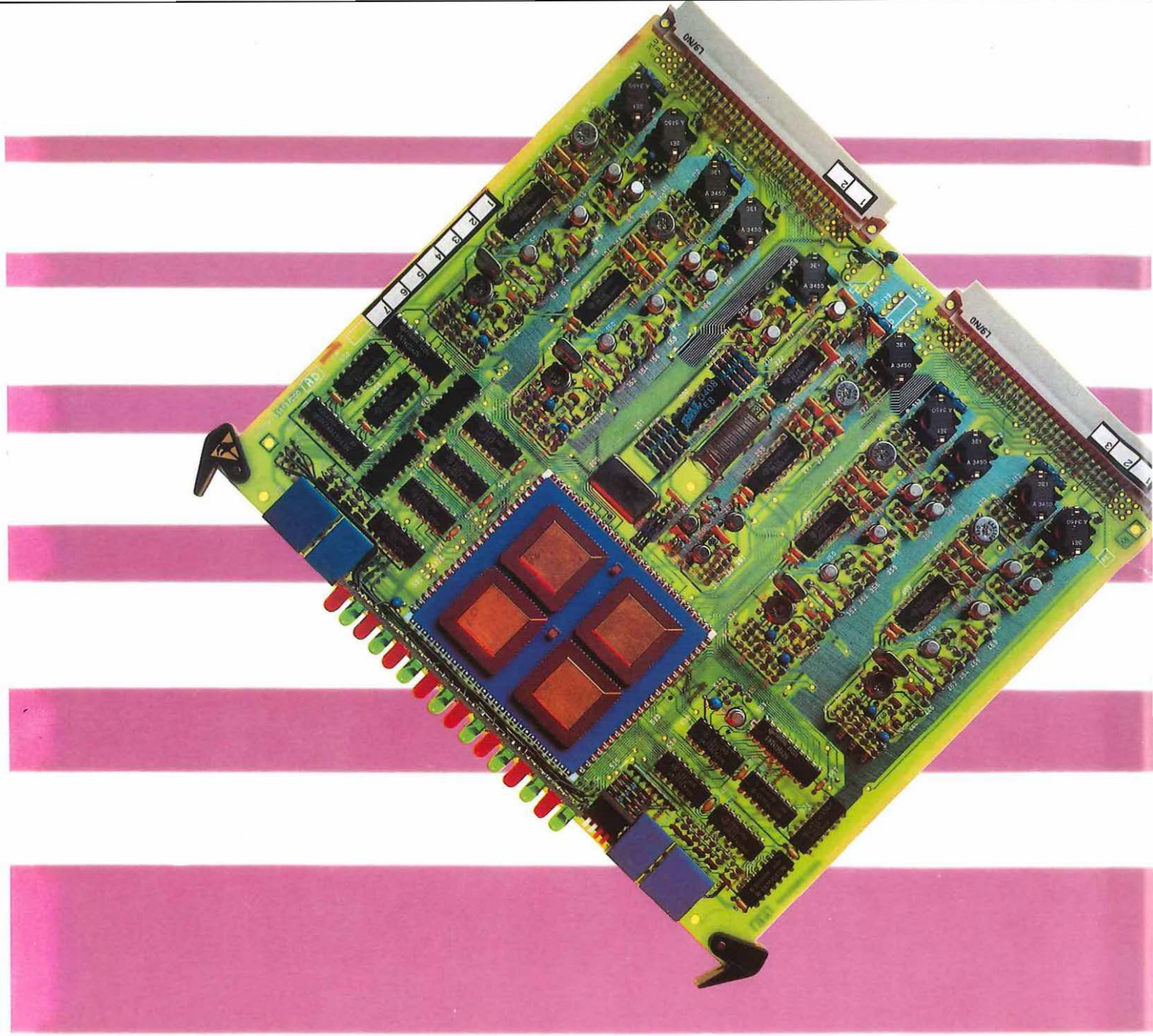
British TELECOM Journal

Summer 1984 Volume 5 Number 2 Price to BT staff 42p



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

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

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

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

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

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

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

That's Plessey in transmission. Giving you more.

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

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Performance, versatility — and it looks good.

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

All Schroff 19" cabinets conform to DIN 41494 and IEC 297-1/-2. For the most comprehensive range of cost effective, quality cabinets, such as Minirack and Eurorack, see Schroff first.

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EBONESTOS

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need we say more!

The perfect host.

Successful and secure packet switching networks need fast and reliable host computers.

That's why GEC Computers created the unique GEC 4100 Series, with their 32-bit processors, proven OS4000 operating system and award-winning real-time hardware executive 'Nucleus.'

These computers have a wealth of highly desirable features.

Job Transfer and Manipulation Protocol (JTMP), File Transfer Protocol (FTP), – all fully supported by nine programming languages. The ability to run continuously for long periods – without supervision. PSS compatible links up to 2Mb/s – that's more than 700 packets/second during peak periods. And they conform to CCITT recommendations.

When you invest in the GEC 4100 Series, you can easily handle videotex, teletex, electronic mail, command and control communications (C^3I), satellite networks and much, much more.

So if you would like to meet the perfect host, we invite you to send for our brochure now.

Call London (01-953 2030, ext 3187), Birmingham (021-327 1829), Manchester (061-872 3433), Gouda, The Netherlands (01820 35222) or Frankfurt (0611 632001).

GEC Computers Limited, Elstree Way, Borehamwood, Hertfordshire WD6 1RX. Telephone: 01-953 2030. Telex: 22777.

GEC Computers
Right from the start

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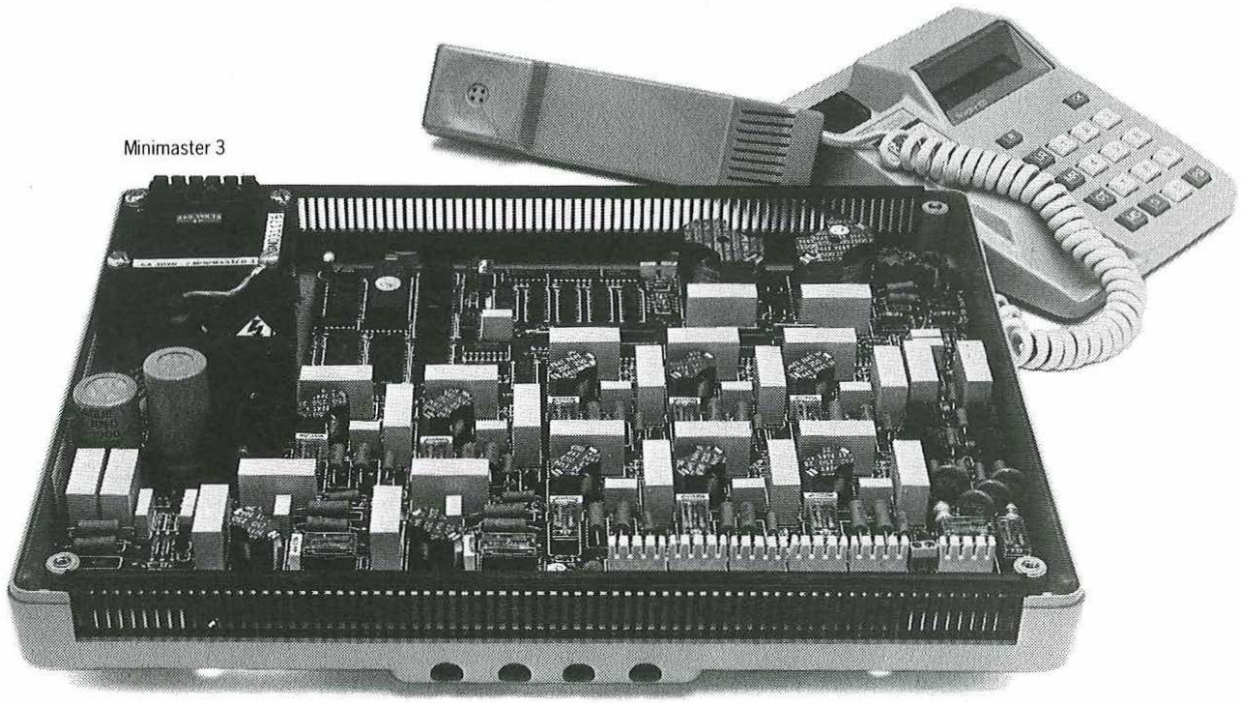


Designed and manufactured by Lake for British Telecom, the Minimaster 3 connects two exchange lines to as many as ten extensions.

Inexpensive to buy and install, it connects to almost any standard approved telephone and provides call conferencing, call diversion, night service, call hold and transfer together with other modern facilities.

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/1000/3/E/022304

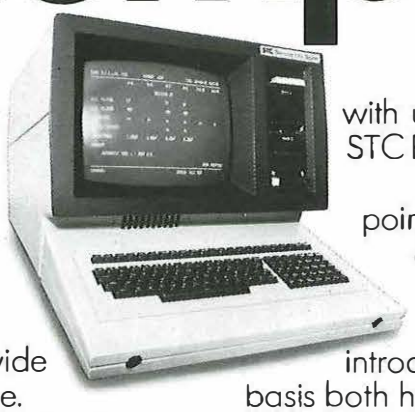
Contact your local British Telecom sales office for more information.

4B Ballymount Drive, Walkinstown, Dublin 12, Eire.
Tel: 0001 522499. Telex: 33328.

Ash Corner, Kembrey Park, Swindon, Wiltshire, UK.
Tel: (0793) 42557. Telex: 444441.

Lake

When you've been finding faults as long as we have, it's easy to knock the competition.



STC first set out to design a new system of remote line testing equipment back in 1977.

The results attracted worldwide interest and praise.

Not least from British Telecom who worked closely with us to develop the STC RLT II.

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.

Today, the RLT II is tried, tested and already operating in several centres throughout the U.K.

We're sorry to say our competitors are a little behind.

But who's fault is that?

STC

RLT II Remote Line Tester

FOR FURTHER INFORMATION PLEASE CONTACT A E REDHEAD, STC TELECOMMUNICATIONS LTD., INFORMATION TERMINALS DIVISION, OAKLEIGH ROAD SOUTH, NEW SOUTHGATE, LONDON N11 1HB. TEL: 01-368 1234

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

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

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

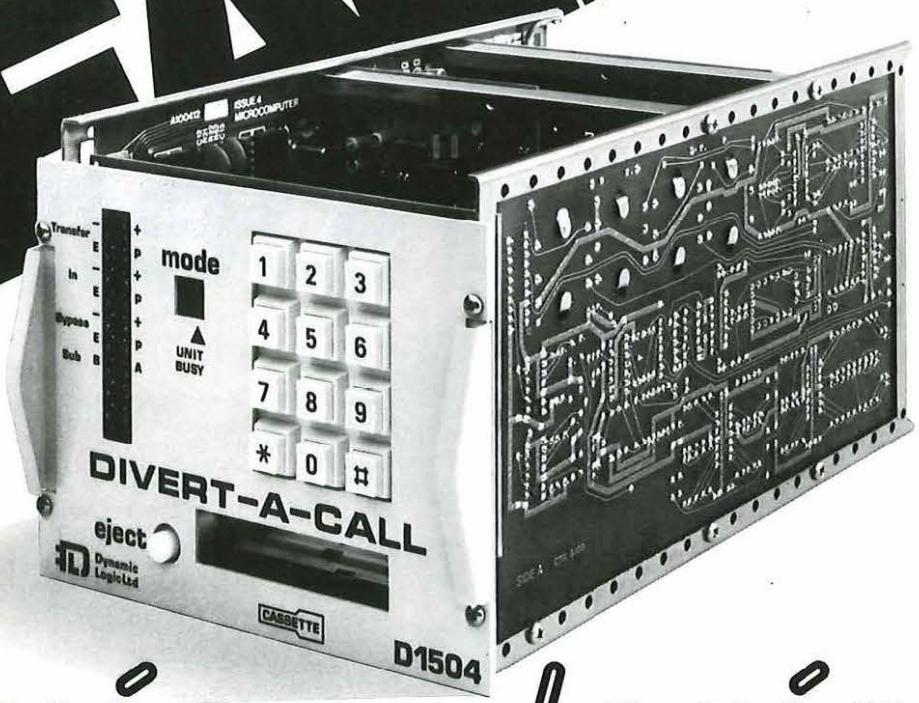
The subscriber can select or change destinations from any location within the telephone network using a synthesised speech facility which is protected by a security code.

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

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

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

PHANTOM OFFICE BECOMES A REALITY



dynamic logic

*See the article 'Phoning the Phantom Office' by Ken Cox. Autumn '83 issue.

