British TELECOM Journal

Winter 1983/84 Volume 4 Number 4
Price to BT staff 36p

Making light conversation on the phone.

Working at the speed of light is nothing new for Plessey.

Plessey scientists, designers and engineers have been developing new fibre optic telephone transmission for over a decade, combining the technologies of digital multiplexing, line systems, opto-electronic devices and optical fibre connectors to create optical fibre transmission systems second to none.

Plessey was responsible for the first optical fibre test route in Britain–between Maidenhead and Slough.

And completed the 17km cable for British Rail between Birmingham International and Coventry in 1981 –the first UK optical link operating along electrified track to meet international telecommunications standards.

In 1982 they opened the longest link in Britain – the 204km between London and Birmingham.

258 systems, or more than 55 per cent of all optical fibre systems ordered by British Telecom for installation in the UK public network, have been awarded to Plessey Telecommunications Limited. 14 have already been completed and are carrying traffic.

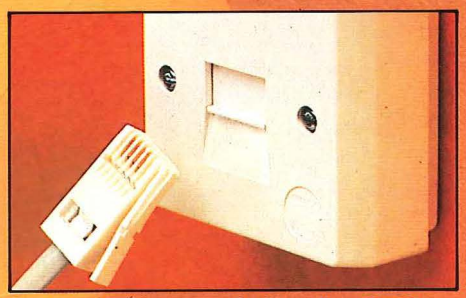
And in Saudi Arabia, Plessey has been awarded the subcontract for the supply of 34MBit/s terminal and line equipment to the central region of the Saudi Consolidated Electric Company.

To find out more, contact: Transmission Division, Plessey Telecommunications Limited, Beeston, Nottingham, United Kingdom, NG9 1LA.
Tel: Nottingham (0602) 254831, Ext. 3542. Telex: 37201.

PLESSEY
telecommunications

5 digit custom LCD, displays call cost, accumulated charges and programming information.

16 digit multi-function keypad for user commands and data entry.



Simply plugs into any telephone line, PSTN or PABX; requires no exchange meter pulses.

One of a series of Innovative Telecom Products designed, developed and manufactured by Rathdown Industries for British Telecommunications Enterprises, Consumer Products Division.

PHONE TAB

The microprocessor solution to call cost monitoring.

Automatically displays call costs as they occur and keeps an accumulated total charge.

- 5 digit custom LCD
- 16 digit multifunction keyboard
- 24 hour clock
- Security key
- Software security code
- Easily user programmable
- Displays current call cost
- Displays accumulated charge
- Displays last call cost on demand
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- For use on any PSTN or PABX line
- Battery powered

INNOVATIVE TELECOM PRODUCTS.

RATHDOWN INDUSTRIES LIMITED

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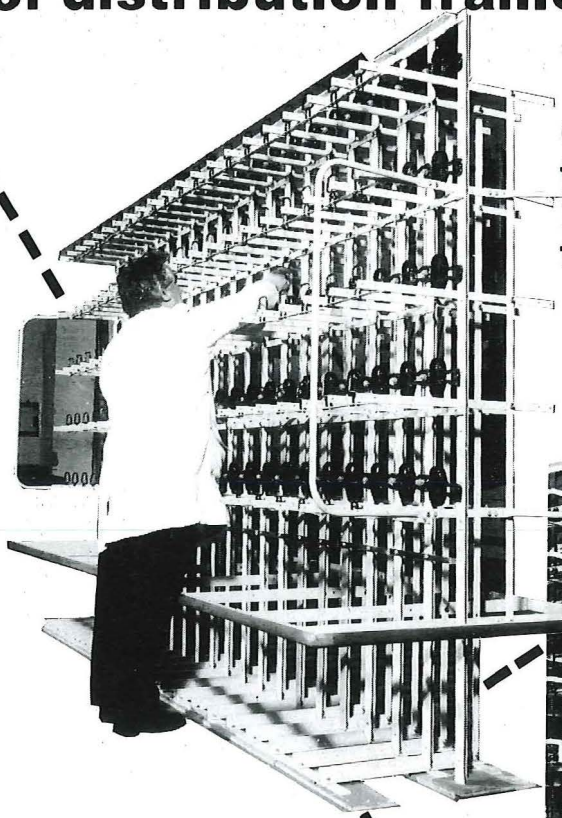
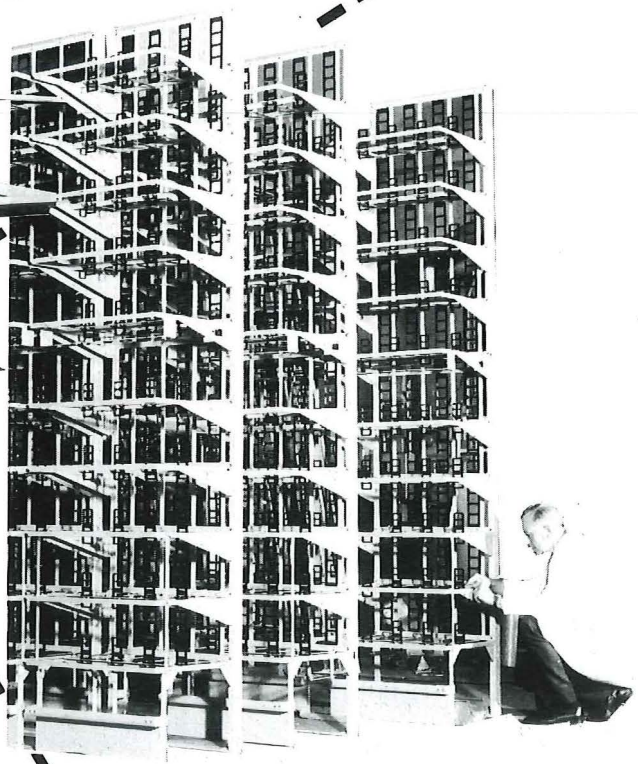
SEE US AT... Communications 84 15-18 MAY 1984 National Exhibition Centre, Birmingham, England.

STAND 5G70

CABLEWAYS manufactures almost every type of distribution frame currently in use.



Custom built distribution frame, nearing completion in Cableways factory.



TP351 (352 & 353) Line & exchange side distribution frames.

Type 6000A frames distribution.

Range of B.T. frames available include

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TP360, T1194
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SEE US AT COMMUNICATIONS '84 N.E.C. BIRMINGHAM STAND NO. 5D20 MAY 15-18, 1984.

Retrieve the Past, Prepare for

The LRS-100: Maximum repair service automation. Our Loop Reporting System saves time and money.

There is one sure way to help your repair service control (RSC) operate more efficiently and economically. Use your people more effectively.

The Northern Telecom LRS-100 Loop Reporting System is the most powerful tool available to achieve this aim. It automates and completely integrates the RSC administration and testing functions—customer line records, fault reports, testing, priority assignments, distribution management, statistics—literally every important function of the RSC.

The past: the answer to your problems.

When a customer reports a problem, the person receiving the call gets complete customer line record data instantly, including station equipment facts and a history of prior repairs and installation orders. The system verifies the fault and a firm commitment for service can be given to the customer immediately. Skilled testers are able to concentrate on the more difficult problems, thus enabling their time to be used more effectively.

The present: accurate distribution reduces wasted time.

Automatic and accurate distribution priority management and geographic block control substantially reduce time wasted in fruitless journeys by outside work forces. Also, by recognizing "common cause" fault patterns the system eliminates duplication of handling and distribution. Most importantly, LRS-100 automation helps balance the RSC's workload and utilize its resources for better management of the repair work force and no confusion—just smooth, efficient service from initial fault report to close-out.

The future: face it with confidence.

By maximizing control and making effective use of RSC resources and outside work forces, LRS-100 offers management some very important advantages in an increasingly competitive environment. Instant access to the LRS-100 customer service facts, line diagnosis (with interpreted results) and accuracy of distribution allows everyone in the RSC to work more effectively because everyone has all the information needed about the work in progress. By compiling statistics automatically, LRS-100 gives managers the information they need to control the present and plan the future.

Through the system's automated routining capability and our exclusive cable topology reports, you will be able to spot problems as they develop, improving service through preventive maintenance.

LRS-100: the head of the family.

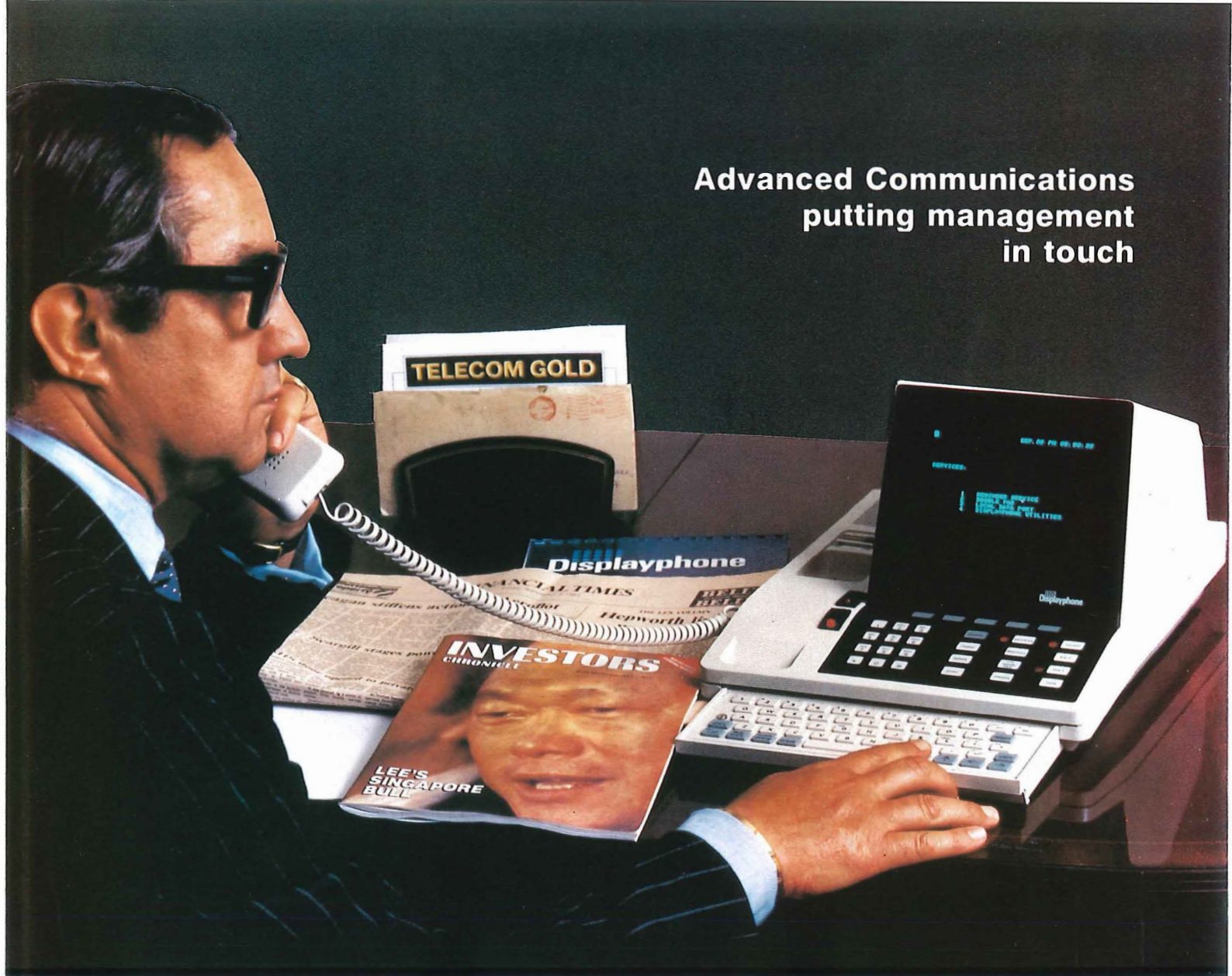
The LRS-100 is part of a modular family of automated systems for the RSC. You can begin with our LRS-1 for automated testing, add the routining capabilities of LRS-10 and expand to a fully integrated, paperless test and administration system with LRS-100.

Control the Present, the Future.

For more information, call or write:
Northern Telecom (U.K.) Limited
Langton House
Market Street
Maidenhead, Berkshire SL6-8BE
Tel. (628) 72921

northern telecom


STC



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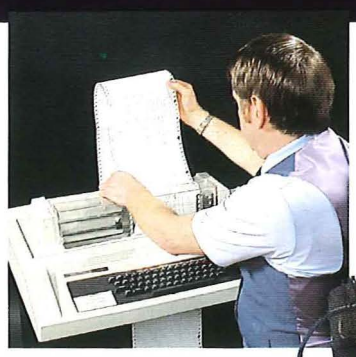
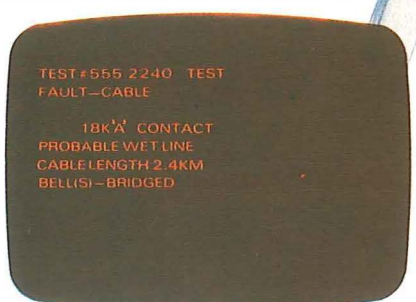
NOW WORLD PTT's AND PHONE COMPANIES WILL FIND FAULTS BEFORE THEIR CUSTOMERS DO



The latest automatic testing technology from Teradyne: the Series III 4TEL System–
automatically tests every line every night and provides powerful diagnostic testing for fault finding every day. The Series III 4TEL System includes:

- ☐ Advanced system refinements based on many years of user experience.
- ☐ The latest technology in microprocessors and communications.
- ☐ New testing features designed for the needs of European PTT's.
- ☐ Testing from the field with computer generated voice response.
- ☐ The facility to network to a separate administrative data base system (ARSCC).



4TEL immediately permits major improvements in quality of service through more efficient responsive and preventive maintenance to meet quality of service objectives.

4TEL from Teradyne, one of the world's leading manufacturers of computer controlled test systems, have been field proven in rural and urban environments and are testing millions of lines now.

TERADYNE

Teradyne Ltd.
Clive House, Queens Road,
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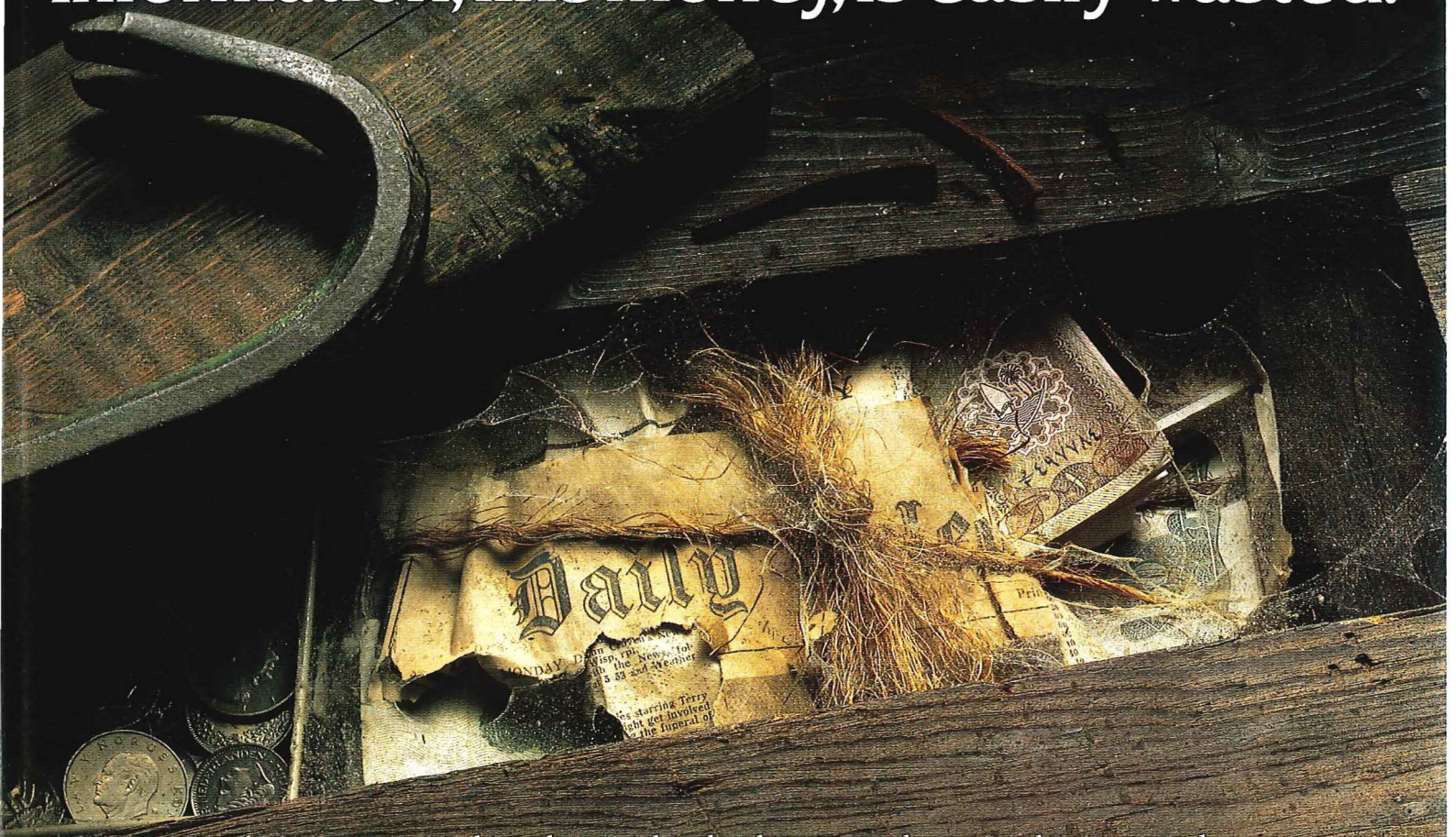
Telephone: Weybridge (0932) 51431.
+44 932 51431.

Information, like money, is easily wasted.



Information trapped inside your data bank is as much a wasted asset as cash lying buried under the floorboards.

Like money, information needs to be put to work to realise its full value.

And that's what Ferranti data communications is all about. Putting information into the hands of those in an organisation who need and can use it.

Ferranti communications systems include store and forward, message switching, packet switching, protocol conversion and networking.

There are already hundreds of PT7 programmable terminals controlling thousands of Ferranti displays within British Telecom.

Now there's the Ferranti Argus Pro-personal Computer, which can be linked together with our PT7 terminal system to the new Teletex network with a Ferranti Teletex Adaptor.

Don't forget either, the Ferranti Voice Manager, an intelligent storage and distribution system designed to eliminate waste and delays in telephone calls.

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Telephone: 061-499 3355, Telex: 668084

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FERRANTI
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BTJ/W3

"Auralite telephone headsets mean maximum efficiency, comfort and mobility."

"We cannot settle for less."

David Hardman, Deputy Managing Director, Godfrey Davis Europcar.

Godfrey Davis Europcar is Britain's biggest car rental company and relies on efficient communications. Its Central Reservations office receives hundreds of car rental reservations by telephone every day, and personnel morale and comfort are essential in maintaining the high standards of speed and efficiency which both the company and its customers expect.

That's why David Hardman sees that all of the Godfrey Davis Europcar tele-sales assistants in the Reservations office at their head office in Bushey, Herts are equipped with Auralite telephone headsets.

"The tele-sales assistants' task is a demanding one" says David Hardman. "The ultralight headsets reduce fatigue. Their superior sound quality is very much better than that of a carbon headset and, as it conveys sound direct to the ear, surrounding sounds do not confuse the listener."

If the telephone plays a significant role in your business, Auralite headsets can make it more efficient, your clients happier, and your personnel a lot more comfortable.

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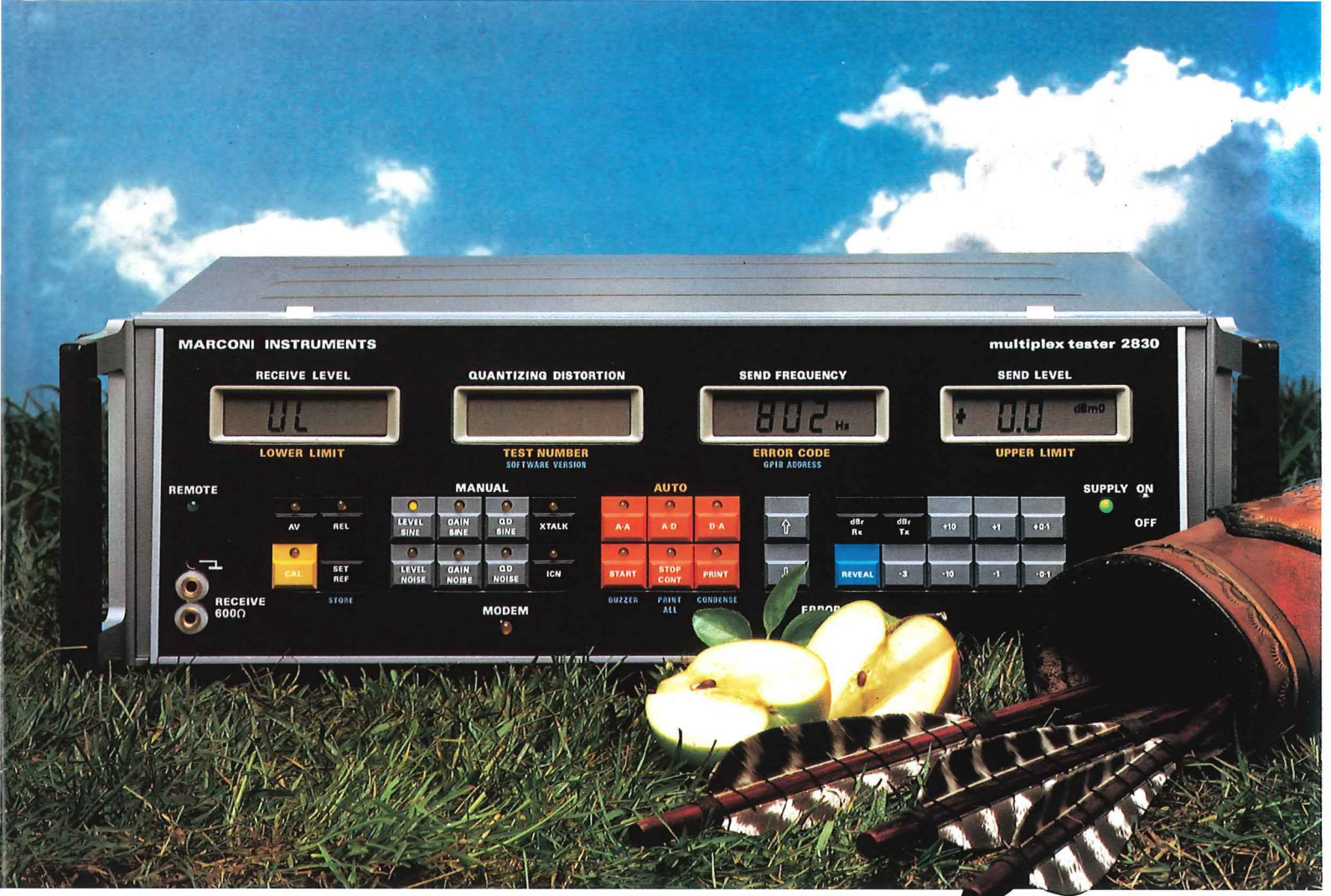
APPROVED for use with telecommunication systems run by British Telecommunications in accordance with the conditions in the instructions for use.

B.T. Approval No. S/1000/GF/1981/PR



More accurate than William Tell. Faster than his overture.

THE NEW MARCONI 2830 MULTIPLEX TESTER

When you test PCM primary multiplexes you need high accuracy, fast speed and more than a little flexibility.

Which are the exact qualities that put the Marconi Instruments 2830 PCM Multiplex Tester head and shoulders above the competition.

The 2830 is a simple to operate unit providing a wide range of test functions including frequency response, gain, linearity, quantizing distortion, idle channel noise and crosstalk.

When combined with Channel Access Switch 2831, the capabilities of the 2830 are extended to provide readings of impedance balance, return loss and signalling distortion.

The 2830 can handle four programmable automatic test sequences as determined by the user. They can even be repeatedly recycled.

Although intended for use as a stand-alone unit for A/A measurements (it needs no external controller) in either automatic or manual modes, the 2830 Multiplex Tester can also be used in conjunction with Marconi Channel Access Switches, Digital Simulators and Digital Analysers to provide a complete test set in D/A and A/D applications.

Other features include:

* Automatic calibration function
* Level measurement accuracy of ± 0.025 dB at 850 Hz from +20 to −60dBm. Speed approximately 2.5 readings per second.
* Quantizing distortion measurement accuracy of ± 0.2 dB over 0 to 40 dB measurement range.
* Results may be printed out under GPIB control.

The 2830 PCM Multiplex Tester from Marconi. Check it out today.

marconi instruments

U.K.: Longacres, St. Albans, Herts AL4 0JN (0727) 59292. TELEX 23350
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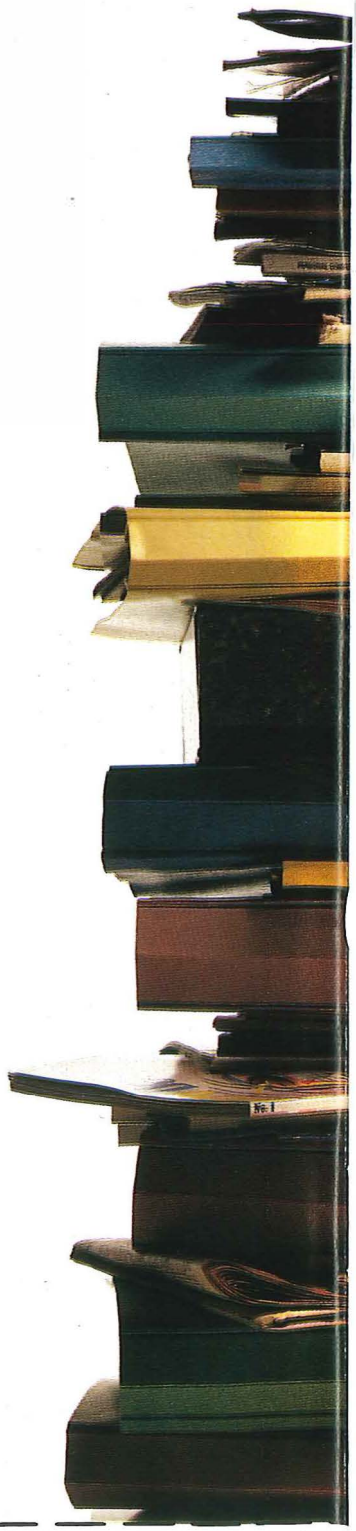
If you're asked to plan a computing system for your company, don't imagine you'll get away with a bit of light reading and conceptualising.

