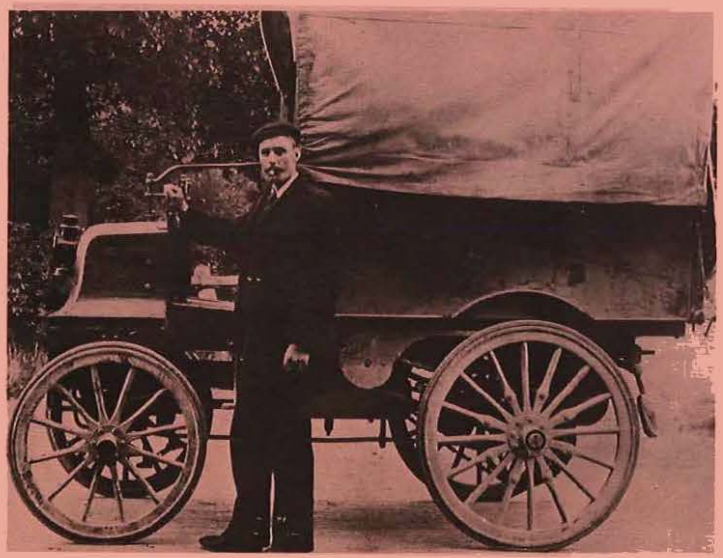
A passage from the same 1935 report reads: "An unfortunate impression may be created in the mind of the individual to be interviewed if, judging by the protective clothing necessarily worn by the inspector, or the type of conveyance provided, he concludes that a person of insufficient authority has been deputed to see him."

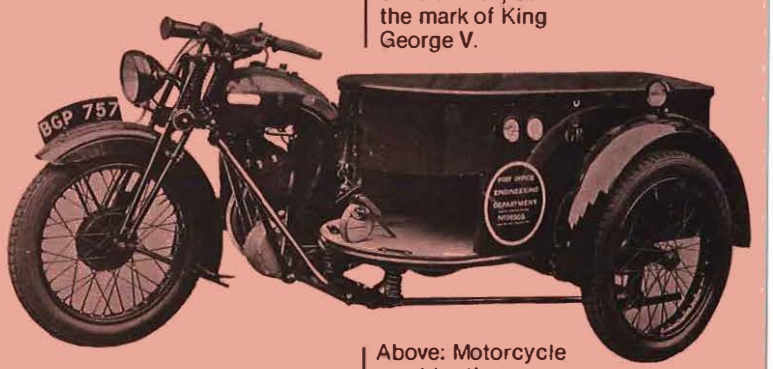
Many inspectors refused to ride motorcycles and used their own cars instead on a mileage basis. Widespread pressure led to the introduction of Morris Minor vans – probably the most familiar of all telecommunications vehicles – and the combination eventually disappeared. Motorcycles, however, are still used by British Telecom for some courier and messenger work.

Machinery has also changed beyond recognition over the years. Hand winches and cranes have been replaced by hydraulic equipment and today specialist apparatus has been designed to cover all aspects of fieldwork.

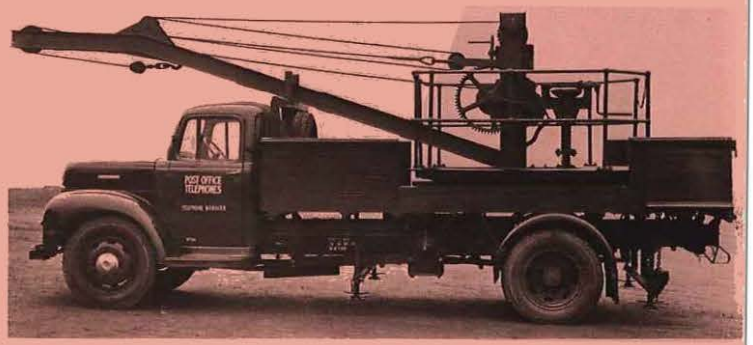


Above: A steam tractor, built in 1905, bears the mark of King George V.





Above: Motorcycle combinations were widely used but were later criticised as 'bad for prestige.'



Above: Muscle-power not horse-power operated this 1951 crane lorry.

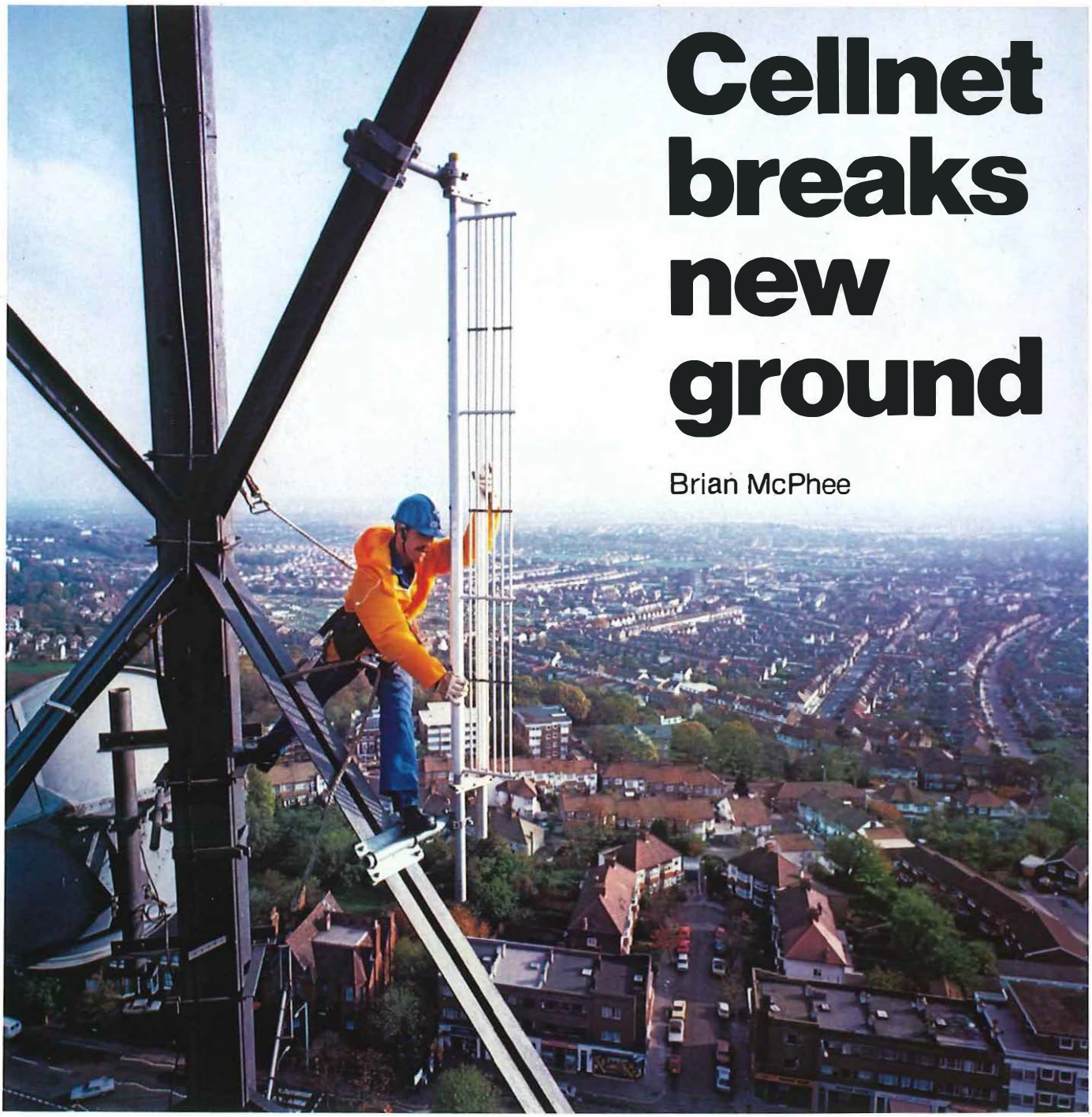
Above, left: A motorised 'covered wagon' in service at the turn of the century.

Left: Petrol rationing during the Second World War resulted in the conversion of this Ford V8 Pilot to gas.

Cellnet, the British Telecom-Securicor partnership which launched its commercial Cellular radio system in the UK earlier this year, is now actively expanding and marketing the service nationwide.

Cellnet breaks new ground

Brian McPhee



The unique commercial and regulatory environment in which Cellnet operates, together with the special characteristics of cellular technology, have opened the door to novel marketing approaches for the service.

The cellular principle itself introduced Cellnet's first marketing task. By controlling the location and density of base stations, it is possible to fit the development of the network to anticipated market demand. This network design has two aspects: determining what areas to cover and what capacity to provide within those areas. As each tranche of equipment becomes available it can be used either to provide more coverage of new towns, or used to augment capacity within areas already served.

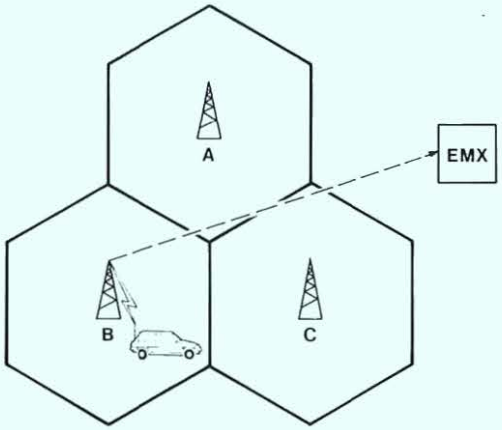
The first task of the Cellnet marketing department was to produce a roll-out plan for the first year of operation. To help in this programme, a market research study was commissioned to derive guidelines into the potential cellular demand. By combining data on population, business density, employment, transport statistics and so on, a model was created which was used to predict relative demand throughout the UK. This led to a 'priority table' of target areas indicating where, and in what order, cell sites were required.

It is a fact, however, that extending service coverage affects all potential users of the service and not just those who live in the area in question. It is necessary, therefore, to consider the totality of the network evolution as it affects the total market. An extreme example would be a motorway section which may be almost totally devoid of indigenous demand but which represents a vital link for other users.

The results of those studies can be seen on the ▷

The fact that the Cellnet service area comprises a patchwork of separate cells means that cellphones will regularly move from one cell to another during a call. The adjacent cell will by definition be operating on different frequencies and in all probability at a different power level. Accordingly for the 'hand off' from cell to cell to succeed, a rigorous protocol must be followed:

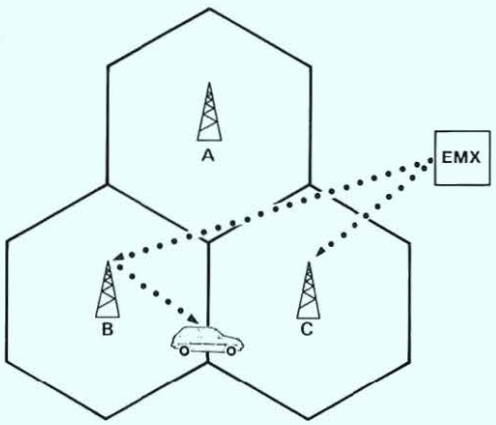
1. Mobile constantly transponds signal from base station. Eventually 'host' base station detects signal strength is at threshold level.



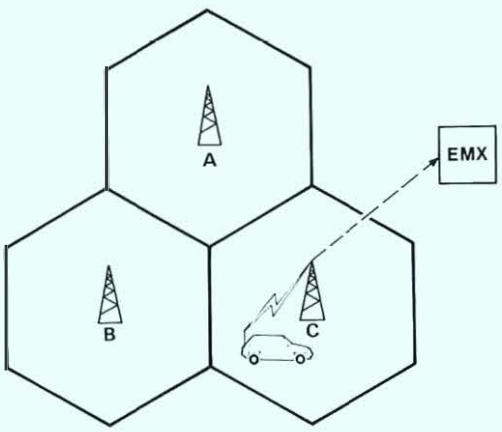
2. EMX audits signal strength from adjacent cells and determines strongest signal.

3. EMX advises Mobile of frequency and signal strength in new cell.

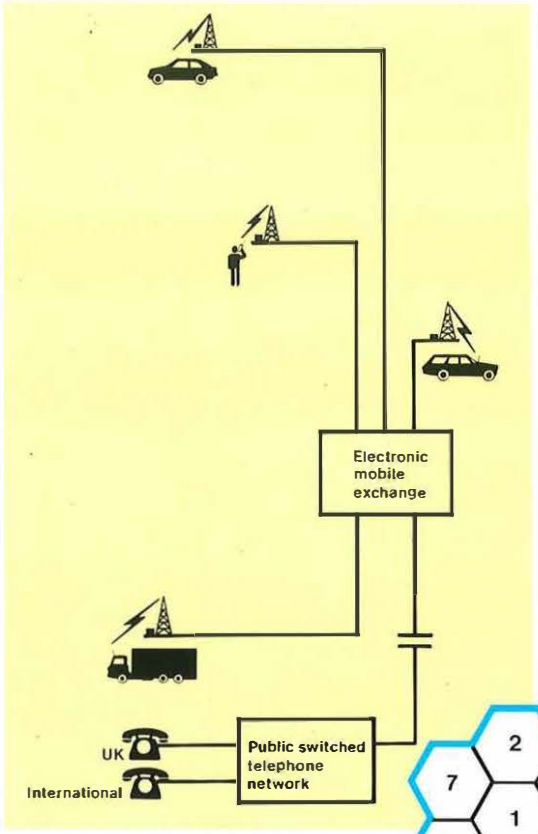
4. EMX establishes channel to new cell base station and holds radio channel.