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

"Now" The Second Generation Puma Telex with Display...

Trend were first to revolutionise the use of the telex network with their electronic telex terminal. Now, Trend's second generation Puma Display Telex Terminal gives you even more advantages over existing terminals.

- Larger 40K user memory
- Automatic insertion of time and date
- Flicker free 40 character LCD strip display
- Automatic transmission of messages with timed release
- Queue jumping for priority transmissions
- Uninterrupted local operation
- Communications port up to 9.6K bits with X-on/X-off protocol
- "Mailbox" option

It receives, auto-dials, stores, waits, re-dials and auto-clears – all without operator intervention!

Electronic typewriters, word processors, computers etc. can now be simply used to prepare off-line telexes. Incoming messages are printed out by the Puma or may be held in store to be redirected to another local or distant station.

And with the exciting "Mailbox" option – allows otherwise dedicated office systems to access the international telex network. At the touch of a key, you transmit messages into the **extra** 40K memory for full automatic transmission to anywhere in the world without disturbing your telex operator.

So at last you can combine all the advantages of your existing office systems with the most flexible Telex Terminal available ... same compact size, more memory (up to 80K), more operating features, even easier operation and all for virtually the same price.

"Mailbox" is a plug-in option which will be available shortly.

Isn't it time to think again? Contact us today for full details.

'thinks'

* PUMA – trademark of British Telecom.

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Telex: 849408 TREND G
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Telephone: (061) 499 2468
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PHICOM DATA COMMUNICATIONS DIVISION

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Denmark: Trend Communications AS
Tangmosevej 99, DK-4600 Køge
Telephone: 03-652345 · Telex: 43587.
Sweden: Trend Communications AB
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... and distributors throughout the world.

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IN A RAPIDLY CH
IT ALWAYS PAYS TO TA

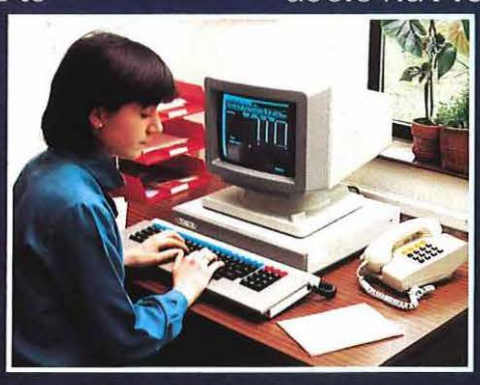
Beware the business computer trap. Don't find yourself locked into BIG BLUE'S idiosyncratic operating system, or tied to the constraints of a Japanese clone's attempt to provide a 'me-too' copy. Either way you can lose – dependent upon an operating system or hardware quirk, which, once you face the facts, you *know* will be made obsolete in the near future by the marketing expedient policy of a transatlantic corporation. None of those computers gives you networking and viewdata and electronic mail and approved modems and communications to mainframes: few even offer colour graphics.

TORCH IS DIFFERENT

Designed to develop by evolution not revolution; by modular functionality not obsolescence. Torch Computers provide you with the richest range of complete business micro computers on earth.

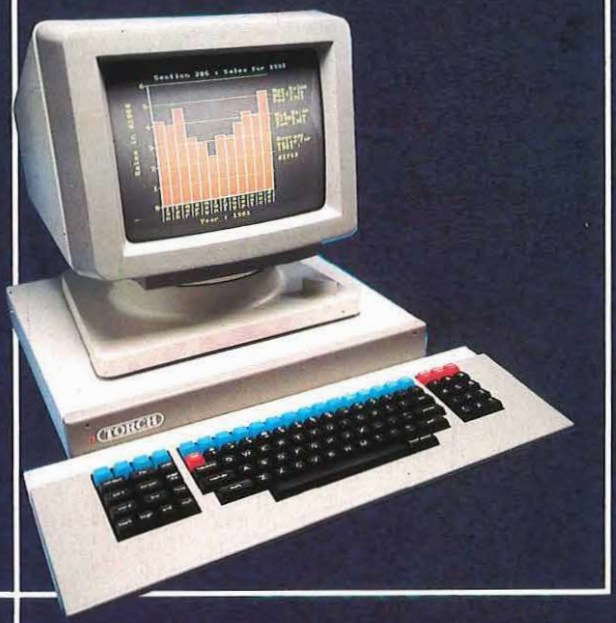
Consider the 8 to 32 bit – Triple processor 725. It is provided complete with three operating systems including full System III UNIX*. The 725 will run all the most popular CP/M* programes, the UCDS-p system and UNIX, as well as the widely regarded BBC Micro computers* MOS and BASIC.

Torch offers three complete and integrated communication systems to open doors via Prestel* and electronic mail communications to mainframes. The TORCH MailPlus electronic mail system is unmatched in power and facility by any competitive offering, anywhere. Remembering that the 725 comes with a 20Mb hard disc, two floppy disc drives, full



*UNIX is a registered trademark of Bell Laboratories. *CP/M is a registered trademark of Digital Research. *PRESTEL is a registered trademark of British Telecom.

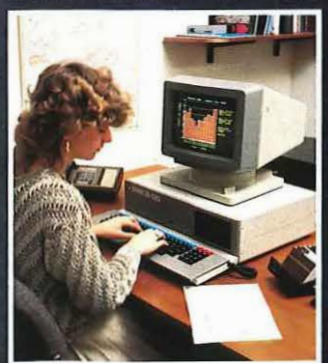
ANGING WORLD
LK TO THE PIONEERS



colour graphics, word processing and spread sheet software and you will see that it provides the best value for money the most technically advanced and the most versatile product of its type.

BUT THIS IS NOT ALL...

Every Torch has a built-in network operating system – TORCHNET, based on ECONET* technology. TORCHNET is probably the most advanced microcomputer networking system in regular use. What other network allows *each* user the choice of which operating system to run?...and then adds data, file, resource sharing and then provides an electronic mail server facility and a shared telex facility?



There are no masters or slaves with the Torch.

Break down those barriers with a Torch open system.

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*BBC Micro Computers is designed and produced in the UK by ACORN Computers Ltd

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Ferranti.
Helping telecommunications come through loud and clear.

Our ZN470 AE microphone amplifier was developed in conjunction with British Telecom for use with an electret transducer to replace the carbon transmitter in telephone handsets.

The reason is clear in the voice of every caller.

There are clear technical advantages too. Dual polarity operation and full lightning surge protection are both on chip, so external components are minimised.

We've now come up with other versions for moving coil and piezo electric transducers, and these can if you wish be located away from the transducer.

ZN470 Series operates from 1mA to 100mA current on telephone supply lines.

Contact your Ferranti distributor, or

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Ferranti Electronics Limited,
Fields New Road, Chadderton,
Oldham OL9 8NP.
Tel: 061-624 0515, Telex: 668038.

BETTER BY DESIGN

FERRANTI
Semiconductors

LET'S TALK TURNKEY

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 nexttime you want to talk telecommunications, talk first to the cable company that talks turnkey.

TCL

Telephone Cables Limited, Dagenham, England. Telephone: 01-592 6611
Cables: Drycore, Dagenham
Telex: 896216

We just had to hand it to you!

As a British Telecom approved supplier, we produce tough cases for field maintenance packs on the CT24/25 and CT23 pay phones. Superior protection features are incorporated into the cases for the Merlin and System X boards.

We've over 25 years experience in manufacturing purpose-built cases, whether they be for sales or service. Options such as anti-static construction present no difficulty.
Phone with your problem or requirement.

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The best in the business

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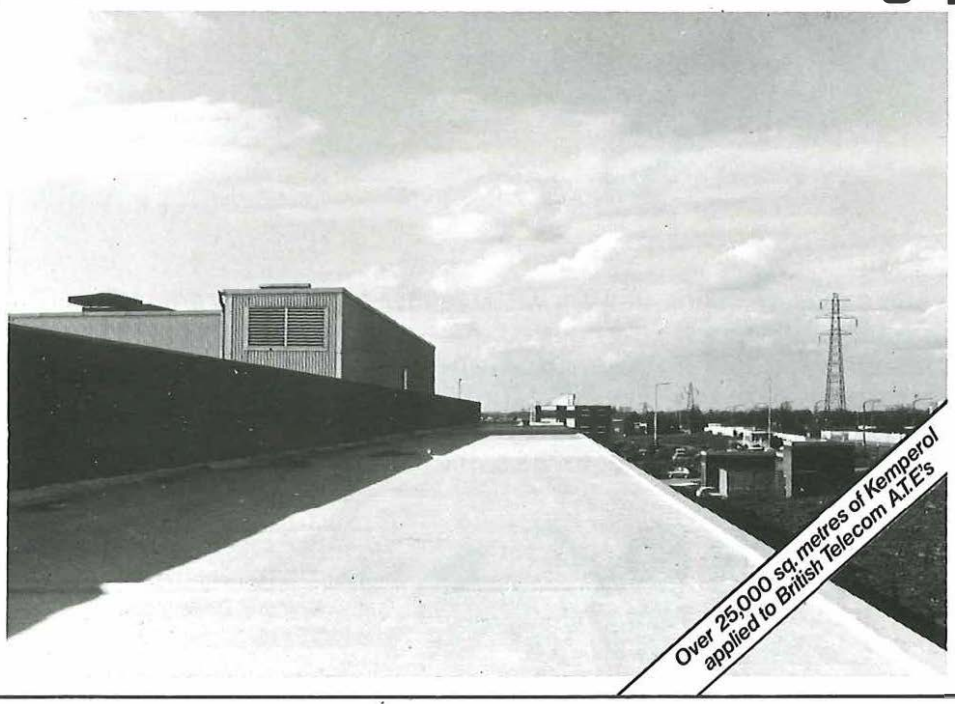
Phone (0473) 623301

Granflex-Kemperol

The most advanced membrane roofing system available



"The most advanced membrane roofing system available"

Roofing problems are many and varied, and often require more sophisticated treatment than conventional waterproofing methods can provide.

The solution is Granflex-Kemperol. It can be used for remedial work — even on water-contaminated substrates — or for new work. And it offers a high level of resistance to the corrosive effects of industrial environments.

With more than three decades in the business, Granflex is a name you can rely on.

Granflex-Kemperol

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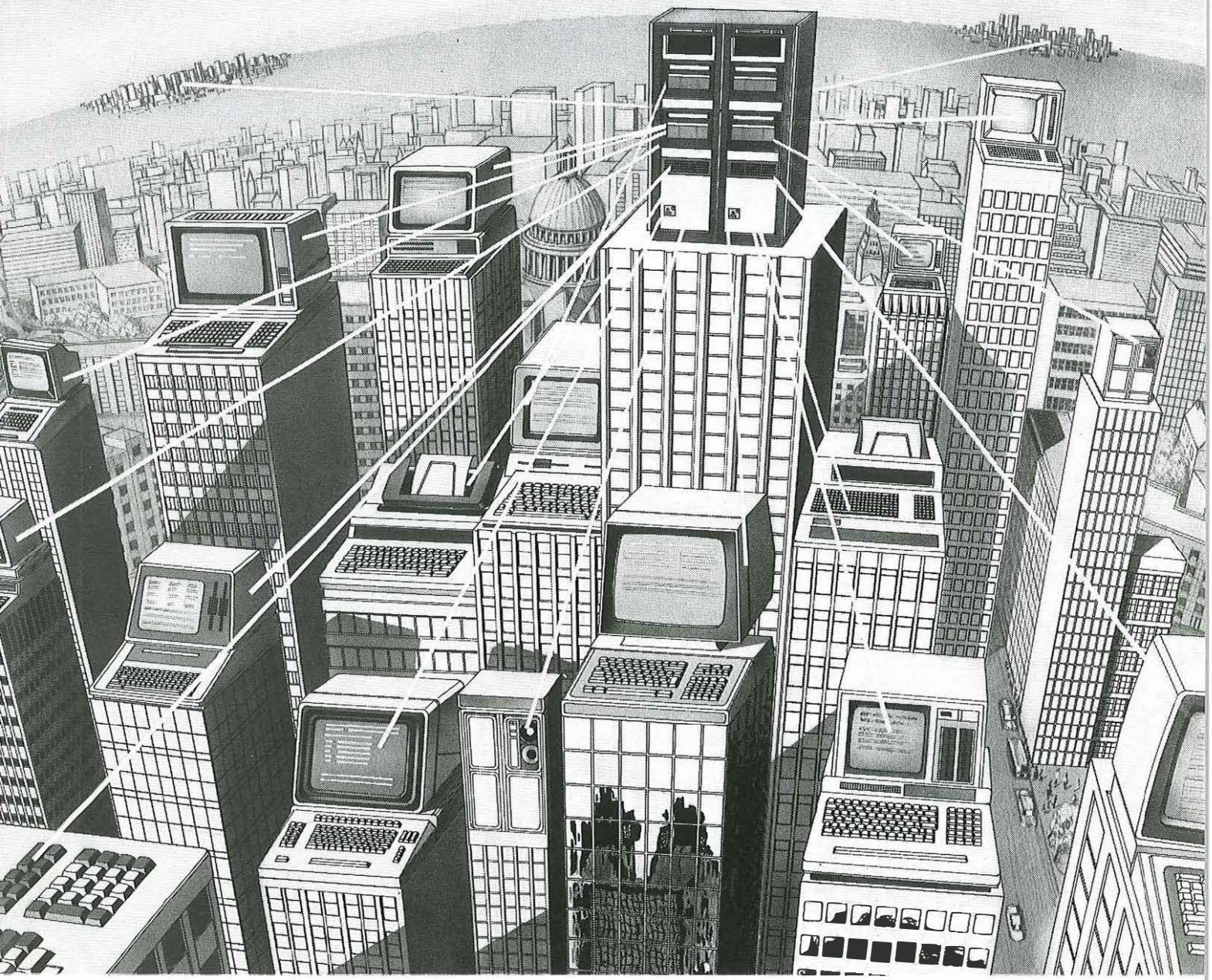
Tel: 0782 279908 Telex: 36611

Who's expanding British Telecom's packet switching network?