You'll soon have enough brochures, files, cuttings, notes and doodles to warrant an office of their own.

So our Distributed Resource System should prove quite a weight off your mind.

It's an office system you don't have to plan: designed to meet the local requirements of offices, yet still be flexible enough to meet the diverse needs of the company as a whole; to be economical enough to be bought from local budgets when necessary, yet still be capable of

A word of advice to anyone planning an office system. Don't.



DRS MODEL 10
An intelligent workstation which can be integrated in a DRS MICROLAN local network, accessing and manipulating data.

DRS MODEL 20
A desk-top workstation with twin 1 Mbyte integral discs that can run alone or be linked via MICROLAN. It can also communicate via Wide Area Networks with ICL and IBM mainframes.

DRS MODEL 25
Shares the same features as a Model 20, with integral fixed and floppy discs of 10 and 1 Mbyte. It can also form its own local network, supporting two Model 20s or Model 10s.

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A desk-style unit with the systems cabinet housing a 1 Mbyte discette and a single fixed disc of 16 or 27 Mbytes. It can support any mix of Model 10, 20, 25, 40 and 50 systems.

communication as part of a network.

Because every piece of equipment in the Distributed Resource System can operate as a personal computer in its own right, or share the resources of any other work station, at any time.

At a stroke, the problems of incompatible micros, and choosing between central or decentralised information processing, no longer exist: the Distributed Resource System grows organically to reflect the particular needs of your company.

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DRS 8800 SERIES
It can function as a stand-alone word processor. Or it can function as one of a number of secretarial workstations, supported by the DRS Document Storage System.

For more information, dial 100 and ask for Freefone ICL. Or send coupon to ICL Infopoint, ICL House, Putney, London SW15 1SW.

OM5/1

Name_____ Position_____

Company_____

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We should be talking to each other.

ICL

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LSI LOGIC means custom-designed HCMOS arrays for all EDP and telecom applications.

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We offer HCMOS arrays for cost sensitive applications as well as for applications with clock speeds up to 40 MHz.

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SERIES	GATE COMPLEXITY	GEO-METRY	METAL LAYERS	TYP. GATE SPEED
● LL3000	272-2550	3.5 μm	single	5.0 nsec
● LL5000	880-6000	3.0 μm	double	2.5 nsec
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for custom designed perfection

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The days when we just made cable are over. Today, we're into much bigger things. Like complete telecommunications systems . . . digital or analogue, optical or coaxial. With the vast resources of GEC at our disposal and our own worldwide project management experience to call on, we have the capability to redesign the configuration of a specific cable, or to survey, plan, install and commission a large-scale network on a turnkey basis – from A to Z. So next time you want to talk telecommunications, talk first to the cable company that talks turnkey.

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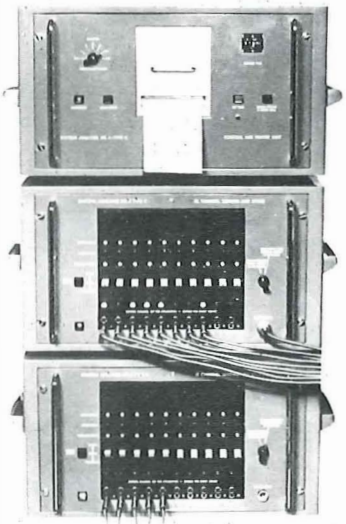
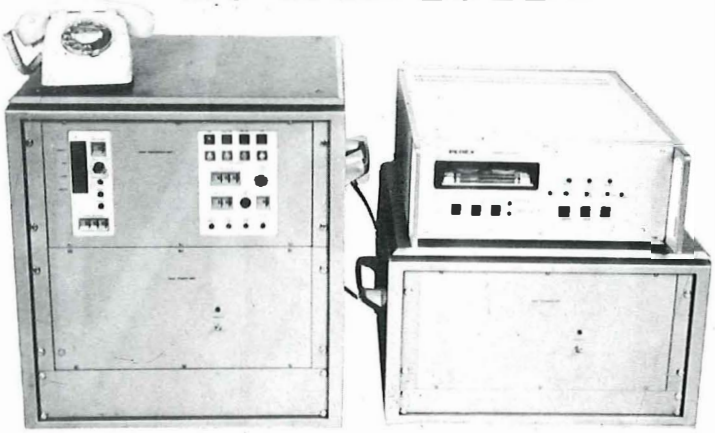
1956 was a great year for call logging...

so was 1971...





PRINTING CALL LOGGER 1956

TNA 2 CALL LOGGER 1971

and so was 1983...

ASL was one of the first companies to recognise the need to develop a call logging, telephone management system that could help businesses to get the very best out of their telephone system.

That was in 1956. Since those early beginnings we have consistently led the field in the design, development and manufacture of CILE.

Producing virtually custom-built systems to meet individual requirements, both in the UK and in many countries around the world.

We believe we're still ahead of the field today.

TNA 11 1983

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It makes telex preparation more flexible because you can:

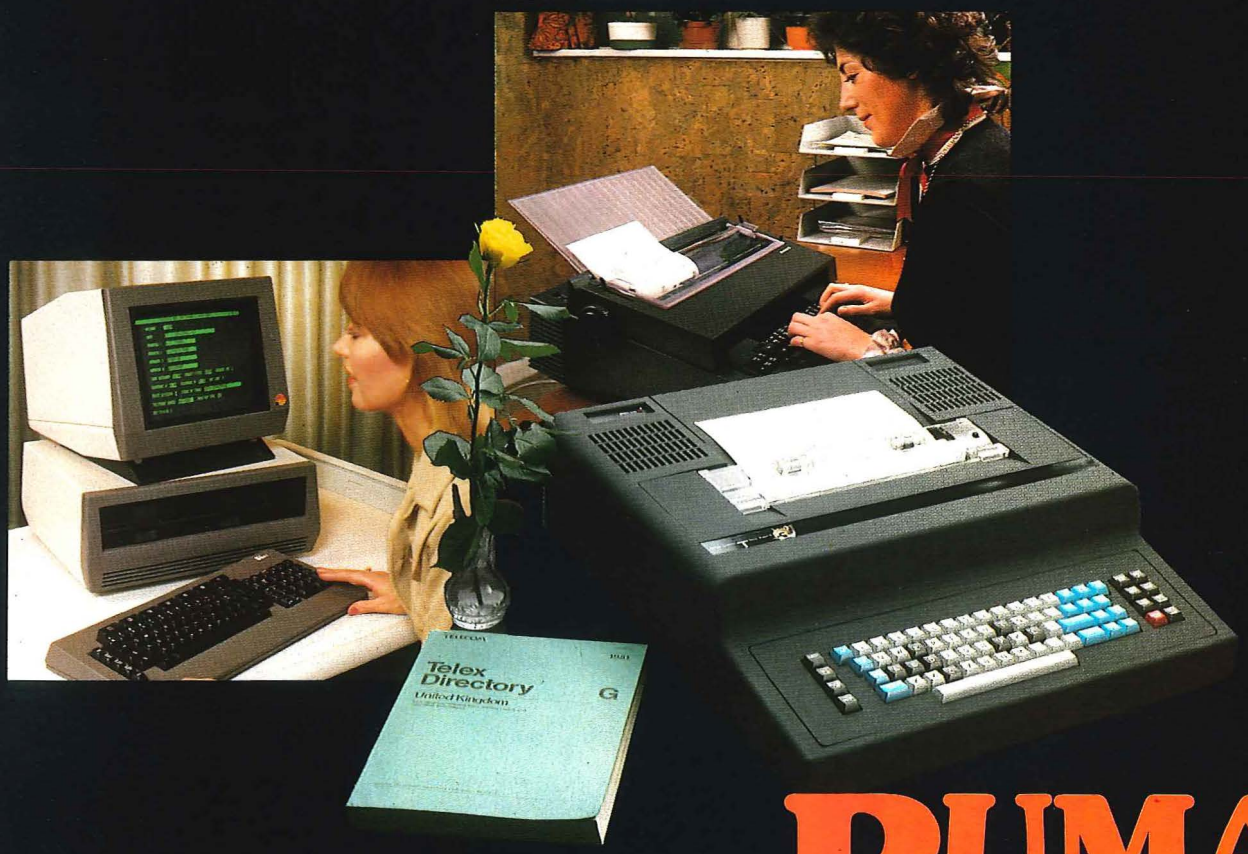
send telexes direct from your word processor, office computer, memory typewriter, micro, etc.

prepare outgoing messages while Puma is busy.

distribute incoming messages electronically to their final destinations.

...all with the standard Puma.

Call Trend (we make and demonstrate them) or British Telecom.



PUMA TELEX

Illustrations by courtesy of ACT (Sirius) Ltd and Olivetti Ltd.

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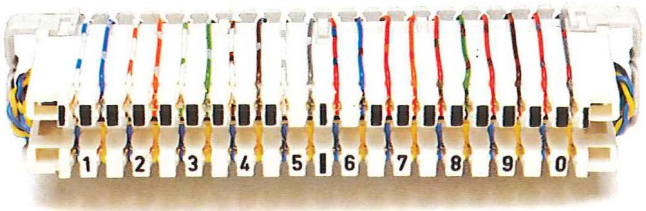
...and distributors throughout the world

PHICOM DATA COMMUNICATIONS DIVISION

TECHNOLOGICAL TEAMWORK



A team . . .

Krone U.K. started trading in 1978 with three people.

It now has a team of nearly 200, a turnover several hundred times that of its first full year and an enviable reputation for innovation and quality.

. . . of people

No company, however bright its boffins, precise its technicians or able its management, produces this sort of record unless everyone pulls together.

And nowhere is this more true than in the field of advanced telecommunications. Competition is tough worldwide and the rate of technological change is dramatic.

In five short years the Krone team is already established as leader in its field.

How?

Because that's what it is – a team.

. . . and products

With the unique LSA-PLUS Quick Connection technique Krone launched a major technical breakthrough.

But they didn't stop there. A growing team of people have developed a growing team of products, products as integrated as their creators.

By adapting and improving; developing and innovating from concept through to production. Now you can communicate from one Krone telephone through the Krone system to another Krone telephone. Yes, literally from one telephone to the other. From the telephone jack, through Krone's unique connection strips, housed in Krone Boxes or Cabinets, to its main distribution frame, to the telephone instruments themselves, the Krone team is increasingly evident where ever mankind communicates through wires.

When BT chose Krone's LSA-PLUS system to be an integral part of their national Rapide network it was just another proof that teamwork works.

Ideas Creating Products.

KRONE

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Cheltenham, Glos GL51 9NQ
Telephone: Cheltenham (0242) 584900
Telex: 43350

British Telecom Journal
Winter 1983/84 Volume 4 Number 4

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

Cover: Whatever the weather British Telecom staff have a duty to repair and maintain the network. Often it is a cold and lonely job . . .

British Telecom Journal costs 36p per issue for staff. External subscriptions pay £10 for two years including post and packaging. Full details on page 40.

Best in cable

Since the first public television broadcast in the UK, some 50 years ago, British Telecom and its predecessors have consistently sought to meet the needs of both local and national networks. And the organisation's long experience in cabling and television distribution paid dividends at the end of 1983 with the Government announcement offering pilot project licences to a number of consortia, of which the corporation is both a shareholder and cable provider in five.

Already £18 million has been spent on modern equipment by British Telecom Cable, a new organisation geared to enter the market in a positive way. Heading the enterprise is Donald Wray, a man with a lifetime's experience in networks and who is totally convinced that British Telecom Cable will compete effectively with private enterprise because of its absolute commitment to information technology.

Mr Wray's conviction stems from British Telecom's long experience, not only in the complex legal and environmental constraints it has consistently come to terms with in the past, but also in its record of innovation and achievement in the telecommunications field. Indeed, it was more than 15 years ago that the Post Office first committed itself to making cable television a practical proposition.

From the completion of its first installation in Washington, County Durham in 1969 it went on to win further contracts to supply cable television to communities in Scotland, Wales, Kent, Suffolk and, most recently, in Milton Keynes. This new network includes 22,000 connections and includes a pay-tv channel, and an optical fibre switched system providing a range of customer services designed for the future.

But the philosophy behind British Telecom Cable extends far beyond the traditional role of British Telecom. It can provide a choice of cable television systems from the advanced VHF coaxial method providing full coverage of up to 28 television channels, 20 radio channels and a full range of inter-active teletext services, to the British Telecom-developed 'switched star' system which offers even greater versatility. In addition, it is rapidly developing the financial and marketing skills appropriate to these new and exciting ventures.

Switched star provides every customer with a dedicated broadband connection using switching points under the street and allows a wide range of two-way services such as teleshopping and home banking. Unique to the switched star network will be access to a video library, allowing customers to see programmes of their choice at any time.

In the end, British Telecom's vast range of management and administrative skills should more than match any competition. Its combination of expertise, experience, vigorous marketing and determination to maintain British Telecom's lead in the field will provide a winning formula. And British Telecom has already begun to work hand in hand with other organisations keen to invest in a profitable and expanding future.

Just 6p more

Success in publishing is measured both by increased readership and a healthy level of advertising – and *British Telecom Journal* can lay claim to both. But unfortunately costs continue to rise and to ensure that the Journal maintains its high standard as the major source of reference for telecommunications developments in the UK, it is necessary to increase the cover price by six pence from the Spring issue this year.

Telecom Silver, the British Telecom Spectrum credit card authorisation service designed to beat fraud, is now becoming established.

SILVER SERVICE

Terry Walton

Most credit card users will by now be familiar with the procedure in which a retailer has had to telephone the credit card company to obtain an authorisation before accepting the card offered. This authorisation is needed to protect the retailer, the card company and ultimately the legitimate users who inevitably bear the cost of fraudulent use of credit cards which is currently running at more than £10 million a year in the UK alone.

Card companies can reduce the level of fraud if they lower the value (floor levels) of transactions above which retailers must seek authorisation. But the cost of handling the extra calls generated by this procedure rapidly eliminates any advantages as well as causing more problems for the retailers. Further automation of the authorisation process could help although it is clear that any answer must keep the cost per retailer to a minimum if the widespread coverage needed is to be achieved.

The problem has now been solved by British Telecom Spectrum which is launching the Telecom Silver Service for credit card authorisation. The new service provides the essential low-cost facility which card companies and retailers need to widen their coverage of fraud prevention measures. Key to cost-cutting lies in the simplicity of the high-volume equipment – the retailer's terminal.

Technical officers Pete Hardy and Paul Lawrence run a check over the system at the London exchange which houses British Telecom Silver's first central bureau facility.

The basic requirement for the terminal is an ability to transmit numeric data and the cheapest means of achieving this is to use the multi-frequency (MF) signalling system now being used for PABXs and exchanges on System X.

Receiving data in coded form can add further cost and complexity to a terminal but can be avoided if the responses are fairly standard. There is after all already a very sensitive and intelligent receiver/decoder at the end of every telephone in the combination of the user's ear and brain! Telecom Silver, therefore, signals its responses to terminals in the form of voice messages.

For operational reasons, the design chosen for the retailer's terminal – the Telecom Silver Checkphone – is more sophisticated than the minimum requirement and it incorporates four features which simplify the procedure for the retailer.

★ The transaction data (the card number, its expiry date and amount) can be entered before the handset is lifted (data is entered manually on the keypad).

★ A 16-digit display and a cancel key are provided to correct mistakes.

★ The terminal can be programmed with an identity code which is added to each message transmitted to identify the retailer to the system.

★ The terminal has a ten number repertory dialler, which not only provides a simple dialling procedure for contacting the Telecom Silver central system but also enhances the value of the Checkphone as an ordinary telephone.

The Checkphones are being produced

Above:
The British Telecom Silver Checkphone.

Left:
A jewellery shop assistant uses Checkphone to verify a customer's credit details.

by Comdial Communications Limited, a UK subsidiary of Comdial Inc USA. Comdial are using British Telecom's Sceptre 100 telephone as the basis for the Checkphone and are incorporating the additional memory and processing required. The MF signals will be generated by Comdial's proprietary dual dialling clip which can produce the MF tones required for the data communications and the normal ten pulses per second signalling required for dialling.

The central bureau facility which provides the essential interface between the simple terminals and the credit card company authorisation service is accessed over the public network. The first centre is in the London local area with other regional centres planned as the service develops. The terminal interface to which incoming calls will be connected incorporates an MF tone detection system and a link to a recorded message store for response messages.

The authorisation request is received as a burst of MF coded digits. The decoded message is then reconstituted into format appropriate for onward transmission to the card company authorisation service. This process involves recognition of the card issuer and selection from a central data bank of the merchant's reference number for the card issuer. The message is assembled into an agreed standard format and sent as a datacall via Packet SwitchStream.

The card company's response will contain either an authorisation code or a code to indicate one of a limited range of messages to be relayed to the retailer. The voice messages heard by the retailer are built up from a vocabulary of digitally recorded sounds according to the actual message required. A total of 96 seconds of recorded speech is required for this application which includes the names of all the major card issuers' and the numbers and words required to construct the phrases which form the repertoire identified by the system design team.

At present the system has been developed primarily for credit card transaction authorisation but once Telecom Silver is established it will open up a range of additional opportunities in areas where simple low-volume data transactions are required. The most immediate example is in the provision of facilities such as retailer/wholesale ordering for retailers already using the cardcheck service. Other applications in catalogue mail order and home banking are, however, being considered as possibilities for the future.

Mr T. W. Walton is head of section in BTE/Spectrum and is manager of the Telecom Silver project.

British Telecom Journal, Winter 1983/84

Towards cellular radio

Malcolm Appleby

British Telecom is playing a major role in developing cellular radio – a concept which will extend the availability of mobile telephony throughout the country.

British Telecom's automatic Radiophone service allows the man on the move to make and receive calls while on the road.

A portable telephone which may become common in the proposed cellular system.

British Telecom's first automatic radiotelephone service was opened during the summer of 1981 to supplement the already popular manual service which had been operating for some years. Initially service was offered only to London customers with some access in the provincial areas already covered by the manual service, but since then the system has expanded and now covers many of the high population centres of the country. Between them, the manual and automatic systems offer service to thousands of customers.

The present British Telecom systems have an excellent performance record, reflecting the continuous programme of refinement which has been followed over the years. But while that process will be continued, overall capacity in the largest markets – London – will be ultimately limited by the number of radio channels available in the heavily used 160 MHz band. The spectrum available to the British Telecom Radiophone service is used economically, with channel spacings of 12.5 kHz and there is some scope for expansion. But there has to be an unwelcome compromise between geographic coverage and the allocation of channels to London and its environs leading to shortfalls which will persist for the foreseeable future.

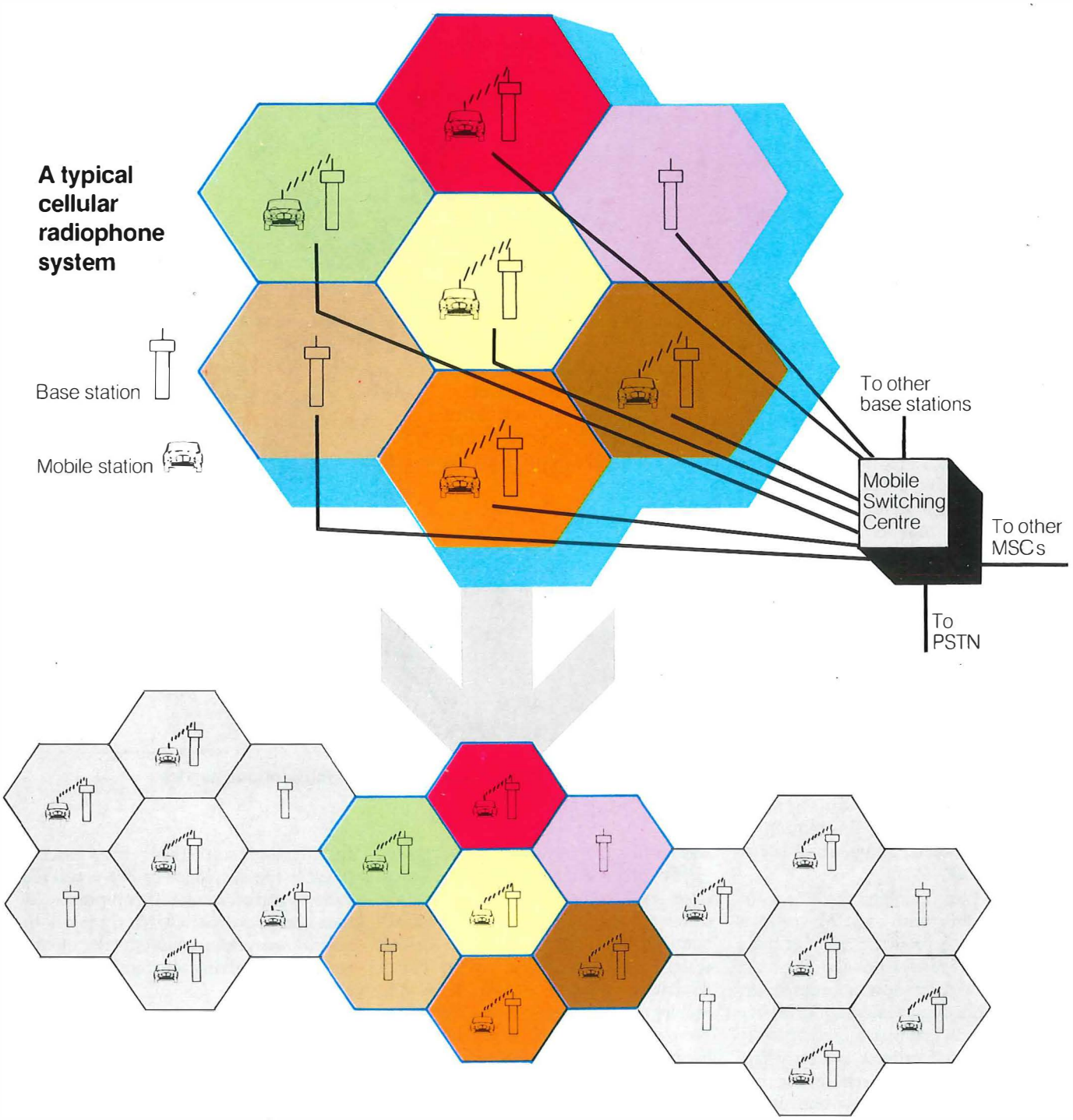
In 1979 the World Administrative Radio Conference (WARC) – held every 25 years to allocate radio frequency spectrum on a global basis – made available a new frequency band for mobile radio around 900 MHz. The size of the new band – 1,000 channels in the European allocation – made its exploitation very attractive. By comparison, the present allocation for radiophone in the 160 MHz band is a little over 100 channels. British Telecom decided therefore to begin some preliminary work so that a proposal for a new cellular radiophone service could be submitted to the Department of Industry.

Cellular radio is not a new concept. The fundamental ideas were originally proposed by Bell Telephone Laboratories soon after the second world war although at the time the technology available did not allow implementation. Indeed it is only recently that working cellular systems have been developed for public use. Among the countries currently operating systems are Japan, the four Nordic countries, and North America, where the go-ahead has recently been given for a large expansion in cellular radio.

The attraction of cellular radio is its ability to cater for a wide range of traffic loading and ultimately, to handle far more customers than present non-cellular systems. The cellular concept is to divide the required coverage area for the system into smaller areas, or cells, each with its own radio base station. These cells are then formed into groups, or clusters, with typically seven or nine cells to a cluster.

The available radio channels are divided equally in a fixed pattern between the cells in a cluster, and the pattern repeated to fill the whole coverage area. In this way each radio channel may be used several times throughout the system, but because the distance between base stations using the same channel is large compared with the size of the cells, interference can be kept to an acceptably low level.

Within each cell the number of simultaneous calls which can be handled is limited by the number of radio chan-



nels allocated to the radio base station. If the size of each cell is reduced, there will be more cells in a given area, so the total number of available channels within the area will be increased with a corresponding increase in the maximum number of simultaneous cells that can be carried. The smaller the cells, the higher will be the overall capacity of the system. In practice, however, variations in radio propagation will tend to limit the minimum achievable cell size to a radius of about two kilometres.

The size of a cell is controlled by careful planning of the base station location, the height and type of aerial, and the power transmitted. It is also necessary to control the power transmitted by the mobiles so that they do not cause unacceptable levels of interference to nearby cells using the same channels. This is normally done by remote control from the base stations.

Cellular systems have two key features which set them apart from non-cellular systems and both are required because mobiles move from one cell to another as they move through the coverage area.

The first feature is mobile tracking, or location. When a call for a mobile is received from the telephone network, the radiophone system must be able to find which base station the mobile is nearest to so that the call can be connected successfully. In a system which might consist of several hundred cells it would not be feasible to send out a call to the mobile in every cell, as the high resultant loading on the calling channels would limit the capacity of the system. Instead the system keeps a record of the current location of each mobile so that calls can be sent directly to the correct base station.