5. EMX instructs Mobile to switch frequencies.



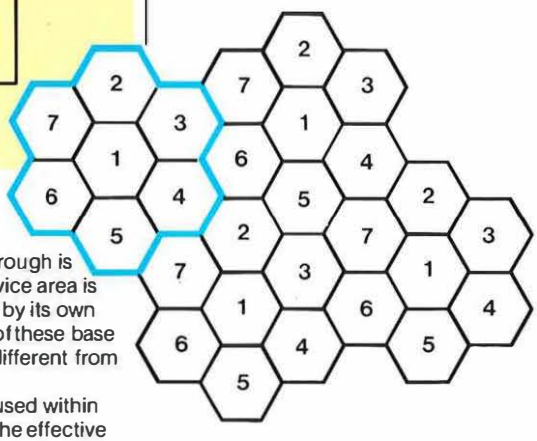
6. 'Old' circuit freed for other calls.



British Telecom Journal Spring 1985
Cellnet breaks new ground

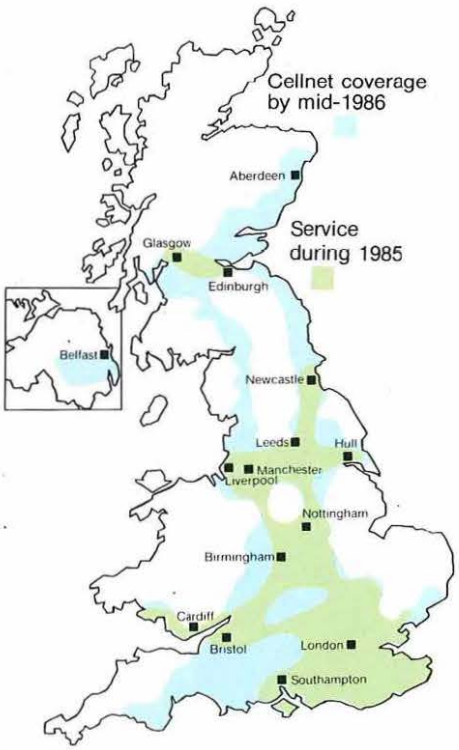
Opposite page: British Telecom engineer Rick Boran completes another link in the Cellnet network by installing this aerial in south London.

Far apart, but cell-to-cell links keep users constantly in touch.



The principle behind the cellular breakthrough is re- use of scarce radio channels. The service area is divided into a series of 'cells' each served by its own low-powered transmitter /receiver. Each of these base stations is assigned a set of frequencies different from those assigned to adjacent cells.

The same frequency groups can be reused within fairly small distances, and by increasing the effective capacity of the system in this way, cellular technology also finally overcomes the traditional restriction of conventional mobile telephone services - low capacity leading to short, expensive manufacturing runs and restricted market development.



Map showing Cellnet's proposed coverage by 1986.

Cellnet

map which shows the progressive roll-out of the Cellnet system up until the middle of 1986.

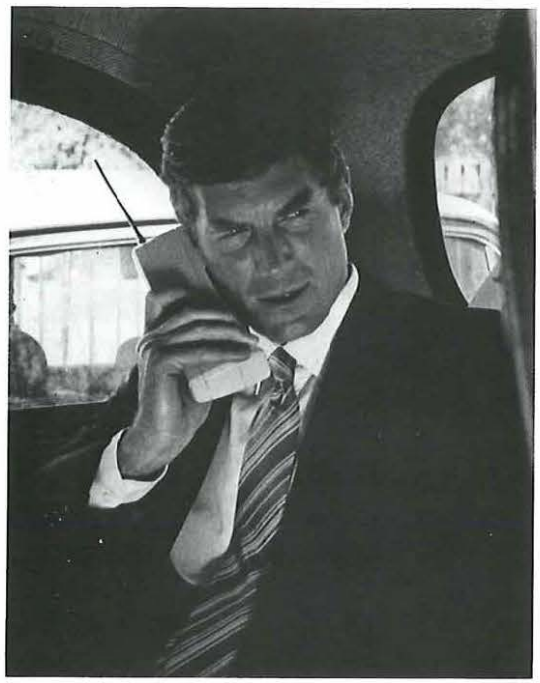
The parallel task of managing the capacity offered within this service area is a continuing programme which makes use of information from Cellnet's database on cell-by-cell system use patterns. All cell sites are designed with expansion capability and channels can be added at short notice. A brief consideration of the frequency allocation pattern rapidly indicates a maximum capacity for any given cell.

This can be found by dividing the total voice channels available (at present 300 in the case of Cellnet) by the number of cells in each repeating pattern – typically seven. But even when the maximum capacity of a cell is reached, it is still possible to increase the number of channels available in an area by cell splitting, which means replacing a single large cell by a number of small ones. The Cellnet system, therefore, can respond to market pressures at a very local level.

But Cellnet's marketing role is not confined to network management and design alone. In granting the Cellnet licence, the Government included specific requirements on the way in which service was to be made available to the public.

Under the terms of its licence, Cellnet may not retail service directly to the public. Instead agreements have been reached currently with 14 companies who act as accredited retailers of the service. In this structure a two-tier marketing approach has been developed in which Cellnet's main tasks are to spread awareness of cellular technology in general and Cellnet in particular, while the retailers concentrate on putting together complete packages of service, hardware, financing, and maintenance and, of course, on closing the sale.

Mr B McPhee is Cellnet marketing manager.



Keeping in touch while on the move – a customer uses a portable cellphone in a London Street while a businessman takes part in a conference as he travels in a taxi to a meeting.

Confusion

This approach has advantages and disadvantages. Particularly in the early days there was confusion among the public, who were faced with a multitude of separate companies, all in some way connected with Cellnet. This confusion extended even into the terminology associated with the industry – with products branded Go-Phone, Travelphone, Marconiphone and so on.

On the other hand, the advantages were soon apparent. Cellnet is being marketed in different ways by all 14 retailers. This means that the potential customer has a real choice within the Cellnet range. The chances of any single customer finding the required combination of equipment, service, price and so on are greatly enhanced by the fact that each retailer has an individual package.

At the same time, the marketing activity stimulated by so many interested parties created a spin-off in terms of overall awareness of Cellnet. And by working with its retailers and with equipment manufacturers, Cellnet has been able to ensure that where necessary, services and products are tailored to meet the needs of particular user groups and occasionally even individual customers.

One of the factors which sets cellular apart from previous mobile radiotelephone systems is its potential for enhancement and development. The high quality of the system, together with the eventual prospect of over half a million users, has encouraged companies to develop products and services specifically for the cellular market. This dynamism in turn helps create the atmosphere of promise and excitement which has surrounded cellular from its inception.

The early experience of Cellnet is confirming hopes and predictions that cellular would indeed represent a clear break with the past. More than any other major telecommunication innovation, cellular networks and services are uniquely responsive to market pressures. As such the industry represents a true trial of the competitive environment that will increasingly operate in the UK telecommunications industry.

British Telecom Journal
Spring 1985

The economical use of energy throughout British Telecom is a vital weapon in the company's drive to cut costs and improve efficiency in the highly competitive environment in which it now operates.

Managing to cut the cost of fuel

Ron Smith

The real cost of energy has more than doubled since 1973 and it is expected to double again by the turn of the century as it becomes more difficult to tap new sources. Energy management, therefore, has become a science in its own right and British Telecom's approach to saving fuel has never been more sharply focused.

Fortunately the spectre of a world fuel shortage – thought to be a distinct possibility seven or eight years ago – has receded but the alarm bells which sounded then have done much to shape current attitudes.

Fuel, of course, is a highly significant factor in British Telecom's overheads. Last year it cost £72 million and the bill will continue to rise with inflation and as the business expands to meet new opportunities. But careful energy management can and does reduce energy costs. This is recognised at the highest levels of management and executive corporate directors have been asked to reduce electricity consumption by at least ten per cent in buildings under their control.

Different fuels cost different amounts for the same quantity of energy. After allowing for efficiency of use, electricity is most expensive and gas is cheapest with the ratios being gas = 1, oil = 1.3 and electricity = 2.7.

Unfortunately, over the past ten years British Telecom's consumption of electricity has doubled, but consumption of gas and heating oil has dropped by 18 per cent. Part of the increased use of electricity has been due to the ▷

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introduction of electronic exchanges – a TXE4 exchange, for instance, uses three times as much energy as a similar size Strowger exchange. And TXD will probably use even more because of its continuous power consumption irrespective of traffic and all except the smallest exchanges need constant air cooling.

The guiding policy towards energy management has always been that energy saving measures should recover capital, labour and maintenance costs within five years but it is easy to be misled and invest in projects whose high capital outlay will never be recovered. Typical examples which should be treated with extreme caution are:

★ Heating water by solar panels: it can take 21 years to recover the cost, whereas the life of a solar panel is only about ten years.
★ The use of heat recovery schemes in buildings: the capital costs are high and there is rarely need of a continuous use for the heat produced.
★ Heat pumps: capital costs are high and, except in ideal conditions, heat pumps do not always operate as efficiently as claimed.

Simple measures, like better controls and improvements to building fabric are the best. Some have recovered up to eight times their initial cost within four years and it is this type of energy management leading to real savings which is worthwhile.

Although every British Telecom employee is urged to help reduce energy costs by switching off unwanted lights, closing doors and windows when the heating is on, and other obvious measures, it is a fact that for much of the time staff are too preoccupied for fuel economy to be at the forefront of their minds. For this reason the problem must also be tackled by use of the correct supporting technology and automatic controls. Fortunately microprocessor/solid state technology is making this easier.

A good example of what can be achieved in energy saving can be found in the lighting of telephone apparatus racks which used to cost £1.6 million a year. Equipment rack layouts are usually deep and require at least ten fluorescent luminaires per gangway to sufficiently illuminate the equipment for maintenance purposes.

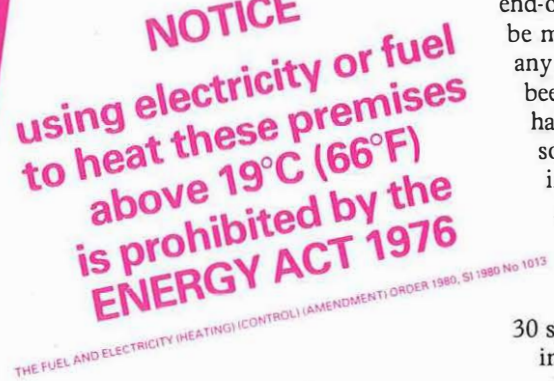
It is common for lights to be switched on in the morning and then be left until staff go home, although no one may use a gangway all day. In larger exchanges which are continually manned, it is conceivable that the lights may never have been turned out!

Automatic switching

Because attempts to persuade staff to turn off unneeded rack lighting were unsuccessful, automatic switching is now being used. There were two problems: the system had to be low-cost and, because a technician could be on a step ladder clearing a fault at any time, it was necessary either to sense the presence of staff or give a warning before turning lights off. Trials showed that sensing staff presence was too expensive but tests with a simple controller, costing less than £30, proved highly successful.

The controller, which proved the point that simplest is best, is now held in British Telecom stores as Control Unit 71A and is suitable for switching a fluorescent luminaire load of 5 amps. It also causes the minimum disturbance to existing circuits.

Lights are switched on when required by the existing end-of-suite switch and can be manually switched off at any time. If lights have not been switched off after half an hour, an alarm sounds and a red indicator lamp flashes. After six seconds the alarm stops, the indicator lamp continues to flash for 30 seconds, after which the indicator lamp and the lights go out. If when the alarm or indicator lamp are operating either pull switch is used a further half hour of light is obtained. ▷



An Area for savings

Typical of an Area where awareness and initiative have paid valuable fuel saving dividends is Brighton which covers 781 square miles, administers 103 sites and employs 3,300 staff.

Since 1974, the Area has seen a 54 per cent increase in telephone connections but currently uses only a fraction more energy (108,000 gigajoules compared with 106,000). If no attempt at conservation had been made it could be argued that with inflation total extra cost to British Telecom would have been in excess of £1,000,000.

In Brighton, all fuel use has been monitored monthly for the past two years and this provides an ideal opportunity to identify problems early on before they become serious.

Consider first electricity, British Telecom's major source of energy which in the Brighton Area last year cost £564,000 for lighting and heating. Major breakthrough has been the development of a computer program which ensures that every site is working on the most economical tariff.

There have been considerable economies in lighting, too. Use of automatic switching using photocells for external lighting is well proven and equally advantageous are automatic time and light sensitive controls in offices. A change has also been made from tungsten to fluorescent lighting, and low energy tubes and fittings are now in regular use.

As far as heating is concerned, there is a mixture of 'off peak' underfloor and night storage heating and a few sites using 'on peak' fan heaters. Originally fixed-time start controls, later updated with thermo-time regulators were installed but more encouraging results have been obtained with the 'Pactrol' controller. Dehumidifiers for summer use are also being studied.

Heating oil is Brighton's second most used fuel with 1.44 million litres being consumed last year at a cost of £245,000. This represents a major success with a reduction of 590,000 litres since 1974 - a cost saving of more than £100,000 at today's prices. A major reason for this is the greater attention now being paid to boiler efficiency with the installation of nearly 50 optimum start controllers.

Three years ago came the microchip and this together with new high efficiency boilers ensures that many installations now work at above 80 per cent efficiency. The story with gas is similar with most savings being obtained from improved heating controls.

Insulation, secondary glazing and draught proofing are other areas which have received careful attention. Since 1974, 3,000 metres of piping has been insulated, as have about 30 buildings with loft space. Secondary glazing has been carried out in areas occupied 24 hours a day like operator switch rooms where work is almost exclusively sedentary.

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Managing to cut the cost of fuel

Brighton Area energy conservation officer Colin Pengelly (left) and technician John Windsor test boiler efficiency at Brighton West TEC.