Plessey, naturally.

Plessey Packet Switching is to be supplied for PSS 'B'—the next phase in the expansion of British Telecom's inland Packet SwitchStream.

That's no surprise, really.

Because Plessey supplied the initial PSS exchanges, and is responsible for network development at over fifty locations.

And because Plessey equipment is designed to the international X.25 standard, and continually enhanced to achieve new levels of performance.

Private networks, too, are already taking full advantage of the benefits Plessey Packet Switching gives—allowing large organisations better use of costly inter-office, national and international links.

Smaller organisations, too, will shortly benefit from a new range of Plessey Packet Switching products.

For faster and more cost-effective data communications, Plessey Packet Switching is proving essential.

Find out more. For a copy of the *Business Guide to Packet Switching* send the coupon, or contact Dr Peter Rawlinson, Plessey Controls Limited, Sopers Lane, Poole, Dorset BH17 7ER. Telephone: Poole (0202) 675161. Telex: 41272.

To Dr Peter Rawlinson, Plessey Controls Limited, Sopers Lane, Poole, Dorset BH17 7ER. Please send me the *Business Guide to Packet Switching*.

Name_____

Position_____

Company_____

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ANIXTER COMMUNICATIONS

The CATV Supply Specialists

Service is our technology

We are leading suppliers of CATV and Local Area Network equipment in North America and have been operating in the UK for over 10 years. Now we have expanded our existing national network of wire and cable facilities to include a range of CATV, local area and telephone network equipment.

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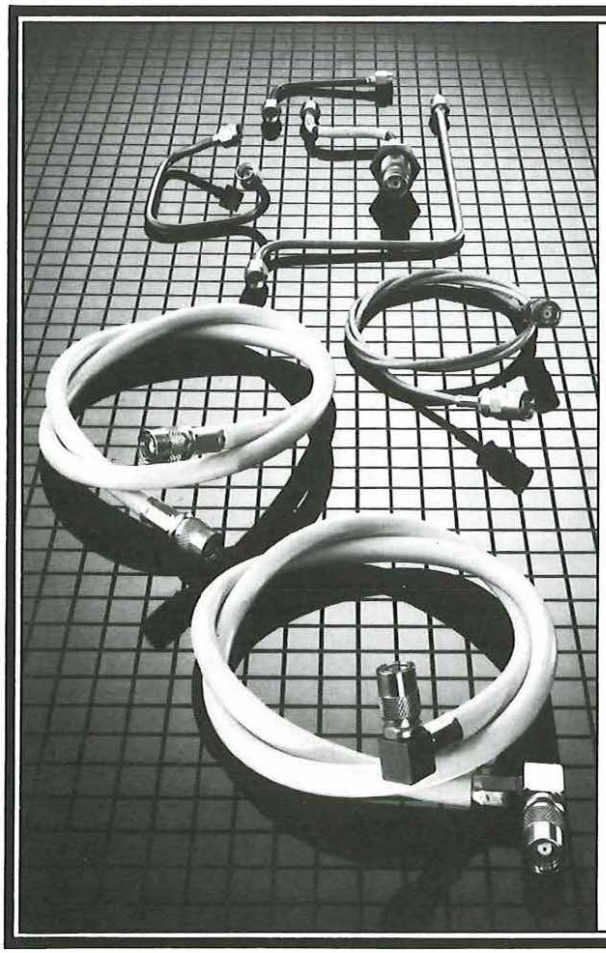

Profit from our assembled expertise

With Sealectro's cable assembly facilities you profit in every way. Because Sealectro do it better ..... blending years of experience in connector manufacture, the finest engineering skills, highly trained personnel and excellent facilities to supply you with finished cable assemblies of the highest quality.

Sealectro cable assemblies are made to your specification, fitted with a choice of SMA, SMB, SMC or Type 43 connectors and many others, to meet the most demanding long term environmental requirements and special cable types employed by British Telecom.

- Assemblies guaranteed and 100% tested to meet your specification.
- Avoid waste, rejects, reworks, shrinkage losses, in-house training.
- Save valuable installation time.

Let Sealectro do it for you – get in touch with us today.

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Portsmouth, Hants. PO6 1TB
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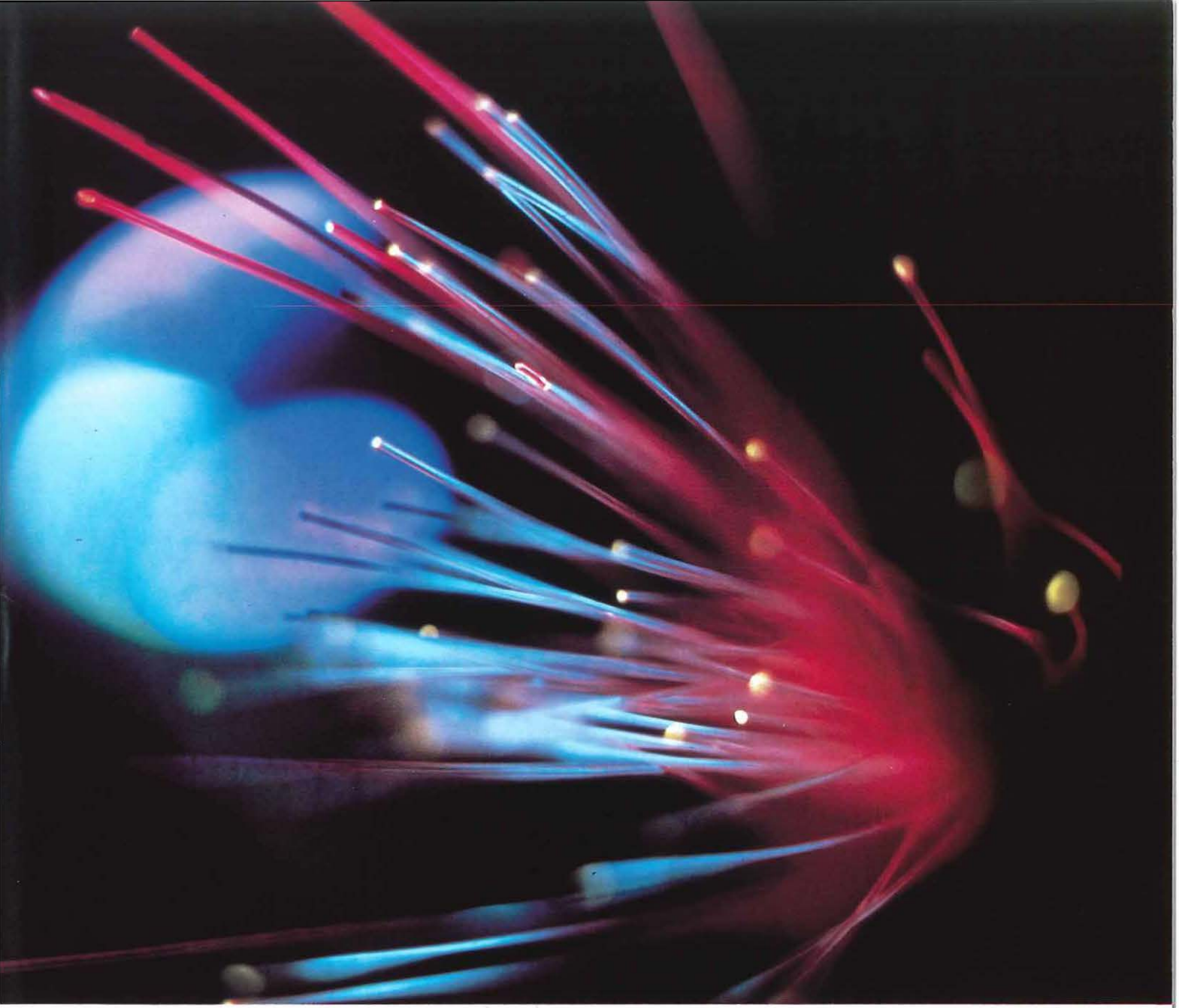
Make the connection



You can't argue with glass that talks

Some time ago two bright STC scientists came up with a rather novel idea.

They were experimenting with threads of pure glass the thickness of human hair as a possible practical optical wave-guide with important potential in a new form of communication.

Optical fibre transmission had been born. Even in those early days, nobody could argue with its potential for having an almost unlimited capacity for high quality signals.

Over the years, we've remained in the forefront of the production and technical perfection of optical fibre in the UK.

After having developed the first practical transmission system between Hitchin and Stevenage we opened Europe's first factory for optical fibre cable.

We have produced the world's first high-capacity commercial singlemode optical system that operates between Luton and Milton Keynes.

And currently we're producing the world's first international underwater optical fibre cable system.

Key components in both these systems are high-powered STC lasers for signal transmission.

All these things demonstrate the international scale of STC's transmission activity.

Thanks to inventions like talking glass, British communications has a future well worth speaking of.

If you would like to take a closer look at how STC is shaping the future, we'll be delighted to send you our colour brochure. Write to:

Peter Earl at Standard Telephones and Cables plc, STC House, 190 Strand, London WC2R 1DU.

Making sure the future has a future.

NATIONAL AND INTERNATIONAL COMMUNICATIONS SYSTEMS · BUSINESS TERMINALS · OFFICE AUTOMATION SYSTEMS · CONSUMER ELECTRONICS · ELECTRONIC COMPONENTS · DEFENCE AND MARITIME COMMUNICATIONS SYSTEMS · AVIATION · MEDICAL AND SOFTWARE SERVICES · TRAINING SUPPORT · TECHNICAL AND TECHNOLOGICAL CONSULTANCY.

LAST NIGHT THESE LINES WERE HUMMING WITH ACTIVITY

It happens every night on every line, automatically, with Teradyne's 4TEL, the subscriber line test system that finds faults before your customers do.

The idea behind 4TEL is simple: help a telephone company improve customer service and save money.

4TEL does this by testing line quality each night, analysing the results and presenting them, in simple form, on a printer in the RSC the next morning. Faultsmen are directed straight to the actual trouble spots so they're far more effective.

The result—reduced time spent on cable repairs and improved utilisation of external plant.