When the mobile is not making a call it constantly listens to one of a number of special channels designated for control purposes, checking from time to time that it is listening to the best possible channel. Part of the information

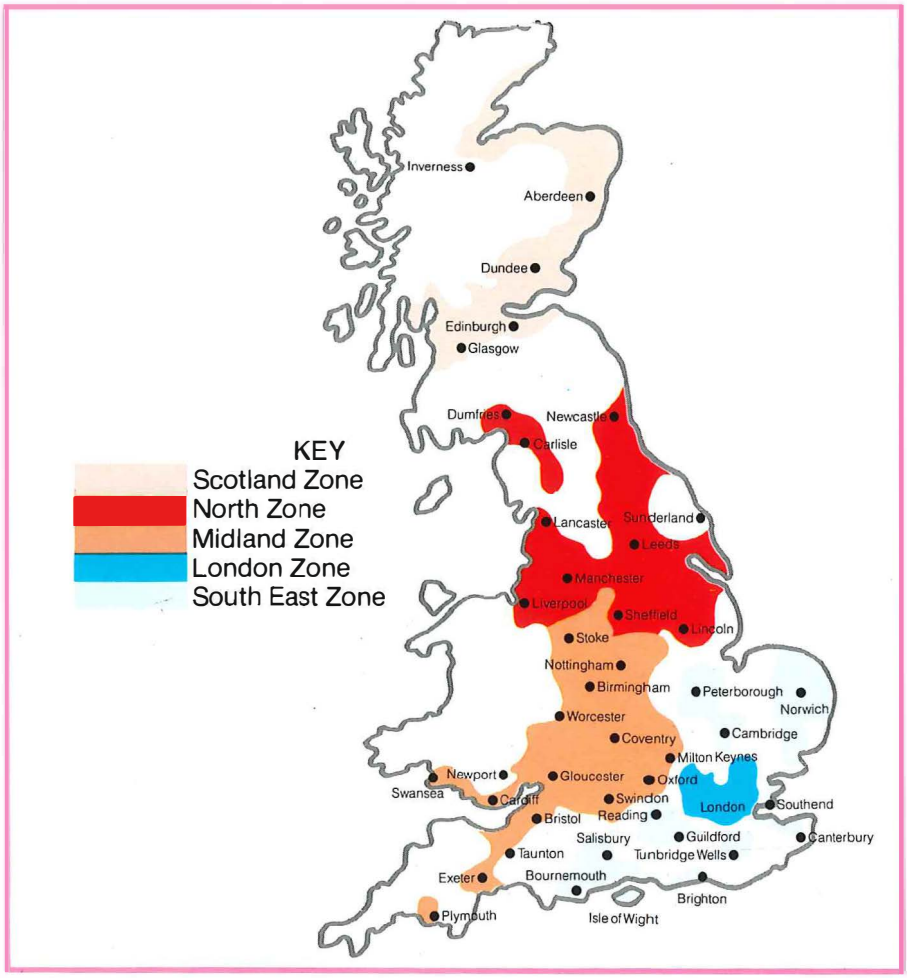
transmitted by the base stations on these control channels is a number signifying the area in which the mobile is located. When the mobile detects a change in this number, indicating that it has moved into a new area, it automatically tells the radiophone system which will then update the information held about the mobile's location.

The second feature is its 'in-call hand-off'. When a mobile is engaged on a call it may move from one cell to another. So that communication is not interrupted the mobile must be 'handed-off' from the cell it is leaving to a new radio channel in the cell it is approaching. The system constantly checks the signal level received from mobiles in conversation and detects when the mobile is leaving a cell. It then commands all surrounding cells to measure the signal strength of the mobile and chooses the best cell to which to 'hand-off' the mobile. A short control signal to the mobile completes the process, which happens entirely without the user noticing.

Although the cellular system and the interactions required with the mobiles are complex, the use of sophisticated microprocessor control within the mobiles means that the customer is presented with easy-to-use equipment. The processes of mobile tracking, hand-off and power control are automatic and occur without the customer's knowledge or intervention. The only controls he needs to use are the keypad for putting in telephone numbers, and a 'send' key to initiate the call.

Cellular radio mobiles will not be restricted to use with cars. The cellular system will also allow the use of genuine handportable radiotelephones. The main difficulties with handportable design are the conflicting requirements of small size and low weight but with a useful battery life. A small-cell cellular system where mobiles are only required to use low power levels is an ideal environment for the portable telephone. Thus a device little larger or heavier than a cordless telephone handset can be used in a cellular system as a carry-anywhere telephone.

In 1982, the Secretary of State for Industry (now Trade and Industry) announced that Britain was to enter the cellular radio field and further that the UK would have two competing services, one to be run by a joint venture company formed by British Telecom and Securicor, and the other by a consortium called Racal-Millicom. It was also specified that the two competing services be compatible so that customers would be free to choose between them. The target date for introducing the systems was set for the beginning of next year.



Coverage areas of the National Automatic Radiophone service at the end of last year.

Following detailed technical discussions on the type of cellular system best suited for adoption in the UK, it was announced last February that the British system would be based on the North American system AMPS (advanced mobile phone system). It was recognised however that there were differences between the UK and US radio environments and operational requirements, so it was necessary for some adaptation before the system could be used in the UK. The modified system is now known as total access communications system (TACS).

To ensure full compatibility between the two competing networks, a joint radiophone technical interfaces group was set up under the auspices of the Department of Trade and Industry to define the key interfaces for the TACS system. The group has included representatives from the Telecommunications Division and the Radio Regulatory Division of the DTI, British Telecom, Racal and the British Telecom/Securicor joint venture company.

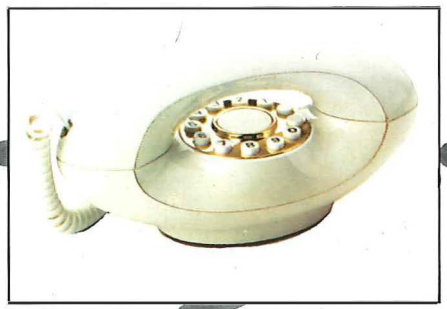
Working to a very tight timescale the group has produced the required specifications so that work may proceed towards the development of the cellular systems and of the mobile equipment. By next year it is expected that there will be several manufacturers producing mobile equipment, giving customers a wide choice.

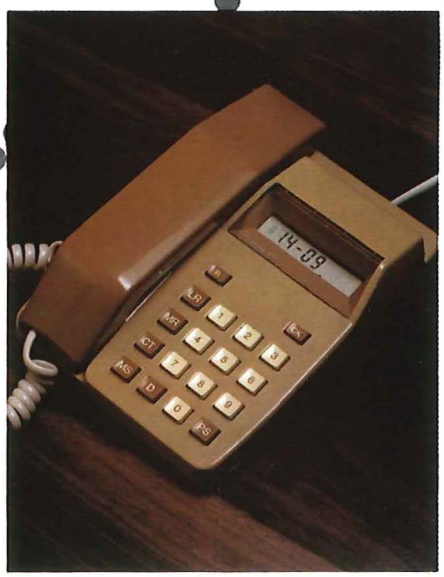
Cellular radio will, without doubt, result in large growth in mobile telephony and should satisfy the demand for mobile services for some years to come. The handportable radiophone may well revolutionise attitudes towards the mobile service and in future years it may become common to see people using handportables in the street. It is also likely that the mobile service will become a carrier for a host of new services as customers start to demand more from the telephone network than simple telephony.

Mr M. S. Appleby is an executive engineer in Development and Procurement's Systems Evolution and Standards Department working on radiophone standards.

British Telecom Journal, Winter 1983/84

First point of contact





The fourth article in our review of British Telecom's major divisions looks at Local Communications Services, by far the largest unit, employing 210,000 staff and serving 20 million customers.

A few examples of British Telecom's Inphone range.

For most people, British Telecom's Local Communications Services – (LCS) – is their introduction to the organisation and its sometimes bewildering array of modern telecommunications equipment, products and services. A huge division employing nearly 90 per cent of British Telecom staff, LCS grossed more than £5,200 million in revenue last year.

Rapid advances in technology, the changing nature of competitive markets after liberalisation, and the new strategic and commercial policy heralded by

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privatisation have combined to make challenging demands. Indeed, the UK telecommunications market is expanding faster than any other, including the US.

LCS finds itself in a kind of corporate Catch-22 – it has by far the greatest opportunity to exhibit successful adaptation to change while also having the widest audience to witness any possible mistakes. This has acted as a potent incentive towards a dynamic and innovative approach to customer products and services.

It was with all this clearly in mind that LCS set about the task of developing strategies appropriate to the new commercial environment.

New organisational arrangements and flexible control systems had to be formulated to ensure that full resources and effort were concentrated on a fuller understanding of customer needs and on ensuring that customers get exactly what they want, when they want it, and, at prices they can afford.

This meant that it was essential to push the decision-making process nearer to the customer interface in the local area.

Each telephone area is now managed as a profit centre, with substantial powers of commercial decision and asset management. The shift in emphasis is away from a hidebound, highly-centralised bureaucracy holding a dominance in its services and standardisation of products by virtue of monopoly, towards a flexible structure to meet the post-monopoly necessities and the economic facts of life in a highly-competitive, rapidly-changing market.

The new LCS management strategy focuses on the nationwide diversity of markets and demands of business and residential customers whose communications needs are determined by the particular characteristics of their individual locality. Supplying such communications markets has meant establishing local management teams responding quickly to the specific needs of customers in the many communities which LCS serves and in which it plays an important role.

Each area has teams of LCS staff with engineering, accounting, marketing and sales backgrounds, which have been formed into separate business units designed for a fast and flexible response to customer demand. This was the new structure established by area reorganisation last year.

New channels of communication are being set up to maintain an efficient dialogue between areas and LCS head office support and advisory staff. These support services can provide areas with expertise across the broad range of business skills, including finance, commercial strategy, engineering, computing, statistics and management information science. They also allow direct links between the managing

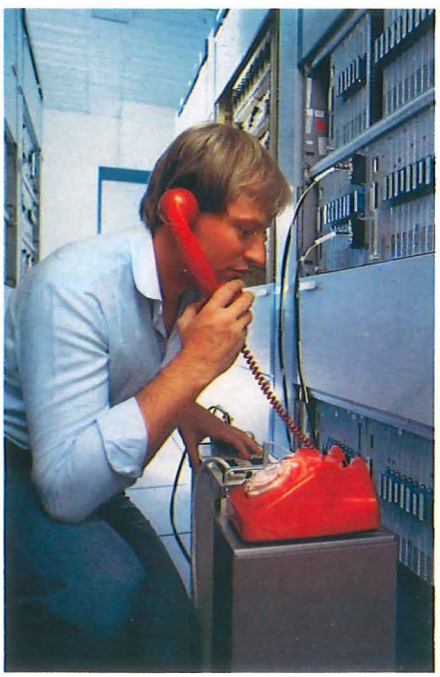
The areas of LCS involvement cover a vast range of British Telecom activity. They include:

1: Information services

2: Telcare

3: System X exchanges

4: Teleprinters



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director, regional directors, general managers and their staff.

LCS headquarters will be responsible for setting policy on key strategic issues, concerning the general direction for the division. The top decision-making body is the LCS management board, chaired by managing director Iain Vallance. LCS board members include Michael Bett (main board director of personnel) and Douglas Perryman (main board director of finance). All the LCS regions are represented on the board, and the other members are the senior functional directors from LCS headquarters.

Other senior-level groups examine key areas of importance to LCS. For example the local network strategy steering group is now considering the future architecture required for LCS networks in the light of market, financial and technical opportunities and threats.

The major areas of LCS business activity can be broadly grouped into two clusters: networks and services on one side, and products and attachments on the other.

The fundamental role for LCS is still to run the local network of lines and exchanges as efficiently and effectively as possible. To this end LCS plays a key part in overall British Telecom modernisation plans.

The replacement of old-fashioned electro-mechanical local telephone exchanges by modern systems has been in hand for some years, but the pace has now rapidly increased. LCS will be spending over £500m in this financial year to install over 150 modern exchanges. And wherever possible LCS has made the jump to the latest electronic digital exchanges, System X. The present plan is to complete the phasing-out of Strowger and crossbar local exchanges by the early 1990s.

Just as vital as the exchange modernisation programme is the need to ensure that the local and junction transmission systems are capable of meeting the most demanding modern requirements. Lines which were previously considered adequate to carry low volumes of voice telephony, have now to be re-evaluated with a view to data transmission and the whole range of other modern services.

The options open to LCS are to instigate a comprehensive local networks modernisation programme to parallel the exchange modernisation plans, or to install specialist overlay networks for the new applications leaving the basic network intact. It may well be that the best solution lies in some mixed approach, combining the best features of each plan in different parts of the country.

A major objective of the plans to modernise the exchange and line plant in LCS's local networks is to improve the quality of service enjoyed by customers.


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5: Phoneshops

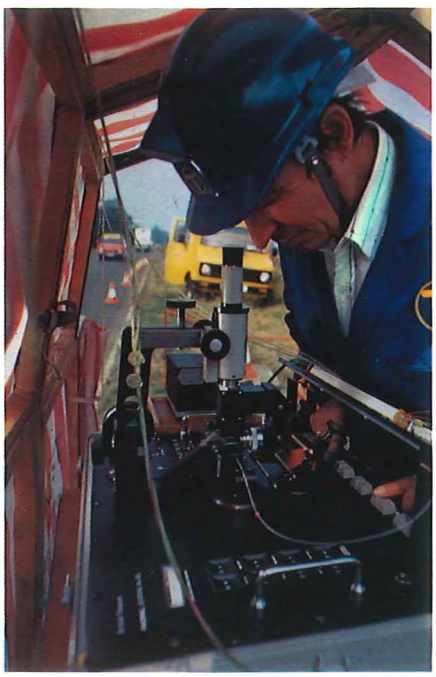
6: Optical fibre installation

7: Cable television developments

8: Microwave radio links

9: Monitoring exchange performance

10: Repairs to underground cable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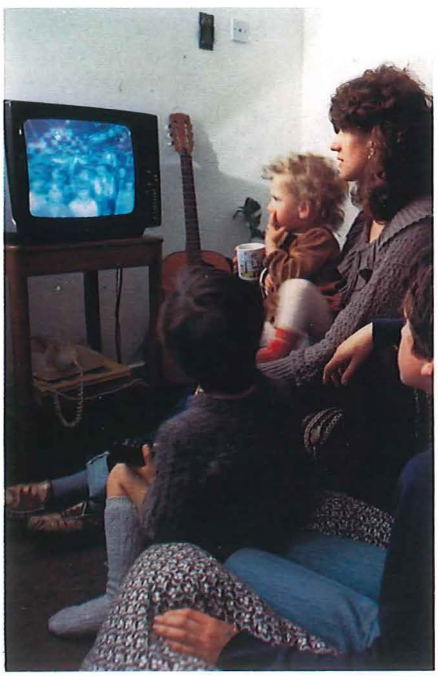
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And last year showed the best ever results with the waiting list for telephone lines down from around 250,000 just two years ago to only 1,500 today; less than one per cent of dialled local calls failing due to LCS; and more than 85 per cent of all faults reported being cleared before the end of the next working day.

Much of the effort in running the local networks goes into making them easier for the customer to use. In particular directory enquiries and printed directories are constantly reviewed to ensure that information is up-to-date, accurate, and readily available. More than 30,000 telephone operators and supervisors work in some 260 automanual centres and 30 directory enquiry bureaux.

Last year, of the 21,400 million telephone calls made within the UK, there were an average of 1.25 million directory enquiries every day. The service costs nearly £100 million a year to operate – all part of the LCS service.

LCS is very keen to see a growing range of new services available to customers over the local network. Many of these are springing from British Telecom Enterprises (BTE), but LCS itself fosters a number of popular services. These include the 'Guidelines' range of recorded information covering such diverse topics as cricket scores and financial headlines, as well as the famous speaking clock.

New services will become available with modern exchanges such as System X or through add-on 'black boxes' on older exchanges. The so-called 'star services' offer customer facilities like automatic call-forwarding, call-barring, and abbreviated dialling. And one LCS service which must not be forgotten is the emergency 999 system. Last year 15 million 999 calls were made, totally free of charge.

LCS is fully committed to offering customers a comprehensive and attractive range of quality products and attachments to connect to the telephone system. Most of these are provided through commercial arrangements with BTE.

Business products and systems are sold by LCS areas in a franchise deal with BTE/Merlin. This range of products includes PABXs in all shapes and sizes, and a wide choice of telex and teleprinter machines.

LCS areas also act as the retail sales outlet for domestic and small business telephones from BTE/consumer products. These are currently being promoted on television and elsewhere under the brand name of 'Inphone'. Care is taken to ensure that heavy promotion is backed up by the availability in areas of appropriate stocks of all the main lines.

As part of the LCS sales effort, telephone shops are being opened in a number of locations. They are already operating in 35 major centres, and this number will be nearly doubled in the next year. Although primarily acting as a sales focal point, telephone shops also provide a vital presence in the high street for LCS. Customers can use the shops for paying telephone bills, making service enquiries, or simply seeing that there are human faces behind the British Telecom system.

In time LCS will be looking to expand its products and attachments range through further arrangements with BTE or deals with other suppliers. The aim must be to ensure that customer needs are always met, in this the most competitive area of LCS activities.

"LCS is fully committed to offering customers a comprehensive and attractive range of quality products and attachments to connect to the telephone system . . .

. . . watchword of the new LCS is customer consciousness."

Looking to the future, LCS expects to move into a range of new activities as the telecommunications market develops and enlarges. The most obvious of these in sight at present is cable TV. LCS can play a variety of roles for cable TV consortia, from simple cable-laying to full participation in the operating consortium.

The range of services to be available over cable TV grows more exciting by the day. Already in prospect are up to 30 channels of broadcast and satellite television and radio programmes; a pay-as-you-view channel; video library; security locks; cabletext (a video magazine); Prestel – telebanking and shopping. The system can be expanded to offer electronic mail, alarm services, remote meter reading, opinion polling, home computer and video game programs.

Among the first round of ten cable franchises recently awarded, LCS, in association with BT Cable, has an involvement in five, and is negotiating multi-million pound contracts with British industry for supplying the latest technology for cable television and related interactive services. Many of the systems will use the most modern switched-star pattern, offering still more possibilities for the future.

Cable TV will hopefully become a major new business area for LCS, the first of many exciting new possibilities in the burgeoning telecommunications market.

The watchword of the new LCS is customer-consciousness. This theme is reflected in a host of initiatives designed to make LCS more aware of customers' needs and their likes and dislikes, and to enable LCS to respond quickly and flexibly. The main statistics used by LCS to monitor its performance are changing from those measured by the business from its own internal sources to those perceived by customers. This is the Telcare system (see page 11), whereby customers are contacted to find out their attitudes to work done by British Telecom.

Another factor in establishing better awareness of customer requirements will come from the establishment of local consumer liaison panels. By finding groups of consumers interested in helping LCS to improve its services, it is hoped to create a healthy two-way flow of ideas and information. The panels will vary in size, composition and geographical coverage from one part of the country to another, but the target of improving customer relations will remain the same everywhere.

Finally LCS is mounting a determined drive to ensure that the customer service systems which support the operational departments are brought right up to date. The aim is an integrated front office in which sales orders, service enquiries, and billing matters can be settled at a single point in the organisation. Behind this front office function will lie an integrated customer information database, served in turn by the main functional systems of sales, service, and billing. By this means it is hoped that there will be major improvements in this key area of customer contact.

Leading with the latest technology, competing to bring the best to the British – British Telecom Local Communications Services is gearing itself to meet and fulfil all the demands the customer will make.

Voice of the customer

Jim Fisher and Peter Faulkner

Telcare is a new British Telecom system which uses nationwide telephone surveys to measure customer perceptions of the quality of British Telecom's main business activities. Normally these activities cover provision of service, automatic service, maintenance and billing.

Telcare, derived from TELecom Customer Attitude REsearch, is an expression of British Telecom's reflection to take account of its customers' needs and to provide the products and services they want quickly and economically. Using highly trained interviewers, Telcare seeks the views and experiences of customers, finding out by telephone what they think of British Telecom and the range of services which it provides.

More than 2,000 interviews for each of British Telecom's 61 telephone areas are completed each month, amounting to over 1.5 million interviews nationally a year. Interviews are carried out by external research agencies which ensure the credibility of Telcare in producing impartial results.

British Telecom has always produced internal management statistics and performance measurements and has for many years used outside agencies for ad hoc market research. But Telcare is different. It is aimed at determining customers' attitudes and needs on a regular basis and is the biggest project of its kind undertaken anywhere in the British Isles.

As long as 20 years ago, British Telecom – then the Post Office – was seeking the views of its customers. The first surveys known as Roots and Boots (Residential and Business Opinion of Telephone Services) were superseded by more sophisticated versions such as Trend and Care (Customer Attitude Research). These were national surveys and were usually undertaken on an annual basis.

By the late 1970s it had become clear that surveys of this nature were no longer adequate particularly since they did not provide information at local level. This led to experiments based on area samples which would give statistically valid results for areas while still allowing regional and national pictures to be obtained. These surveys also give areas, for the first time, the opportunity to add their own questions. Under the name Spotlight, they were successfully tested in seven areas in 1980 with a view to subsequent implementation nationally. But it soon became obvious that the advent of competition was making Spotlight less than ideal. Something far more comprehensive and more immediate was required.

It was known that US telephone companies such as AT&T and GTE had schemes for surveying customer perception. Top of the list was AT&T's Telsam (TELephone Service Attitude Measurement). Telsam had been evolving for some ten years in the US and had moved in that time from postal questionnaires to a computer-assisted system of telephone interviewing. No such computer-assisted telephone interviewing facilities existed

Supervisor Sylvia Freeman checks a business customer's response with the Gants Hill Telcare director Trevor Cockings (centre) and British Telecom Telcare liaison officer Ilwas Sarwar. Each centre is run by independent market research agencies contracted to British Telecom.

British Telecom's 61 telephone areas are served by three purpose-built Telcare centres each owned and operated by an independent research agency under contract to British Telecom. Each centre has 30 or 40 interviewing positions, each equipped with telephone and VDU facilities, and separate training, clerical and computer facilities. The centres are in London, Coventry and Newcastle, and each handles information from about 20 areas.

Following the initial introduction of Telcare into 12 areas in 1982, a further 12 areas were brought into the scheme early in 1983.

After a review in spring, Telcare was extended to a further 17 areas between April and July and was fully implemented by August.

anywhere in the UK either in British Telecom or within the market research industry.

Following a visit by senior management to the US a steering group was set up to see whether a system like Telsam was viable for use by British Telecom. They reported that it was, coined the title Telcare and established a Telcare Task Force in July 1982 to implement the system.

British Telecom's market research section had meanwhile begun to work with a market research agency and a data processing company with the aim of setting up a pilot computerised interviewing centre. This centre was to use similar computer-assisted interviewing facilities but would attempt to go one better by offering improved facilities for quality control.

British Telecom provided exchange lines and modems, the market research agency the interviewing booths, visual display units and staff, and the data processing agency the main-frame computer and software. The first trial of CATI – Computer-Aided Telephone Interviewing – began at the pilot centre in June 1982, using samples from the Southend Area, just prior to the Telcare Task Force being established. The implementation of Telcare was about to begin.

The Task Force quickly benefited from the experience of the pilot centre and drew up plans for the national introduction of Telcare by last August. Telcare was initially introduced into 12 areas in autumn 1982, extended to a further 12, and was completed with all areas in the scheme by last autumn – the target date.

At each Telcare centre, agency staff make brief calls to customers who have recently used, or had contact with, British Telecom services. Using CATI techniques, interviewers ask for customers' perceptions of one of seven main telecommunications activities:

*Provision of service (residential and business).

*Automatic service (local and long distance).

*Repair service (residential and business).

*Telephone billing.

Questions cover quality of service for both the facilities supplied and the manner of supplying them. Questions have been carefully formulated from research by British Telecom, and although agency interviewers must not deviate from the set questions, there are many routes through the questionnaire according to response.

Computerised help repeatedly offers the correct route freeing interviewers to concentrate fully on their interviews. If a respondent raises a significant point not covered by the questionnaire, the interviewer records it for subsequent follow up. Supplementary surveys can be added – tailored specifically to local or national needs – to provide important new information for use by management.

Customers are chosen at random from records using standard sampling techniques – either centrally, by British Telecom computer, or manually in areas. Sample customers to be interviewed on automatic service and billing are selected centrally from rental records and are notified direct to the agencies.

Currently provision of service and repair service samples are selected manually by areas using standard methods from completed customer orders records and repair service centre fault records. When new methods of handling customer orders and fault reports become available, Telcare samples will be obtained directly from computerised records.

Samples are then notified to one of the Telcare centres where they are input to the agency computer. At an appropriate time, the computer flashes a customer's name and telephone number and the questions to be asked on to the interviewers' visual display unit. Responses are then coded directly into the computer. Customers may, of course, decline to be interviewed and it is an important aspect of Telcare not to seek forced responses which may produce unrepresentative results.

A central computer analyses monthly the coded information obtained from all the Telcare centres and provides summarised results and graphical information for area, regional and national managers early the following month. Telcare results are of course confidential to British Telecom management.

There is a need to monitor and control Telcare to ensure that the sample and hence the results are as unbiased as possible. Each area and region has its own Telcare liaison officer who looks after local aspects, including sample selection. And each Telcare centre has a resident British Telecom agency liaison officer to monitor samples and ensure overall quality control at the centre. Nationally Telcare is managed at the Local Communications Services headquarters by its Organisation Performance and Systems Department, with research advice and development support provided by British Telecom's Management Science Consultancy Unit.

It is essential that British Telecom must have comprehensive information about its customers' perceptions and their needs if it is to survive and prosper in a changing world. Managers must be given regular, accurate and objective information on which they can plan and act – locally and nationally. It is the aim of Telcare to provide this information by constantly monitoring its customers' experiences of service, performance, courtesy and promptness.

Mr J. F. Fisher is head of the market research section in Personnel and Corporate Services.

Mr P. Faulkner is manager of Telcare and is based in LCS/Organisation Performance and Systems Department.