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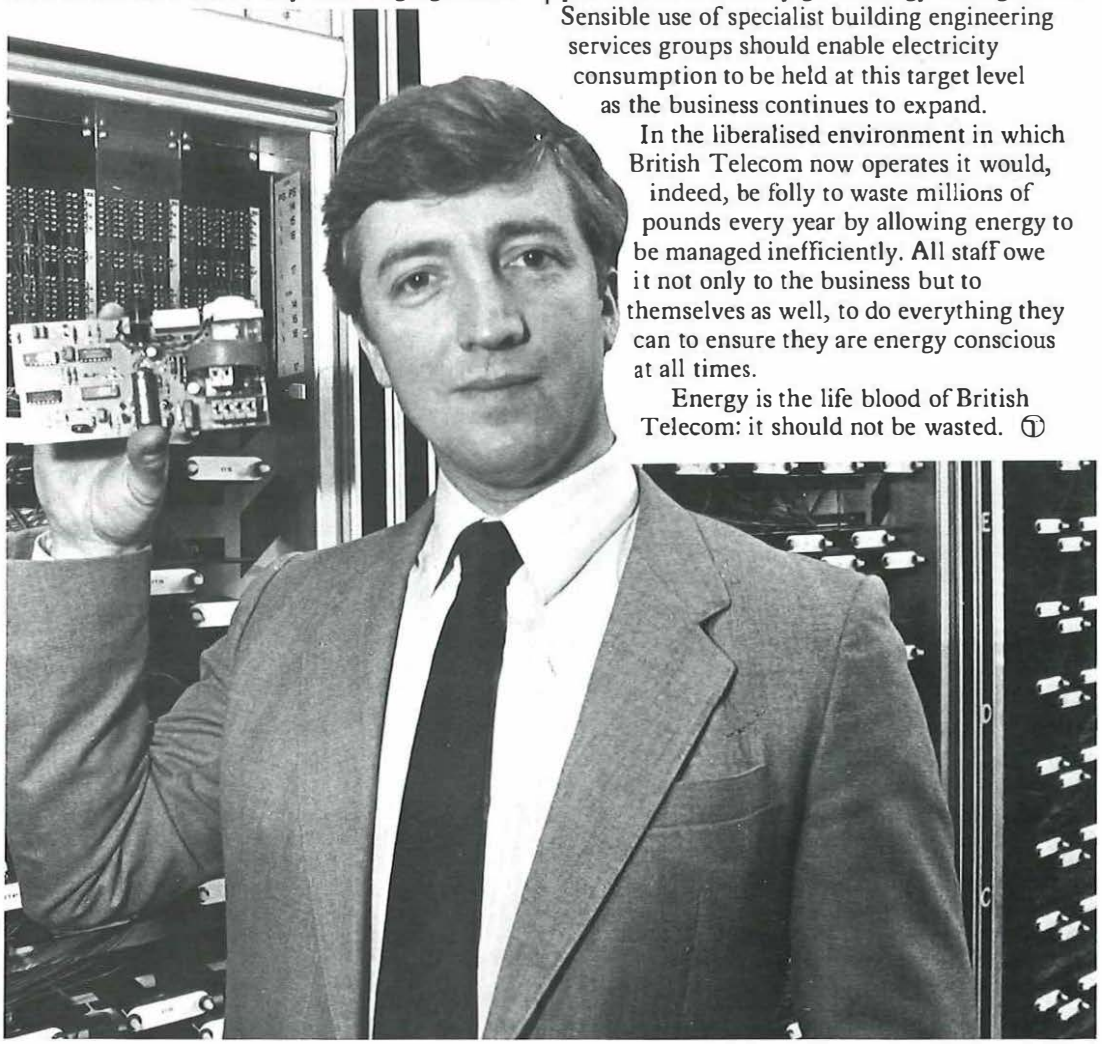
Tests have shown that the new control unit consistently reduces energy consumption on rack lighting by 60 per cent and recovers all purchasing and installation costs in about a year.

The savings achieved by good energy management increase year-by-year as fuel prices rise. There have been many encouraging results in this area and it is conservatively estimated that if nothing had been done to manage energy, last year's fuel bill would have been £79 million instead of £72 million.

The target set by the chairman to reduce electricity consumption by at least ten per cent is possible to achieve by good energy management. Sensible use of specialist building engineering services groups should enable electricity consumption to be held at this target level as the business continues to expand.

In the liberalised environment in which British Telecom now operates it would, indeed, be folly to waste millions of pounds every year by allowing energy to be managed inefficiently. All staff owe it not only to the business but to themselves as well, to do everything they can to ensure they are energy conscious at all times.

Energy is the life blood of British Telecom: it should not be wasted.



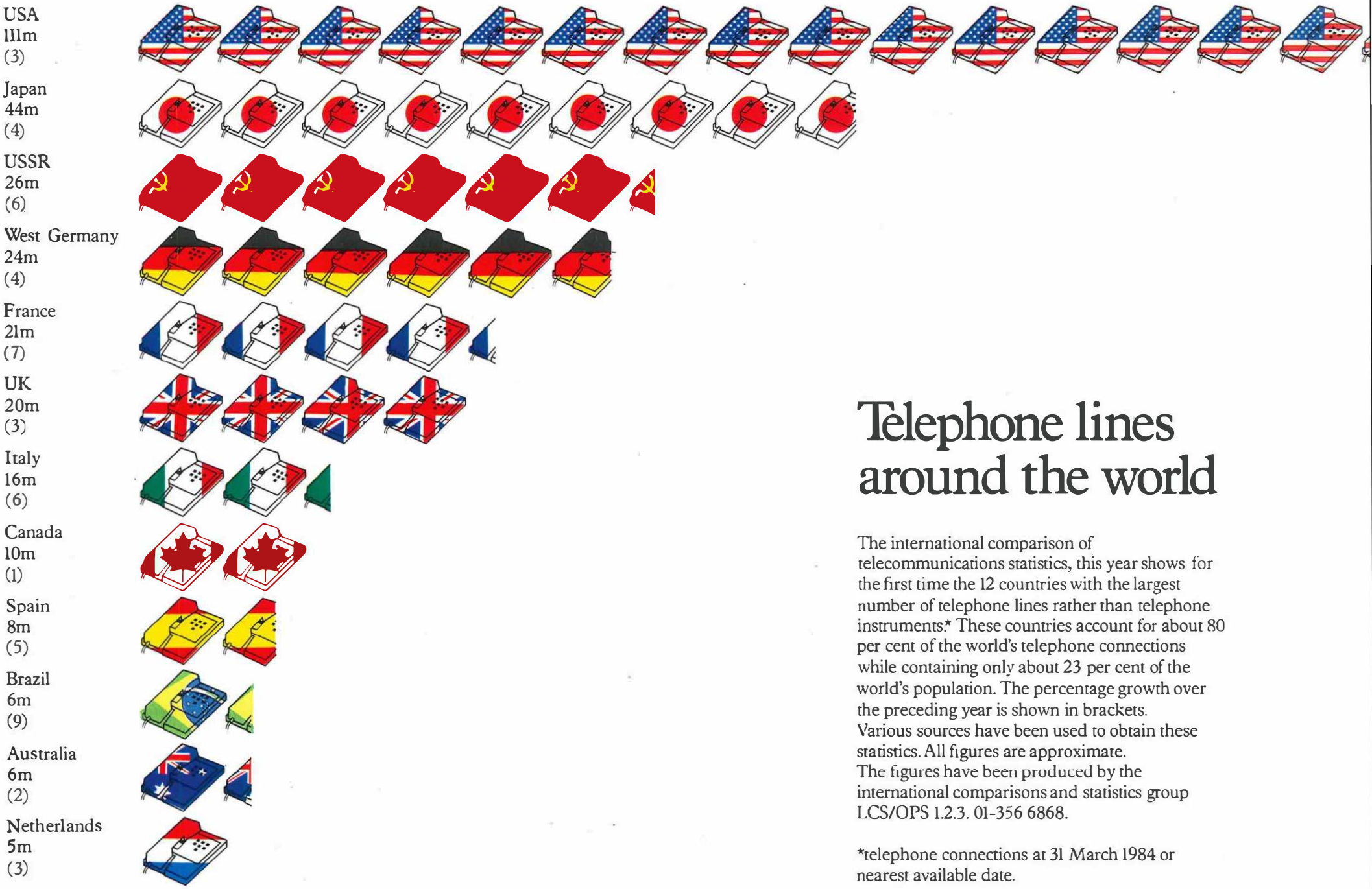
Small – but highly effective. This small control unit demonstrated by Bristol Area AEE Phil Lewis automatically ensures that when exchange rack lights are not needed, they switch off.

Mr R Smith formerly worked in LCS/Power and Building Services Division but is now responsible for building engineering services for computer installations and computer projects.

Keep it simple

The range of opportunities to save energy and money and increase staff satisfaction is immense. Generally simplest is best, and below are a few areas with high money saving potential.

- Temperatures may be set too high in one part of a building to maintain the correct heat in another. This is usually caused by obsolescent or badly maintained controls. Calling in the specialists from the local building engineering services group will normally solve the problem.
- Heating and cooling systems operating at the same time are common where they have been installed separately. If the heating thermostat is set higher or too near the cooling cut-off temperature, both systems will continually operate at full load to gain control. The solution is to redesign the systems with a common control and an adequate 'dead band' between the maximum heating and minimum cooling temperatures. Savings of 25 per cent of a building's energy bill have been made by doing this.
- Buildings are sometimes heated unnecessarily, often due to badly adjusted controls. Unattended buildings such as those housing UAX exchanges have been found to have heating operating permanently, sometimes throughout the summer. One visit by an engineer can soon put matters right.
- Inefficient boilers are another potential source of waste. Clean burners and waterways are essential for good boiler efficiency as two millimetres of soot on a heat exchanger can reduce efficiency by ten per cent. Cheap and portable electronic flue gas testing equipment now makes boiler checks quick and simple.
- Reduction of building heat-loss is always worth exploring. Heat is lost by conduction and radiation via the floors, walls and roof and by air infiltration. Although some loss is inevitable, it can be minimised at little cost. Window and door frames should be adequately sealed and loft hatches closed as natural leakage can represent 70 per cent of the building's heating bill.
- Monitoring consumption and cost is vital. The recording of energy consumption and comparison with previous years' figures will quickly show buildings using too much energy. Several regions have computerised energy consumption records and later this year the EMIS computer program will include an energy subsystem.
- Most British Telecom buildings are now on the best available electricity tariff, but, because building use may change, regular checks should be made on the tariffs used. Checking electricity tariffs usually requires the expertise of the local building engineering services group.



Telephone lines around the world

The international comparison of telecommunications statistics, this year shows for the first time the 12 countries with the largest number of telephone lines rather than telephone instruments.* These countries account for about 80 per cent of the world's telephone connections while containing only about 23 per cent of the world's population. The percentage growth over the preceding year is shown in brackets.
Various sources have been used to obtain these statistics. All figures are approximate.
The figures have been produced by the international comparisons and statistics group LCS/OPS 1.2.3. 01-356 6868.

*telephone connections at 31 March 1984 or nearest available date.

British Telecom Journal
Spring 1985

Payphone power

Britain's payphone service is to undergo a complete facelift during the next few years. Bright, easy-to-use aluminium and steel booths housing highly-sophisticated and vandal resistant equipment will soon become as familiar as the traditional red kiosks they will replace.

No sooner had the centenary of Britain's 'public call offices' been marked at the end of last year (see *British Telecom Journal*, Autumn 1984) than British Telecom was able to announce its plans to invest £160 million pounds in the payphone service to make it rival the best in the world.

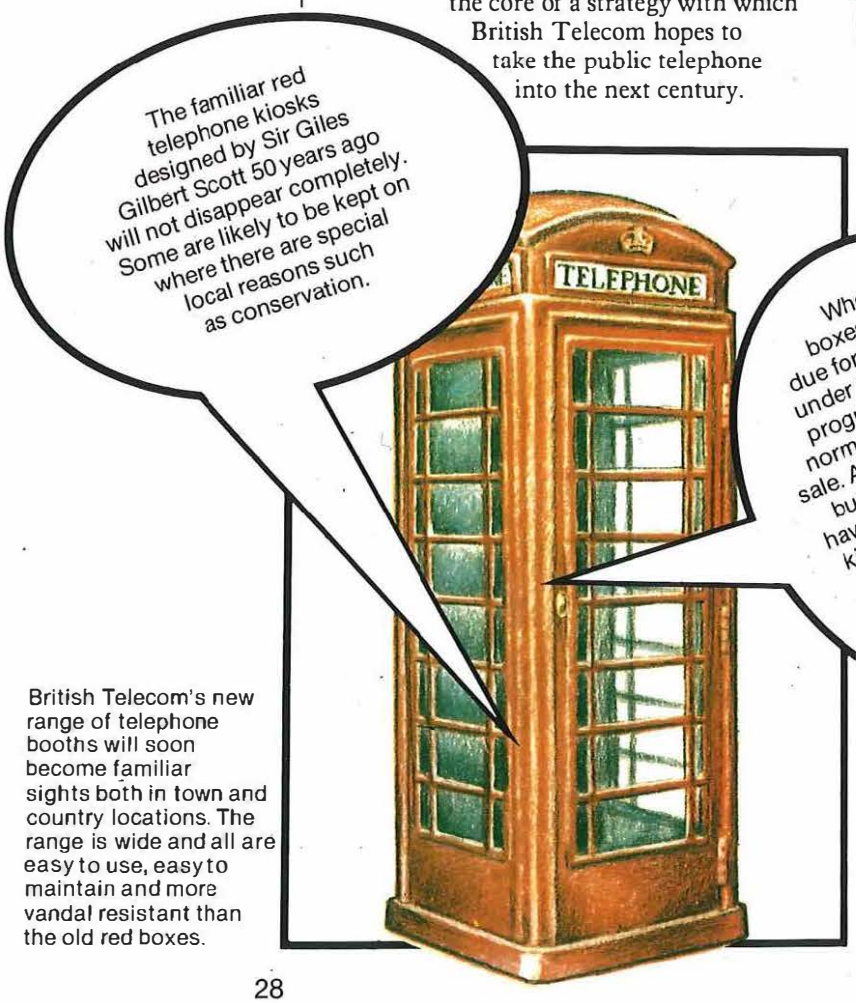
The plan, unveiled by Local Communications Services and Managing Director, Iain Vallance will mean:

*fully electronic payphones
*thousands of phones which take credit and/or cash cards rather than coins
*wider, lighter doors to give easy access to those in wheelchairs
*various vandal resistant features
*easy-to-clean and maintain booths

On the way out are:

*troublesome and outdated equipment
*fittings prone to vandalism
*the old, heavy doors
*the narrow, restricting entrances

The modern light new booths with their up-to-the minute technology form the core of a strategy with which British Telecom hopes to take the public telephone into the next century.