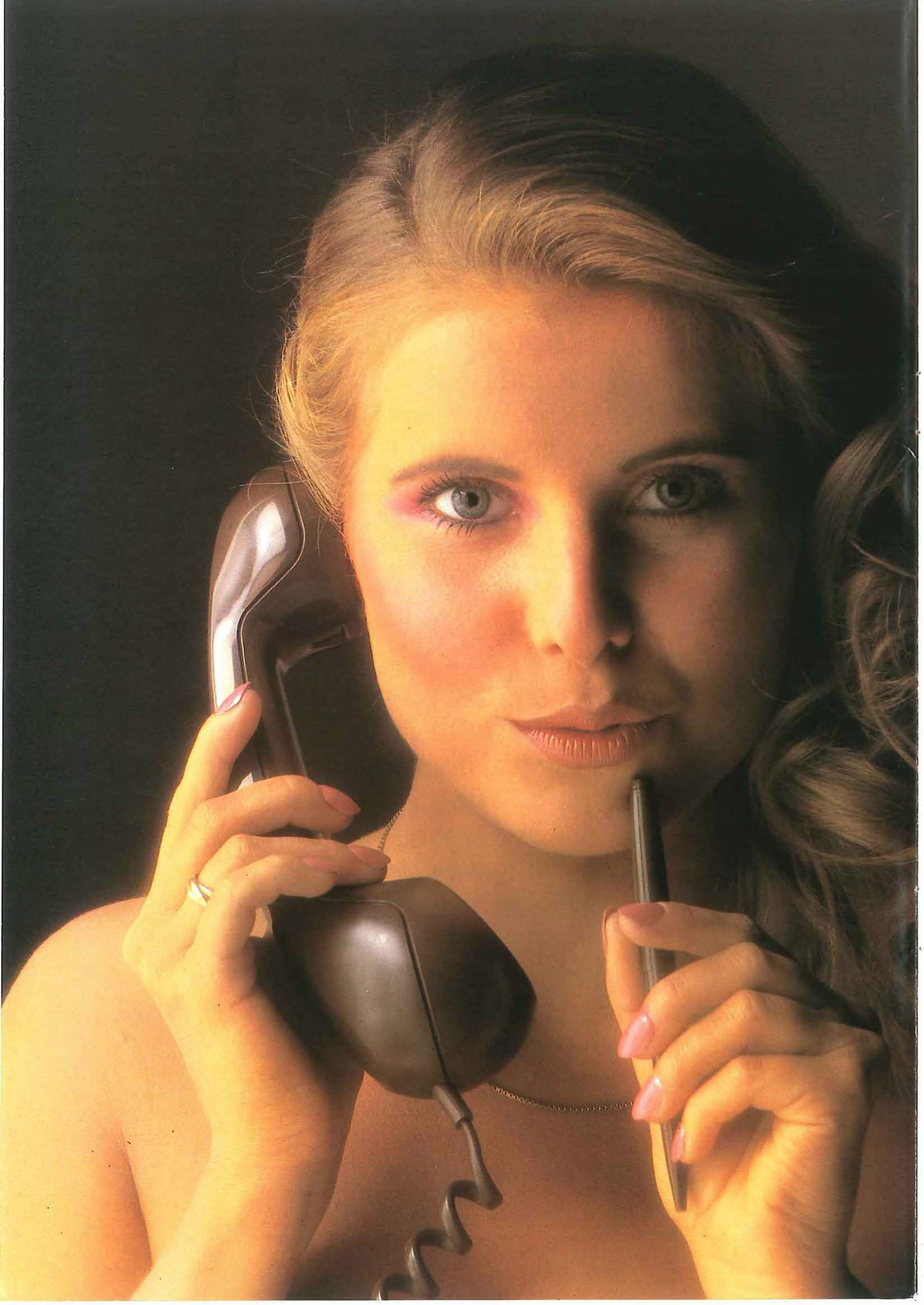
Apart from its night time duties, 4TEL works a pretty full day too. On demand, it performs a comprehensive series of line test and diagnostics—enabling faults to be distributed immediately and pin-pointed quickly.

And around the clock the 4TEL Voice Response System (VRS) lets you test lines from anywhere in your local network simply by using a field telephone.

4TEL is the total line testing solution: field proven in the BT network; working with every major exchange type; inter-working with the ARSCC database; and, compatible with System X.

For the full story contact Alan Garrett at Teradyne Ltd, The Western Centre, Western Road, Bracknell, Berks RG12 1RW. Tel: Bracknell (0344) 426899. Telex: 849713.

TERADYNE



A complete range of DIGITAL SYSTEMS

GEC offers a comprehensive range of digital switching and transmission systems for rural, national and International networks.

'System X', Britain's digital switching system, has a flexible architecture designed to meet the rapidly changing needs of communications networks throughout the world. State-of-the-art technology based on continuous in-depth research and development ensures that 'System X' is as suited to providing the sophisticated services and facilities of the future as it is to enhancing and overlaying existing networks from local to international gateway levels. Designed for world markets GEC's 'System X' embodies the experience of British Telecom, one of the world's largest operating administrations, and the skills of Britain's biggest electrical and electronics manufacturer.

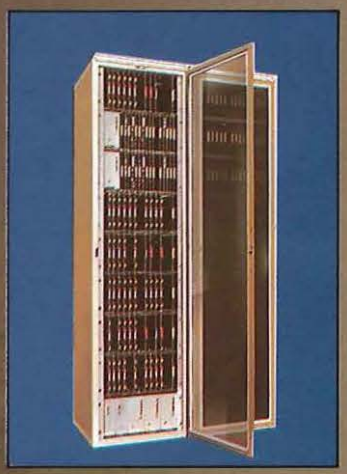
GEC also produces UXD5, an economic stand-alone exchange for small-capacity rural and suburban use, which is compatible with all types of digital and analogue exchanges. An enhanced version of UXD5 incorporates a 2GHz, 8Mbit/s microwave system within the same equipment cabinet.

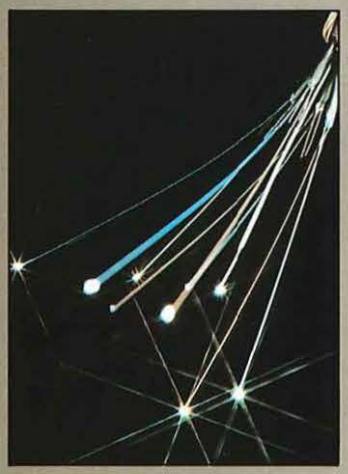
The GEC range of broadband microwave transmission systems includes an 11GHz, 140Mbit/s system which is being used by British Telecom to overlay the whole of the UK network. The range also includes 4 and 6GHz, 140Mbit/s trunk systems and 19GHz, 8 and 140Mbit/s roof-mounting systems for metropolitan applications.

GEC has extensive experience in the design, manufacture and installation of optical fibre systems which have been supplied to both UK and overseas customers. The current range of optical fibre systems features muitimode and monomode equipment for operation at bit rates up to 140Mbit/s.

A complementary range of digital multipex equipment is available to cover all CCITT-preferred bit rates.

GEC digital switching and transmission systems are carefully planned, researched and developed towards the goal of operating administrations throughout the world - an Integrated Services Digital Network.





GEC

GEC Telecommunications Limited

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AC8

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.

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ATTENTION

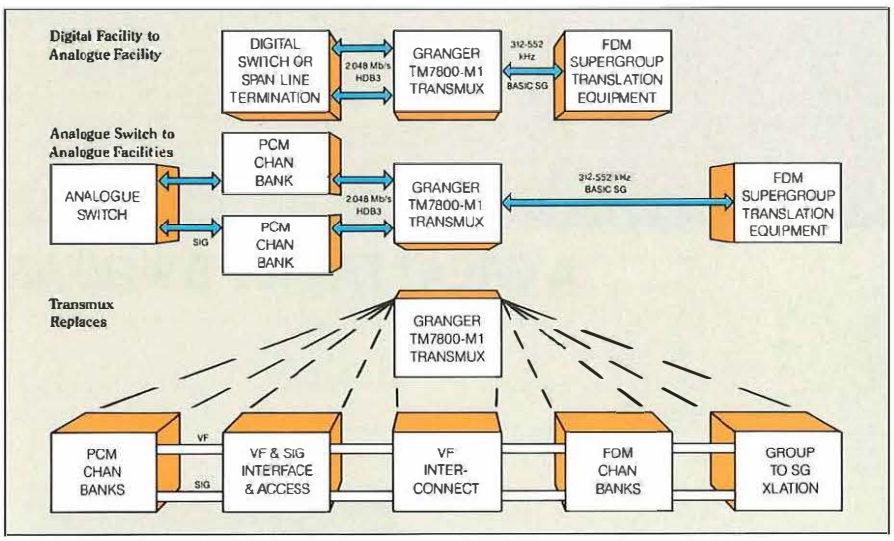
The new Granger CCITT TransMux.™

Granger transmultiplexers are converting analogue FDM directly to digital TDM in over 300,000 channels. New fourth generation units—TM7800-M1—save more power, space, time, and money.

- Meets or exceeds all CCITT recommendations.
- Converts FDM to TDM without demodulation to voice.
- Saves power with low current HCMOS IC's.
- Saves space by packing 60 channels into 311 mm of rack height.
- Saves time. All digital circuitry is software controlled. No screwdriver adjustments or routine maintenance necessary.
- Saves money by eliminating the need for conventional equipment.

Since 1979 Granger's TransMux™ has been the simplest, most economical way to connect new digital TDM switches to existing analogue FDM trunks. Granger transmultiplexers are working in 42 major telecommunications systems. Now our fourth generation TransMux offers even lower power drain, higher packing density, more programming power, and lower cost per channel.

Typical applications of the new Granger TransMux TM7800-M1.



All digital design.

Digital circuits maximize reliability and reduce service costs to nearly zero. The VLSI digital circuits are extremely reliable, and the TransMux never requires tuning or alignment. A-to-D and D-to-A conversions are performed by digital circuits operating under a sophisticated proprietary algorithm.

Remote alarm. Remote control.

A microprocessor monitors the entire TransMux operation. Any failure will illuminate an LED alarm on the front panel and transmit an office alarm and diagnostic message in plain English to a display on the handheld keyboard. The keyboard with display may be located remotely, connected via an RS-422 port to the TransMux. You can also remotely program any of 14 modes of signaling. Or the level of each individual channel. Or test tone insertion or removal. All programs are stored in a non-volatile EAROM device.

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So fast, it's hard to believe. But Granger has been doing it for years.

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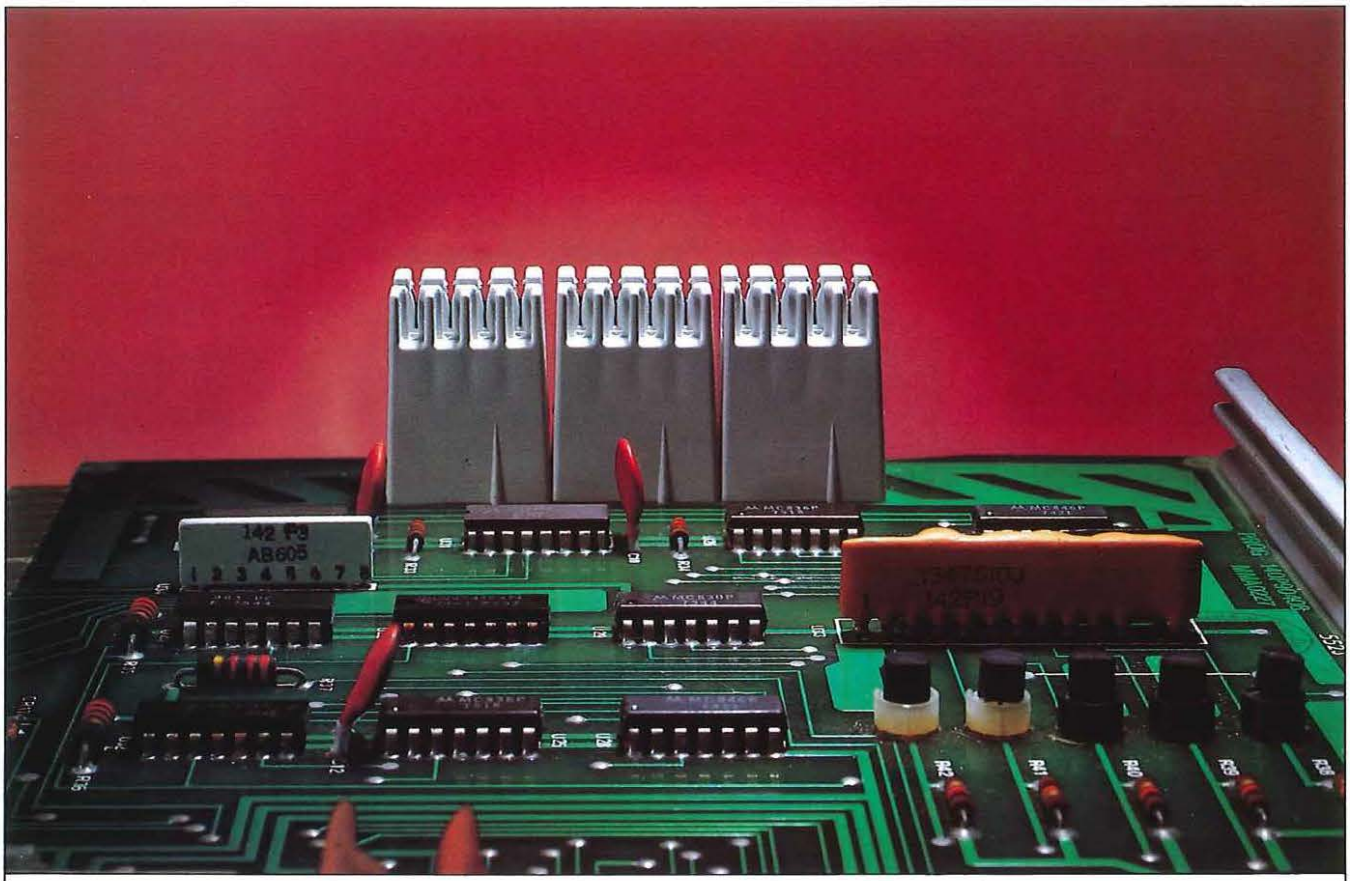
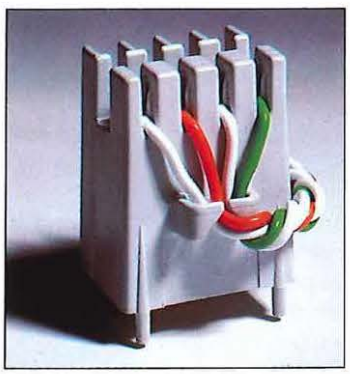


A GREAT FAMILY'S NEW ARRIVAL



KRONE-LSA-PLUS-Kontakte®*

When KRONE'S-LSA-PLUS Quick Connection system was introduced to the U.K. Telecommunications market – it took off.