British Telecom Journal, Winter 1983/84

Microwave training on the move

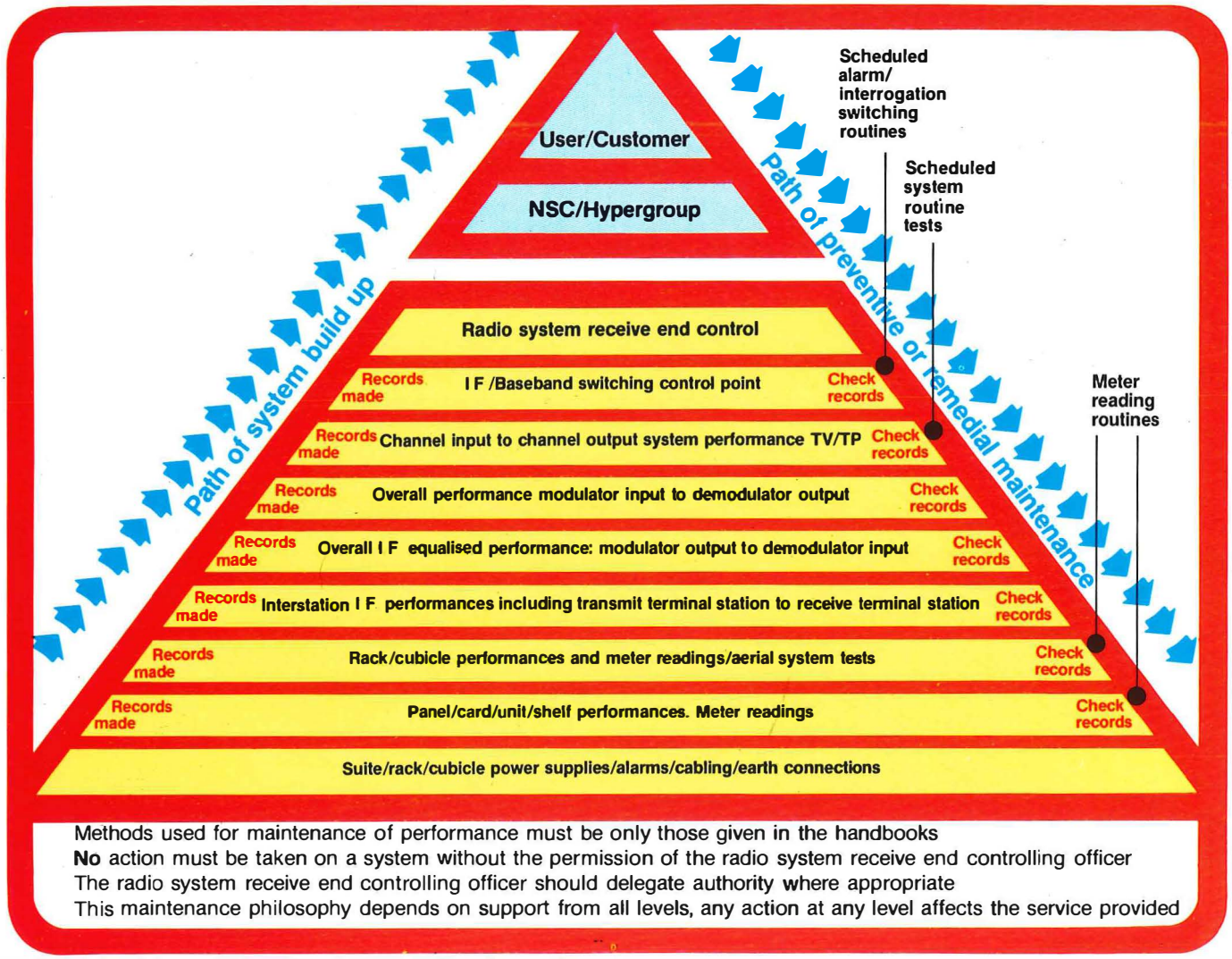
Cliff Dorkings and Arthur Hickson

Below: The new purpose-built training vehicle which is being used as a mobile classroom.

A new purpose-built vehicle is now being used nationwide by national networks to give specialist classroom training to staff working on both analogue and digital microwave radio maintenance.

From relatively simple beginnings, British Telecom's microwave radio network has evolved to become both diverse and highly complex. Its ever-increasing complexity is symptomatic of the spectrum of services it is able to handle. Its diversity is a result both of equipment design improvements and variations in technology used by manufacturers to achieve the same end.

This complexity and diversity places particular strains on radio station staff faced with ever-increasing network capacity. The training centre at Stone in Staffordshire continues to provide the basic requirements for producing a



Principles of microwave radio system engineering philosophy.

competent radio technician. But it is to give staff practical experience to complement this training, that the mobile demonstration vehicle has been developed.

It was back in 1975 that the maintenance of British Telecom's analogue microwave radio network was radically changed to incorporate a philosophy called system engineering. This gave rise to new techniques, which were designed to reduce maintenance time on expensive protection channel facilities, for microwave radio systems.

This approach meant that overall radio channel performance had to be carefully monitored, but still made best use of radio station staff time. Earlier practices meant staff having to complete a regular and detailed inspection and testing procedure of the component parts of each radio channel – a lengthy and sometimes ineffective process.

By monitoring overall performance, faults can be cleared by using diagnostic information and staff can avoid wasted effort by communicating and co-ordinating their actions rather than using experience or intuition.

Part of this new approach was the introduction of a converted and modified television outside broadcast van which was used to provide demonstrations throughout the microwave network. Supporting display charts were provided at all radio stations. It was important at this stage that staff had a clear understanding of the relationship between the cause of a system fault and its 'character' – thus the need for practical demonstrations.

Area staff welcomed the new approach, because it provided a practical solution to everyday problems and area management were enthusiastic because this method of training minimised disturbance to work schedules. The first two-day analogue demonstration was given at Lampeter in Wales during 1977 to regional staff from radio stations.

The analogue demonstration is split into two sessions – television testing and telephony testing – each designed to show how overall system tests are affected by changes in radio channel performance. Both television and telephony services are affected by radio channel distortions. the intention of each demonstration is to show the diagnostic 'cause and effect' technique.

By introducing causes of degradation into the microwave link, the step-by-step recognition and location of each cause is illustrated by showing the effect on the overall radio channel performance. The resultant effects of these manufactured distortions are then displayed on test equipment. Instructions on the use of test equipment are essential, as their correct use is the key to efficient fault finding.

The ex-television vehicle provided limited space so that only small groups could be dealt with at each demonstration. Sites were selected to minimise travelling time for staff thus keeping down costs to areas and most were at microwave radio stations although the only requirements were power supplies and the usual basic staff facilities.

By the end of November last year the mobile demonstration had travelled the length and breadth of the UK – from the Orkneys to Goonhilly and from Belfast to Dover. In that period it had visited 60 locations and given 110 analogue demonstrations to 800 staff.

Co-author and engineer Arthur Hickson runs through a fault-finding exercise for two microwave technicians on board the training vehicle.

During 1980, a new purpose-built vehicle, designed specifically to meet its unique requirements, was built to replace its aged predecessor. The radio and test equipment, installed by staff at Charwelton Radio Station near Daventry is mounted on an anti-vibration shelf over the microwave radio link. The closed circuit radio equipment operates at a frequency of 11 GHz and consists of a modulator and demodulator, IF amplifiers and frequency changers.

The super high frequency (SHF) transmitter and receiver are connected together with waveguide under the main shelf. All the interconnecting test and flexibility points are displayed on a panel above the test equipment. This allows for the introduction of 'distortion boxes' to show the results of certain types of response variations. It also allows for signal measurements to be made easily.

With the introduction of 11 GHz digital radio equipment in 1981, it became necessary to extend the scope of the material. Single-day demonstrations were introduced in July 1982 and are designed to illustrate, practically, the fault location techniques needed for 11 GHz 140 Mbit/s digital radio systems. More radio and test equipment was subsequently provided, still retaining the analogue demonstration facility.

Because digital radio equipment and techniques differ a great deal from analogue systems, a video tape has been made and is shown at each digital demonstration. The video describes the operation of 11 GHz digital radio systems currently being installed and copies of the block schematic diagrams shown in the video are also given to staff attending the demonstration. Finally they are shown distortions to radio performance and are taught to recognise their effects.

More recently, specially-tailored demonstrations have been given to area and district management. They are aimed at improving management understanding of the problems faced by first-line maintenance staff at microwave stations. The demonstrations are supported by a special publication which shows the various printed aids issued to station staff.

Already, more than 1,000 British Telecom microwave staff nationwide have received on-board training in the maintenance of both digital and analogue radio links. The National Networks' digital microwave system provides further evidence that British Telecom is determined to offer a first-rate service backed by first-rate maintenance.

Messrs C. Dorkings and **A. G. Hickson** are engineers in National Networks' trunk network and operations division and are responsible for special investigations on the microwave network.

British Telecom Journal, Winter 1983/84

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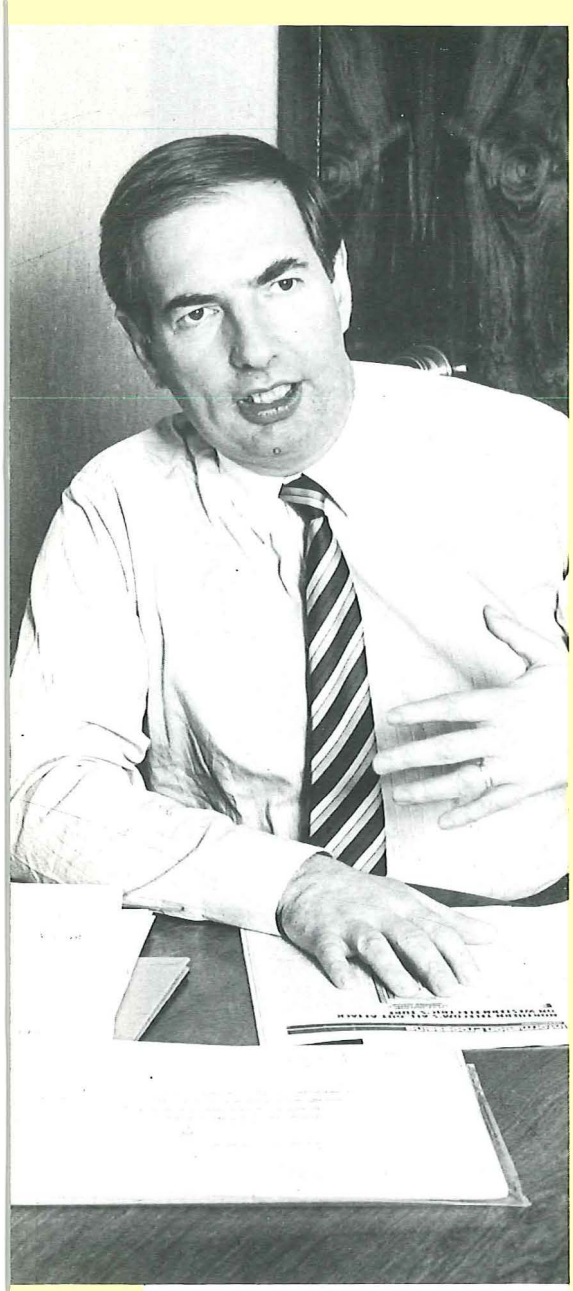

Colin Crook, 41, was educated at Harris College, Preston. After an apprenticeship with the BBC he moved to Canada to work on tropospheric scatter systems and then to Nasa to work on the guidance system for the Apollo moon landing.
He next returned to the UK to work on computer and system design with Plessey before switching to Motorola in Geneva where he eventually became European computer marketing manager.
He was invited back to the US as product marketing manager for the LSI operation and was responsible for developing Motorola's microcomputer business. In 1979 he became managing director of Rank Precision Industries and was later made managing director of Zynar/Nestar.
Mr Crook, married with two daughters, lives in Buckinghamshire and his interests include photography, sailing, and walking.
He became British Telecom board member and managing director, British Telecom Enterprises on 1 January.

The recent strengthening of the British Telecom Board has seen the appointment of two new members from outside industry. John King has come from Philips as board member for Marketing and Corporate Strategy while Colin Crook from Zynar is the new managing director of British Telecom Enterprises. *British Telecom Journal* editor **Mike Margetts** asked both men for their first impressions of British Telecom and how they see their roles within the organisation.

Colin Crook could be described as an all-rounder. A highly qualified engineer, he has had wide operational, business, financial and marketing experience both in Europe and the United States and has played a pioneering role in many of the technological developments of the past 15 years. He is also an unashamed enthusiast in anything he undertakes.
He considers that his new appointment with British Telecom is the most exciting project he has yet tackled. In addition to being a corporate board member, he has specific responsibility for British Telecom Enterprises and says the division will play an increasingly important part in British Telecom's future.
Mr Crook is still coming to terms with the size of the organisation. "I have worked in large companies before, but nothing quite on this scale. The resources we have are incredible."
But Mr Crook is undaunted. He finds the sheer magnitude of the organisation comforting. "I don't mean in terms of security, but more in terms of what is possible," he said.
He has been delighted with the aggressive attitude he has detected in British Telecom. "One or two people suggested it might be something of a sleepy backwater, bureaucratic and sloth-like," he said. "But there seems to be great awareness of the challenges ahead."

Impressed

Mr Crook is also impressed with the staff he has met. "British Telecom obviously has many bright, highly skilled people. Although there may be some difficulties in understanding fully the concepts of sales, marketing and business principles, everyone seems willing to learn."
He is also excited by the information technology challenge which the organisation has to face, and the opportunity to take part in its managerial and organisational metamorphosis.
He was equally positive about his dual role as British Telecom Board member and operational head of BTE. "The question of conflicts of interests simply does not arise," he said. "On the contrary, I think it is essential that everyone should balance and reconcile operational parochialism with the interest of the company as a whole."
As for BTE, Mr Crook said he had not yet got involved with any of the technical aspects. "My first step has been to determine the business mission of BTE, explain to my peers within the organisation what I think it is and to reconcile this with other divisions' objectives."
One thing clearly emerges. Mr Crook is convinced the real focus for BTE lies within its products — not just equipment, but services, hardware, software and systems.
"The fundamental charter of BTE is to define market segments and the products to service them," he said. "There is vast scope and the whole thing is very exciting. We will be involved in a lot of experimentation and BTE will certainly have a vital role to play in the development of British Telecom."
And according to Mr Crook the name British Telecom itself is of inestimable value. "When you have worked in the harsh winds of the market place, you understand the benefit of a large organisation like ours which has an excellent reputation throughout the world," he said. "The key to our success is to make the customer happy and to make money while making the customer happy."

Competitive

Looking to the future of British Telecom as a whole, Mr Crook said BTE's role was a particularly sensitive one. British Telecom's ability to participate in information technology was likely to be measured by BTE's ability to be competitive in new business areas.
It was necessary to develop a highly tuned 'feel' for each particular sphere of business. "We need the very subtle blend of everyone doing their own thing while at the same time working to an agreed plan," he said.
Mr Crook was also at pains to emphasise the contribution to be made by operational staff. "Those at the 'sharp end' will be the people we need to come up with the new ideas," he said. "It is difficult to spot new opportunities from the corporate ivory tower — but there must be good communications because it is up to senior colleagues and myself to assess these ideas."
With privatisation on the horizon, Mr Crook says that a key priority is to establish the scope of the competitive market place. "I have worked in some very tough markets and I have had both success and failure," he said. "I now know what it means to compete and I hope to be able to use my experiences to the benefit of British Telecom."

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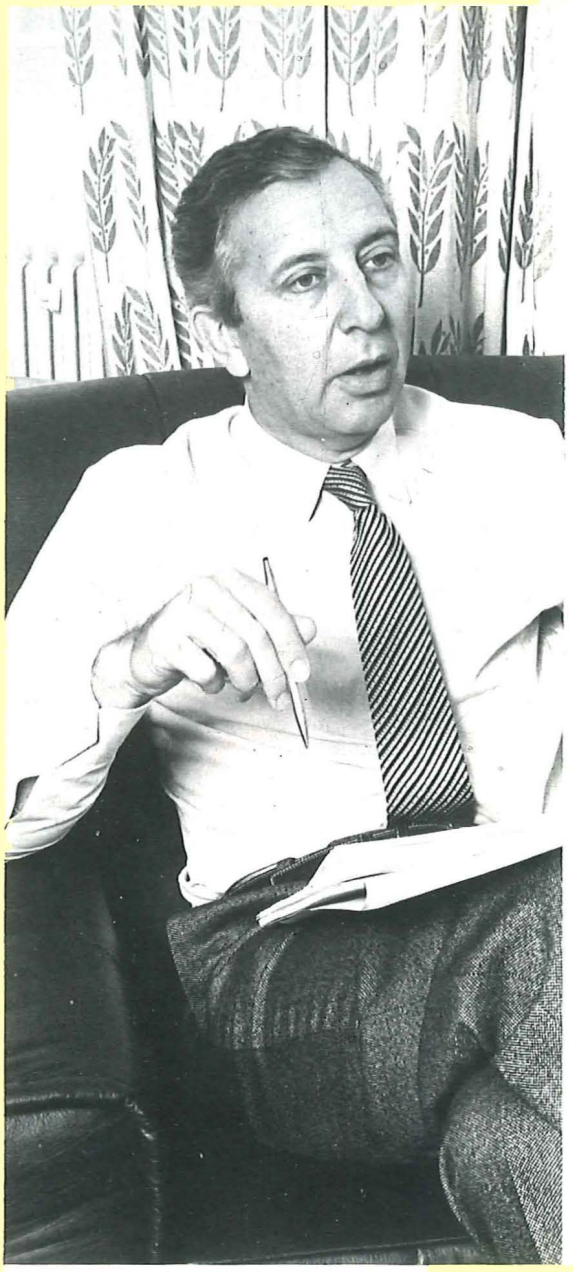


John King is restless by nature and has a thirst for a challenge. Whether he's weighing up the merits of a major new marketing initiative or simply playing a game of squash, he is a man of action committed to making the most of every opportunity as it arises.
And Mr King is convinced that over the next few years British Telecom will be presented with many exciting opportunities which will enable it not only to maintain its vital role in telecommunications but also to become a world leader in information technology.
Although Mr King has been at British Telecom for only a few weeks he is impressed with the quality of its staff and the way in which most have responded to the rapid changes which have been and are still taking place.
"It is, of course, vital that we do change, but we must remember that while there is a high degree of excitement, there inevitably will also be concern," he said. "It is essential that we are sympathetic to people's problems but we must also retain our firm resolve to compete wholeheartedly in the markets in which we operate."

Responsibilities

With marketing and corporate strategy his dual responsibilities, Mr King lists four 'major events' which he considers relevant to both.

* Devolution of central authority
* Liberalisation
* Rapid technological change
* Privatisation

"It seems to me that these four things are separate but very closely inter-related and we need to bear them in mind when we ask ourselves the question: 'Where are we going?'."
On marketing, Mr King was in no doubt that the telephone areas had an important marketing and selling role to play.
"I don't think we should be embarrassed to admit that in the past we have not been among the forerunners as a marketing organisation," he said. "But now we really have to earn our share of the new markets we have selected and adopt the attitudes and postures of other big, successful companies. We cannot afford merely to stay in responsive mode."
Mr King said that the core of corporate strategy was the establishment of a framework for the shape of the future British Telecom. "We must ask ourselves where we want to be at the end of the decade," he said. "If we fail to do that we could end up going off in diverse directions. We could be faced with an embarrassment of opportunities and it is essential that we be selective. This is a critical corporate strategy issue."
But Mr King was quick to emphasize that growth was vital and warned that stagnation could only lead to decline. He saw many opportunities in diversification but stressed that all new ideas should be objectively considered.
Mr King is also an advocate of establishing and maintaining good communication channels not only with the market place but within the organisation.
"These should be two way," he said, "otherwise we run the risk of ignoring the ideas and skills of staff who are at the 'sharp end' of the business."
Looking further afield Mr King suggested that there was considerable scope for British Telecom expanding into international markets. Although BTI was big business in itself its main function was linking the UK with the rest of the world. British Telecom needed to examine whether it could profitably market its expertise and services overseas.
But first things first, and Mr King sees his initial brief as a two-fold task; on the marketing side to establish a corporate standard in all aspects and see that it is maintained and with corporate strategy to formulate what British Telecom should be doing by 1990.
The fact that British Telecom's five major divisions were developing more autonomy did not in any way lessen the need for a corporate strategy.
"I think it is important that the threads of the business are organised centrally and that the divisions operate within these standards," said Mr King. "If we do not there is a chance that we will operate as a lot of small businesses — on small business terms — and lose the advantage of the size of the organisation."
And how should British Telecom present itself to both the public and Parliament? Mr King is convinced that it should strive to show that it is an outstanding service company which can be relied on to provide people with what they need when they need it.
"We must be responsive," he said. "This is one of the advantages of competition — it provokes greater efficiency all round."

Invest

British Telecom must also show that it is able to stand on its own feet, and compete vigorously in the market place as well as having the facilities to invest in new ventures.
On the flotation of British Telecom as a public company, Mr King said the key issue was for British Telecom to be sure of the way in which it presented itself. Its prospectus should state clearly the range of current activity and future plans.
"This is where I have a significant role in helping to formulate a corporate strategy and long-term objectives," said Mr King. "But at the same time we must ensure we do not overlook any entrepreneurial opportunities."

John King, 50, was educated at a grammar school in Rochester and at Bristol University. After a graduate apprenticeship in the automotive industry with CAV, he spent 15 years with IBM UK. In the early 1970s he established Telex Computer Products (UK), where he was managing director, and was subsequently director, Data Processing Division with the Metra Consulting Group.
He joined the telecommunications industry in 1976 as marketing director for ITT Business Systems UK and later moved to Brussels as a director of the Business Systems and Communications Group, Europe. In 1981 he joined Philips, as commercial director, for its Business Communication Systems.
Mr King, married with two sons, lives in Surrey and his interests include tennis, squash, classical music and bridge.
He became British Telecom board member for marketing and corporate strategy on 1 January.

In touch with City business

Today, financial markets around the world depend on up-to-the-minute communications. *British Telecom Journal* looks at the revolutionary City Business System, designed and developed by British Telecom City Area staff and sold both at home and in Europe, the Middle East and the United States.

Heart of the City Business System (CBS) is a television screen which doubles as data display and touch keyboard. A unique data and telephone system, it meets fully the special needs of currency exchange and commodity dealers, allowing them to access computerised information as well as providing multi-line telephone facilities by simply touching an image of a key on a visual display screen.

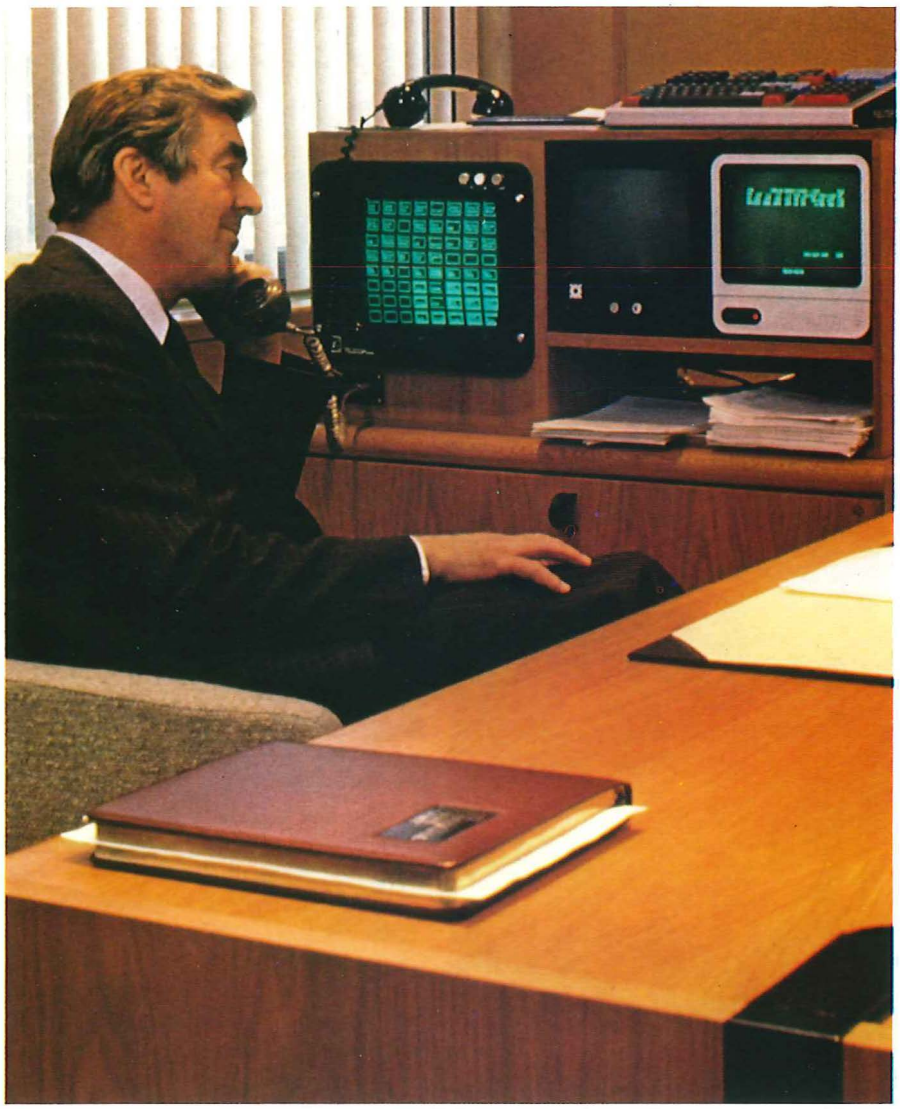
The potential of CBS has already been clearly recognised. More than £5 million worth of orders have come from this country alone and leading US Wall Street stockbrokers Merrill Lynch have placed orders worth £10 million. Teletrade, British Telecom's overseas marketing arm, have clinched orders from Hong Kong and Abu Dhabi.

Williams and Glyn's Bank in the City of London was the first to use British Telecom's City Business System. The installation, in the bank's treasury room, has 24 dealer positions, each having access to 160 telephone lines.

"British Telecom has revolutionised trading systems by producing a new product that is truly a market leader. It integrates data and speech in a way that gives the user real benefits and can be used in the largest New York offices."

Steve Vanderwoude
Centel Corporation.

The Hong Kong order comes from stockbrokers Hoare Govett whose 18-dealer position system was installed and working by October last year (1983) and the Centel Corporation of America are to market CBS throughout the US.



Financial brokers find the flexibility of the City Business System invaluable.

CBS uses microprocessor technology to meet the ever-increasing demands of international currency and commodity dealers. Recognising this need in 1979, when financial institutions were using slower and less-sophisticated dealer boards, City Area began secret development work under a team led by engineers Dave French and Dave Cable. Their aim was to use increasingly-economical microchip technology to improve the traditional dealer board design.