British Telecom's new range of telephone booths will soon become familiar sights both in town and country locations. The range is wide and all are easy to use, easy to maintain and more vandal resistant than the old red boxes.

The radical new approach is aimed at encouraging greater use of payphones. This in turn will lead to a reliable, clean and profitable service. In 1983/84 British Telecom's 76,500 payphones lost £50 million but the new investment programme should yield a profit by the end of the decade.

The new booths come in a variety of designs in hard-wearing paint-free finishes of anodised aluminium and stainless steel.

They will be lit up to four times more brightly and fitted with sound proofing and vandal-resistant panelling.

Two new types of cashless payphone are planned to remove the motive of coinbox thefts – the major cause of payphone vandalism. CreditCall will operate on a customer's own credit card – Access, Visa or American Express. The card is inserted in a special unit attached to the payphone which reads the card and sends information to the exchange. The customer is then charged on his credit card account in the usual way. Trials are currently being held in ▷

Mobile payphones on trains and express coaches are being installed, working on British Telecom's Radiophone network. All Western Region trains are to be equipped with Trainphone in a programme scheduled for completion this summer. Further expansion of the service to other routes is being considered. Coachphones are operating on services between London and Newcastle.

The new generation of electronic equipment automatically reports when its cashbox needs emptying and tells engineers when it has a fault. The latest version, Blue Payphone 2, accepts all coins from 2p to £1 in a single slot. Coins can be inserted any time during a call without interrupting the conversation.

Kiosks were a variety of shapes, sizes and designs until 1921 when the first standard design, in concrete, was introduced in London. But it was 1936 before a standard kiosk spread to the rest of the country. This was Sir Giles Gilbert Scott's Jubilee design.

Britain's pay-phone users pressed Buttons A and B for more than 30 years. Introduced in 1936, this much-loved equipment was used until the mid-1960s.

The current range of push button electronic payphones was introduced in 1981. They are now replacing pay-on-answer dial telephones which date from 1957.

There are approx-imately 1,000 Phonecard phones at busy city centre locations. These are being increased to more than 8,000 by the middle of the year. They operate on holo-graphically-encoded cards available from newsagents, British Rail Travellers' Fare outlets, post offices and British Telecom shops.

There are about 60,000 traditional red kiosks through-out the United Kingdom. Most of the rest have large windows and wider doors. Designed by Bruce Martin, they were introduced in 1968.

London – at Heathrow Airport and Waterloo Station.

AccountCall is also on trial. Customers in Bristol dial their account and code number onto modern push-button payphones linked to special exchange equipment before making a call. Charges are added to the users home or business telephone account.

The now familiar Phonecard service is also being expanded. By the summer more than 7,000 Phonecard Phones accepting pre-paid cards will have been added to the 1,000 already in service.

British Telecom is spending £55 million to equip all existing 76,500 public booths with modern push-button electronic design payphones and a further £70 million will be spent converting its 293,500 rented payphones in places like hotels, hairdressers and public houses to all-electronic equipment.

Other developments include extending the Trainphone trial on British Rail's Western Region to other areas and introducing payphones on express coaches and ferries using British Telecom's radio network.

Earliest kiosks were either automatic or controlled by an attendant. Automatic kiosks had coin slots in their doors. Customers had to insert one penny or two ha'pennies to gain access to the telephone. Attendants took payment, connected the call and then left the customer to talk in private.

Although British Telecom's licence allows it to remove little-used kiosks where takings fall below £185 a year, kiosks are only removed after detailed consultations with local organisations such as district and parish councils. They may subsidise British Telecom to retain the service.

The pedestal booth, compact and functional, fits in with the village environment.

British Telecom Journal
Spring 1985

A good deal easier

An agreement has been signed which will speed up and simplify dealings with British Telecom's biggest customer, HM Government. After six months of negotiations, a standing arrangement has been made with the Treasury's Central Computer and Telecommunications Agency (CCTA) for deals up to £100,000.

The new rules and regulations cover the sale of telecommunications apparatus, computers and associated maintenance services to all Government departments. Orders in excess of the £100,000 ceiling will be dealt with under different tendering arrangements, but the new rules are expected to speed up numerous small and medium-sized deals in the future.

The agreement, which came into force immediately after a signing ceremony at British Telecom Centre in London, was prompted by the launch of British Telecom as a public limited company. It means that British Telecom now joins the Government's list of approved contractors for standing arrangement purchases.

CCTA's deputy director of contracts, Mr John Winup said that the negotiations had been arduous but always 'courteous and friendly'.

Mr Paul Reevey, National Networks director of national accounts and sales, said that it was vital for British Telecom to give the best possible service to ensure that the Government had the communications facilities it needed.

Pictured at the signing ceremony are (left to right): Mr John Winup and Mrs Christine Janner-Burgess, both of CCTA and Mr Paul Reevey, of National Networks. ℗

City information service

Businessmen and private investors can now receive up-to-date reports on key developments on the Stock Market and foreign exchanges by picking up the telephone.

A new information service, Citycall, offers a choice of six separate bulletins which are updated throughout the business day. Each covers a specific topic – Stock Market Report, Leading Shares, Company News, Active Shares, Foreign Exchange and World Markets.

Citycall is the first of a new range of premium telephone services to be offered by Supercall, a business within British Telecom Enterprises. Deputy chairman of British Telecom, Mr Deryk Vander Weyer, said that it had been chosen to spearhead the range because of the special needs of businessmen in London.

The service is equipped with a local area network of nine IBM computers linked with both the Stock Exchange and the National Westminster Bank. A database covers the top 1,500 securities on the London market and the system is designed to cope with the thousands of share price changes which occur on a busy day.

The bulletins are compiled and recorded by an experienced team of financial reporters, led by Caroline Griffiths, formerly a senior producer of financial programmes for BBC radio. They are available 24-hours a day on 0066 0066 and provide about two minutes of information for a cost of up to 20p a minute.

The picture shows Mr Vander Weyer (right) and the chairman of the Stock Exchange, Sir Nicholas Goodison, trying out the new service. ℗

British Telecom Journal
Spring 1985

Keeping up with change

A specially-written computer software program which provides rapid retrieval and updating of internal directory information is now working in Coventry area.

Nigel Davis
and Will Barton

As the telecommunications market increasingly opens up to competition and technological innovation continues unabated, it is vital for British Telecom to attract more customers and retain those it already has. And nowhere is the need for an efficient and helpful image more crucial and sensitive than the way in which British Telecom responds to enquiries made via its own principle product – the telephone. With this in mind British Telecom Coventry, has put computer technology to work in the shape of its locally developed software package Cassidy (Coventry Area Service Switchboard Internal Directory).

Three years ago, Coventry General Manager's Office (GMO) moved from its old ex-GPO headquarters to the futuristic tower of glass and concrete that is Telecom House. In keeping with its modern image, the new GMO was fitted with a microprocessor-controlled digital call connect system but the internal directory, containing more than a hundred pages of information, and listing extensions and outside lines by duty reference and surname, was still the principal source of 'connect-to' information.

In the fast-moving world of modern telecommunications, however, such information is subject to almost daily change. Despite regular reprints and supplements, a paper directory rapidly becomes a mass of manuscript amendments and additions, as each new product or service, and each new business method has its impact on the organisation of the Area.

The problem was further complicated by the reorganisation of the old sales and installation groups into the new business systems and

Above: A close-up view of Cassidy as operator Valerie Wardle uses the system to deal with a customer enquiry.

A general view of operators at Coventry GMO making use of the new Cassidy system.

consumer products divisions. To connect calls to sales it was now necessary for operators to be able to establish whether a business subscriber was a single- or multi-line customer. This meant that each operator needed to refer to a list containing every multiline business telephone number in Coventry Telephone Area – more than 5,000 numbers.

Each operator's copy of this list, together with the appropriate 'connect-to' information was contained in a large visible index file (VIF) which although an improvement on simple paper lists, was difficult to consult and update, along with the various other paper records. This led to Coventry Area's Customer Services Computer projects group producing a purpose-written software package to replace the VIFs with a computerised system, providing rapid retrieval of accurate 'connect-to' information and allowing speedy and efficient updating and expansion, ultimately replacing almost all paper records – in short Cassidy had arrived.

Satisfaction

Prime criterion in its development was to provide a first-class service to any customer calling the Area office. It had to replace the VIFs and, as far as possible, the other paper records, provide a rapid retrieval time for all data held, allow for easy adaptation to meet future needs, enhancements and changes to operational structure and increase the job satisfaction of the operating staff.

All this meant that user-friendliness was at a premium in Cassidy's development. The program had to be so designed as to prompt the operator for input to be elicited from the caller and to display information and instructions in a form that would be most conducive to smooth operation of the terminal and the switchboard.

The system was consequently developed in close consultation with both the operating staff and local trade union representatives. The degree of interaction and co-operation between the projected end-users, their first line supervision, the area computer support group and divisional management that could be achieved by an in-house computer projects group within the customer service division, was the crucial ingredient in Cassidy's success.

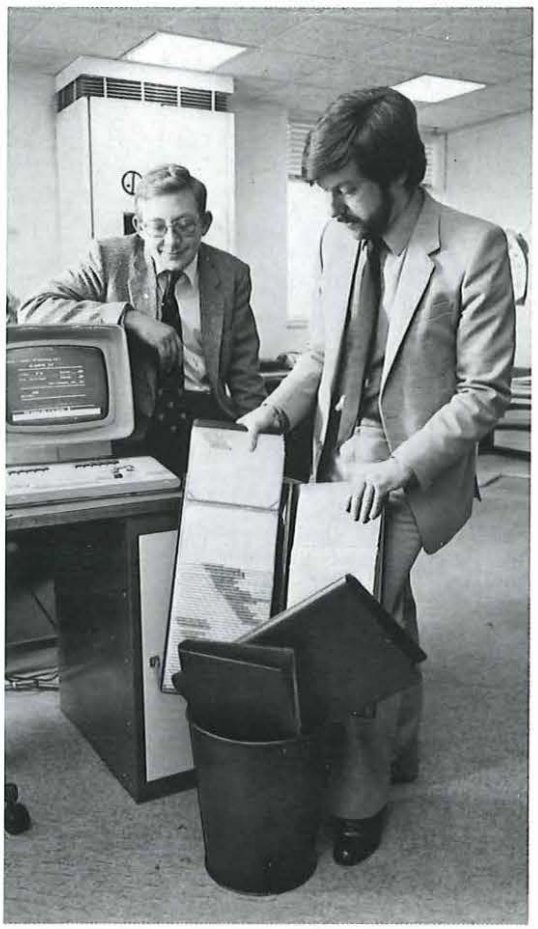
In place of printed records operators using Cassidy are equipped with VDU terminals giving access to files held on a British Telecom Factories multi-user microcomputer. Each operator is logged into a dedicated copy of the main Cassidy program, allowing her to consult extensive files of information on 'connect-to' numbers and, where necessary discriminating as required between multi- and single-line customers. The operator keys a single digit code from an on-screen menu to select the type of 'connect-to' information required, followed by the detailed information needed to select a particular extension.

Most incoming calls are to telephone accounts, sales or customer service duties. A full screen of information giving, as appropriate, the name, duty reference and extension number of the person required, along with alternative extensions and related notes, is accessible within two seconds of keying in a two or three character exchange code and the caller's telephone number. Also accessible by a single digit code from the on-screen menu are routines to consult an extensive file of miscellaneous 'connect-to' numbers not covered in the three main sections, and an alphabetical directory of staff, as well as an index of the local exchange codes used by the operators.

Operating staff and management were closely consulted over the design of output screens to ensure that information was complete and clearly displayed. Error trapping is provided to give user-friendly on-screen reports and instructions in the case of operating error.

The modular structure of the program ensures that future changes in the operational organisation of British Telecom Coventry will easily be accommodated with the minimum of re-writing and the files are designed for rapid updating and amendment. Routine file maintenance takes place outside working hours, but in an emergency an urgent amendment to files can be inserted in minutes. The program structure invites further enhancements in response to the developing needs of the business.

Cassidy was installed on a trial basis last year and was extended from one to five terminals over a period of two months. It has proved popular and reliable and the trial has now been completed. Already other telephone areas have expressed interest in the project. ◑



No more paper directories! Authors Nigel Davis (right) and Will Barton commit a set of old directories to the waste paper bin.

British Telecom Journal
Spring 1985
Keeping up with change

Mr N S Davis is a telecom superintendent in Coventry Area Customer Services Division responsible for local computer projects.
Mr W D Barton is a telecom officer in the same group.

In a future world, many people will no longer need to travel to an office, but will 'telecommute' instead via computer terminals from home. Today, a growing number of business executives are finding that thanks to British Telecom's Network Nine service, telecommuting is no longer a prediction but a daily reality.

At your service

David Brunnen

To support the business needs of independent executives and businesses located away from large business centres, British Telecom's new venture, 'Network Nine', aims to provide a package of services that include not only 'high-tech' telecommunication facilities but the many practical details that make it all possible.

The service offers a complete range of efficient office facilities with access to advanced communications and computer technology and it is available to both UK and overseas businesses who need good 'London office' facilities at an affordable price.