British Telecom adopted it as the basis for its Rapide operation and many companies in the private sector were as quick to appreciate its advantages.

But having turned the problems posed by Insulation Displacement technology into solutions, KRONE didn't stop at the LSA-PLUS Strips and Connectors, despite the fact that it is *still* unbeatable.

Success bred Success.

The family grew.

KRONE'S latest addition to the LSA-PLUS family of Insulation Displacement Modules (now BT coded: Strips Connexion 244) is a further high quality unit for use on PCB's.

The 244 is an impressively compact, completely sturdy 4 way module, offering both disconnection and test access facility to take KRONE'S standard range of plugs and cords.

And given its parentage, it will come as no surprise that the 244's wires are simply connected with KRONE'S unique Inserter Tool (BT coded: Inserter Wire 2A).

The 244 module incorporates KRONE'S highly acclaimed LSA-PLUS contacts and can take a wire diameter range from 0.4–0.63 mm.

For details of this, and any other member of our fast growing family, please contact us at our Cheltenham headquarters.

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In fine fettle

Healthy profits, continuing business growth and better service to customers achieved against a background of far reaching change . . . that was the triple success story to emerge from this year's report and accounts which enabled Chairman Sir George Jefferson to confirm that British Telecom was well placed to make the transition from public to private sector.

In announcing profits of £990 million, Sir George said that British Telecom had:

★ increased its business volume by 7.5 per cent
★ reduced real unit costs by 5.8 per cent, and
★ enhanced customers' perception of its services

The second half of the year had shown an improvement on the first six months but, historic profits in 1983–84, at £990m, were £41m (four per cent), lower than in the previous year, despite the 7.5 per cent growth in business volume.

"The fall in profits reflects the fact that we did not increase the price of any of our main services — and reduced the price of some — in the two years from November 1981, during which period the retail price index increased by 11 per cent," said Sir George. "Our tariff policy was, of course, geared to meet the financial targets set by Government, and both of these were achieved."

All this had come in a year when the forces of change in the marketplace had continued to develop and intensify. British Telecom's accounting policies were altered because of changes in the competitive environment and to bring their presentation more in line with those of most major private sector companies.

The Chairman noted that all parts of British Telecom had contributed to growth in business volume. The major elements were:

★ inland telephone calls — up £183m or seven per cent
★ international telephone calls — up £81m or ten per cent
★ sales of equipment — up £94m or 44 per cent

Staff numbers dropped by 4,852 over the year, and the business was on course for the planned reduction of about 15,000 employees over the three years up to March 1985. Increases in staff costs overall were limited to £144m or 5.6 per cent. Improvements in British Telecom service, particularly in the speed of provision of equipment to residential and business customers, was a result of the sustained effort in meeting customers' needs and demands.

"This effort was reflected also in the general expansion, modernisation and improvement of our services and although we are not complacent and recognise that there is still much to be done, we can take some pride in what has been achieved," said Sir George.

As the end of an era approaches and a challenging new dawn begins, few would argue with those sentiments . . .

Cover: A high-voltage tester developed to check the stress levels of submarine cables proves a dramatic sight at British Telecom's Martlesham Research Laboratories. Pictured working on a cable for the proposed UK-Belgium link, technician Carlo D'Inverno uses an earthing wand to discharge the cable. The machine generates a DC potential of half a million volts.

British Telecom Journal costs 42p per issue for staff. External subscribers pay £12 for two years including post and packaging. Full details on page 41.

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Summer 1984 Volume 5 Number 2

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

The problems of planning

Pat Hastings

The building of large structures such as satellite earth stations can be a controversial and complex business. This article examines the procedures British Telecom International has to go through to obtain planning permission.

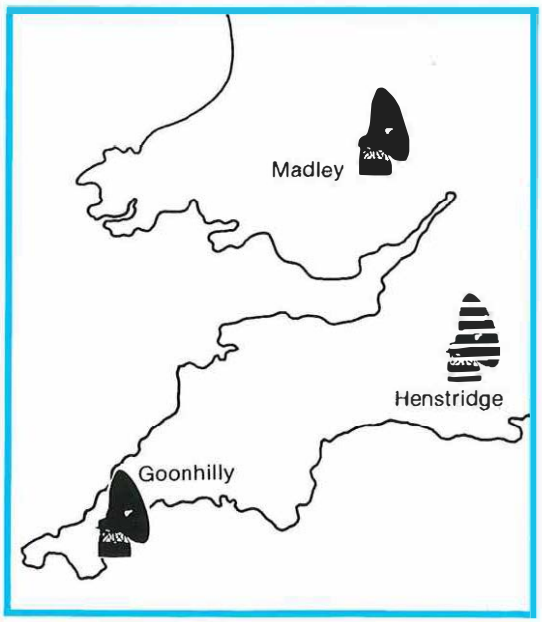
Above: Madley satellite earth station.

Right: Map showing Goonhilly, Madley and the proposed new Henstridge site.

British Telecom International's plans to build satellite earth stations and tropospheric scatter stations are being greeted with more protests and objections from the public than ever before. But this increasing resistance to change is by no means peculiar to British Telecom. Other large national industries and services encounter similar or even greater levels of objections to their plans for such schemes as new coal mining developments, nuclear power stations and oil pipelines. There are probably two main reasons for this increase in interest in major developments.

Firstly, modern industry has become highly technical and if people do not fully understand the technical arguments, they tend to think that the experts are trying to 'blind them with science'. Secondly, the public is today more conscious of the environment and ecology than, say 30 years ago.

Many people feel duty bound to ensure that there is proper protection and supervision of the environment against large developments, to maintain not only the aesthetic beauty of the countryside and the general amenities it provides, but also the possibility of physical danger.



It may seem strange that plans to build inert and silent structures, such as radio and satellite aerials, should provoke any great reaction. But for technical reasons, both developments need green field sites and can create a considerable visual impact. They are thought by many people to be exceptionally intrusive when they dominate the surrounding countryside. This is particularly so for tropospheric scatter and microwave radio towers which are normally situated at a high point in the landscape.

It is also argued that agricultural land in the UK is being eroded year by year for either housing or industrial developments, and any type of development on agricultural land is now unacceptable. Two other questions which inevitably arise concern microwave radiation from satellite and tropospheric scatter aerials and hazards to local services from high-powered radio transmitters. Although there are no dangers, hazards, or means of interference, it is often difficult to convince members of planning committees.

Public awareness

Today it is essential for large industries planning major developments to take increasing public awareness of environmental issues into account. British Telecom International accepts that there will always be some objections to any planning applications which require the erection of large structures in the countryside in the United Kingdom. With greater mobility and more leisure time, the countryside is seen and enjoyed by a greater percentage of the population and the nation is united in wanting to preserve the natural environment as far as possible.

BTI recognises the environmental and ecological arguments and attempts to include various proposals in its planning applications to make developments less intrusive. The aim is to persuade the public, who will be using the services, that unusual structures can be accepted into a rural environment if suitably planned.

There are no plans for new British Telecom International Radio Stations and it is unlikely that any will be developed in the future. But there will be the need to replace or add new masts and buildings to those already existing and these will all require new planning submissions. ▷

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Left: The land at Henstridge Airfield, Somerset bought by BTI for development of a third earth station. Part of BTI's planning process included engaging a planning consultant, producing 400 copies of a 60-page planning support document and 4,000 copies of a leaflet for local residents. An information caravan also toured the proposed development area and there were meetings with representatives from local and national organisations.

Local paper headlines reflect the public interest.

British Telecom Journal
Summer 1984
The problems of planning

Stages in a successful planning application – simplified

Above: A simplified example of a successful planning application.

Mr P Hastings is buildings projects manager for radio and satellite stations in British Telecom International.

The development of satellite communications will continue for years to come, and there will be a need to establish new earth stations and again each will need a planning application, whether the station is on the roof of a tall building or in rural countryside.

Obtaining planning consent for a third satellite earth station has been a long drawn-out process and has already involved the refusal of a planning application to develop a site in Wiltshire. The current application for the new Somerset location was submitted in April last year and provisional outline agreement was not given until this March. Permission will not be finalised until agreement has been reached with the local district council to undertake peripheral works, including sewerage and road improvements. Legally, BTI cannot be party to these agreements until it owns the site but it is reluctant to buy until outline planning consent is granted — a 'cat and mouse' situation which has culminated in provisional agreement from the local planning authority, which is now pressing for formal agreements to be signed so that full planning permission can be given.

Proposals

Over the past three years, there has been a lot of publicity given to the proposals, including radio and television broadcasts and a continuing lobby to local newspapers. Typical objectors have included the Council for the Preservation of Rural England (CPRE); County Landowners Association (CLA); Ministry of Agriculture, Fisheries and Food (MAFF); Ministry of Defence (MoD); Nature Conservancy Council (NCC); Wildlife Trust; Countryside Commission; National Farmers Union (NFU); Friends of Pewsey Vale; Milton-on-Stour Action Group and the Ramblers Association.

Controversy apart, successful applications have been recently submitted by BTI for a tropospheric scatter station at Scarborough, extensions to the facilities at Madley and Goonhilly, and building extensions to Rugby Radio Station.

With the advance of technology, satellite 'dishes' are becoming smaller and it is likely that there will be a lot more of them. Satellite tv will lead to small dishes on the roofs of commercial buildings and private houses becoming common place later in the decade. Although the Government has waived the need for planning permission for such structures, there is a view that one-metre dishes perched on the top of houses all over the country will be much more environmentally intrusive than the odd major satellite station. One solution would be to design the dishes into the structure of houses, but alterations to existing buildings would need planning permission or at least agreement on building regulations.

Fortunately, planning permission is not yet necessary for space satellites. Should the day arrive, however, there will doubtless be further debate about the ultimate authority for planning consent.

How the procedure works

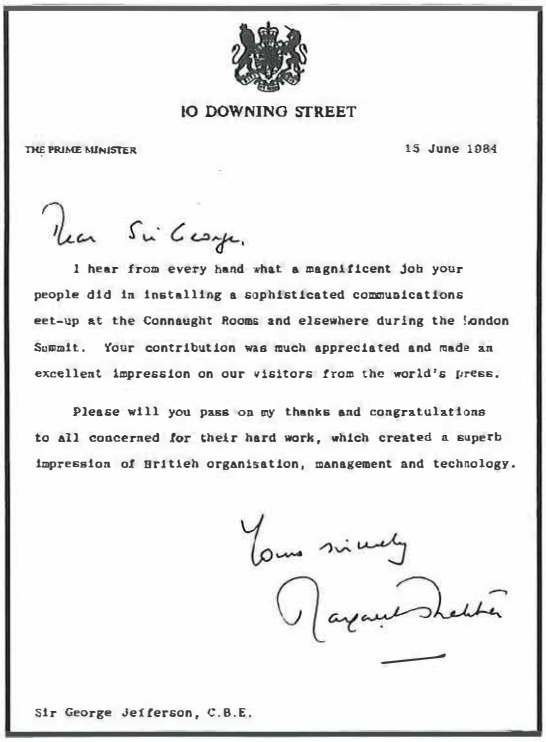
Householders who want to extend their homes or buy newly-developed property quickly discover that planning permission has to be sought first from their local authority.
There are two ways in which an application can be submitted, either as an outline plan with subsequent details as the plan develops, or as a detailed plan from the outset. With large developments such as a new satellite earth station, the initial application will be in outline so that the principles can be established before commitment to land purchase and design activity.