The breakthrough came with the introduction of the touch-sensitive screen. Even more exciting than the concept of dealers using such an instantaneous method of communication, however, was the realisation that the visual display unit could also be used to access a wide range of computerised information.

Key presentation was one of the biggest problems. Early experiments to access circuits by keying a code on a typewriter style keyboard were soon abandoned as being too slow. The problem was finally solved by presenting an image of labelled-keys on to the screen. When the centre of the image on the screen is touched, a criss-cross matrix of infra-red beams is broken and this can then be decoded by the microcomputer. If a solid object or a sheet of paper is inadvertently placed on the screen, the computer recognises and discounts it.

"There isn't a dealer board comparable to the one British Telecom supplies. They were competitive before the City Business System, now they are extremely competitive."

John Gunn
managing director,
Exco International plc.

"We chose the City Business System because it is a new concept in trading systems, years ahead of its competitors but with proven reliability and with an excellent track record."

Gerry Ely Merrill Lynch.

Each CBS terminal consists of a visual display unit and two telephone handsets. The terminal is used by dealers to consult company information and for telex messages. Built-in 'hot-lines' provide an instant link with other dealers or clients, as well as offering normal telephone calls. The system stores its own information – up to 10,000 pages – and can be used to access other computers. Up to 10,000 exchange lines, switchboard extensions or private lines can be connected to the system, and it can cater for more than 1000 dealer positions.

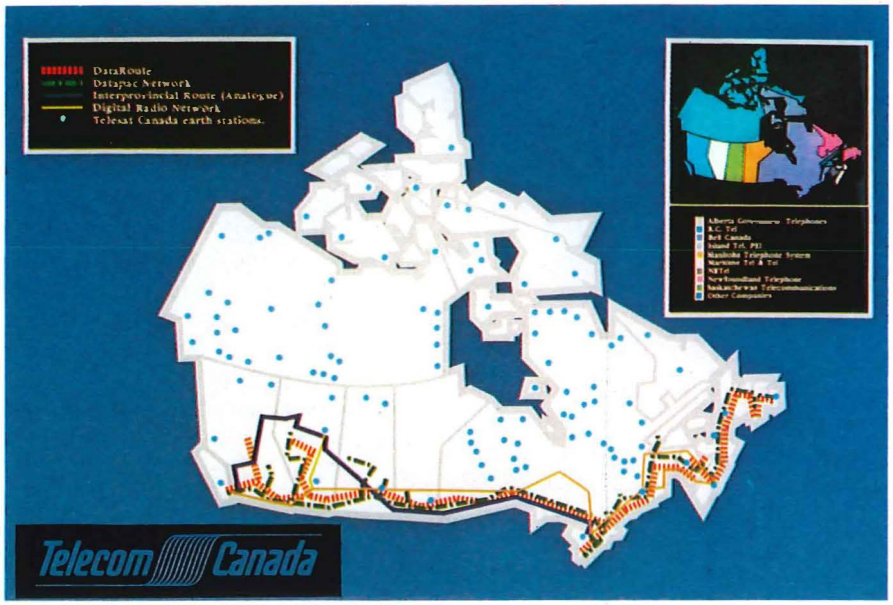
Although designed primarily for the financial community, it can be used for any sophisticated communications facilities where there is little desk space. CBS terminals are, for example, being used by British Caledonian Airways in its control centre at London's Gatwick Airport. One application in Hong Kong is to control a large network of power generating stations.

A significant advantage over any previous design is the system's ability to alter electronically existing information stored in it. If, for example, a telephone circuit is reallocated to a different desk, no new wiring or physical relabelling of switches is needed.

CBS can be installed quickly, needing just six wires between each position and the central computer control unit compared with thousands of wires on older systems. In-built diagnostic features identify problems and report the situation automatically to the British Telecom local repair service centre. Its modular construction makes repair quick and easy.

The CBS system also has many potential applications for the office of the future. Its integrated telephone and display screen, telex and word processing capabilities, and its potential to display Prestel and other viewdata information means that it could be used in a wide variety of sales offices.

The sixteenth article in our series on overseas administrations looks at Canada, a country whose scattered population, harsh climate and rugged terrain demand the most modern telecommunications facilities.



Forming part of the world's second largest land mass, Canada covers an area 40 times the size of the UK and stretches more than 4,000 miles from the Atlantic to the Pacific. Most of its 25 million population is scattered in a narrow ribbon across the southern portion of the country, where its major cities – Ottawa (the capital), Montreal, Toronto and Vancouver – are to be found.

Mounting success

It is no coincidence that Canada has become a world leader in the use of advanced telecommunications technology. Alexander Graham Bell invented the telephone there in 1874, and before long, telephone companies were set up in most cities, towns and villages across the country. Of these, just a few major telephone companies, answering the needs of the larger population centres, became leaders in technological development.

During the 1920s, they began to explore the possibility of developing a national telephone system through interconnecting the various independent systems. Regardless of the many problems posed by Canada's harsh climate, small and scattered population, vast distances and difficult terrain, seven major companies came together in 1931 to form the TransCanada Telephone System – today's Telecom Canada – with the aim of constructing a coast-to-coast network –a massive undertaking completed in less than a year.

Today there are still more than 100 telephone companies in Canada, but over 93 per cent of telephones are the responsibility of the member companies of Telecom Canada. This unique co-operative organisation is made up of ten companies: Alberta Government Telephones; Bell Canada; British Columbia Telephone Company; The Island Telephone Company Limited; Manitoba Telephone System; Maritime Telegraph and Telephone Company Limited; the New Brunswick Telephone Company Limited; Newfoundland Telephone Company Limited; Saskatchewan Telecommunications; and Telesat Canada, the country's domestic satellite carrier.

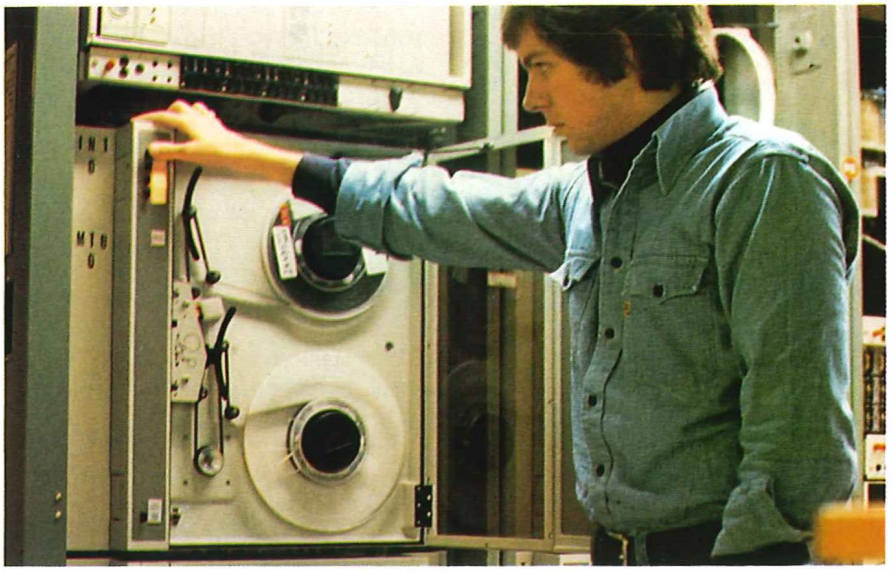
Other major carriers include Canadian National and Canadian Pacific (CNCP) telecommunications, which offers leased circuit voice and data communications for business. One of the CN group of companies, NorthwesTel Inc, also provides telephone and telecommunications services to residents in northern British Columbia, the Yukon and the western Northwest Territories.

Telecommunications between Canada and other countries overseas are carried over an international network of submarine cables and satellites with access to this network being provided by Teleglobe Canada.

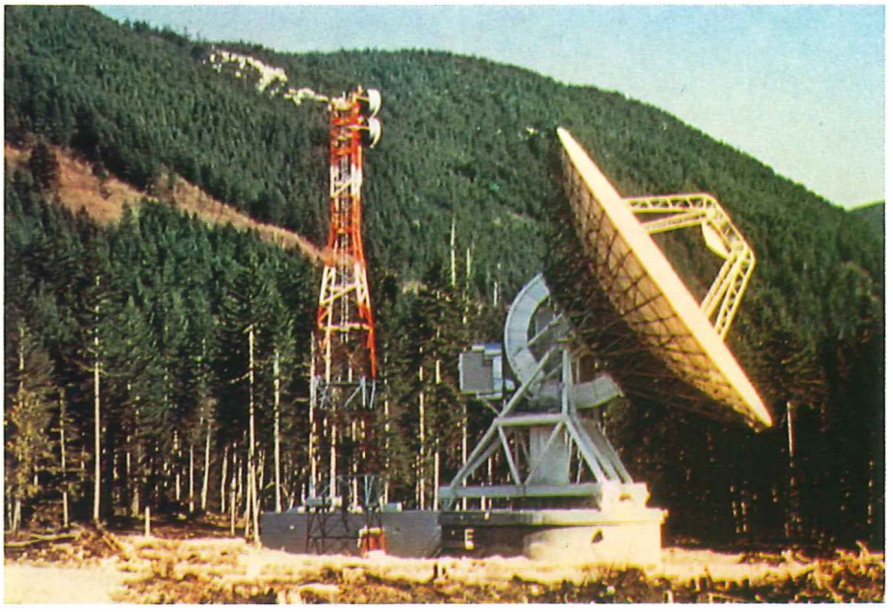
Telecom Canada members are an unusual blend of privately and publicly-owned companies, some regulated by federal and others by provincial agencies. Each fully controls local services in its own area although regional biases are set aside when members come together through Telecom Canada, to maintain and improve Canada's telecommunications system.

The organisation of Telecom Canada has some similarities to the structural system of Canada's government, and like Canada's ten provinces, its member companies have a high degree of autonomy. But the Canadian government operates on the principle of divided sovereignty, with particular legislative, executive and adjudicative functions performed by both federal and provincial governments.

Telecom Canada, in contrast, is run by



A technician checks SP-1 ESS equipment in a Toronto central office. SP-1 is a stored program controlled switching system with computerised facilities for controlling and processing telephone calls.



The Rocky Mountains form a dramatic background for a microwave tower and satellite antenna in Western Canada.

committee through which senior managers from each of the member companies direct the system's construction, operations, maintenance, marketing and planning activities. Each company has an equal vote on policy and operational matters and unanimous agreement is needed for all major decisions.

By the early 1950s, it had become clear that open wires would soon be inadequate to meet the rapidly growing demand. Telecom Canada began to experiment with microwave systems. By 1958, the member companies had established 139 microwave stations across Canada, forming a spectacular national system that was the first of its size and scope in the world, and bringing national television broadcasting to Canada for the first time.

In digital technology too, Telecom Canada became a world leader with Bell Canada, the largest of its member companies, introducing the DMS digital switch family and the SL-1 digital business private branch exchange system. Last year, Telecom Canada combined digital switching and transmission to form the world's first all-digital toll network stretching from coast to coast.

The arrival of digital technology in the 1970s led to the development of Dataroute™ the world's first nationwide digital data network, and Datapac™ a shared packet switched digital data network. Telecom Canada's digital data networks portfolio was completed with the introduction of Datalink™ an end-to-end, circuit switched digital data service, based on the DMS-100 digital switch, which uses portions of the digital voice network to transmit data.

The use of optical fibre cable in Canada, with its enormous capacity to carry all types of communications signals, is expected to become cost-effective in the near future. Already, most member companies are either planning or using optical fibre transmission systems, and last year, Saskatchewan Telecommunications inaugurated the first section of a 3,200 km integrated broadband fibre optics network. This $56 million network which is to be completed later this year will carry long distance modern communications services such as cable, pay-TV and videotex, and will connect all Saskatchewan cities and 40 of the province's larger towns.

Another Canadian telephone company, the Manitoba Telephone System, together with the federal department of communications, is conducting an optical fibre service trial in which a combination of voice, video and data signals are being integrated onto the network and, through a single cable, are being brought directly into the customer's home.

From this year, Bell Canada will also be using optical fibre exclusively for all its new and replacement trunk installations. And before the end of the 1980s, Bell plans to extend the use of optical fibre transmission systems from its central offices to certain customer locations.

Canada continues to lead the world in domestic satellite communications. Since the early 1970s, Canadian satellites have been transmitting telephone, teletype, data, radio and television signals across the country and into remote settlements formerly isolated from the mainstream of Canadian communications.

Telesat Canada earth stations across Canada provide satellite services to remote Canadian businesses. Oil or mineral exploration crews and construction crews can now enjoy the full range of communications services available in

A Toronto construction crew install new optical fibre cable at Yorkville.

urban centres. Its Anik satellite (C3), launched from the first commerciall space shuttle flight in November 1982, was the first to provide national links, and was also the first to be integrated into the digital network.

Since that time, most Canadian telecommunications users have had the option to purchase equipment from independent suppliers as well as renting or buying equipment from the telephone companies. As a result, residential telephone customers may now own extension telephones although inside wiring continues to be provided by the companies. More new products are now being offered to businesses and supply sources now include Mitel and Siemens, as well as systems manufactured by Northern Telecom. As in British Telecom, Bell Canada has established marketing teams each responsible for all the services supplied to its large customers.

With more than ten million connections – 43 per 100 people – Canada's telephone penetration is far greater than the UK's (currently 34 per 100 people). Telephone charges for business users are similar to those in the UK, although charges for residential customers are among the cheapest in the world. Tariff structures in all the telephone companies are based on a fixed basic charge (flat rate) coupled with an unlimited number of calls within the local call area.

Bell Canada has one of the largest extended area service networks in the world. EAS allows customers on one exchange to call customers in other nearby exchanges without incurring long-distance charges. For example, customers in the Toronto area can call almost two million telephones which, because of the EAS network, are part of their local call area.

It is not surprising that, as a result of this charging structure Canadians make more calls per person than telephone customers in any other country except the US, and make some three times as many as British Telecom customers.

Some Canadian companies, more notably Bell and British Columbia Telephone are now thinking of billing customers for local calls. Increased competition in long-distance services threatens to undercut the cross-subsidisation structure that has served to keep local service rates low. And new technology, which has resulted in the increased use of home computer terminals, has lengthened many local calls, raising the whole question of flat rate pricing.

One development, introduced last year, which will have a direct influence on charges is a service trial of long-distance calling between Canadian and American cities using the networks of member companies of Telecom Canada and the America MCI Telecommunications Corporation. Customers are charged a monthly fee and then pay reduced rates for their calls.

Another facility, teleconferencing, is becoming more and more popular among Canadian businesses to control costs and increase efficiency. Telecom Canada member companies offer a wide range of teleconferencing options. These include audio-only, audio-plus, where graphics transmission enhances the audio portion of the conference, and the latest development, Conference 600, which provides audio and video conferencing capabilities for two separate locations.

Member companies have also begun to introduce text messaging products and services, such as Envoy 100™ an electronic messaging service and Envoypost™ an electronic mail service.

In September last year, Telecom Canada announced a new satellite communications service. Stratoroute 2000 is an exciting new concept for providing integrated communications systems between business offices across Canada – a rooftop-to-rooftop exchange of information, via satellite.

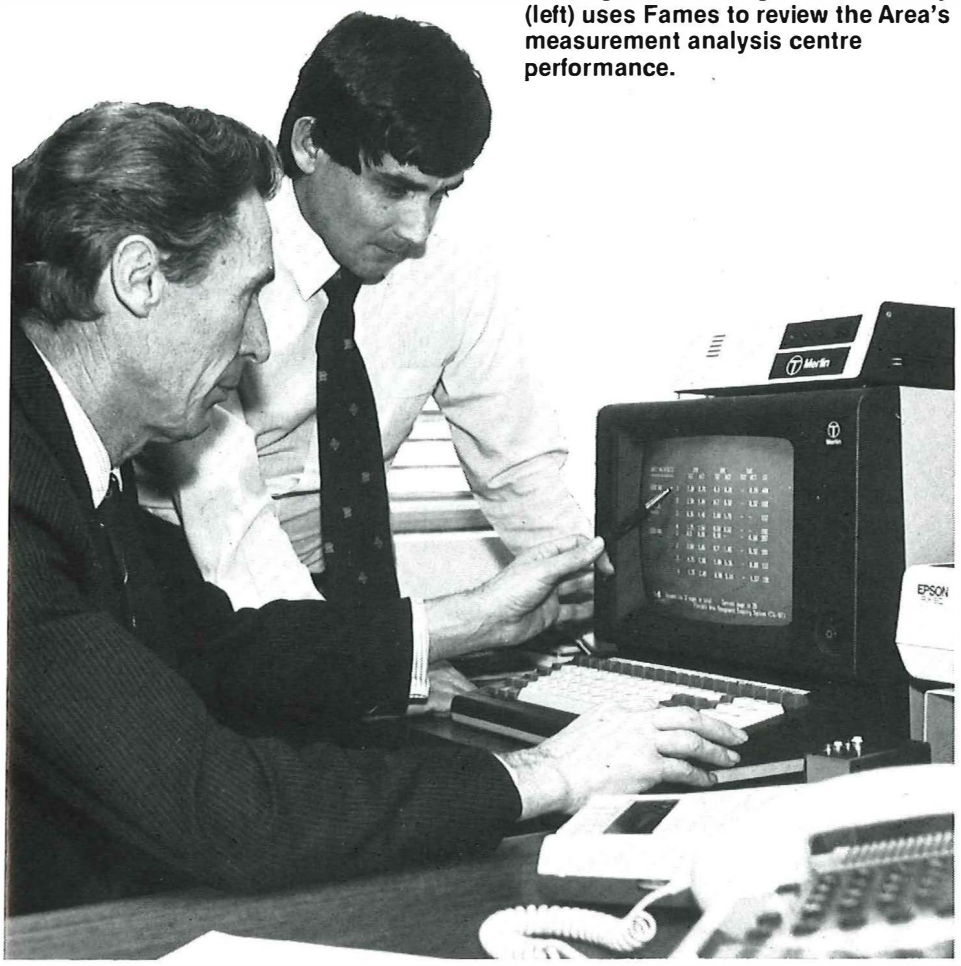
One of the latest technological advances soon to be available from Telecom Canada's member companies is the provision of a cellular mobile radio telephone service. Bell Canada plans to offer this service in Toronto and Montreal from later this year and is expecting competition from other member companies.

The ten member companies of Telecom Canada have accepted the challenge of the 1980s – to meet the changing expectations of customers, to adjust to the demands of an increasingly competitive environment, and to make effective use of constantly changing telecommunications technology. It is largely a reflection of these new directions and concerns that the TransCanada Telephone System changed its name to Telecom Canada in September last year. This new name more accurately reflects the organisation as a dynamic national system operating an integrated telecommunications network.

In just over 50 years Telecom Canada has grown to become one of the most technologically-advanced systems in the world. Today, with its member companies, it provides an integrated network for a wide range of voice, data and image services on a truly national basis. Ⓣ

The authors – **Messrs P. H. Dabbs, F. Cassidy, D. Long, A. Watson** and **M. Reid** are all members of the international comparisons group in the organisation, performance and systems department of the Local Communications Services Division. They acknowledge the help of Telecom Canada and Bell Canada's corporate public relations department, particularly **Mr R. M. Doney.**

British Telecom Journal, Winter 1983/84



Leeds general manager Derek Reevey (left) uses Fames to review the Area's measurement analysis centre performance.

Keeping managers in the picture

Steve Morritt

A computerised information system known as Fames has been operating in Leeds and could result in major improvements in the management of telephone areas.

The flexible area management enquiry system (Fames) has grown from a recognition that management-level information needs were not being met by existing computer systems. British Telecom has a long history of computer systems serving operational needs without which the business would have long since ground to a halt with the sheer volume of data.

Corporate information becomes more important in a competitive environment, and in harnessing the sponsorship from the inland computer strategy, Fames has sought to provide real experience in an area environment.

In the project, visual display units are linked to databases holding up-to-date information on all aspects of area work from network records to the number of faults outstanding. The system also puts at a user's disposal all the benefits of office automation such as electronic mail and word processing capabilities.

The system is seen as a powerful aid to effective and efficient management, ensuring that managers make the best use of resources. Access to local databases is a particularly important feature. A daily area status report, for example, gives updated information on the number of faults received by a repair service centre, number of faults still outstanding and what staff are available. Not only does this keep managers informed, it enables them to redeploy staff to cope with any particular problem such as an exchange failing. Similarly, operator performance figures can be accessed as can bill revenue or even information about each division's budget.

The project has four objectives:

★ Access to all existing British Telecom computer systems via one desktop terminal.

★ Creation of those databases that did not already exist.

★ Simple and flexible access to data via a query language.

★ A consistent and user-friendly interface for managers with little or no computer existence.

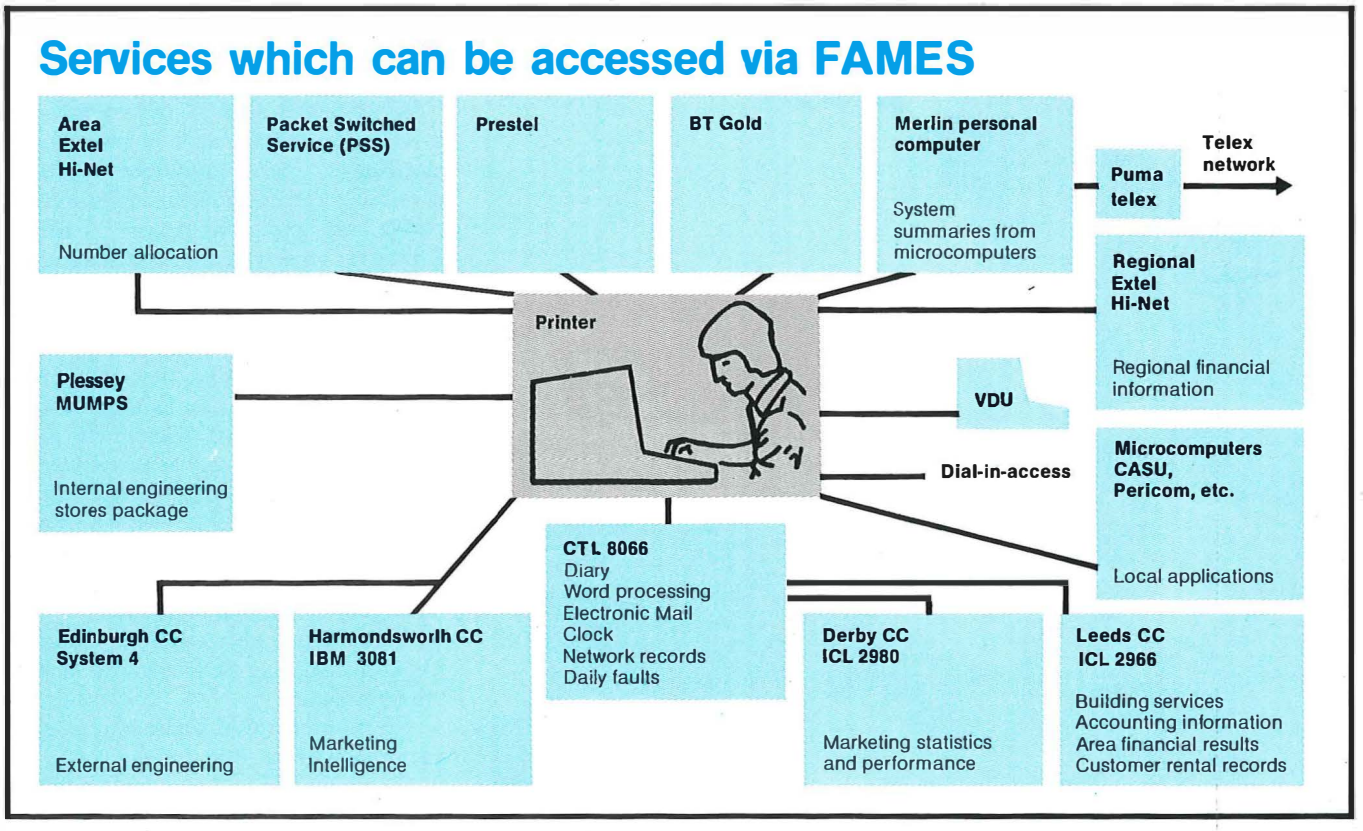
The project team consists of staff from diverse backgrounds and experience from BTHQ as well as Leeds Area.

The team acts as a mechanism for drawing together the relevant strands of expertise, which have long existed in isolated 'pockets' of British Telecom, or can be found elsewhere, and uses modern technology to produce results quickly.

Having won sponsorship from Headquarters, and support from Leeds Area the concepts were rapidly demonstrated at the end of 1982. The system was quickly developed into a working information system for the Leeds Area board. The schematic diagram (opposite) outlines the facilities available, with deliberate emphasis on the user. Using a local area network and a minicomputer, the four objectives have been directly addressed.

With the technical hurdles largely resolved, the emphasis has now turned to the more complex task of persuading managers to use the system, and relate their difficulties, preferences and ideas. The terminals are connected to the minicomputer, which presents a digital clock with day and date and a selection of options, including 'electronic office' facilities, and Fames facilities. Access is controlled by a password system, and the facilities available to any particular user can be tailored accordingly.

Using a standard and consistent set of instructions, the user is guided through



successive menus until the desired application or facility is reached. These may exist on the minicomputer itself, on mainframe systems around the country, on local Hi-N systems, or multi-user, multi-processor systems (Mumps). But to the user this is irrelevant. He is 'buffered' by the system.

How easy the application is to run if not on the minicomputer, is at present still dependent on its design. In many cases this has proved too cumbersome and time-consuming for managers. This problem is, however, being tackled with a view to isolating completely the user and applications. This will be achieved by using the minicomputer to translate the dialogue between application and the individual using the system.

After several months in operation Fames has confirmed that it is not enough simply to ask a manager what he needs. The process has to be one of providing something, seeing how it operates, and then finding out what is really needed. The 'research' approach of the project has allowed this. Similarly, users have generated interesting feedback on how existing facilities can be improved still further.