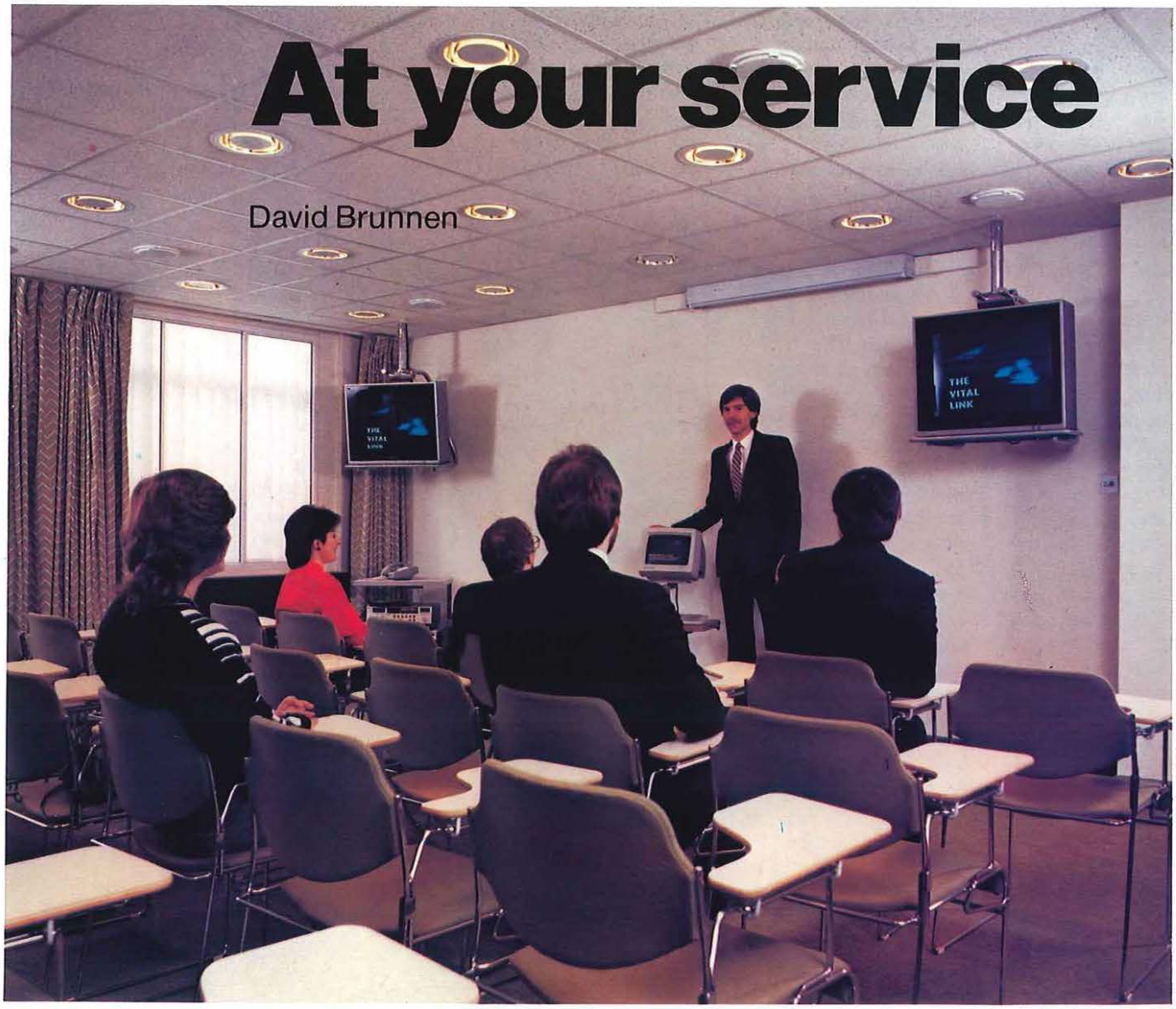
Network Nine has been designed for companies which need an occasional London base, executives who work from home, and businesses requiring flexible short-term capacity with all the advantages of modern communications as well as office services without technical and administrative problems.

An executive office complex, in the heart of London's West End, provides short-term, fully-furnished office space, meeting rooms and conference facilities with comprehensive technical and secretarial back-up.

The business name Network Nine was drawn directly from an analysis of the needs of smaller businesses and independent executives. A review of how these businesses bought and used Information Technology was carried out and the analysis was split into three sectors – data, text/image and speech.

In looking at support services it became clear that although the possibilities for convergence were increasing, many users were unable to buy compatible equipment. Smaller businesses found it difficult to make radical purchase decisions and could rarely find sufficient time or sufficiently patient and understanding suppliers. Larger businesses, however, did not seem to have these problems, so the analysis was extended to probe the differences between large and small businesses.

This showed that smaller businesses required three additional attributes to overcome their disadvantages. Firstly, large businesses often had specific resources devoted to the management of communication technology. Secondly, small businesses were disadvantaged by being unable to afford access to the most sophisticated telecommunication services. Whereas a large



company can afford to buy a front-end processor or PABX to make intelligent use of national telephone systems, the smaller company was restricted to single line access with perhaps only the benefit of an intelligent telephone.

Finally, the large company could deploy a dedicated route into Packet-SwitchStream while the independent executive was left only with basic dial-up services. The idea of working from home may seem attractive but the sort of services found in large offices, such as photocopying, conference rooms, and receptionists, are essential from time to time.

Organised

The analysis showed that the gap between big company advantages and small company needs could be filled if the small businesses could be organised in such a way that their demands could emulate the scale of larger users. It also indicated that, to address effectively the market for this growing population of hi-tech hungry businesses, the delivery of their combined requirements could be packaged so that they could be used only when required.

By taking its name from the nine parts of this matrix, Network Nine has produced packages of services to suit both regular customers and those small businesses which need the operational advantages of the big company for short periods. The name Network Nine may sound 'hi-tech' but it also reflects the essential attributes of a 'club'. It does not aim to operate 'public access' facilities but rather to develop and understand the facilities needed by every one of its members. ⓣ

Support services and facilities are available in any combination to suit individual needs but a comprehensive package for regular clients, known as 'Networkers', is offered for an annual subscription of £480 plus VAT. It includes:

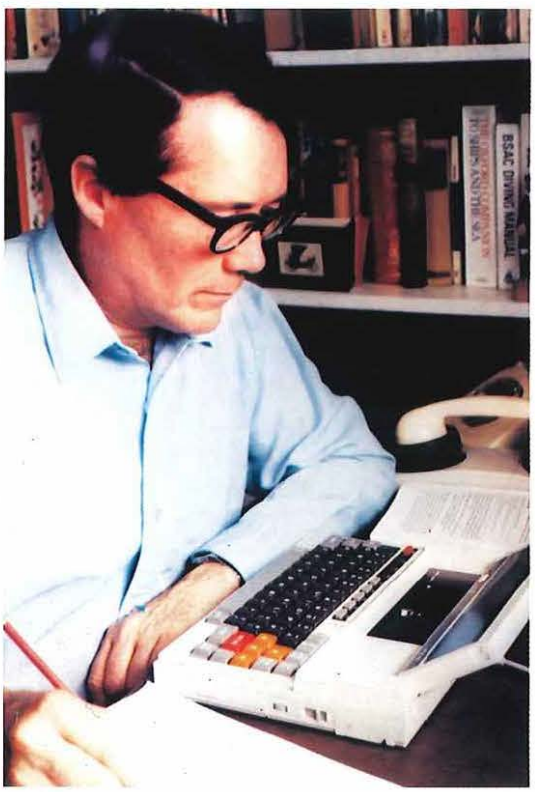
* A prestigious address for receipt and despatch of mail.
* Telephone, telex and facsimile addresses for transmission and reception of messages.
* Access to computing, secretarial, and telecommunication facilities.
* An individually allocated Electronic Mailbox in conjunction with the client's own or Network Nine's computer and speech terminals.
* Access to the offices, meeting rooms, conference and workspace facilities which are all fully cabled for access to PSS and electronic mail.
* Training in the use of electronic mail and other facilities.

Optional services are also available ranging from individual telex and facsimile addresses to Radiopaging, Voicebank (voice mailbox) and computer terminal rentals.

Offices in a variety of sizes are also available on monthly licence for periods from one month and have full 24-hour access.

The licence fee covers rent, rates, heating, lighting, air conditioning, power and daily cleaning. Other services are available on a tariff scale.

British Telecom Journal
Spring 1985
At your service



Above: The reception area is spacious and well appointed.

Far left: Network Nine's conference and meeting room facilities.

Left: A customer remotely accesses Network Nine facilities working from his study at home.

Mr D J Brunnen is Network Nine business manager.

British Telecom Journal
Spring 1985

Pagers provide a link for life

Up to 250 medical patients awaiting organ transplants can now be in constant touch with their hospitals through Life Page, a new service provided free by British Telecom Radiopaging. The service was accepted on behalf of the National Health Service by the Under-Secretary of State for Health, John Patten MP, at Papworth Hospital, Cambridgeshire, one of Britain's foremost organ transplant units.

Under the scheme, patients awaiting heart, kidney, liver and other organ transplants are issued with standard British Telecom radiopagers, supplied free of charge through transplant unit administrations. Many of these patients remain active and mobile and British Telecom believes it is they who will benefit most from Life Page, keeping them only a 'bleep' away from vital surgery.

Supporter

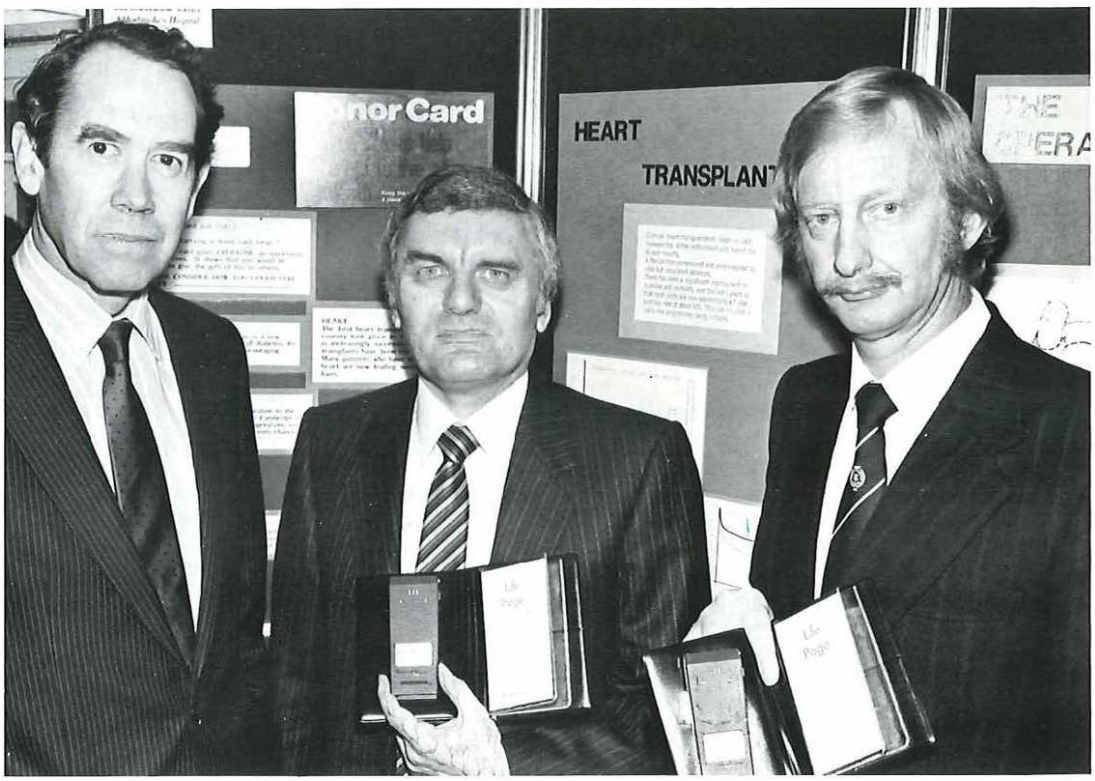
The Life Page service was officially presented to the NHS by Dame Mary Donaldson, on behalf of British Telecom. Dame Mary, a former Lord Mayor of London, a trained nurse, and life-time supporter of health services and administration, is a member of British Telecom's Action in the Interest of the Disabled (BTAID) committee.

British Telecom Radiopaging conceived the idea of the Life Page scheme after studying the success of a similar scheme run by independent radiopaging companies in the United States. Mr Trevor Harvey, general manager of British Telecom Radiopaging, said the service, was virtually nationwide and would mean that people waiting for their operations need never fear being out of touch. Those who were mobile need not have to wait by a telephone for their life-saving call.

Operations

The Life Page scheme will be administered by NHS organ transplant units in all parts of the country. Unit administrators from about 50 hospitals will be providing radiopagers to those patients most likely to need them. Once patients have had their operations, the radiopagers will be passed on to new patients.

Life Page is a logical step forward in communications for transplant administrators. Radiopaging has been part of the medical scene for many years but extending the system to patients is a major breakthrough especially as seconds count once a donor is matched to a patient urgently requiring a transplant operation. The Life Page system ensures that no time is wasted and adds greatly to the peace of mind of patients and transplant teams. ◑



Compact Life Page units will keep patients Paul Stokes (centre) who is awaiting a heart transplant and kidney sufferer Roger Ward (right) in touch. On the left is surgeon Terence English.