Generally, a planning application will be considered and a decision given within eight weeks of registration after receipt of the appropriate administration fee. The size of the fee is determined by the area of land to be used for buildings subject to the maximum of £2350. Before submitting a plan, the applicant must give public notice at least seven days before registration. The owners of the land must be told through advertisements placed in local papers, and notices posted in a prominent position adjacent to the property to be developed. A three-week period from the date of registration is given for objections and comments to be made to the local authorities.

Their planning officer prepares a report for consideration at the next available meeting of the planning committee. The report will contain technical information and a summary of correspondence received from members of the public and recognised institutions.
The planning officer will also comment on statutory planning matters and will consider the need for any improvements to road, water and drainage services. At the end of the report the planning officer recommends the committee to accept or reject the proposal or to defer a decision to enable more information to be gathered.

On larger developments, the planning authority will almost certainly need more than the normal eight weeks to consider the application. If the planning officer does not ask for an extension or if the applicant is not willing to agree to a delay, an appeal against non-determination can be made to the Secretary of State for the Environment. A detailed inquiry often follows and 12 months could elapse before a final decision is made. The Secretary of State can use a special procedure on plans for major developments of national importance. Known as the 'call in' procedure, he can ask for all information to be forwarded to the DOE before any recommendation or comment is made by the local authority. An Inspector is then appointed to conduct an inquiry, generally in public, at which everyone interested can give evidence.

On completion, the Inspector makes a recommendation to the Secretary of State for final ministerial decision. The whole process can be long and tedious, and in some cases may result in delays of four or five years before a decision is given. The Stansted Airport and Sizewell B Power Station Inquiries are two current examples. British Telecom International's plans for radio and satellite stations have never reached the appeal stage, nor has there been any attempt by the Secretary of State to 'call in' planning applications. But plans for the third major satellite station came close to both procedures, and public meetings had to be held.



10 DOWNING STREET

THE PRIME MINISTER

15 June 1984

Dear Sir George,

I hear from every hand what a magnificent job your people did in installing a sophisticated communications set-up at the Connaught Rooms and elsewhere during the London Summit. Your contribution was much appreciated and made an excellent impression on our visitors from the world's press.

Please will you pass on my thanks and congratulations to all concerned for their hard work, which created a superb impression of British organisation, management and technology.

Yours sincerely

Margaret Thatcher

Sir George Jefferson, C.B.E.

Far left: How news of British Telecom's involvement in the London Economic Summit reached millions of newspaper readers.

Left: the Prime Minister's letter of gratitude.

Government service

Dennis Owen

British Telecom is a large and complex organisation offering a wide range of equipment and networks, some specially designed to satisfy the needs of specific customers. A government services unit was first set up as long ago as the 1930s and a close relationship has always been maintained since those days.

The new government services division (GSD) has a sales section which is made up from experienced sales and network specialists and recently, a group of major account managers (MAMs) has been added. Each MAM is responsible for liaising with specific government departments and advising on their telecommunications needs. Their job is to provide a focal point for access to the ever-increasing range of products and services available from British Telecom.

The addition of MAMs to the division brings a new emphasis to British Telecom's approach to government departments, and this, together with an enlarged team of network specialists skilled in all aspects of the design and implementation of private networks, improves customer relationships. The government sales MAMs, represent the whole of British Telecom, providing direct access to the experts – whether in GSD or any other part of British Telecom. This means that the customer can be certain of obtaining the best possible advice about hardware, systems and networks for every form of telecommunications.

There is no doubt that government departments make great use of their MAMs and now find dealing with British Telecom's large and complex organisation much easier. Early indications show that business with government has significantly increased since their introduction towards the end of last year.

A good example was the work done for the London Economic Summit in June this year. The Cabinet Office asked government services division to co-ordinate all communications needs – an enormous task for the project team. Delegates to the summit and about 1,000 support staff from the US, Canada, France, Japan, West Germany, Italy and the UK, gathered in Lancaster House, London as millions of people throughout the world eagerly awaited news. The world's press, radio and TV reporters and their teams of technicians and cameramen – some 3,000 in all – were involved with interviews, discussion groups, profiles and background reports as well as the usual daily reporting of the summit proceedings.

As the summit took place two miles from the press headquarters in Kingsway, a key task was to establish a high-capacity broadband network (metropolitan area network) between the two sites to provide an umbilical cord of information transfer. This network provided 16 tv channels, including a live television channel from the conference rooms to the press centre, and served 125 tv sets at Kingsway and 24 sets in Lancaster House. ▷

A headquarters unit fully equipped to meet the specialist demands of government departments has been set up by British Telecom.

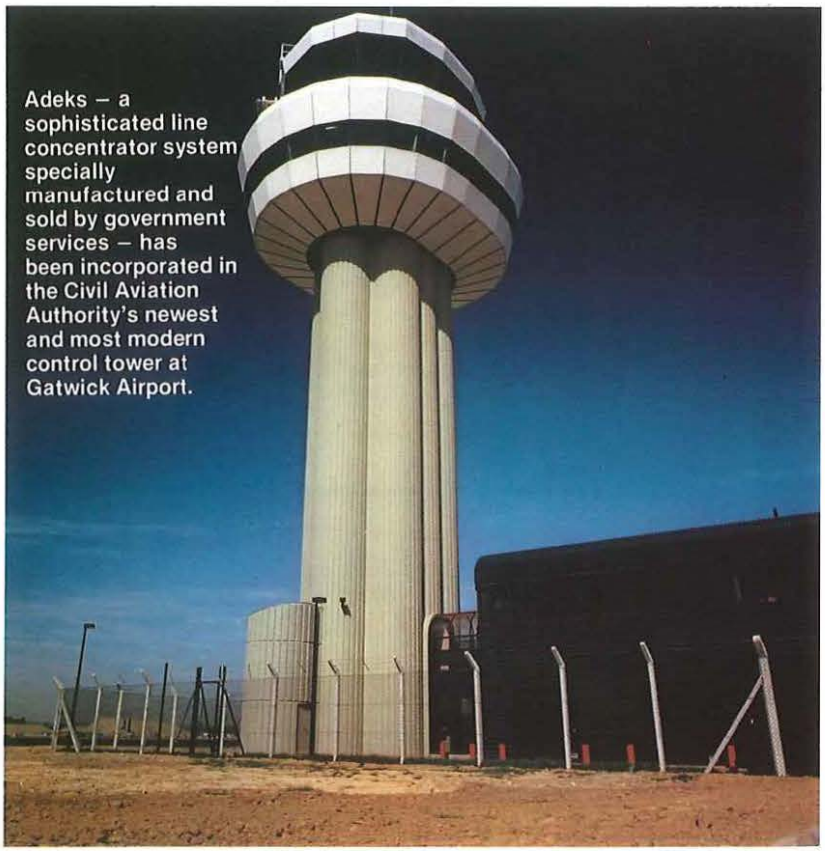
An integrated press bureau was provided giving reporters and commentators a wide choice of communication channels including 100 operator-assisted outgoing telephones, nearly 200 payphones, an operator-assisted data bureau with 36 telex terminals, and 18 automatic unmanned telex machines. Facsimile and communicating word processor facilities were also provided. Twenty lines were provided for an incoming answering service and three forms of radiopaging were available – 20 digit pagers; alpha-numeric papers, and Voicebank, British Telecom's new telephone message service.

To keep key people in touch at all times during the Summit, British Telecom installed the first UK cellular radio system covering central London as well as the Heathrow and Gatwick airport areas. The logistics of an operation of this size were daunting but British Telecom was able successfully to complete full-scale trials one full month before the conference began while maintaining normal business commitments to other government departments.

Another example of the work of GSD was the submission of a tender submitted to the Department of Health and Social Security (DHSS) for a multi-million pound scheme to computerise the national unemployment benefit system. It involves replacing the existing 110 baud system by Packet SwitchStream (PSS) with dataline connections serving some 800 offices throughout the country.

As well as being involved with the network, the MAM concerned has been working on an associated project – the terminal replacement enquiry service – which comprises tens of millions of pounds worth of terminal controllers and terminals. Again the two-year project aims to replace existing outdated equipment with modern high-technology alternatives.

GSD also produces a range of specially-manufactured products developed as a result of the long-standing relationship with the Ministry of Defence and the Home Office. They include the Landair ground-to-air communication



Adeks – a sophisticated line concentrator system specially manufactured and sold by government services – has been incorporated in the Civil Aviation Authority's newest and most modern control tower at Gatwick Airport.

system, the Advanced Design Electronic Key System (Adeks), and the Solent fire brigade call-out system. (See *British Telecom Journal*, Spring 1983.)

The Landair system offers ground-to-ground facilities such as exchange line, PBX, private circuit or inter-position circuit, and access to radio transmitters and receivers for ground-to-air communications. These systems are well known in emergency services, air defence and air traffic control circles and are installed throughout the UK with a number in use abroad.

The Adeks system is a sophisticated line concentrator which can be connected to public exchange lines, PABX extensions, private circuits, and radio.

It is ideally suited to fire, police and ambulance services and many commercial organisations will also find Adeks valuable for busy telephone enquiry departments.

Modular

Adeks is microprocessor-controlled and is modular in construction to give users a reliable high-technology system based on a design drawn from many years' experience with the MoD and emergency authorities. The new Civil Aviation Authority tower at Gatwick uses an Adeks system, which was brought into use in June.

The Solent system is a computer-based call out system which is designed to speed up the handling of '999' emergency fire calls. In a typical fire emergency, calls from the public are routed to county headquarters, where the control operator records details on a VDU while the caller is on the line. Solent enables the operator to send an incident report to the remote fire station teleprinters so that the firemen have a printed record before they leave the station.

Alarms can also be set off, doors opened and, if necessary, Solent can even switch off electric cookers at the station. Vital information for the firefighters is stored on the Solent computer and signals are routed over private wires to ensure that the emergency messages are transmitted instantly.

Wiltshire Fire Brigade commissioned a new headquarters building and telecommunications tower and Solent system this year. At the new headquarters in Devizes, the duty officer is in instant contact with 23 outlying fire stations at the touch of a button. In the busy headquarters which deals with more than 5,500 emergency calls every year, Solent will help improve the speed and quality of response. Vital life-saving seconds can be clipped in this way for any emergency, whether it be a motorway pile-up on the M4 or a major fire in an industrial complex. So far Solent has captured almost half the UK market for new generation call-out systems.

These products are sold by telephone areas with support from the sales teams and specialists in GSD. There is a programme of continuous development and a considerable investment is being made in cash and manpower to ensure that these 'specialist' products continue to lead the field. Export potential is good and British Telecom International (BTI) is actively promoting them in a growing number of countries.

GSD is a vital limb of British Telecom and helps to ensure that government departments stay ahead in the world of information technology.

British Telecom Journal
Summer 1984
Government service

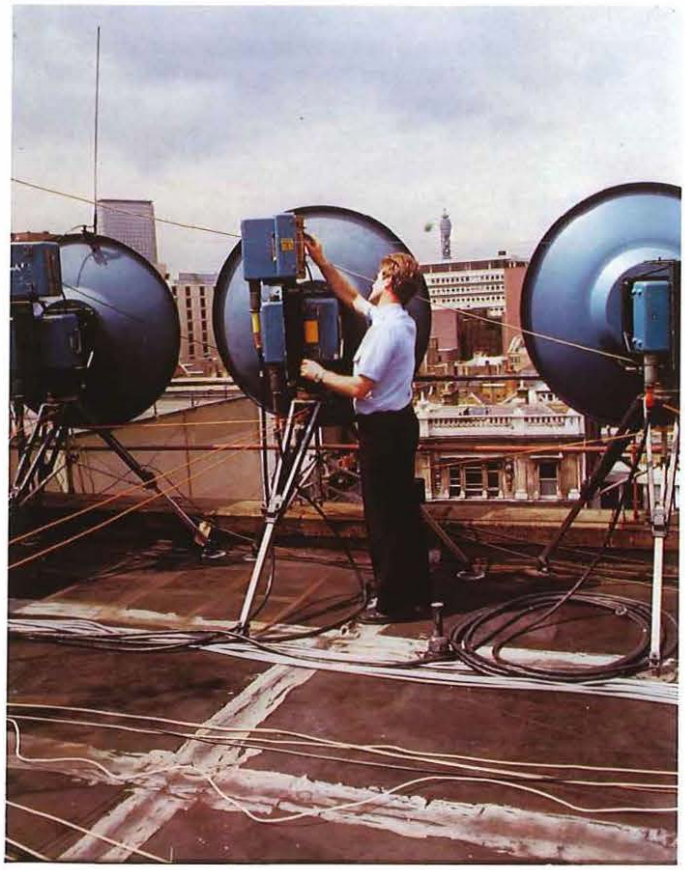
Bottom from left: Government services division has developed and supplied a range of sophisticated line concentrator systems known as AD9000 – ideal for emergency services.