Possible extensions are continually being identified, but with resources limited to a small number of people, it is difficult to restrict the project's aims to a realistic level. One of the most pressing tasks is to emulate the logging-on sequence into the mainframes, without any lapse in security to remove this arduous task from the user and enable full use of the databases.

The obvious overlap with many of the technical and software requirements of a 'front-office' has long been recognised, and a light-hearted demonstration of this is usually included when the Fames project is demonstrated. But this is just one possibility. The spread of Fames has already begun through Leeds Area and a further development could be the linking of local area networks to form wider ones.

Jim Lawn, Steve Morritt and Dave Whitley use a computer printout to check the Fames configuration.

Mr S. M. Morritt is an executive engineer in LCS/Organisation, Performance and Systems Department based at Harrogate and is responsible for engineering and business efficiency.

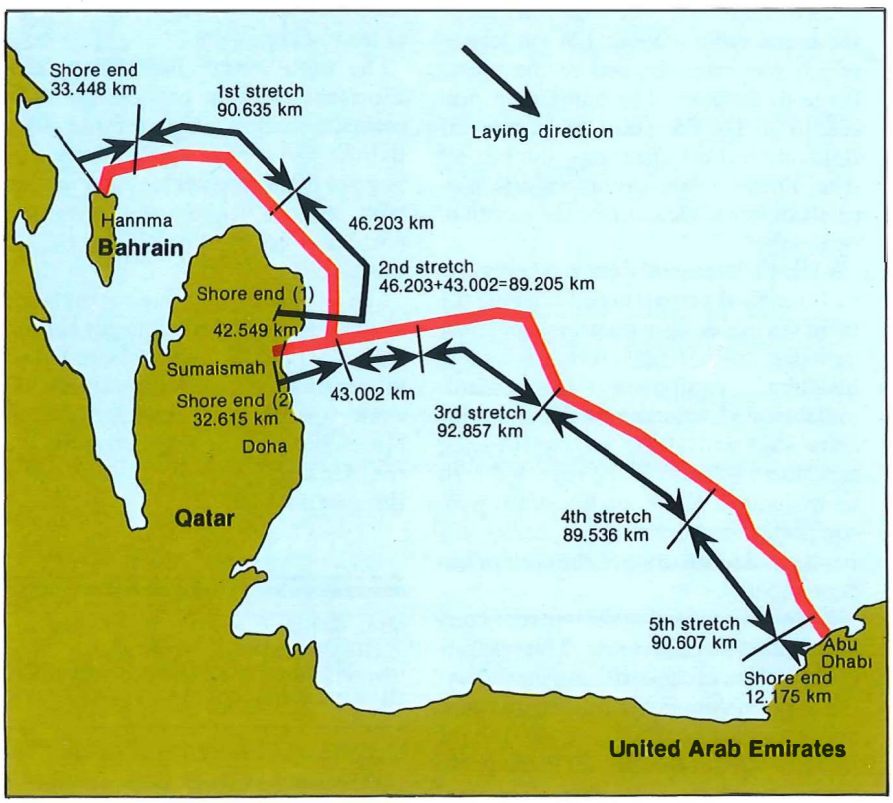
British Telecom Journal, Winter 1983/84

CS Iris plays vital role in Gulf

Richard Gribble

British Telecom cableship *Iris* played a major part in the Gulf project.

Route of the new Gulf cable.



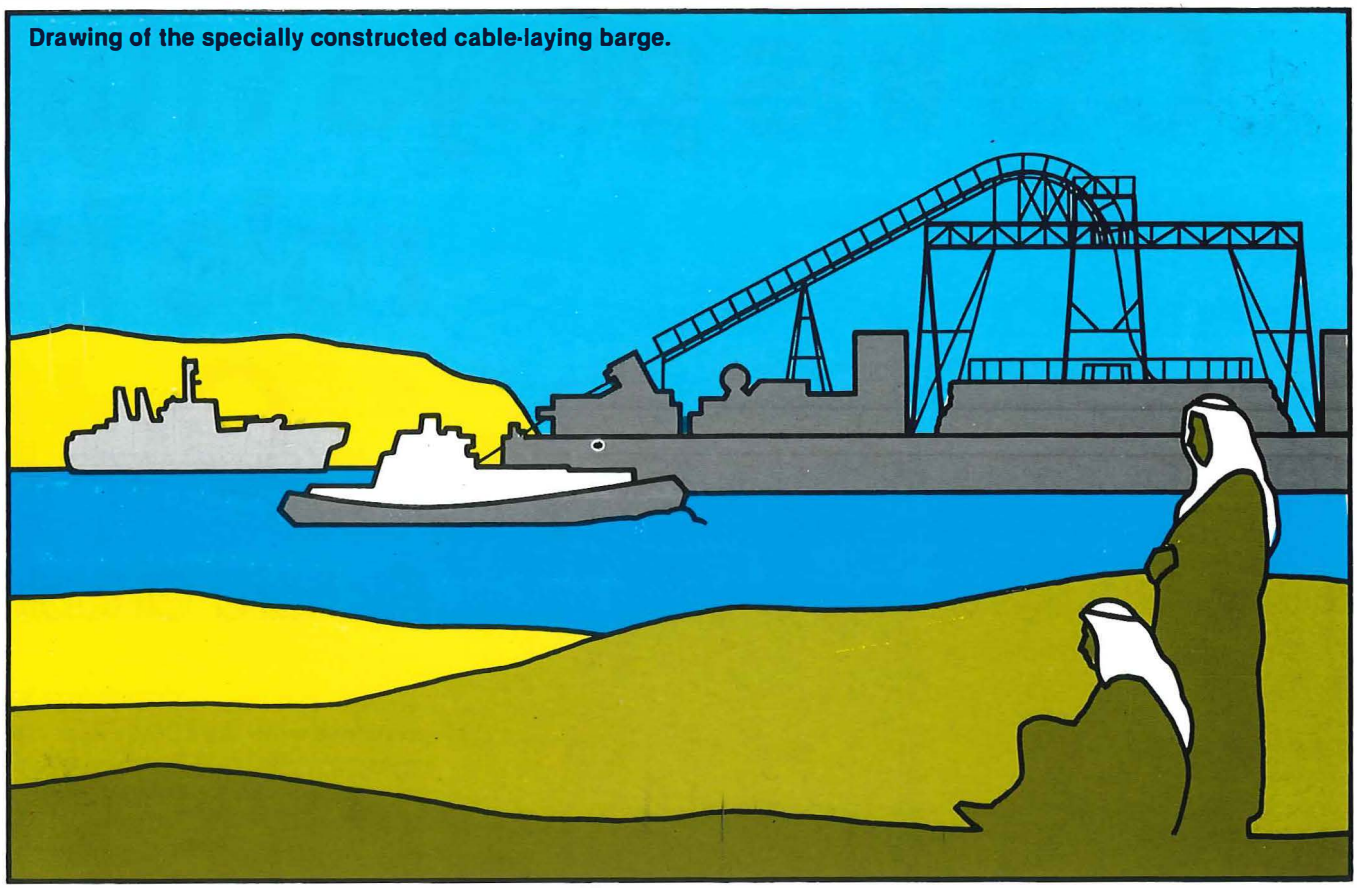
British Telecom cableship Iris has returned from the Middle East after playing a vital role in the laying of a new submarine telephone cable in the Arabian Gulf. The project – outside CS Iris's normal repair brief – was completed well ahead of schedule and highlighted both the cableship's versatility and British Telecom International Marine Services (MS) ability to offer first class specialised facilities on a worldwide basis.

The success of the venture was the culmination of nearly two years of hard work which included international competition and negotiation followed by careful planning. The submarine system was initiated by the co-owners of the three telecommunications authorities of Bahrain, Qatar and the United Arab Emirates, who needed to supplement their existing communication systems by the installation of a high capacity (12 MHz) cable.

Following international tendering, Fujitsu of Japan were awarded the contract to manufacture and install the system between Manama in Bahrain, Sumaismah in Qatar and Abu Dhabi in the UAE. Total length of the system is nearly 600 kms consisting mainly of one and a half inch single armoured cable with each repeater spaced at a nominal 12.7 kms.

After MS staff had quoted for cable laying, meetings were held which led, in April 1982, to the signing of a final contract. As well as the main laying operations it was mutually recognised that there were further opportunities for MS to offer its specialised skills and equipment on this project.

One of the areas where advice was given



Drawing of the specially constructed cable-laying barge.

was in the installation of the shore end cables. The project required the laying of four long shore end cables from the landing points to the deeper water parts from where a cableship could be used to lay the main sea sections. Fujitsu contracted a Japanese company to carry out this work which involved the construction in Bahrain of a tug-manoeuvrable cable-laying barge able to carry 1,400 tonnes of cable together with accommodation for 30 cable handlers, workshops and various items of cable handling equipment.

MS was invited to provide advice and guidance on the preparations and overall operation. To enable the barge to handle the cable, special equipment had to be installed and a transportable hauling machine developed by MS was sent to Bahrain by container. And before and throughout the operation, an MS engineer acted as both instructor and maintenance engineer for the machine.

Another service was to advise and then place a contract with IGW Surveys in Abu Dhabi for the supply of navigation equipment. IGW supplied Trisponder equipment for the shore end lays and Syledis equipment for use during the laying of the main sea sections. Accuracy of positioning was generally within five metres while the required laying accuracy to within 50 metres of the proposed cable route was achieved throughout the operation.

A further service outside the main laying operation was a separate advisory/consultancy contract in which staff at MS were always on hand for consultation on any marine matter.

Installation of both the shore end and main lays required cable and repeaters to be shipped by sea from Japan to Bahrain in two freighters. The first carried the shore end cable – about 126 km long – which was trans-shipped to the laying barge in Bahrain. The barge then proceeded to lay the shore ends, one off Bahrain, two off Qatar and the last off Abu Dhabi. This operation was successfully completed during the month of September.

While the shore end work was being carried out, final preparations for laying the main sea cables were progressing. These included modifications to *CS Iris* cable handling equipment on board, prefabricated accommodation units for extra staff and larger air conditioning machinery to counter the expected high temperatures. These modifications were completed in Southampton before *CS Iris* headed south towards the Gulf in late September.

She met the second of the two freighters in Bahrain in mid-October. This was carrying 452 km of cable to complete the laying of the system but as this length could not be carried by *CS Iris*, it was divided into five similar lengths, for loading and laying in separate operations. To speed the process, the repeaters had already been jointed into the system and the freighter remained in Bahrain with transfer of the cable being undertaken directly into the cable tanks of *CS Iris*. Once in Bahrain officers and crew worked for the next few weeks on a 24-hour rota basis and ultimately the planned schedule was bettered by eight days – a notable achievement.

The cable length included a 'slack' allowance of about one per cent. This proved more than adequate especially the Bahrain-Qatar cable where, to avoid cutting one of the repeater sections unacceptably short, a re-route was planned on board and surveyed by *CS Iris* before it was laid.

The cable laid by *CS Iris* was the longest of any single lay by either her or her sister ship, *CS Monarch*, and it was undertaken in particularly high temperatures. The work was finally completed in mid-November and the ship arrived back at the Marine Depot in Southampton about three weeks later.

Mr R. Gribble is a nautical assistant in BTI/Marine Services and was responsible for the overall co-ordination of BTI's involvement in the project.

British Telecom Journal, Winter 1983/84

Call logging for business

Barry McLean and John Mayes

The first aids for recording telephone call information available to company communications managers were manual surveys at their own switchboard using telephonists armed with stop watches. When, eventually, manual switchboards gave way to the automatic type, they gave extension users the facility of direct access to the public switched telephone network. Control of these calls and the operator's ability to log them was temporarily lost.

Because of the wide range of equipment now available, buyers of large installations are very much alone at a time when sound advice has never been more necessary. Today, more than ever, a buyer needs to think logically and systematically about planning and choice, especially when the average cost to replace a medium-size PABX could be as much as £250,000.

To this end, a networks and systems consultancy group (NSCS) was set up in June last year by British Telecom London to ensure that it not only maintained its objective of being a centre of communications excellence, but that it could give a much needed unbiased service to exploit this lucrative market.

Local 'call logging' is where call data is recorded and processed on-site giving all management and traffic reports at source. Call logging in the remote mode is achieved by scanning and storing data at each site involved in the survey. Data is later processed automatically by a central computer which produces individual and composite management and traffic reports for the consultant and the customer. Information is extracted using private or public telephones incorporating modems.

An early development was the introduction of call-barring facilities on PABXs, giving certain extension users access to the public switched telephone network (PSTN) only through the operator. This extra workload on operators proved unsatisfactory and subsequent relaxing of the barring facilities resulted in a need to identify automatically call details of each extension. The solution was the manufacture of electronic equipment which could scan exchange lines, extensions or private circuits on the PBX and deduce whether the call was incoming or outgoing, its duration, cost and the number dialled.

At first this data was stored on a magnetic tape which was later processed on a large computer elsewhere. But advances in technology have led to microprocessor-controlled machines which can not only scan and store the data, but can produce outputs via a printer, as well as various management and traffic reports, all within the one on-site machine.

Details supplied by electronic stored program control (SPC) PABXs only give a listing of calls made by extensions and are very restricted, providing information on time, duration, extension number, number dialled and cost. To analyse and produce manually the range of reports provided by separate call logging information equipment (Cile) would be time-consuming and costly. For this reason the equipment can be manually 'plugged' directly into a special port, the output of which it interprets and processes into its normal range of reports.

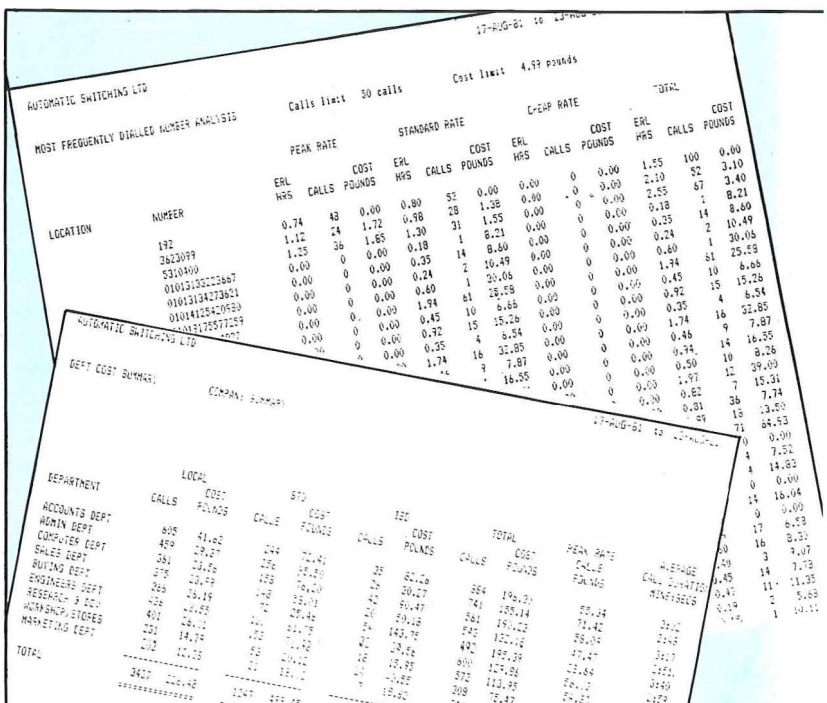
Cile can monitor and manage PABXs, singly, in tandem, and in networks, and is essential equipment for a company communications manager thinking of buying a PABX for the first time or replacing one with larger and more up-to-date switching equipment.

During its first year, NSCS has subcontracted its call logging services to an external agent. But following recent agreements, an order has been placed with Automatic Switching Limited (ASL) for a call logging package which processes call details both locally and remotely.

Remote processing is particularly useful when there are many sites to be logged; when a regular daily input is

Barry McLean (second from right) and John Mayes (third right) check specifications of new call logging equipment with ASL's Roly Borthwick (right).

The TNA 25 telephone call logger produced by ASL can perform a wide range of functions including summaries of costs, line use, traffic and call totals.



needed; when long-term logging is required; and in certain industries such as hotel and catering. Logging units at these sites merely record the call event details for later extraction by the central processor. This enables the data stored at remote locations to be conveniently and economically accessed from a single point.

The choice of methods, however, depends on individual needs. A local record would be adequate where it was necessary to find out costs only. The management and traffic reports obtained on-site would enable a communications manager to determine the most effective and economical configuration for that site. In these circumstances, it is quite common to save between five and 15 per cent on public network call charges. Further savings may be achieved on rentals for exchange lines, extensions and private circuits from effective use of the reports.

For a customer, with many sites, remote data retrieval would be more useful, and information could be used:

*To obtain individual records for remote sites for use in isolation by local management.

*To determine whether innovative alternatives would improve efficiency and economy. For example, introduction of digital exchanges, message switches and digital transmission circuits.

*To establish whether a private communications network combining speech and data where appropriate, could be provided.

Modern call logging can be carried out on an individual PABX for single site surveys, or it can be used to gather data to enable cost comparisons to be made on the viability of private speech and data networks. Benefits of call logging to management were previously unobtainable. But without call logging, no objective analysis of communications cost could be made whether or not the information obtained resulted in financial savings.

The system provided by NSCS can help improve the efficiency and cost effectiveness of a telephone installation by minimising excessively long calls, encouraging avoidance of peak-rate calls and by keeping private calls to an acceptable level.

It can help make the best use of equipment by determining optimum quantities of extensions, circuits and switching equipment saving both capital expenditure and rental charges. And it can work out correct switchboards and enquiry office levels ensuring a first class service to callers.

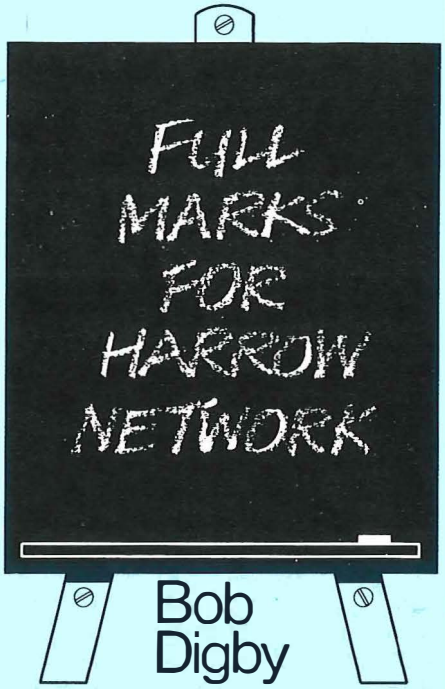
The setting up of NSCS offers London customers a complete service and helps them to use their telecommunications equipment cost-effectively. Already the service has earned British Telecom more than £30,000 in consultancy fees and is just one more way in which British Telecom is helping customers to help themselves.

Mr B. McLean has been senior consultant with British Telecom London's networks and systems consultancy group since its inception in 1982.

Mr J. Mayes is an assistant executive engineer in the same group and provides technical support for NSCS.

British Telecom Journal, Winter 1983/84

Regular meetings keep the consultancy service in touch with latest developments. Roly Borthwick, managing director of Cheam-based ASL, outlines progress to Barry McLean and John Mayes.



In one of the most complex installations ever undertaken in London North West Area, British Telecom engineers have fitted a completely new telephone system for Harrow School.

An installation enquiry usually begins in a sales office with a telephone call from a customer. The call is taken by a commercial officer who prepares case papers, and if promising, is followed up by a visit from a British Telecom salesman. Every now and then, a special challenge presents itself and one arose when a top British public school wanted a new telephone system.

Records of the existing installation at Harrow School showed a pre-war design keymaster 2 + 10 house exchange system. The school bursar clearly had a serious communication problem – and it was sitting on his desk. Links to the rest of the school – old boys include Sir Winston Churchill and Lord Byron – relied purely on a system of 150 direct exchange lines and a manual signalling 'field telephone'.

At first, the scale and implications of the Harrow problem were not fully apparent. Most schools consist of buildings grouped together in a close-knit area, but at Harrow-on-the-Hill the area to be covered was vast. The school community is, in fact a village.

Negotiations began with a Herald call connect system in mind but moved on from there and eventually the go-ahead

was given for a Monarch 120A. A subsequent technological breakthrough resulted in a smaller processor for the Monarch, while at the same time the number of people wanting to be in on the new Harrow system grew until the point was reached where it would have been unable to meet the demand.

Once more the advance of technology saved the day, and Harrow School was offered the newly-developed and higher-capacity Monarch 250. This time the order also included the new Pennant Logger which provided the school with its own internal itemised telephone billing system. The final installation comprised the Pennant and the Monarch 250 with 64 exchange lines and 103 extensions of which only about eight were genuinely internal. Also in many cases, single press-button telephones proved inadequate and engineers fitted Ambassador electronic switching systems and many other extra attachments.

There were, of course, many engineering problems the size of which became clear at the initial area provision of service meeting. Eventually it was decided to provide a mini-external scheme solely for the school using new cabling which had to be run in the external duct network.

Many of the ducts were full of silt and footway boxes had not been opened for years. Ancient iron lead-in ducts to many of the buildings had rusted completely away and where duct was left, existing cable had in many cases, corroded into the metal pipe. The new cable carried a special 'earth' wire as an extra safety measure.

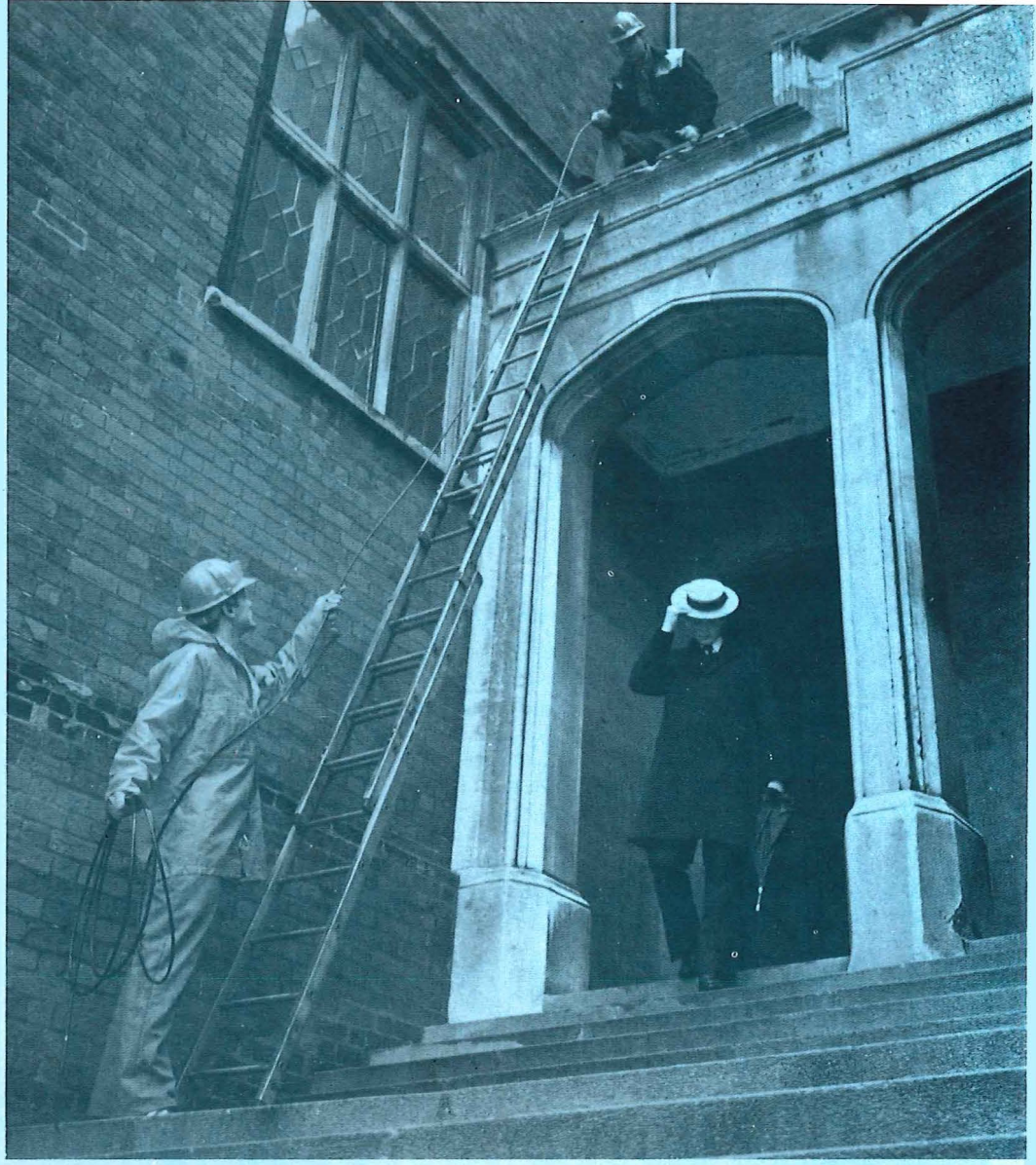
From the central processor 100-pair cables radiated out in four directions. The cable was colour-coded black and white to distinguish it. Distribution points were given a unique identification number with the prefix 'HM' – for Harrow Monarch.

Providing cabling to many of the individual buildings was in itself another challenge. The old Victorian-style structures had thick walls and stone steps – akin to wiring up a castle. Earlier wiring for the direct lines came from the main public network but there was no duct work at the crown of the hill as the main feeds came from the sides and in some cases in the opposite direction from the processor. The hill also made it difficult to provide drop wires.

New technology and procedures were a great help during installation particularly a method known as insulation displacement of cable in which the cable termination is carried out by pressing the insulated cable over a sharp 'V' shaped prong which cuts into the insulation to form contact with the wire inside. Modern heat shrink insulation methods were also used to obtain a neat fit around cable joints.

Telephone installers also had problems particularly in gaining access or by finding that initial orders were inadequate. This resulted in a formidable list of additional items some of which are contained in the panel above.

The system was finally completed last autumn and a ceremony was held at the school where an inaugural call was made by old Harrovian Sir John Clark of Plessey, the company which manufactured the Monarch system for British Telecom. Ⓣ



London North West Area technicians Les Wickenden and John O'Malley run a new cable to Harrow School's historic Speech Room.