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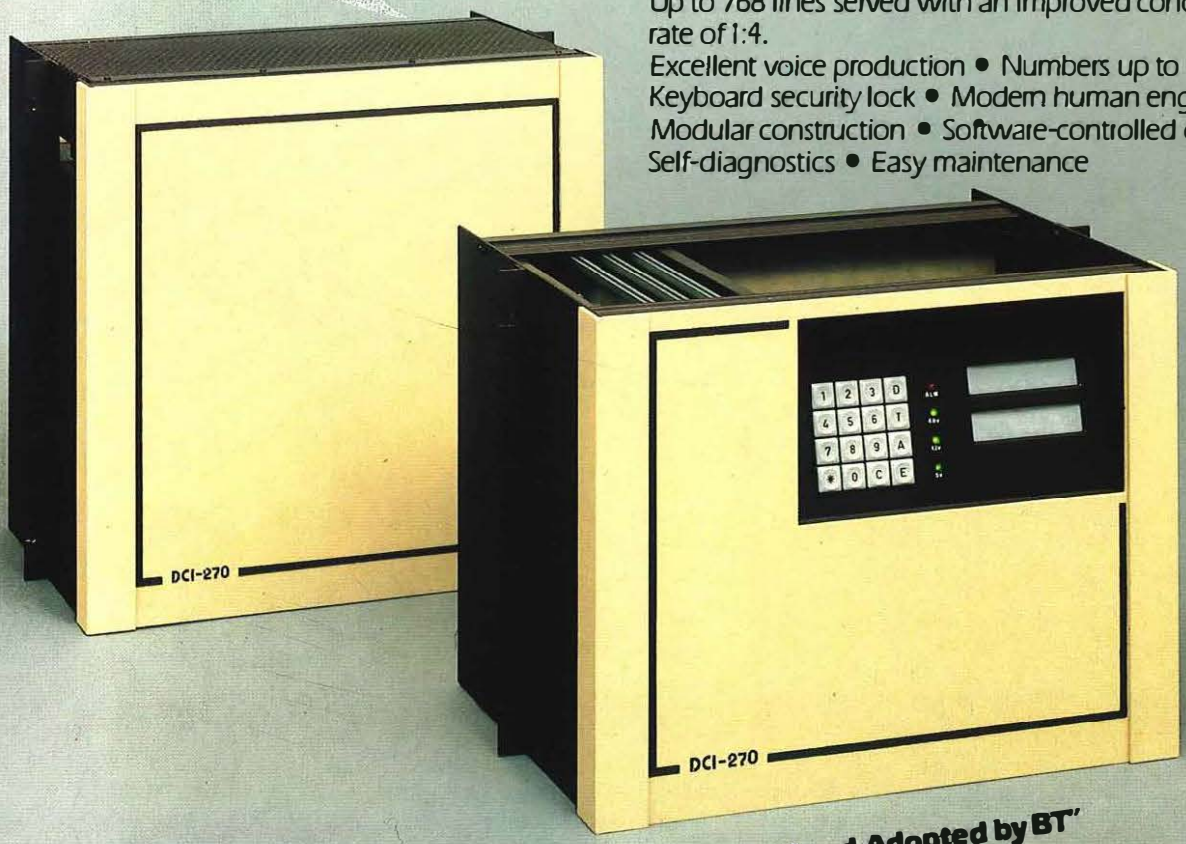

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Pagoda payphones

Two of the most unusual telephone boxes in Britain have been installed in Gerrard Place – in the heart of London's 'Chinatown'.

The aluminium-framed kiosks feature a red and gold pagoda style roof, and instructions on how to use the modern press button payphones inside, are in both Chinese and English.

Westminster Council plans to turn the area into a pedestrian precinct with a Far-Eastern look and the new kiosks are designed to blend in with the theme.

Red is the traditional 'happy' colour of Chinese culture, and the kiosks which cost £800 each – the same as the conventional design – were a gesture by British Telecom to mark the Chinese New Year.

Growing profits

British Telecom has announced pre-tax profits of £1,070 million for the first nine months of 1984/85.

Pre-tax profits of £386 million for the third quarter were £131 million higher and for the cumulative nine months £353 million higher than in corresponding periods in the previous year. If allowance is made for the special factors identified in the prospectus, profits for the three months were £53 million (21 per cent) higher and for the cumulative nine months £176 million (25 per cent) higher.

Turnover was up £211 million (12 per cent) for the three months and growth in volume contributed £136 million – nearly eight per cent.

Sir George Jefferson, chairman of British Telecom, commented: "There has been encouragaing growth in business exchange line connections, up 4.2 per cent over the last 12 months. Residential connections increased 3.4 per cent over the 12 months. Telephone call growth continues to be strong, up 8.7 per cent in volume terms."

He added: "Business has continued to be satisfactory during the fourth quarter and the profit for the quarter should continue the favourable trend of the first nine months results."

World lead

The world's most powerful telephone exchange has been brought into service by British Telecom International (BTI).

It is an enhancement of the international exchange at Keybridge House, Vauxhall, London, inaugurated last May and can handle nearly six times more calls with a capacity of 800,000 call attempts an hour.

The new exchange – code-named TXD20 – has been installed to cater for continuing rapid growth in international phone calls. It also provides for international digital operation, creating a link between British Telecom's growing inland digital network and similar networks overseas.

Mr Anthony Booth, managing director of BTI said the new exchange put British Telecom ahead of the rest of the world. It confirmed that it was in the vanguard of the world drive towards integrated digital networks, which were essential for Britain's future economic prosperity.

The exchange will act as a 'bridge' between existing analogue networks and future digital services, carrying British Telecom into the 1990s and beyond.

Eventually, BTI expects to have three more digital international switching centres and tenders for the next exchange to come into service in 1988 will be evaluated later in the year.

Factory micros

British Telecom is to make and sell an advanced microcomputer designed in Britain.

The company has reached agreement with Bleasdale Computer Systems plc to produce and market, under licence, the Bleasdale 68000 Unix computer.

The machines will be assembled at British Telecom's plant in Birmingham, part of the company's general factories division. Production is due to start in August.

Unix, a software operating system developed in the early 1970s by Bell laboratories, was designed to run on a variety of computers from mainframes to micros, irrespective of manufacture.

System X gains pace

A fourth new main System X digital exchange has been opened at Birmingham (Mercia). Similar exchanges are already in operation at Coventry, Leeds and the City of London and a further 11 are due by mid-summer, at Birmingham (the City exchange), Bristol, Cambridge, Leicester, Liverpool, Luton, Manchester, Newcastle, Nottingham, Reading and Sheffield.

About 60 of the new trunk exchanges will be in place by 1987 to create a fully integrated digital main network.

Customers will link into this network through local System X exchanges, the first of which will be at Baynard House, in the City of London. A further 12 local units will follow later in the year.

Boost for PSS

British Telecom has announced plans to enhance Britain's public data network, giving it added flexibility to meet customers' growing information technology needs.

As part of an £80 million investment programme, new developments for the Packet SwitchStream service (PSS) will include new customer services and an open systems achitecture which not only supports new open standards as they are developed but also caters for existing standards to increase the freedom of intercommunication.

The volume of calls using PSS is doubling each year and credit card validation is a rapidly expanding facility, with about 2,500 card terminals linked to the service.

The service is used for the automatic clearance of bank payments between clearing houses and provides links between insurance companies and their brokers. It is to be developed to carry transaction data for the electronic transfer of funds at the point of sale from banks to retailers.

PSS consists of 87 switching units at 27 sites and the network is being expanded to include more inland switches and a second international gateway at a cost of £30 million.

A further £20 million is to be spent adding MultiStream to provide a local access network for data which will provide low cost, high reliability direct or dial-up connections. MultiStream is based on packet network multiplexors in local exchanges to give improved support for users' terminals and small host computers. About 200 multiplexors will have been installed by April next year, building up to more than 1,000.

Contracts

AT&T and **Philips Telecommunications UK Ltd** have received an order worth £784,000 from British Telecom for the delivery and installation of 140 Mbit/s optical line systems for 14 telephone transmission routes throughout the country.

Austin Rover has won an order worth £13.75 million to supply 3,000 Maestro 500 City vans for British Telecom's motor transport fleet.

Delivery began last month and will continue for a year. British Telecom has an option to purchase a further 1,500 vans at the same unit price.

The Maestro vans will replace a number of Bedford HA vans, currently in service throughout the country on customer apparatus ▷

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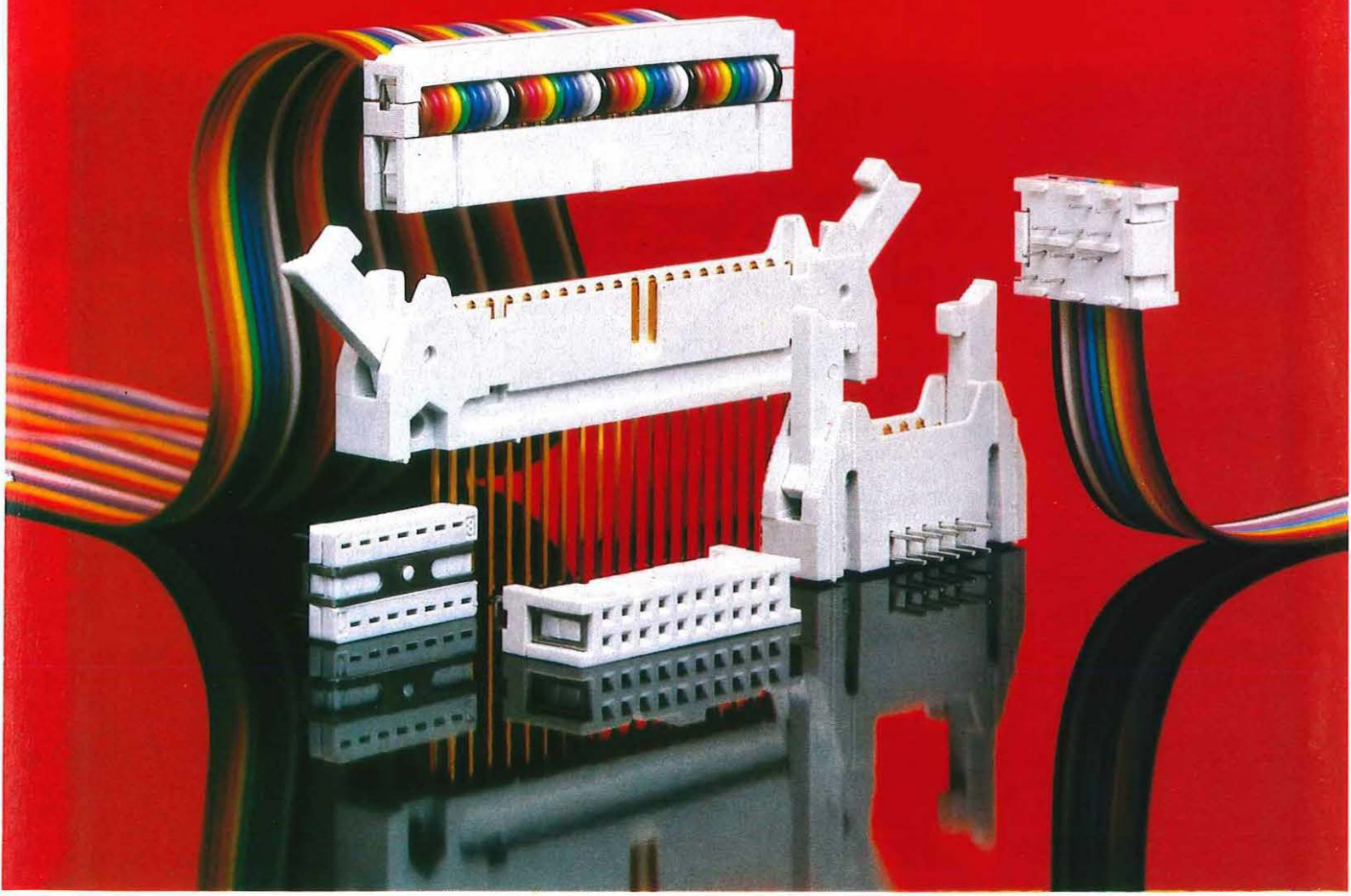

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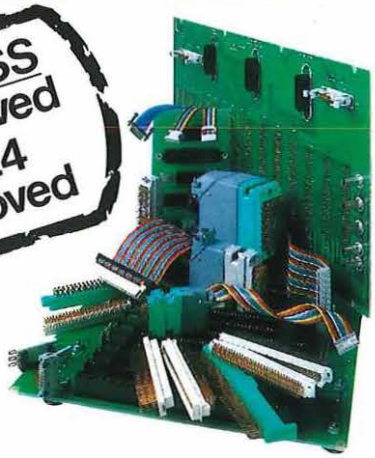

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and maintenance duties. They will be assembled at Austin Rover's Cowley plant.

BICC Telecommunication Cables has been awarded two contracts worth a total of £4 million for the supply of optical fibre cables for British Telecom's trunk and junction networks.

The first contract, valued at £2.5 million, represents 70 per cent of British Telecom's current requirements for single-mode fibre cable in the trunk network. A second contract for junction cables worth £1.5 million, will provide 50 per cent of British Telecom's requirements for the next six months.

STC Telecommunications electronics division has won orders worth £3 million from British Telecom for automatic loopback equipment and telegraph modems.

The automatic loopback equipment allows four-wire private network lines to be tested remotely without affecting the normal working of the line. The telegraph modems will be used in British Telecom's programme to convert customers' telex lines to single channel voice frequency transmission.

STC's transmission products division has won an order worth £800,000 to supply British Telecom International with 77 transmultiplexers, together with installation and customer training services.

The equipment will be used to convert international traffic, analogue signals from satellites or submarine cables, to digital signals for switching at a digital international switching centre.

The same division will also supply British Telecom with £2 million worth of advanced optical fibre transmission equipment under a separate contract. Optical fibres for both contracts will be provided by Optical Fibres of Deeside.

Teradyne has been awarded a £2 million contract by British Telecom to provide line test systems for the City of Birmingham.

Thorn EMI Instruments has won an order worth £63,000 from British Telecom for the supply of chart recorders for use in analogue telecommunication systems and for fault analysis in digital systems.

Wolsey Electronics Limited has been awarded a development and production contract worth £2.44 million to supply specialised subscriber equipment to British Telecom Enterprises Consumer Products. The equipment will be manufactured in Wolsey's new factory near Pontypridd, Mid Glamorgan.

Local 'Lightlines'

British Telecom is about to take delivery of more than 23,000 km (14,000 miles) of optical fibres and equipment with a total value of £9 million.

The order, the largest ever placed for 'Lightlines', was divided between six British cable and electronics firms. The equipment will be installed in British Telecom's junction network, which interconnects local exchanges.

Most of the links are less than 16 km (10 m) long but large-scale industrial production has led to major cost reductions which make optical fibres attractive for short-haul routes.

British Telecom is buying the optical fibre cable from BICC, Pirelli-General and TCL. Transmission equipment is being supplied by GEC and Plessey. STC Telecommunications is supplying both cable and equipment.