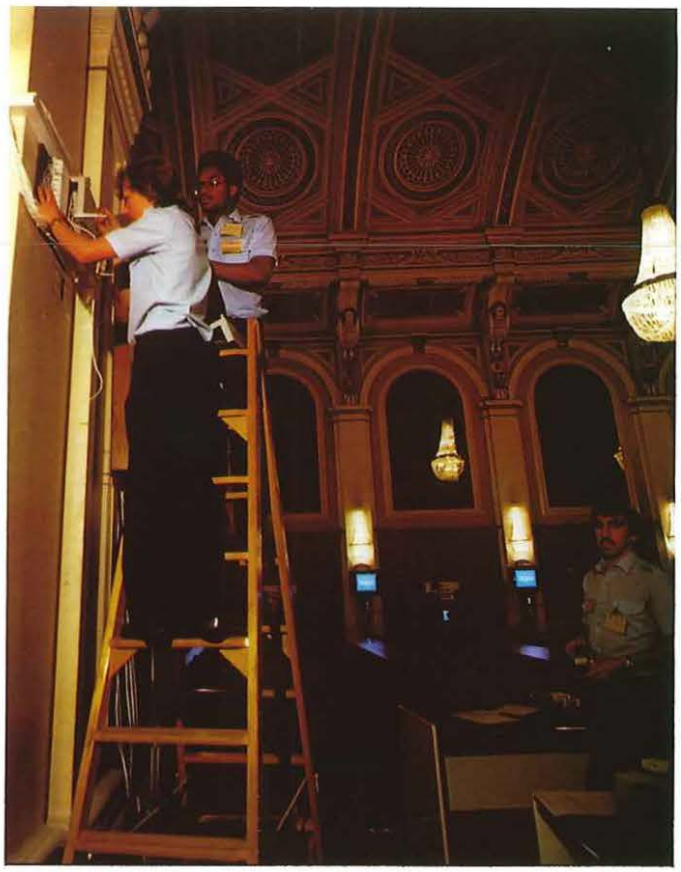
Project leader and head of government services division Colin Davis (right) finalises arrangements for the London Economic Summit with John Cumming, major account manager for the Cabinet Office and Foreign Office.

Engineers line up dish aerials on the roof of the Connaught Rooms immediately before the meeting.

Last minute tests for equipment provided by government services and used by delegates to the summit.

Mr D T Owen is head of the major account group in the newly-formed government services division, which is part of National Networks.





British Telecom Journal
Summer 1984

Factories' computers in demand

Keith Boak

British Telecom Factories is now actively involved in developing and manufacturing its own computer systems for a range of specialist applications.

It is now nearly four years since British Telecom took its first tentative steps to join the select band of UK computer manufacturers. There was no champagne press launch, no popping of flash bulbs and no evidence of jitters on the stock market; it was simply a modest venture to produce a small number of functional and flexible small business computers for British Telecom in-house use. Since that modest beginning, however, the microcomputer industry has mushroomed, products have become increasingly sophisticated, and the demand for Factories' computer systems continues to grow at an increasing rate.

Several factors have contributed to this success story. Selective marketing, keen pricing and customer support have all played a part. But the most telling factor has been the continuing commitment to engineering development – not in the customary sense of trying to build bigger, better and faster computers than competing manufacturers, but with the objective of adapting the technology better to satisfy the varied and specialist needs of British Telecom.

The pedigree of the Factories rack-mounted processing unit (RPU) from the single processor CP/M machine to today's powerful 16-processor multi-user system is not in doubt. Visual appeal was never a strong point and no attempt was made to win awards for aesthetic design. Instead emphasis was placed on functionality, reliability and serviceability.

From a conceptual viewpoint, the Factories computer was often ahead of its time, particularly its detachable keyboard, function-key facilities and integral VDU. Each successive system sold in greater numbers than its predecessor and today there are several hundred Factories built computers in use throughout British Telecom. They are as far apart as Aberdeen, Belfast and Taunton and in situations as diverse as headquarters offices and BTI earth stations.

But this is just the beginning of the story. With the introduction of the System 410, giving access for up to ten users simultaneously, each with a dedicated processor, the Factories small business computer was increasingly sought by headquarters and regional engineering efficiency groups as a tool to aid software development. Through regular contact with these groups, it soon became apparent that not only was the system admirably suited to applications software development, but also if provided with the appropriate interfaces, there was no reason why it should not be possible to commit the same hardware to running the application in the field. The trick was to find ways of dedicating some of the processors to real-time control and on-line data collection as opposed to serving a user VDU. A number of jointly-funded development contracts were put in train.

It was about this time that Factories (General) where the computers are produced, decided to establish a dedicated computer products and services (Compas) business unit to co-ordinate the activities of the various groups involved in development, marketing and after-sales support, and to provide a more commercial face to the customer.

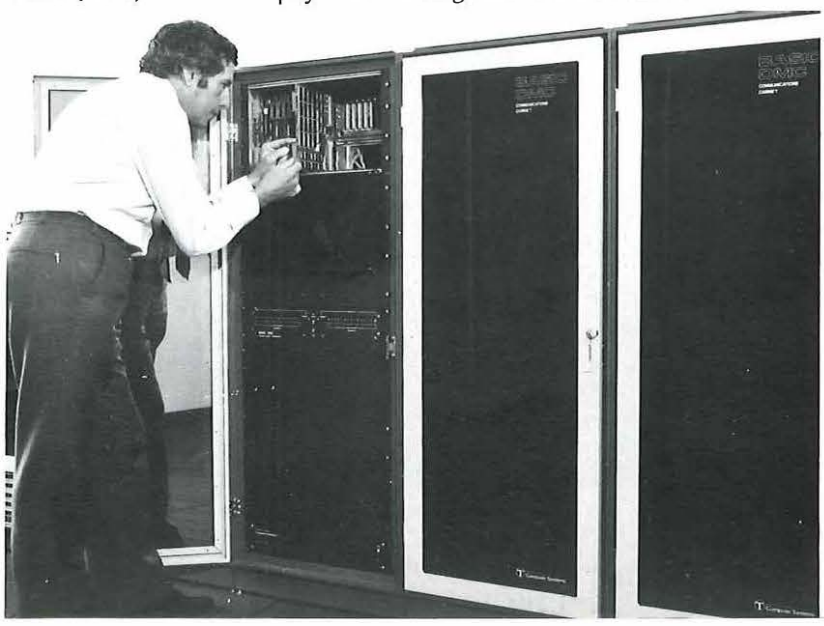
Support role

The strategy adopted by Compas was to continue selling and supporting stand-alone computer systems for commercial-type applications while reinforcing the trend to exploit the development potential of the system in dedicated operational support role. Several derivations are already in the field.

Exchange computer terminal equipment (ECTE) was one of the first dedicated products to employ the multi-processor system. It was conceived as a comprehensive TXK3/TXE4 exchange maintenance management aid running software developed by the local exchange systems department of Local Communications Services (LCS).

The software dubbed 'Comfort' by its developers, consists of a series of modules designed to monitor switching performance and to provide exchange staff with fast access to records and fault analysis. The objective was to speed up the process of information retrieval, improve the quality of reporting and provide simultaneous access to the data for the maintenance team, whether or not they were situated in the same building as the exchange equipment.

Special access racks and interface units were developed as a front-end to the RPU to allow it to communicate with the exchange and with the outside world via line-drivers or modems. ECTE is now a well-established product and in continuous production.



Technician Ron Smith checks an access card in the Baynard House System X operations and maintenance centre (OMC).

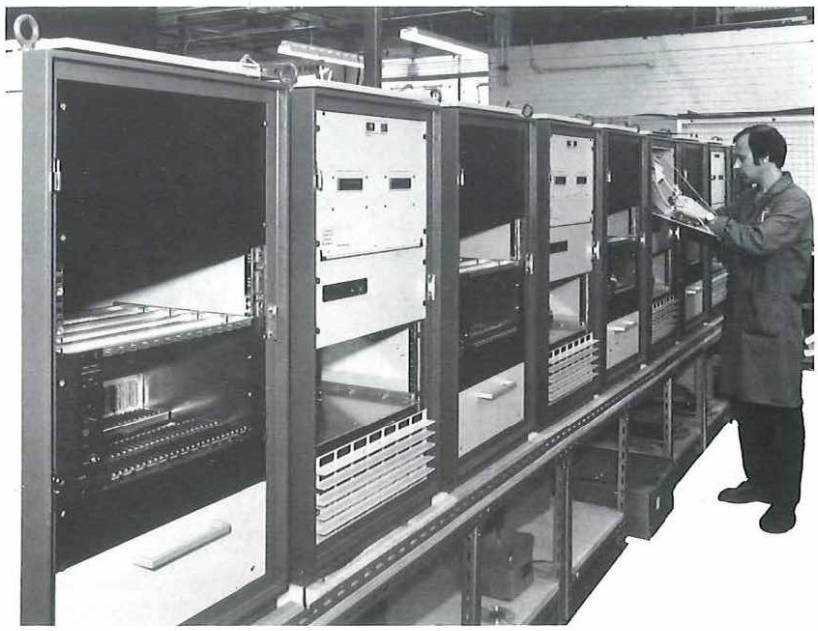
Scour – surveillance of cables in the overhead and underground network – is another spin-off much in demand. Here, LCS/organisation, performance and systems department (OPS) was the instigator, and the concept was one of providing an automated, overnight line-routining and analysis facility for repair service centres (RSCs) in an effort to improve Tips (telecom improvement plans) 1 and 2. OPS developed the application software and Compas engineered the interfaces and the routiners to enable the RPU to control and monitor remote line testing in satellite exchanges.

Through use of a database log maintained by the RPU, the quality of information presented to the RSC engineer is greatly improved. Changes in line parameters from one night to the next can be highlighted and individual distribution points can be pinpointed as the likely cause of multiple faults. Scour has completed its field trials and is in production.

System X basic operations and maintenance centres (OMCs) are one of the most recent derivatives to be put into production. The need for a basic OMC arose because it was necessary to bridge the gap between installation of the early System X exchanges and the complementary OMC equipment. The basic task was clearly defined. Software existed and the challenge to the development team was to accept the hardware to enable it to carry out all the routine maintenance, housekeeping and administrative tasks required.

Despite strict deadlines and tight budgets, a system was engineered incorporating all the necessary interfaces and alarm unit systems and based on twin 16-processor RPUs. The first system was installed at Baynard House in the City of London earlier this year and production is now in full swing.

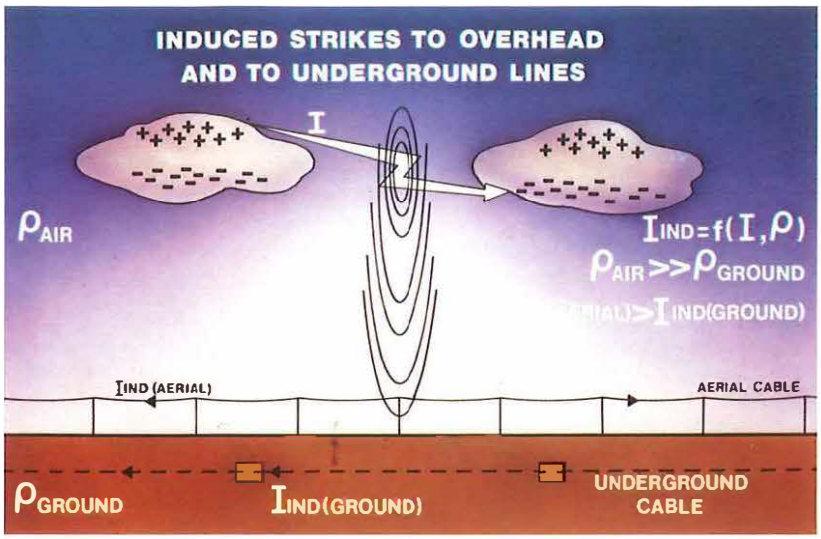
The multi-user multi-processor technology employed in the System 410, and more recently in the System 516, has provided a powerful, flexible system suited to a wide range of British Telecom applications. It has already proved itself in a variety of commercial and industrial situations as diverse as on-line exchange monitoring to payroll. Whose payroll? Factories, of course. What greater vote of confidence could a customer seek? ◑



Factories technician Tony Saggs makes an adjustment to a row of ECTE cabinets awaiting assembly.