Included in the Harrow School installation were:

3,317m of cable in duct
490m of wall mounted cable
143m of aerial cable
125m armoured cable
1,025 internal pair terminations
1,460 external pair joints
5 new footway boxes
28 cable distribution points
64 exchange lines on system
103 extensions
18 Ambassador electronic switching systems
95 MF4 telephones
17 additional phone sockets

Harrow School receptionist Mrs Ivy Howley is delighted with the new Monarch 250 system.

Mr R. S. Digby is a marketing account executive in BTL's North West Area.

British Telecom Journal, Winter 1983/84

The case of the carbon copy...

Despite the spectacular advances in telecommunications technology in recent years, telephones throughout the world still depend on the 'Hunnings Transmitter', a device invented more than a century ago by a Yorkshire vicar. Reading Area historian **John Duncan** concludes his series with the story of its development.

Triggered by a seemingly insignificant advertisement in the *Telegraphic Journal*, of October 1880, 'The Telephone Case' is still described in legal circles as the most interesting law suit concerned with infringement of patent rights ever conducted in Britain. The advertisement simply read:

Patent No 3647 – Improvements in and appertaining to carbon Transmitters for Telephones – H. Hunnings.

But in the United States, the news was received with concern by telecommunications expert, Thomas Alva Edison who was acknowledged by the British Patent Office as the patent holder for carbon transmitters.

The difference between Hunnings' and Edison's microphone was that the American's device incorporated solid carbon components, whereas the Yorkshire clergyman used crushed granules of steam engine coke. The principle of both transmitters was the same in that sound waves striking paper or a metal diaphragm set up vibrations which caused electrical fluctuations in voltage across the carbon. This was converted to electrical energy, and sent out along a line where at the far end, a receiver converted the electrical waves back into sound.

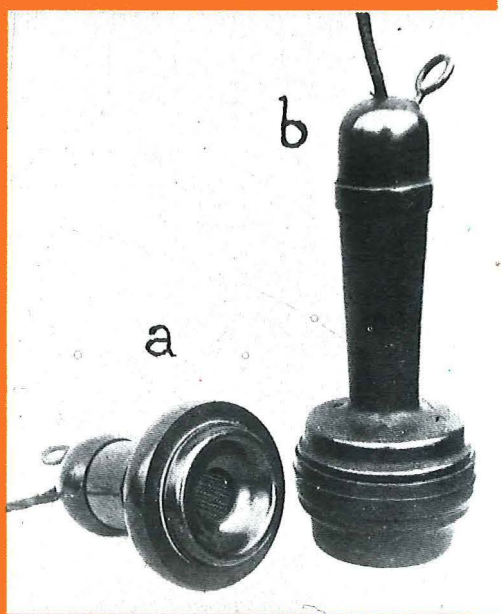
Hunnings demonstrated his telephone transmitter in front of a large audience over wire strung between poles alongside the railway line between Darlington and York – a distance of 45 miles. This led to Edison sending his personal assistant to England to investigate the Yorkshireman's claims. The American was deeply impressed with Hunnings' invention and offered to buy the rights. Edison wanted the microphone not only to install in his own telephone design, but also as a component for his newly-invented phonograph machine, forerunner of the modern day record player.

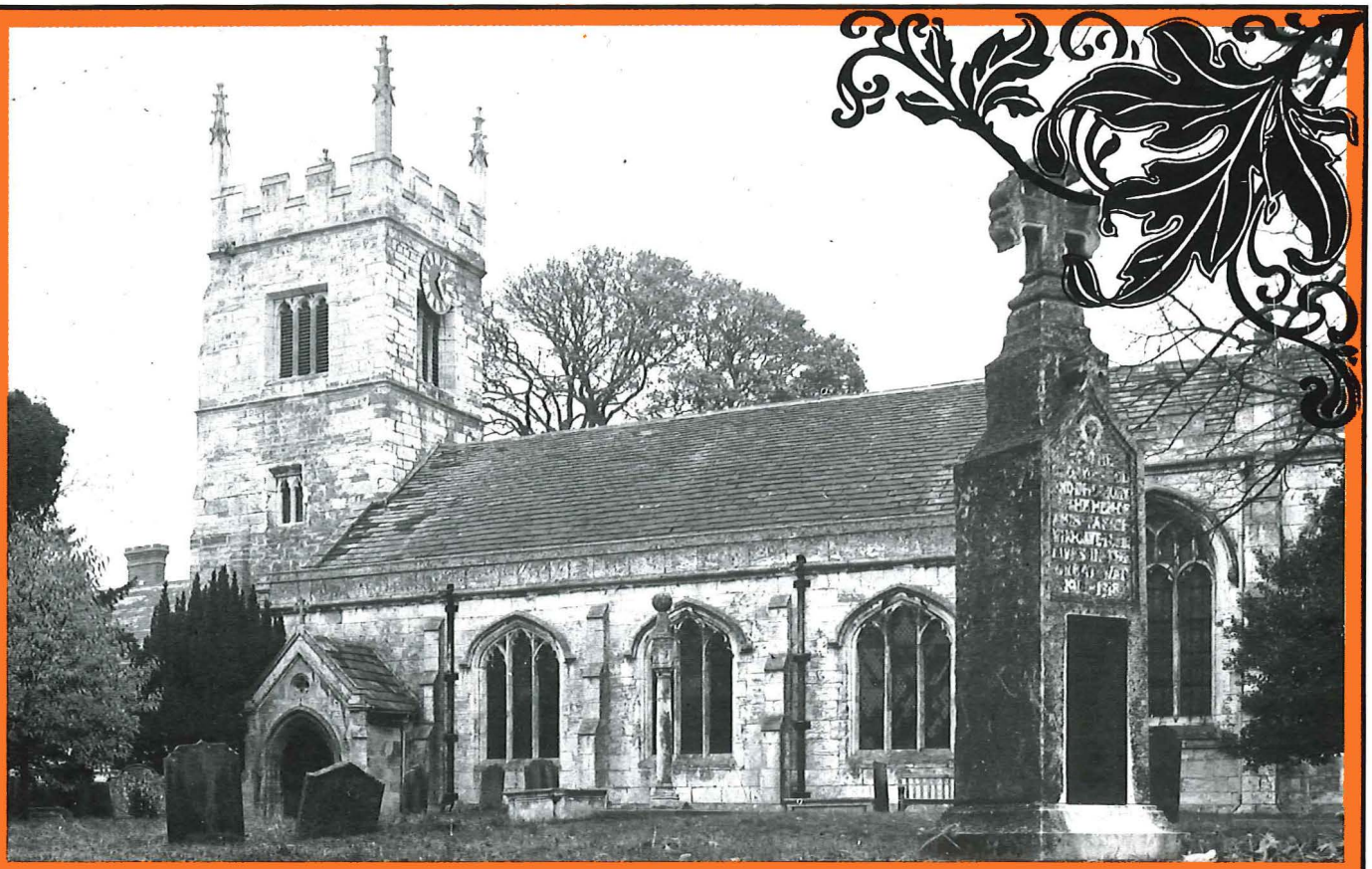
Hunnings, however, rejected Edison's bid and decided instead to go into business with a friend, Edward Harrison, proprietor of a small precision engineering works, at Darlington. Within weeks the instrument was on the market, as the 'Hunnings Micro telephone', retailing at 15 guineas (£15.75) a pair. The Hunnings phone, known as 'the Potato masher' because of its similarity of shape to the domestic appliance, was unusual in that it was impossible, by looking at the separate pieces to distinguish the transmitter from the receiver. To avoid confusion a red band was painted on the transmitter.

At this time the telephone market in the UK was dominated by the transatlantic

Vivienne Canter, assistant manager at Telecom Technology Showcase, shows the details of a Hunnings, wall transmitter.

Photograph and diagram of the Hunnings

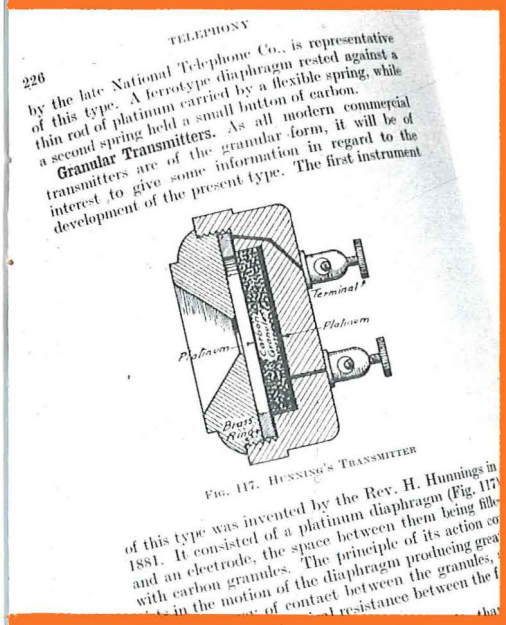




Bolton Percy Church near York where Henry Hunnings was made curate in 1874.

telecommunications giants, Edison and Alexander Bell. Both had British-based companies operating in London and were locked in bitter opposition towards each other. The threat by the Post Office, however, to take-over the telephone network, caused the tycoons to consolidate their assets and form a united front against all opposition. Thus Edison and Bell launched The United Telephone Co Ltd and Edison's UK patent, for the carbon transmitter, was transferred to the company.

transmitters . . . and how they work.



TELEPHONY

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by the late National Telephone Co., is representative of this type. A ferrotype diaphragm rested against a thin rod of platinum carried by a flexible spring, while a second spring held a small button of carbon.

Granular Transmitters. As all modern commercial transmitters are of the granular form, it will be of interest to give some information in regard to the development of the present type. The first instrument

Terminal

Platinum

Platinum

Brass Ring

FIG. 117. HUNNING'S TRANSMITTER

of this type was invented by the Rev. H. Hunnings in 1881. It consisted of a platinum diaphragm (Fig. 117) and an electrode, the space between them being filled with carbon granules. The principle of its action consists in the motion of the diaphragm producing greater or less pressure of contact between the granules, and consequently a variable resistance between the

Financially strong, the 'United', took steps to liquidate the opposition – Hunnings and Co. A writ was issued, alleging infringement of the Edison patent and the case was heard in April 1882. It lasted for 16 days and the United lost.

It was ruled that the Edison patent was not sufficiently described in the specification, and the action was dismissed. Undaunted, the United wasted little time in returning to the attack. They filed a petition of a disclaimer and memorandum of alteration of certain parts of the Edison patent, and in August this was allowed by the Attorney-General.

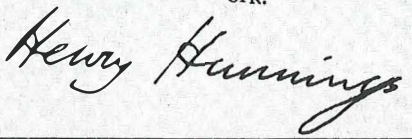
But it was not the end of the matter. The following year Hunnings and partners lodged a protest which led to a lengthy and argumentative case conducted in the English Court of Appeal. It lasted nearly a fortnight before the 'United' finally won. Hunnings' patent was now declared illegal.

But all was not lost. The apparently soulless United Telephone Company gave him £1,000 for his invention and as other entrepreneurs followed Hunnings each action in turn was contested in the courts. The 'United' never lost a battle thanks largely to their expert witness – the vicar himself who had joined the company!

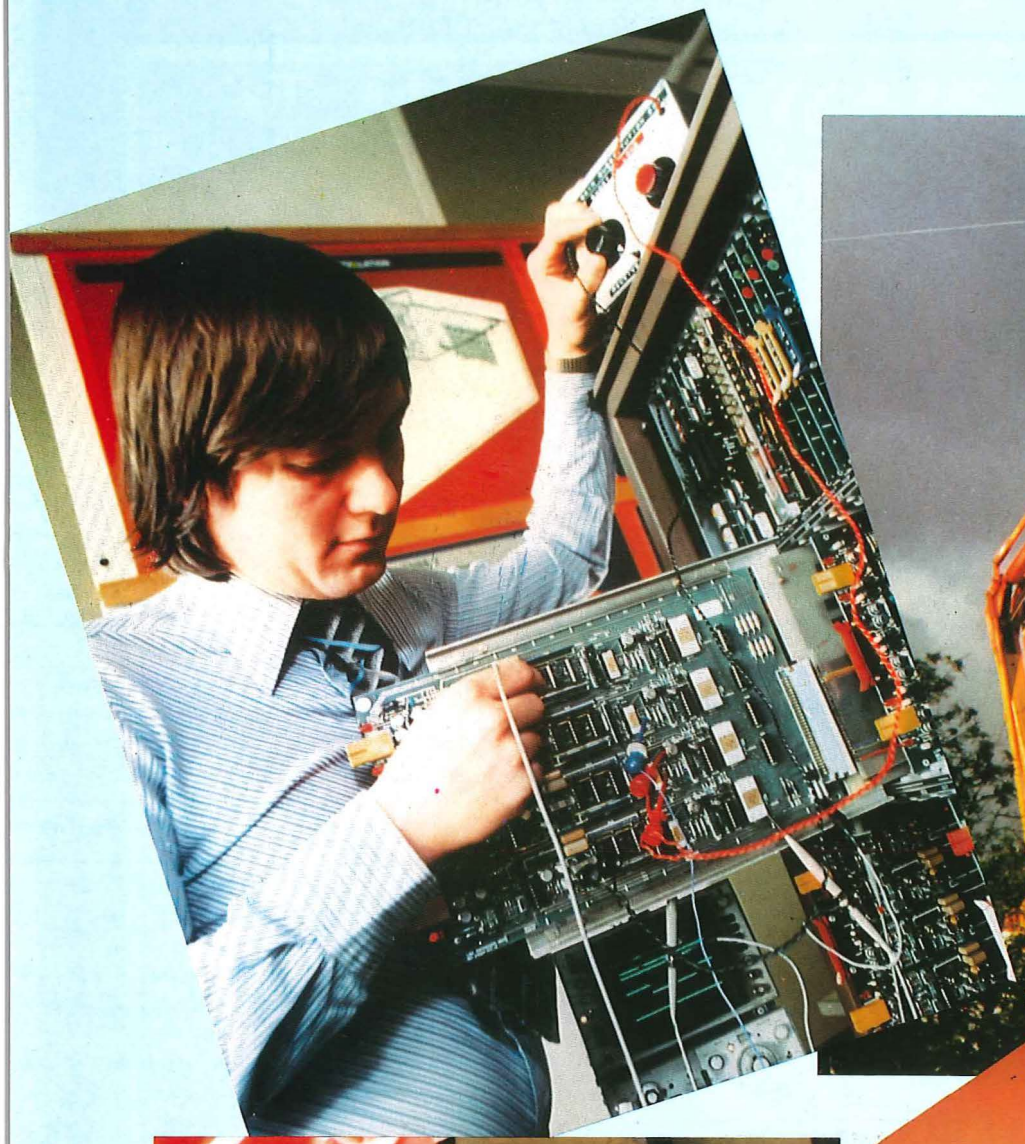
Much of the irony of the story is that at his own hearing, Hunnings confessed that he did not know how his transmitter worked. Had he been able to explain its principle it was felt that he would have won in the Appeal Courts. If he had done it is possible that today's telephones might have been vastly different in performance and design . . .

British Telecom Journal, Winter 1983/84

According to ecclesiastical records held at York, it appears that Henry Hunnings was in fact far happier dabbling in 'matters electrical', than administering services for christenings, marriages, and funerals. He had been a classical scholar at Oxford obtaining his masters degree in art. At the age of 23 he embarked on a series of temporary clerical appointments until 1874, when he became curate of Bolton Percy near York.



Right: Signature taken from Bolton Percy register.



Quality is the key

Tom Lomas

The future success and prosperity of British Telecom depends critically on its continuing ability to provide telecommunications services of a quality level at least as good as that of the competition. Quality in this context is not solely to do with the stores and equipment which, of course, are essential elements in the provision of service, but is concerned with all aspects of a service which the customer values – price, design, availability, delivery, performance, maintainability and reliability.

As its contribution to the National Quality Campaign launched by the Government last year British Telecom has set in train a number of parallel quality drives all directed towards bringing about a marked improvement in the quality of its services. These include Local Communications Services throughout which telephone areas are closely involved in the drive to step up quality, British Telecom Enterprises (Consumer Products and Merlin) and National Networks Trunk Services. In fact all parts of British Telecom should now be taking up the challenge to improve quality in ways appropriate to their activities, and British Telecom Quality Assurance – part of Development and Procurement – is playing a major role by providing specialist advice on disciplines and procedures.

Left:
Quality is concerned with more than just stores and equipment. It is about the commitment of everyone who works for British Telecom to provide the standard of service which customers demand.

It is a widely held misconception that quality is available only at a cost and that a quality product or service is necessarily costly. Consider the elements of the so-called quality costs of an item for use by a customer. These are:

★ Costs of prevention of failure – the costs of the initial design efforts to ensure that the item does not fail.

★ Appraisal costs – the costs of testing and inspecting the item after it has been manufactured.

★ Failure costs in manufacture – re-work, scrap and redesign costs following manufacturing failure.

★ Failure costs in use – the cost to the user of the consequences of failure.

A little reflection will show that only the first of these can rightly be called quality cost as it would not be unreasonable to expect it to increase with improved quality. The other three, however, should more properly be described as 'unquality' costs as these increase with lack of quality or, conversely, they decrease with increasing quality.

This simple concept is the essence of modern quality assurance systems which might be described as 'get-it-right-first-time systems', the lesson being that effort spent in ensuring that the item is a quality item in the first place is more than repaid in reduced re-work and redesign costs, reduced customer-incurred costs and hence increased customer satisfaction.

The success of Japanese products in world markets is due in no small part to their pursuing this principle to the limits of producing higher and higher quality goods which can now set the standards against which other countries' goods are measured.

Japan's success in world markets did not come about overnight, nor was it easily won. It came about from the acceptance, after the last war, that Japan had few natural resources and little to offer world markets other than its capacity to manufacture and export goods. It perceived that what customers the world over demand are goods of consistently high quality and reliability and then set about ensuring that Japanese industry could satisfy this demand.

High quality and high reliability were seen by the Japanese as principal factors in gaining and retaining market advantage and there can be little doubt that superior quality is a major reason for the dramatic shift in market share to Japan in the last 20 years of items like televisions, video cassette recorders, hi-fi equipment, and motorcycles.

The United Kingdom National Quality Campaign which is now being vigorously pursued throughout UK industry has as its main aim the bringing about of a similar revolution in the quality of UK produced goods and services. Quality applies, of course, no less to services than to goods.

Although the quality of those services provided by British Telecom has improved markedly over the last year or so there is some way to go yet before the best of international standards are matched. The task ahead is not easy. It is no easier than that with which Japanese industry was faced some 20 years ago. If useful lessons can be learned from the Japanese experience then four ingredients are necessary for success in achieving high quality. These are top-level commitment and top-level leadership in the drive for quality, a clear understanding at all levels of top management's quality policy, annual programmes (with targets) for quality improvement and above all, the personal commitment of every individual in the organisation to the pursuit of quality.

There is no doubt that the first of these ingredients already exists in British Telecom and that considerable progress is being made towards realisation of the other three.

There is also no question but that British Telecom must succeed in enhancing the quality of all its activities. Customers demand it and so the future livelihood of the organisation depends on it.

Mr T. Lomas is deputy director, Major Systems Procurement, responsible for quality assurance throughout British Telecom.

British Telecom Journal, Winter 1983/84

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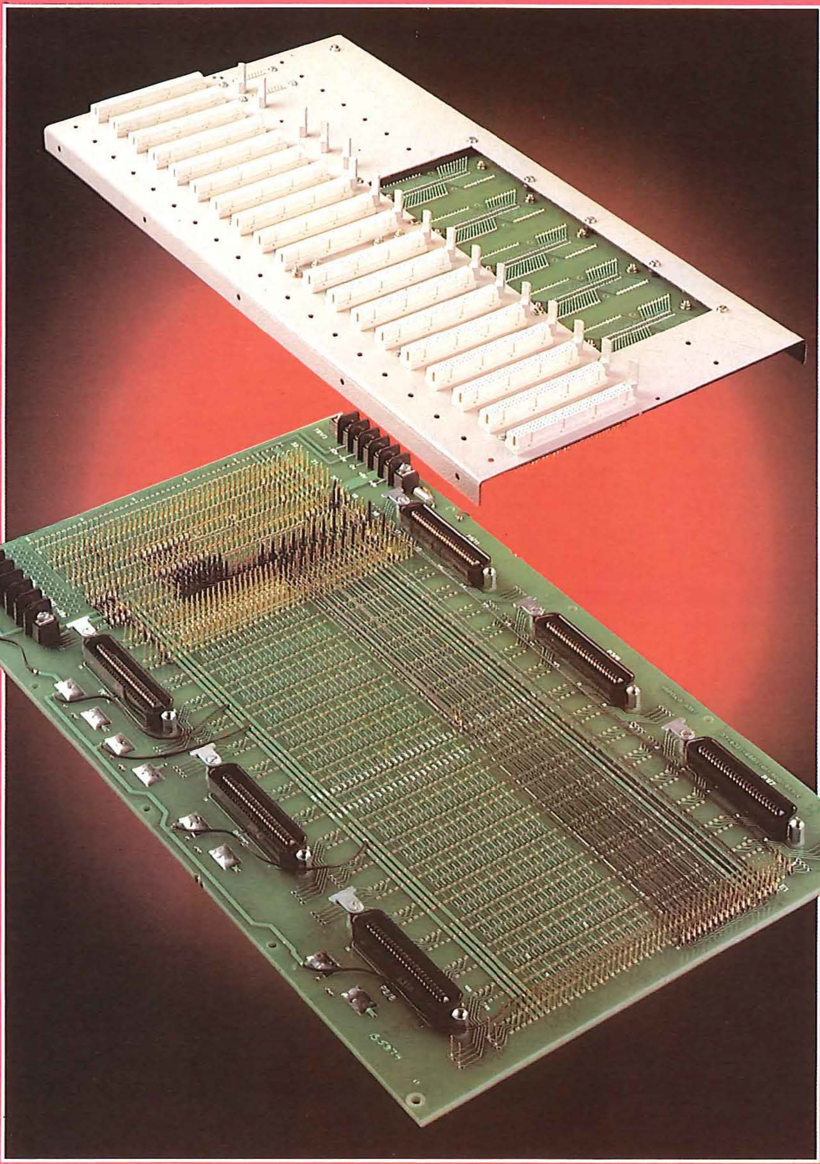

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MISCELLANY

Go-ahead for TAT-8

The go-ahead has been given for a $335 million (approx £225 million) submarine cable which will carry phone calls, data and messages across the Atlantic on hair-thin strands of glass.

British Telecom will contribute the second largest share of the total cost – about $50 million (£34 million) and the UK firm of Standard Telephones and Cables will supply its system as one segment of the link, valued at $52 million (£35 million).

The cable – due to be ready in 1988 and known as TAT-8 – will be the world's first submarine link to use an ocean floor 'junction box' to enable it to land in three countries.

The cable is needed to cater for continuing huge growth in calls between the two continents, and in particular between the USA and Britain – by far the world's busiest transoceanic telephone route.

The number of telephone calls between the two countries grew at nearly 30 per cent a year throughout the 1970s and is still expected to double every five years or so in the 1980s. At present about 30 million phone calls are made each year between the UK and the USA. About half go by cable and half are routed by satellite.

For ships at sea

Ships' crews and passengers can now plug into the world of information technology – thanks to British Telecom International's maritime satellite system, Inmarsat, and its international packet switching services, IPSS.

The new service will provide packet-switched links to the UK's public data network, Packet SwitchStream (PSS), and also to more than 50 similar data networks in over 30 countries throughout the world.

On the right lines

British Telecom's first payphone on a train went into service in January on the Inter-City 125 service between London (Paddington) and South Wales. Stations served include Reading, Swindon, Bristol and Cardiff and the move is a joint experiment with British Rail.

All calls from the coin-operated Trainphone cost 50p a minute. Customers are able to make direct-dial calls to all parts of the UK, but incoming and international calls are not available.

The experimental equipment, which will be replaced by a more sophisticated trial model later this year, is being operated over British Telecom's existing radiophone network. It will be used to test customer reaction and help solve remaining technical problems.

Trainphone is easy to operate. After dialling a number in the usual way customers then only need press a button and the Trainphone equipment searches for an available radiophone channel. If no channel is free, a 'call fail' light appears on the Trainphone console and the dialling procedure must be repeated.

More Trainphones are planned for the London South Wales later this year. Wider coverage of Inter-City routes is planned for next year, after the introduction of cellular radio services.

World-first cable link

A £7.25 million contract for the world's first international optical fibre undersea cable has been signed by Sir George Jefferson, chairman of British Telecom. The 122 km cable links the UK with Belgium, and will be made in Britain by STC.

The contract means that within two years phone calls, computer data and messages will travel between Britain and continental Europe as pulses of laser light along tiny strands of ultra pure glass as thin as human hair.

The investment is shared between four countries. Half will be held by British Telecom International, and the balance by administrations in West Germany, Belgium and the Netherlands.

The cable – capable of carrying nearly 12,000 phone calls simultaneously – will be laid by British Telecom's cableship *Alert* during spring next year. It will run from the Kent coast near Broadstairs to near Ostend.

New Year honours

Jim Hodgson, vice-chairman of British Telecom who was awarded the CBE, and Dr John Midwinter, head of Optical Communications Division at Martlesham who received the OBE, were among British Telecom staff honoured in the New Year List.

BTE reorganises

Two new divisions have been formed within British Telecom Enterprises. One division handles value added systems and services; the other deals with mobile systems and services.

Headed by Richard Hooper as chief executive, the value added systems and services division will concentrate on serving the business and mass consumer markets.

Introduction of the Trainphone means that rail travellers can make calls while speeding towards the West Country and South Wales. See this page.

It is split into five parts:

★ Prestel, the world's first and largest public viewdata service.

★ Yellow Pages.

★ Cable Interactive Services, supplying cable tv operators cabletext magazines and the Gamestar video games service

★ The National Data Processing Service, supplying computer services to the freight industry.

★ Spectrum, providing bureau and special services such as Telecom Telemarketing and Telecom Tan (new forms of direct marketing), Talkabout (a public chat service) Telecom Red (security services), and Telecom Gold (electronic mail).