Coventry goes cable

About 16,000 homes in east Coventry will be able to receive cable TV by the end of the year. Initial cabling work is being carried out by British Telecom and Coventry Cable in an area comprising 3,000 homes in the Upper and Lower Stoke districts.

Test transmissions of Coventry Cable's new services have been made using two satellite reception dishes installed on the top of British Telecom's Leofric Exchange building.

The dishes receive signals from the Intelsat V F4 and ECS F1 'geo-stationary' satellites positioned 23,000 miles above the earth. Signals will then be fed by a 'super trunk' cable to Coventry Cable's transmission control room and transmitted along co-axial cable trunk routes to cable TV viewers.

British Telecom engineers will soon be installing co-axial cable along existing telephone duct routes and, where necessary, additional ducts or access boxes will be inserted in existing 'service strips' along the pavement.

Coventry Cable intend to provide over a dozen channels of entertainment and information services on the cable TV network.

New appointments

Mr Colin Browne has been appointed Chief Executive designate of British Telecom Broadband Services, the division responsible for developing the company's interests in cable television and associated services.

Mr Browne was Director of the Office of the chairman of British Telecom, Sir George Jefferson, for four years and before that was personal director to the former chairman of the Post Office, Sir William Barlow. He succeeds Mr Donald Wray who has retired.

Mr Tony Vardy has been appointed by British Telecom as Director, Financial Relations (North America).

Mr Vardy, who will be based in New York, will be responsible for British Telecom's investor relations in the USA and Canada.

Instant insurance

Britain's first information technology service for the insurance industry has been launched by British Telecom.

Designed to help brokers sell more business, it enables them to transact their customers' business faster and more efficiently and at the same time cuts costs and paperwork.

A pilot service – known as Mediat – links nearly 100 brokers directly with the computers of nine insurance companies – Commercial Union, Equity and Law, Legal and General, the Minster Group, Phoenix, the Prudential Group, Save and Prosper, Standard Life, and the Sun Life Group.

Using desk-top microcomputer terminals, brokers will be able to obtain quotations for new insurance business, obtain unit prices, and raise queries on policies. Companies will be offering brokers the ability to enter new business directly.

Mediat enhances British Telecom's public data service, Packet SwitchStream (PSS) and uses new local access links. It will also offer facilities, such as Telecom Gold – British Telecom's electronic mail service – access to specialised information services, and data format conversion.

The pilot service will continue until the autumn when British Telecom expects to launch Mediat commercially. Initially, brokers are being supplied with Merlin M4000 microcomputers by British Telecom's Business Systems division. When the commercial service opens, brokers will have the opportunity of choosing from a wider range of personal computers and terminals.

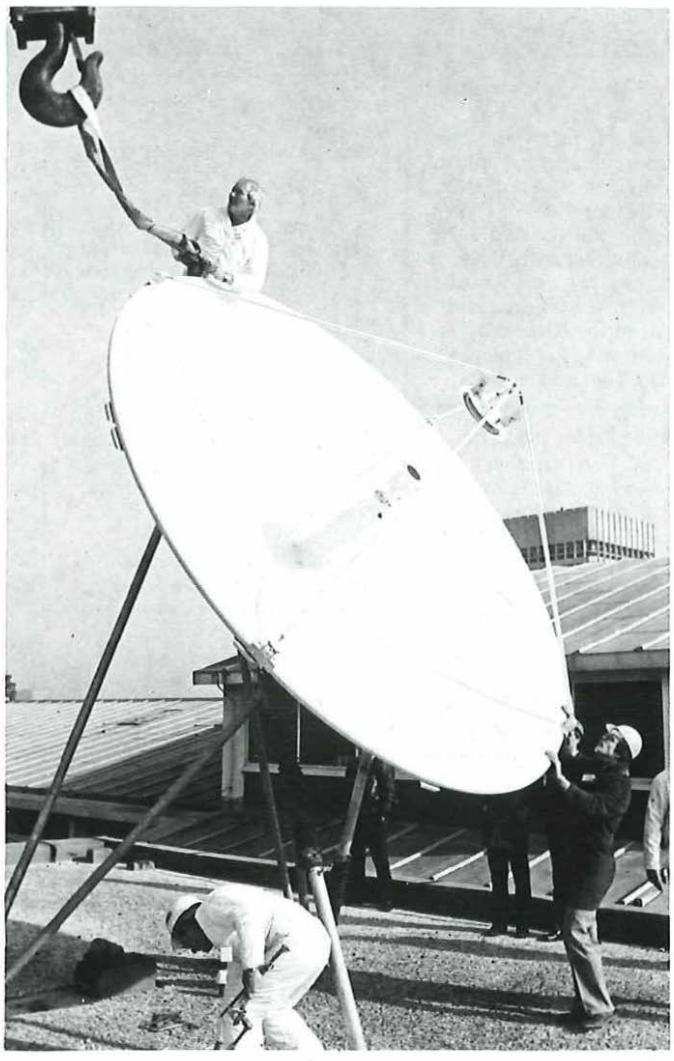
News on shares

British Telecom's vast number of shareholders can now keep a day-to-day check on the performance of their investments by dialling Shareline, a new recorded information service.

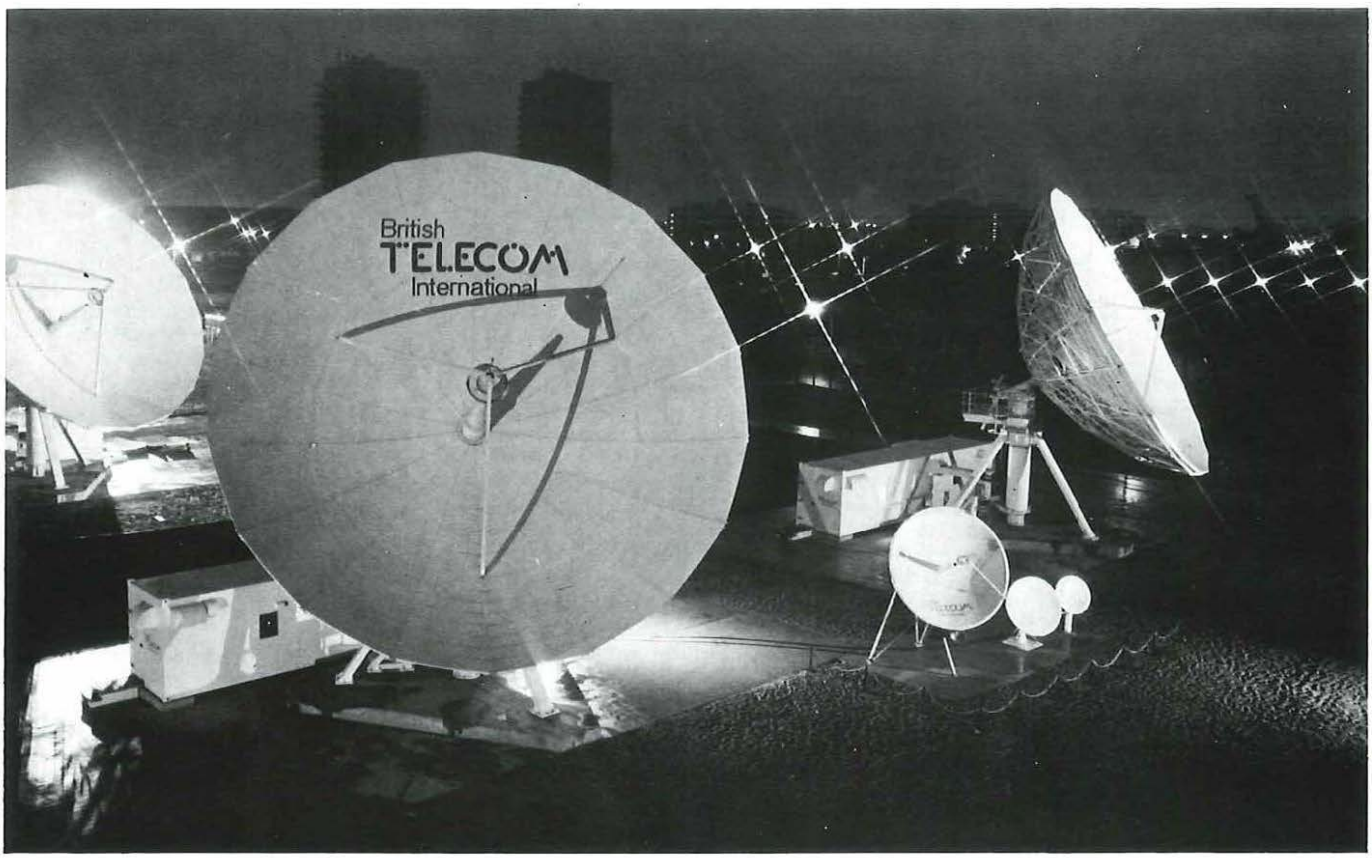
Shareline, on 0272-215444, offers concise and simple information for investors, many of whom have no previous experience of Stock Exchange dealing.

Updated every weekday at 6pm, it gives the closing price and information about the discount vouchers and free shares investors will be entitled to. ▷

One of Coventry Cable's satellite reception dishes being installed on the 70-foot high roof of British Telecom's Leofric Exchange in the city. (See Coventry goes cable).



London Docklands back at the helm



Shipping used to be the major commercial link between countries, but now the telecommunications industry is forging even closer bonds. Situated in London's Docklands, the London Teleport has recently been augmented by a new British Telecom Business centre to cater for today's world of high-technology commerce. (See Help for Docklands).

UK satellite centre

A new small-dish transatlantic business satellite link designed exclusively for multinational companies by British Telecom International, has enabled the giant Massey-Ferguson group to establish its world-wide communications centre in the United Kingdom.

The key to the operation is BTI's SatStream North America small-dish service using an Intelsat V satellite for high-speed computer traffic between Britain and North America.

Control of data processing of Massey-Ferguson operations across the world is now carried out at the firm's Birmingham centre which has British Telecom MegaStream connections to a subsidiary plant at Peterborough.

Dealers throughout Canada and the United States will now be able to place computerised orders via their own terminals for parts and machinery direct to the British factories.

Massey-Ferguson intend extending their satellite links to the continent using BTI's SatStream Europe service, due to start operation this spring, and transatlantic links will be developed to include voice and document facsimile traffic as well as computer data.

Satellite 'scoop'

The Financial Times is to become the first British newspaper to print in the United States using facsimile pages sent from London by British Telecom International's SatStream North America small dish satellite service.

Facsimile pages will be sent from the newspaper's head office in central London over digital circuits to British Telecom International's SatStream North America earth terminal at Ealing.

From there, signals will be transmitted to an Intelsat satellite then on to a small dish terminal located at the printing works in New Jersey.

A low-speed return path using British Telecom's recently introduced International KiloStream service will be used for the reception of confirmation signals.

The system, which starts in July, means that the Financial Times will no longer need to airfreight copies from Frankfurt.

Cellphones sell

British Telecom's Mobile Phone Division has connected 1,000 of its new cellphones to the Cellnet cellular radio system. (See page 20.)

The Cellnet service, which opened in London in January, has quickly expanded into Birmingham and Manchester, with Leeds, Bradford, and the London to Birmingham motorway link to follow shortly.

The commercial manager of Mobile Phone, Colin Tipping, said Cellnet's rapid expansion into the provinces had increased its potential and popularity among business people on the move. He expected the next 1,000 customers to be connected very quickly, and British Telecom to maintain its position as the market leader in mobile phones.

British Telecom's London Region expects to become the world's largest single dealer in cellular radio products by the end of next year. It has already established six cellphone installation centres in London.

Help for Docklands

A shop window for business communications services in the heart of the London Docklands development zone has been opened by British Telecom.

The centre, at Canary Wharf, West India Dock, will offer British Telecom's latest products and services which are available off-the-shelf to businesses moving to the area. Visitors will be able to see and use the latest telecommunications equipment and place their orders on the spot.

At the opening ceremony, British Telecom chairman Sir George Jefferson said that businesses would now be able to plug in to high technology telecommunications through the optical fibre network, London Lightlines, already provided for the city of London, with a spur reaching into Docklands.

They would also be able to use the network to access an extensive range of international communications services through the London Teleport, British Telecom's new satellite earth station in the Docklands Development Area.

New offshore link

Oil and gas production platforms in the North Sea are to have their own satellite communications system called SatStream Offshore.

Contracts for the provision of permanent service to a floating production platform in June next year have been signed by British Telecom and the North Sea Sun Oil Company. It will be the first service of its kind between the UK mainland and an installation in the North Sea.

British Telecom is to build a new satellite earth station near Aberdeen, using an 8m (36ft) diameter dish, which will work to

the European Communications Satellite, EUTELSAT 1-F2. It will offer satellite facilities to platforms in any part of the UK's offshore exploration and development areas.

SatStream Offshore will provide all mainstream communications services, such as national and international direct dialling for telephone and telex. It will also offer customers high-capacity digital transmission at rates of between 64 kilobits per second (kbit/s) and two Megabits per second (Mbit/s).

Number pleases!

One of Britain's best-known telephone numbers – 0 272 272 272 – is now available to clients of Telecom Tan, British Telecom's computer-based response-handling service. The number was called by more than 600,000 people asking for information during the British Telecom share issue last year.

Telecom Tan, a 24 hours-a-day, seven days-a-week service, is to offer advertisers the opportunity to use the famous number or choose one of their own.

Tan operators personally answer calls from potential customers within seconds. They use individual computer terminals which display full details of the client company and its services and are trained to respond to a range of enquiries in the same way as a member of the client's staff.

Tan's national services are operated from Bristol, where calls are sorted and distributed by a new system which is capable of marrying telecommunications and computer processing techniques.

US cable TV deal

British Telecom International (BTI) has clinched a deal that will allow direct reception in the United Kingdom of the American cable television channel, Cable News Network.

The channel, produced in the United States by Turner Broadcasting Systems (TBS), will be available to British broadcasting companies in September. It features a variety of news-related and current affairs programmes.

Cable News Network will be beamed from the TBS headquarters in Atlanta to an Intelsat V satellite, using capacity leased by BTI and the Communications Satellite Corporation (COMSAT) in the US for transatlantic television services.

Britain will be the first country outside North America able to receive Cable News Network commercially and on a full time basis.

As well as providing the eastern half of the satellite link, BTI will be working closely with TBS to make the extension of Cable News Network available to other European countries.

Classroom Prestel

Students at schools and colleges throughout the UK can now use their micros to learn new skills with Prestel Education – the country's first fully-operational electronic education service which has been specially designed for schools by Prestel, British Telecom's public viewdata service, and the Council for Educational Technology.

Mr Richard Hooper, Chief Executive of British Telecom's Value Added Systems and Services, said that Prestel Education was the ideal way for students to acquire the information technology skills they would need in the future.

The service includes careers information, details of higher education courses, a guide for teachers and 'School Link', an electronic magazine with news, software reviews and features.

The use of Prestel Mailbox and special curriculum projects are also to be encouraged.

Merlin micro boom

British Telecom Business Systems, Merlin, has notched more than 2,800 orders for its M4000 series of microcomputers and word processors from the Government.

The orders were won in the face of strong competition against the major microcomputer suppliers.

The Department of Health and Social Security (DHSS), has announced an order for its Local Office Microcomputer Project involving the supply of more than 2,600 M4000 series micros to be used in Social Services offices throughout the UK.

Another recent success was a contract to supply 72 multi-user systems to the Forestry Commission.

To assist with the collection of duties and taxes payable on imports, more than 90 M4000 micros will be installed in HM Customs & Excise offices at major sea and air ports in the UK as part of an order won in conjunction with British Telecom's computer bureau NDPS and National Networks Division.

Sailors' warning

Inshore sailing could be made safer with a local weather information service available by phone.

Marineline, a new British Telecom Guideline service for all UK coastal areas, will provide a general weather synopsis, gale and strong wind warnings, and an outlook for the following 48 hours based on information supplied by the Meteorological Office.

Britain's coastal waters have been divided into 13 areas, each with dedicated access numbers. Sponsored by HM Coastguard and the Royal Yachting Association, the service will operate day and night.

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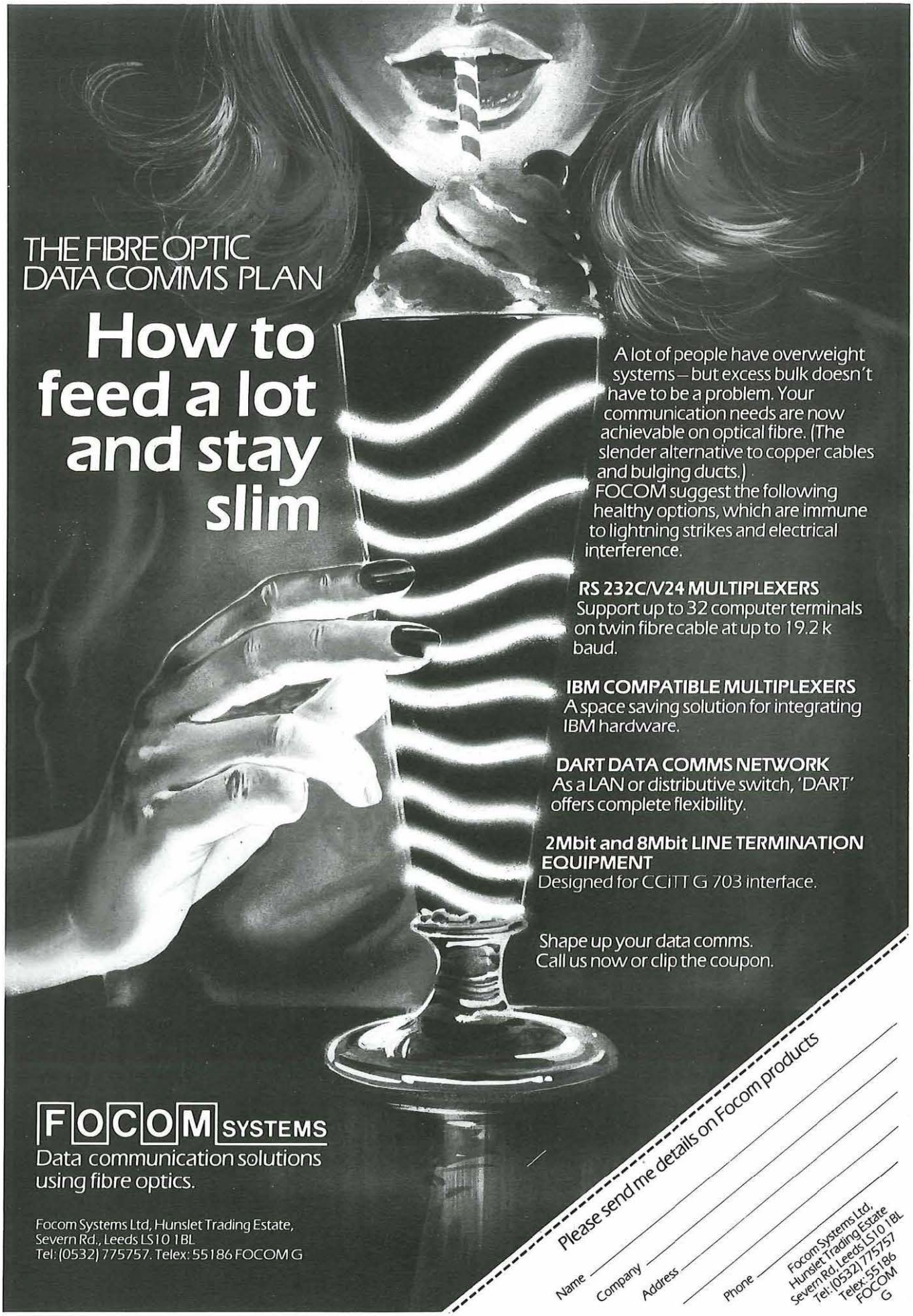
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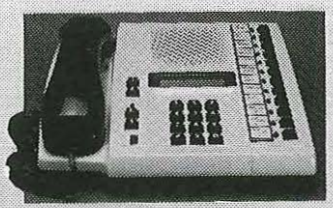

This gives MD 110 a degree of reliability that cannot be matched by its rivals. If one module fails, the others will continue unaffected.

This is particularly valuable where locations are geographically remote from each other.

MD 110 can serve locations spread over a wide area, all fully integrated with a common numbering scheme and with all extensions having full access to all facilities.

This brings tremendous operational savings, both in reducing outside line costs and improving efficiency.

MD 110 has one other priceless advantage. One that genuinely makes it future proof.

MD 110 is APPROVED for use with telecommunications systems run by British Telecommunications in accordance with the conditions in the instructions for use.

Its design uses a unique brand of system architecture – a building block approach.

Each block can be conceived either as hardware or software. It is defined only by the way it interfaces with its neighbours.

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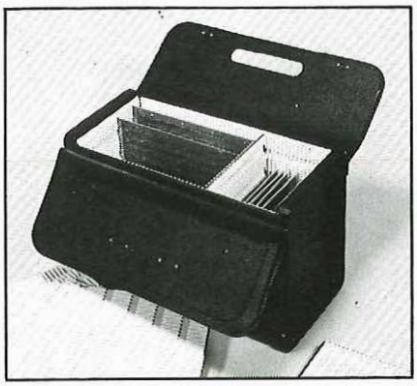

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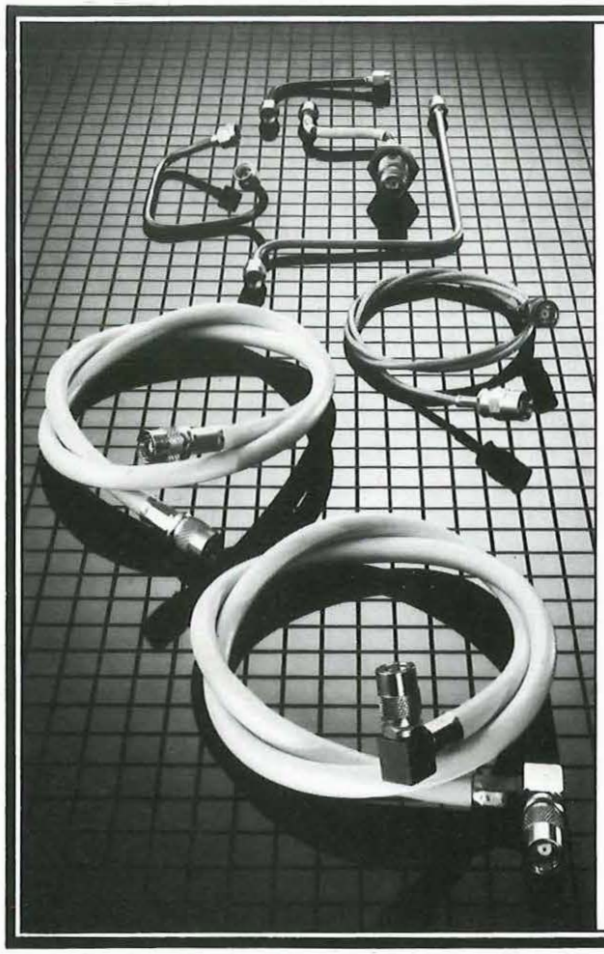

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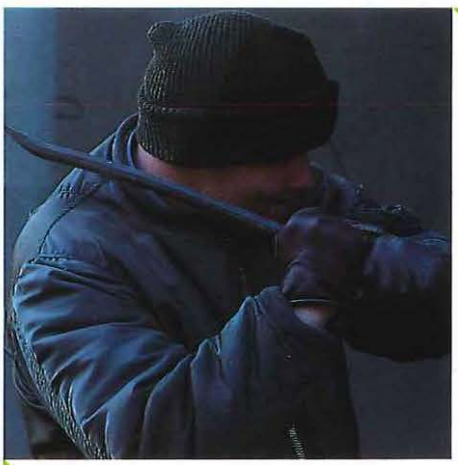

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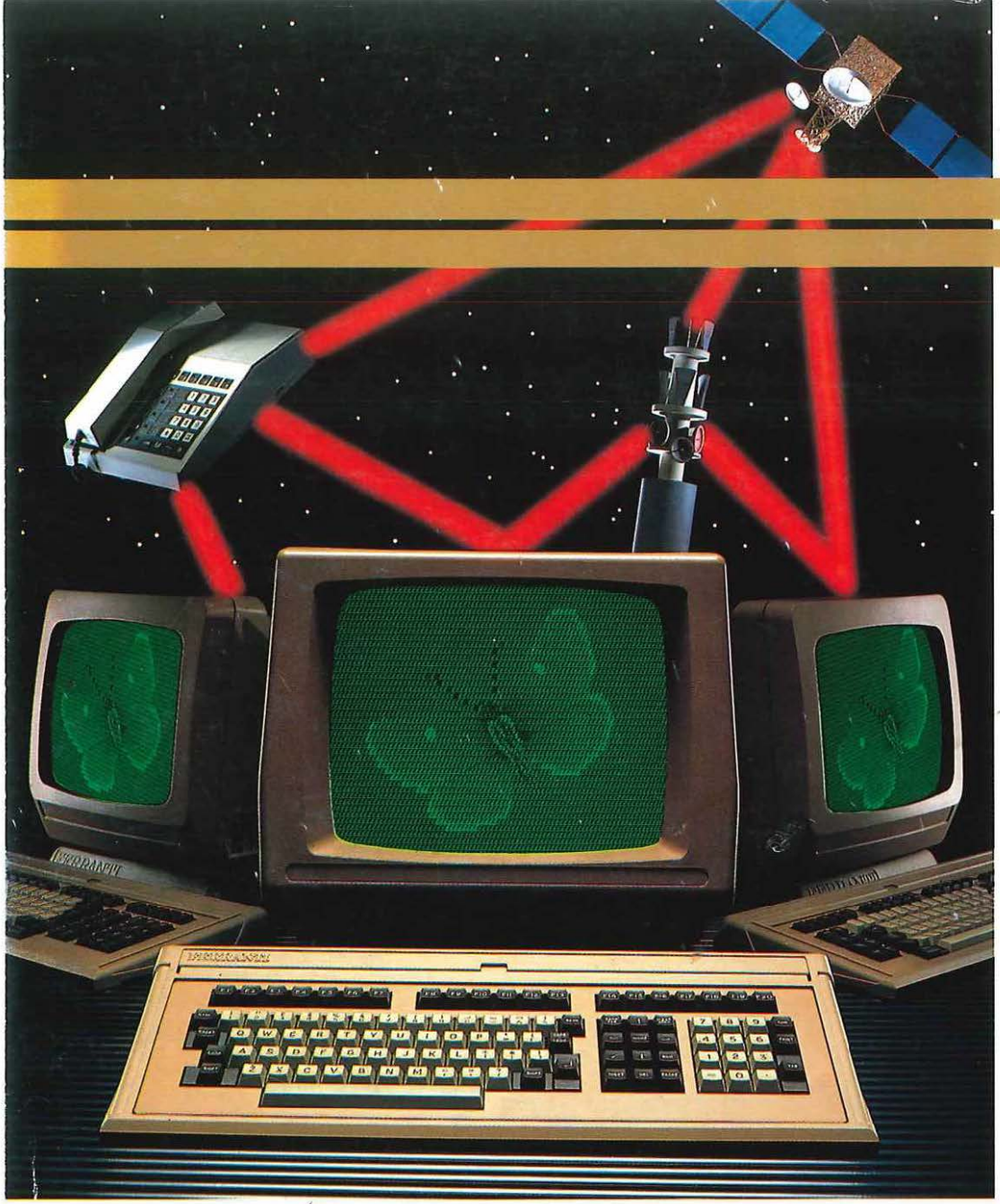

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