The new Mobile Systems and Services Division has been formed out of the former radiopaging, radiophone and cellular systems units. It will take on the expanding market opportunities created by new mobile information technology.

The other two divisions of BT Enterprises, Merlin and Consumer Products, remain unchanged.

Payphones modified

Britain's electronic payphones are being modified to make them more resistant to vandals and thieves. The 5,500 electronic press-button payphones already in service will be modified within the next few months.

Modifications will make it difficult for vandals to tamper with the coin mechanisms and at the same time British Telecom is stepping up its regular inspections of problem sites.

By the end of the decade all Britain's public payphones will be microprocessor-controlled models which offer advanced facilities, including the ability to report back automatically when they are out of order or when the box is full.

New appointments

New senior appointments have been made by British Telecom to strengthen its Technology Executive.

Dr David Leakey, former technical director of GEC Telecommunications, is deputy engineer-in-chief. He will operate across all aspects of British Telecom's engineering strategy and report directly to John Alvey, managing director development and procurement and engineer-in-chief.

Charles May, formerly director of research, has been made senior director, development and technology, to fill the vacancy created by Mr Alvey's move.

David Merlo takes over as director of research at Martlesham laboratories while Dr John Thompson is deputy director dealing with transmission research.

Clive Foxell, senior director procurement, has assumed responsibility for procurement of all materials as well as major systems, and will act as adviser to the board of British Telecom on procurement policy.

Budget accounts

More than 15 million telephone customers can now pay bills by monthly instalments with British Telecom's new Budget Account.

The new facility is aimed at residential customers – all 15.5 million of them – but business subscribers can also have a Budget Account on request.

Personal letters explaining the system are being sent to residential customers outside London. They need only sign and fill in the name and address of their bank before returning the form by Freepost. They will then pay a stipulated amount – based on their recent telephone bill charges – each month through a banker's standing order.

A personal invitation to take out a Budget Account will be extended to London customers next year. Meanwhile any London customer requesting the facility will be offered an immediate account.

MerlinBroker launched

Office automation designed to help insurance brokers win more business has been unveiled by Merlin, British Telecom's business equipment supplier.

The system is designed to run on Merlin's small business computers and uses software written by React Management Services.

MerlinBroker as it is known, acts as an electronic diary and filing system, keeping records of a broker's customers and prospects. It produces reminders for follow-up, policy renewal, or step-up options on a life insurance policy.

It also produces accounts relating to clients, to insurers, and to brokerage. It records and analyses details of each day's transactions and can make entries in a nominal ledger to produce a trial balance and profit and loss account.

New insurance scheme

British Telecom has taken out its first wide-ranging commercial insurance and set up its first internal self-funding property and liability scheme.

The commercial scheme covers catastrophe insurance which runs into millions of pounds while the internal scheme covers property losses over £10,000 and third party legal liability over £5,000. It will be funded by premiums paid by profit centres into a corporate fund.

Contracts

Standard Telephone and Cables has won orders worth more than £10 million for 2 Mbit/s line systems. The transmission products division of STC Telecommunications at Basildon, Essex, is to supply 16,000 line terminals and 35,000 signal regenerators manufactured at the company's New Southgate site in North London. These will be delivered by June this year.

STC has also won orders worth £200,000 for optical communications equipment to give Londoners more telephone circuits, and a contract to supply British Telecom International (BTI) with 32 transmultiplexers – equipment for converting FDM (frequency division multiplexing) to PCM (pulse code modulation) signals and vice versa.

The equipment will be used to provide alternative routing of international telecommunication traffic transmitted via satellites.

Trend Communications, the data communications division of Phicom plc, has received a further order worth £8.5 million from British Telecom for its Puma telex terminal. This brings the total value of orders from British Telecom for Puma to about £22 million, since the first order two years ago.

The new order follows the recent announcement of a facility which enables Puma telex terminals to be linked to word processors, computers or electronic typewriters.

General DataComm (UK) has been awarded a contract to supply multiplexing equipment worth £2 million to British Telecom to aid the implementation of the new KiloStream and MegaStream digital services.

John Noad (Ceilings) has been awarded a £17,500 contract for the installation of integrated ventilating ceilings. The ceilings are to be installed in British Telecom's refurbished repair service centre at Monument Telephone Exchange, London.

Plessey Telecommunications, Transmission Division has been awarded a contract by British Telecom to supply, install and commission a 565 Mbits/s optical fibre system between Nottingham and Sheffield.

The Dictaphone Company has been awarded a £2 million contract for systems on which British Telecom will record all 999 emergency calls. Dictaphone will be supplying 285 of their Series 5000 communications recording units, an upgraded version of their systems already in use by about three quarters of Britain's fire, police and ambulance service control centres.

SEMITRON

The next generation of transient protectors

Modern electronic circuits and equipment need better protection against voltage overloads and especially from high-energy transients. The Semitron foldback diode is the most up-to-date answer to transient protection, with its outstanding clamp capability. A simple, two-terminal construction, it is now widely used, especially in telecommunications equipment.

The unique Semitron design enables the reverse biased junction to avalanche normally. Enhancement from the forward-biased side of the chip lowers avalanche voltage by about thirty per cent when conducting 100mA. The voltage level is maintained even when the avalanche current exceeds this.

Semitron achieves cost savings by enabling the designer to use a narrow band between stand-off and clamp conditions, permitting the use of lower voltage transistors or circuits. Moreover the all critical turn-on time is very fast, typically as short as 1 ns – fast enough to protect tomorrow's high speed digital circuits.

Semitron foldback diodes are of simple construction, encapsulated in the majority of popular diode packages, glass-to-metal and plastic, and of 1 to 75W continuous dissipation.

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Doing business at long distance over the phone has until now tended to be expensive and often time-consuming.

But with a long-line extension (LLE) your calls become 'internal' so you don't pay for them. All you pay is the cost of a leased line—which quickly pays for itself.

In addition, you get all the advantages of being able to utilise a modern automatic switchboard to the full.

Keeping people in closer touch.
Your 'remote' people won't feel so cut-off. An LLE gives them automatic phone contact when an engaged line becomes free; direct access by dialling an extension number; 'call transfer'; 'conference'; 'hold'; 'earth or timed recall'. In short, every PABX facility over *any* distance throughout the UK mainland.

So if you want to establish closer links in a far-flung business organisation, look into Mitel's Long-Line Extension System. Call us about LLE now, or use the coupon below.

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SUBJECT INDEX

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Its ability to pin point faults at any distance from the Repair Service Centre led to its introduction on a trial basis both here and abroad.

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THE 'TERRIER' LINE-TEST HANDSET

Available in six different models, Dial and press button; loop disconnect and DTMF. A fundamental aid for installations and maintenance.

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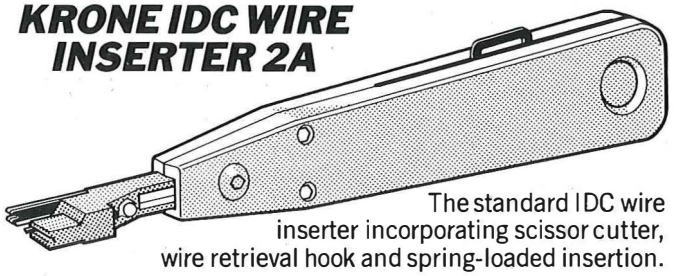
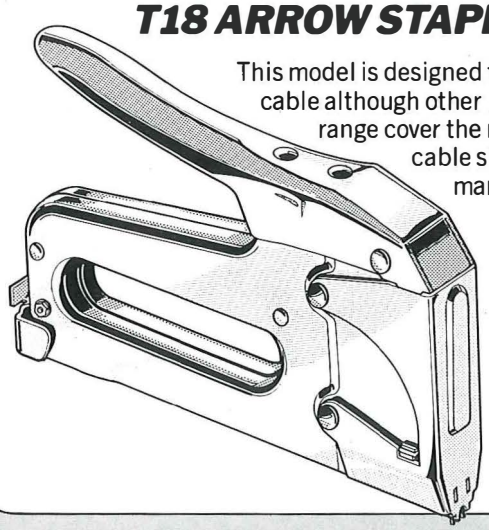


The standard IDC wire inserter incorporating scissor cutter, wire retrieval hook and spring-loaded insertion.

T18 ARROW STAPLE GUN



This model is designed to fit 4-core cable although other guns in the range cover the marjority of cable sizes on the market.

If you need access to a complete range of telephones and accessories *telephone 01-581 8011 or return the coupon below.*

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For the complete facts on LCR 2000, and more information on the benefits of automated Repair Service operations, contact: Philip G. Moore, Director of Systems Sales, Porta Systems Ltd., The Parade Frimley Surrey GU 16 5HY. Telephone (0276) 683140

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                              DISPATCH POSITION
CQ  0200 01 17 82 11:00 LORD T063209 1106
TM 732 9906 SLVR 1200 CS01 PR12 TKN07060
NA  J R KELLY                                  SPIN TEST TIP  GRD RING GRD TIP RING
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ADD 1062 ATHENS BL APT 204                     DC VOLTS  0.0V     0.0V      0.0V
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LV FAULT    RING GRD 2000 OHMS                  DISTANCE STRAP TO FAULT 3282 FEET
DISPATCH CABLE

LOG ON OPR102   POS 12

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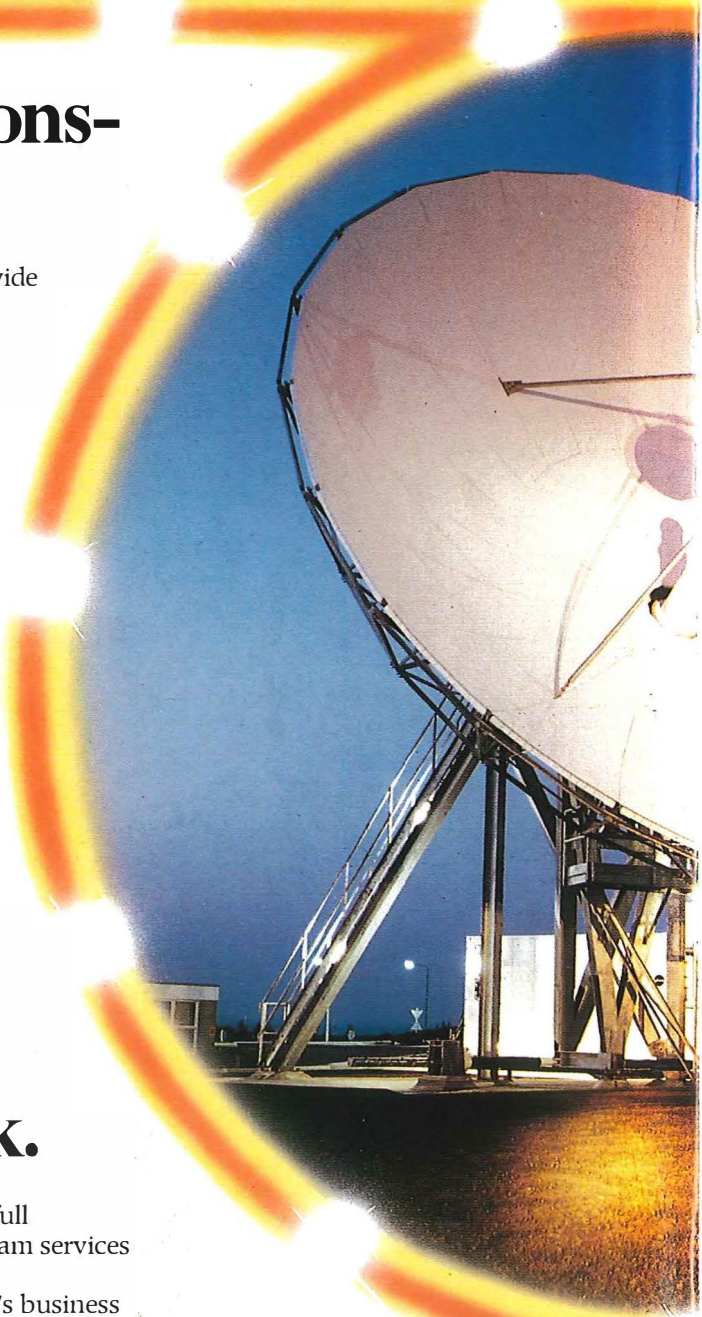
Satellite communications– the new link.



Whatever the need, Plessey satellite ground stations provide the new link for even better national and international communications.

Proven expertise in switching and transmission systems means that Plessey has the capability to link the ground received satellite signal into public, private and local community networks.

Plessey remote stations supply high quality, reliable telephony, data, telex, television and radio links for businesses and the public.

Plessey Telecommunications Limited recently won a £1 million contract from British Telecom International for an enhanced Standard B earth station at Goonhilly Downs in Cornwall.

Plessey is responsible for the provision, installation, acceptance testing and commissioning of the earth station, which will be transmitting live in 1983.

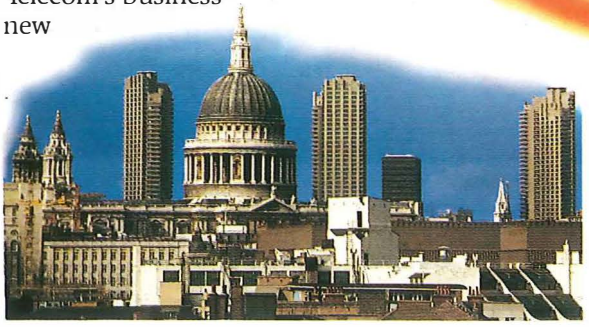
The station will interwork with Intelsat IV, IVA, V, VA, and subsequent satellites to transmit and receive vision and sound on two colour TV channels at either 625 or 525 lines, and is capable of being extended to handle a further two channels.

Contact Transmission Division for further information.

Plessey–the vital link in the London Network.

Soon, London's business community will be getting the full benefit of British Telecom's Kilastream and Megastream X-stream services —at the speed of light.

It's the result of increasing demand from British Telecom's business users for high-speed data transmission facilities. The new services will be carried by a high bit-rate, fibre optic transmission network called the London Network.

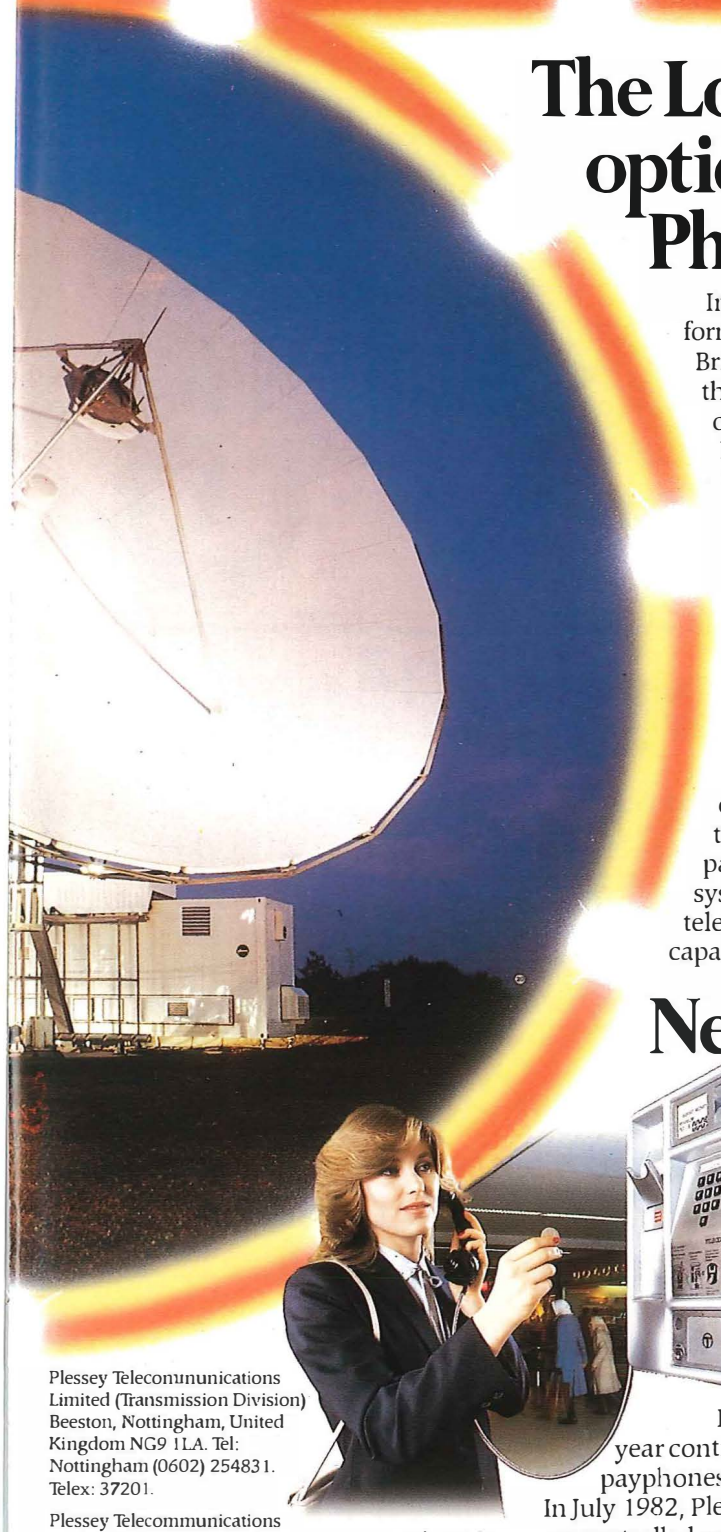


As a world leader in fibre optics, and major UK supplier of optical transmission systems, Plessey was chosen by British Telecom to supply optical transmission equipment.

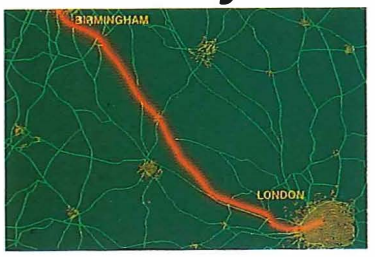
The contract, worth £0.5 million, includes 8 and 34 Mbit/s line terminal equipment, intermediate station equipment and higher order muldex from the Plessey product portfolio.

With a completion date set for May 1984, Plessey is aiming to commence deliveries in November 1983, to meet British Telecom's requirements.

Contact Transmission Division for further information.



The London-Birmingham optical fibre link enters Phase 2 with Plessey.



In July last year Plessey formally handed over to British Telecom what was then the world's longest optical fibre route. Reaching from London to Birmingham, the link provides two 34 Mbit/s systems each with a capacity of 480 telephony channels or sixteen 2 Mbit/s digital streams for data transmission.

Plessey is now installing and commissioning two further 140 Mbit/s systems, each with a capability of providing 1920 telephony channels or the equivalent in data, marking Phase 2 in the London-Birmingham programme.

As a world leader in optical fibre systems Plessey continues to make fresh advances in optoelectronic technology, which is one reason why it was chosen to participate on the London-Birmingham link. For optical systems from 2 to 565 Mbit/s providing 30 to 8000 telephone channels per installed fibre, Plessey offers a total capability.

Contact Transmission Division for further information.

New intelligent Plessey payphones for New Zealand.

The new Plessey payphones are unique. They're tough on vandals and what's more they can function on their own—making them a highly attractive and cost effective proposition for any PTT authority.

In New Zealand, Plessey has been awarded a three-year contract (with a further right of renewal) to supply payphones to the Post Office.

In July 1982, Plessey won the £40 million contract to supply 77,000 new microprocessor controlled payphones to British Telecom.

The payphones, being installed now throughout the UK, were chosen on their high reliability, automatic status reporting, and ability to refund unused coins.

Contact Telecommunications Products and Services Division for further information.

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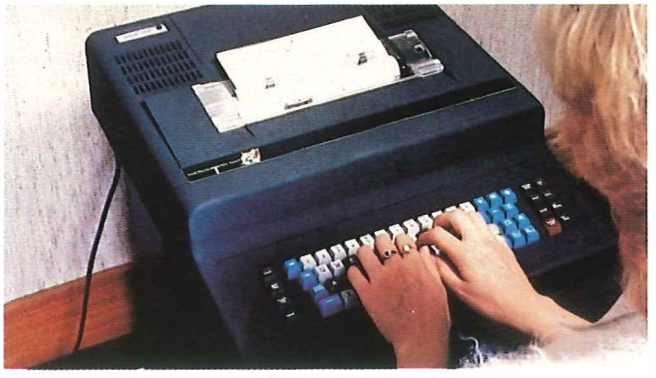

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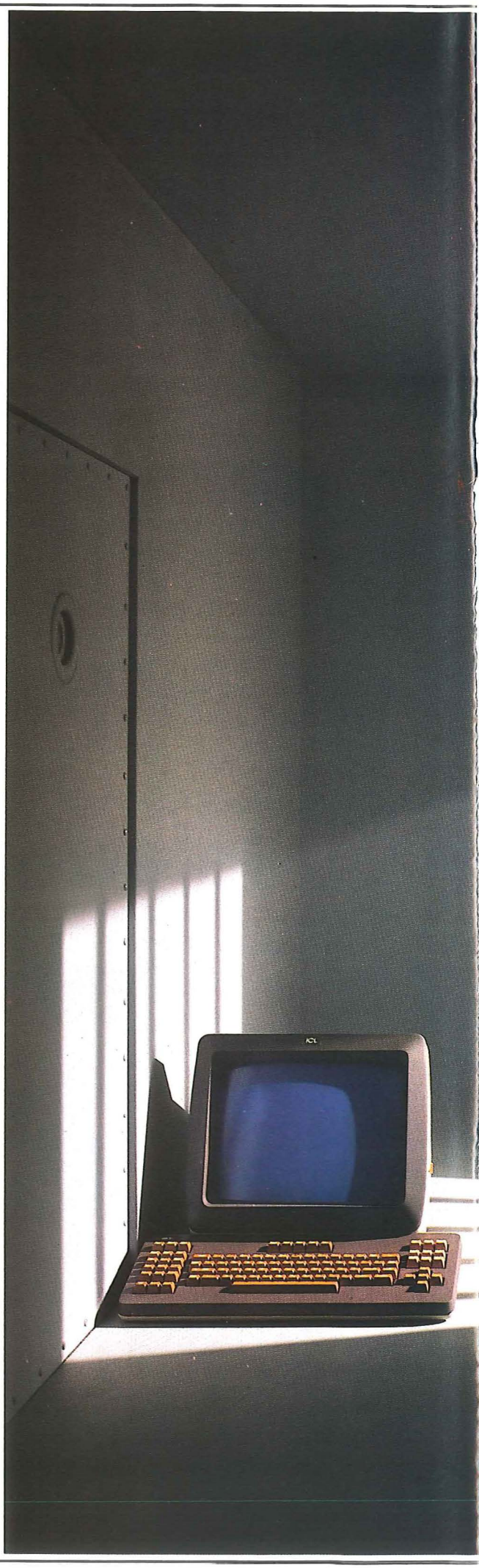

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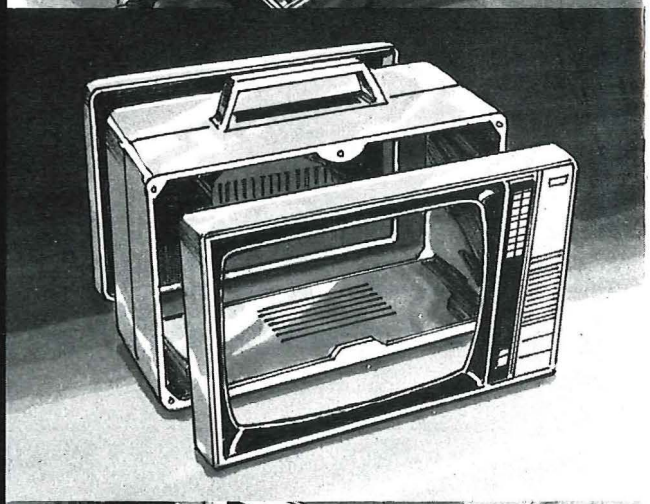

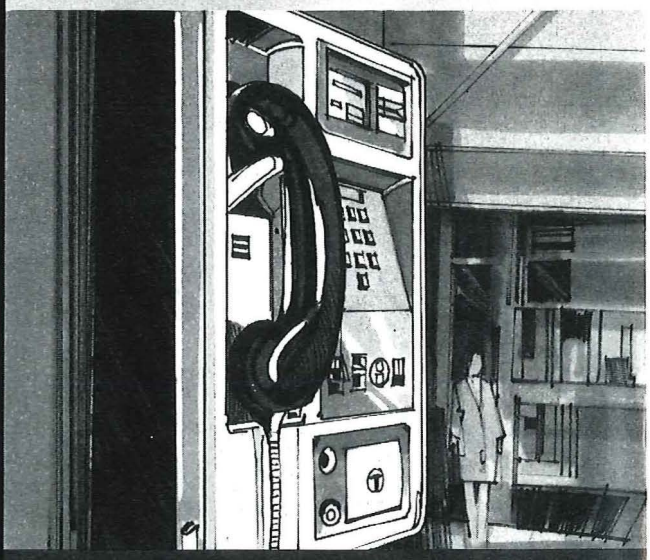

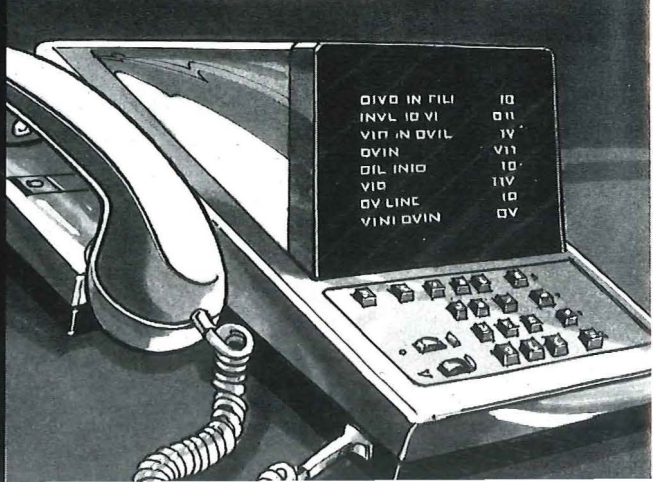

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