Technician Chris Marlow (right) checks the wiring on an exchange computer terminal equipment (ECTE) produced by Factories while colleague Ian Gibbs removes a small business computer printer circuit board returned by a customer, from an anti-static bag.

Mr K Boak is Compas marketing and system support manager in British Telecom Factories (General).



The need for British Telecom to protect its equipment from lightning damage is becoming an increasingly important factor throughout the entire network.

Above: Aerial cables are subject to much higher electrical induction than underground cables. Key: ρ is the resistivity of air or ground and I_{IND} is induced electrical current in the aerial or underground.

Protection at a stroke

Ray Adcock

The old maxim that lightning never strikes twice in the same place is, in fact, far from reality. Although thunder and lightning are held in special awe and often feared by many, their occurance can be predictable and a scientific approach may be used for dealing with the phenomena. British Telecom has a vital interest in understanding the effects of lightning because telephone exchanges, externai plant, and customer equipment are all susceptible to damage. The modern electronic age has accentuated the problems because the electronic circuits of today are far more sensitive to lightning voltages than the valve-operated circuits of yesterday.

Reports from the field showed that lightning incidence was higher than usual last year and that the level of lightning damage to British Telecom plant and equipment was unacceptably high. It was also considered that the greater vulnerability of modern customer equipment was a significant factor which contributed to the increased damage. Because of this, Local Communications Services (LCS) decided earlier this year that special efforts should be made to obtain improved performance in 1984.

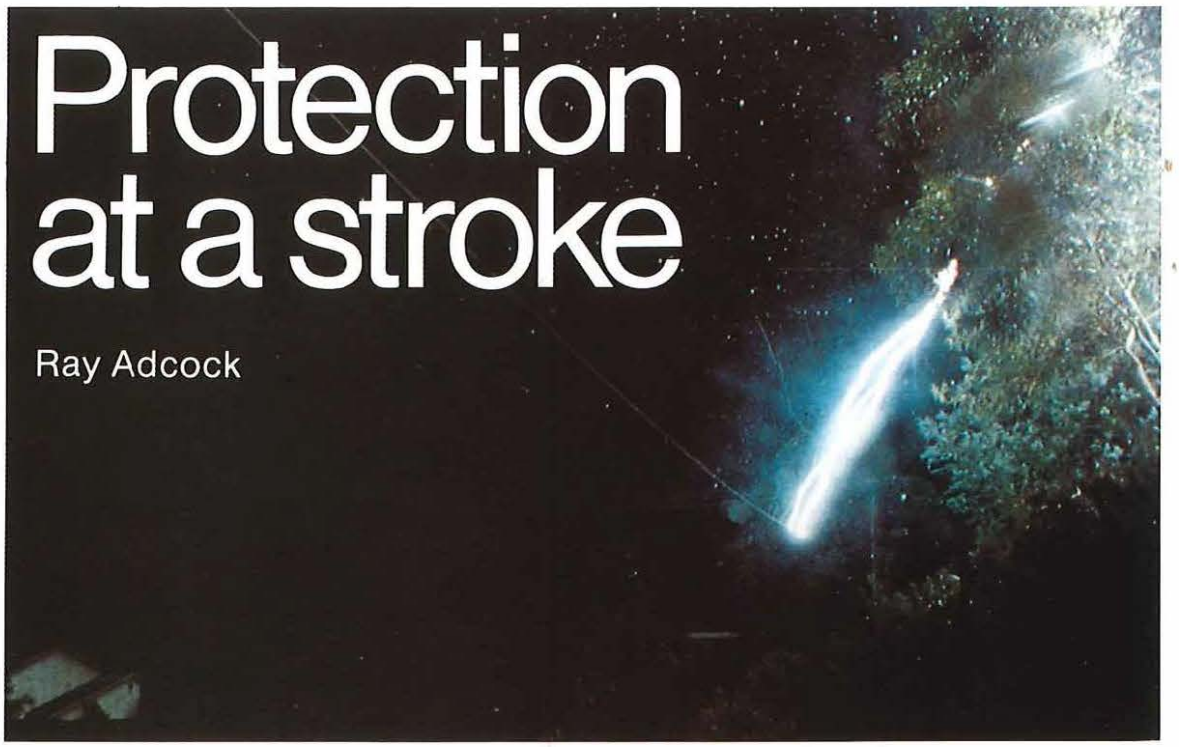
An increased level of lightning damage is not peculiar to the UK and British Telecom has suffered to a similar extent as any of the telecommunications systems round the world. Because of this, the International Telegraph and Telephone Consultative Committee (CCITT) has urgently studied requirements for new Recommendations and an international group, led by British Telecom, has produced draft documents which have already received wide circulation.

Two of these will be presented for publication to the CCITT plenary assembly in October and deal with general principles of protection and the protection of exchange switching systems. A third document, which deals with protection of customer equipment, is already substantially agreed within CCITT and is expected to be dealt with by an accelerated publication procedure next year rather than wait for the next plenary assembly in 1988.

Ice crystals

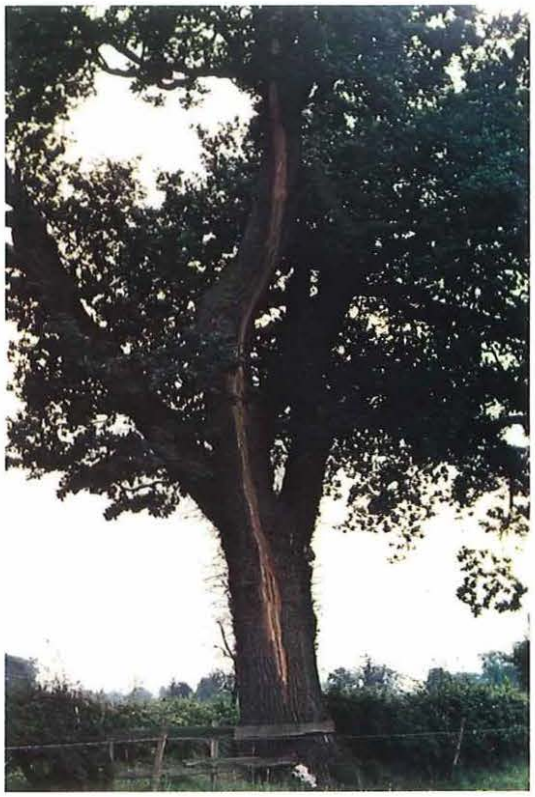
Lightning occurs in thunderstorms and results from a difference in electrical charge building up between the bottom and top of a cloud. As warm air rises it is cooled, first forming water droplets in the base of the cloud, and then as these rise to greater heights, ice crystals are formed. These become positively charged and the water droplets take on a negative charge producing an electrical dipole which in turn influences the state of electric charge of the earth's surface.

Lightning conductors are desirable at the top of tall structures, for instance, where the electric field is concentrated and ionisation of the air occurs. This makes an electrical path up into the



A remarkable picture showing lightning hitting a telephone cable.

Centre left: Two types of lightning – cloud-to-ground and cloud-to-cloud – are shown in this picture.



This oak tree survived a lightning strike at Shrewsbury – but an adjacent British Telecom cable was destroyed.

cloud along which the first lightning stroke discharges to ground. This is called the leader and is followed by a return stroke, a process which is repeated several times in a multi-stroke flash. Alternatively, lightning can occur between clouds and not involve the earth. A direct stroke to the ground can obviously damage British Telecom plant but so too can a cloud-to-cloud stroke as a result of electrical induction.

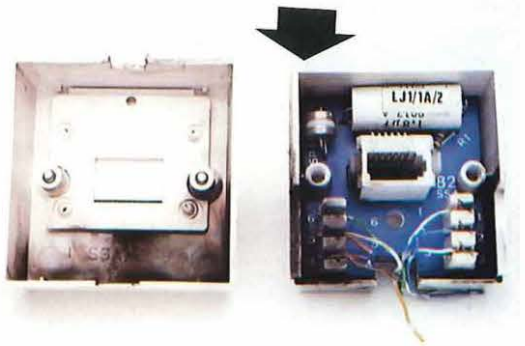
The type of damage to telecommunications plant can be seen from the pictures. Direct strokes can cause currents of thousands of amps to flow along wires or cables for microseconds only and result in many thousands of volts being applied to plant. It is impossible to avoid some damage when a direct stroke occurs but by careful planning the extent of such damage can be limited.

Compromise

Most lightning incidents to telecommunications plant, however, occur as induced voltage surges and can be completely nullified by appropriate protection. Some districts are more prone to lightning than others so that area staff need to base their judgement on local experience. The level of lightning protection afforded must always reflect some economic compromise related to the importance of the value of the plant being protected.

The severity of lightning varies widely in different places. In rural areas, a high level of lightning activity and exposed overhead plant justifies careful attention to protection to keep maintenance costs within acceptable levels. In such areas a high soil resistivity may occur, such as with rock in hilly places, making the good earth connections needed for lightning protection difficult or sometimes economically impossible. On the other hand, city centres and areas of minimal lightning activity require little protection and this is aided by other buried metal plant such as water pipes and armoured cables.

Lightning protection today is normally achieved by gas discharge tubes. These contain spark gaps in a rare gas mixture which allows their electrical properties to be carefully controlled. When a lightning surge occurs, the high voltage causes conduction to take place across the spark gap to a grounded low resistance earth connection. When the lightning surge is ▷



The gas discharge tube – arrowed – of the master line jack unit is in a circuit designed to protect against transverse voltages only. As a result it could not prevent the unit being destroyed by a longitudinal voltage lightning surge.

Although burled four feet underground, this fibre optic cable on a major trunk route was damaged because of its metallic moisture barrier.

Damage estimated at £5,000 was caused when lightning struck this church near London earlier this year. Four nearby telephones were damaged.

dissipated, conduction across the spark gap ceases and service continues.

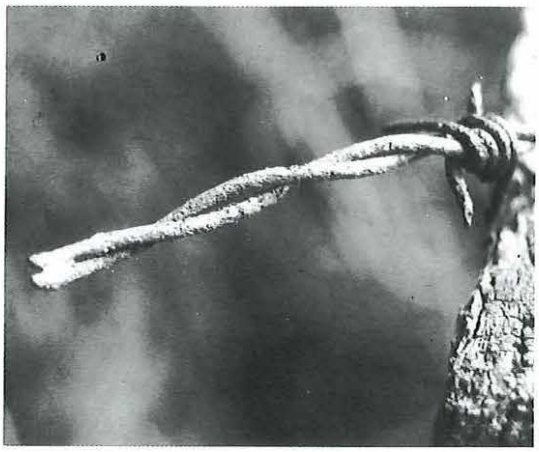
The electrical protection group in LCS sets the policy and provides guidance instructions for lightning protection. Telephone areas should apply these according to local requirements and experience. The skill and judgment of the local man is vital for the best balance between cost and protection.

The present guidance distinguishes between lightning protection for the network, exchange and customer equipment. The general rule for the network is that protection should be fitted at the ends of overhead plant, which may include the customers' premises, whenever there are more than four overhead spans in a route. Additional protection may be fitted whenever it is desirable to reduce the size of sections of plant which would require replacement after a direct stroke.

Guidance for exchanges has changed over the years. Because of the high resistibility of Strowger exchanges it was decided in 1972 not to protect them at all. All modern electronic exchanges, however, are far more susceptible and now require protection on the main distribution frame in nearly all locations except city centres.

Protection of customers' equipment is increasingly important with the advent of more sophisticated telephones and other modern equipment but it is also outside the immediate control of British Telecom now that customer equipment is liberalised. The network protection policy contributes to the safety of the customer but not for the protection of more sensitive equipment which may be connected to the network.

In the past, British Telecom was able to decide when additional protection was needed for equipment it supplied but the matter is now for the customer and his supplier. Although a gas discharge tube is fitted into every master line jack, this only provides protection for transverse voltages because there is no earth connection to deal with longitudinal voltages as is necessary for lightning protection.



Below right: The temperature needed to weld this piece of barbed wire would be between 2,000°C and 3,000°C. Major damage was caused to local plant by the same lightning stroke.

Trials

The electrical protection group has recently developed a new procedure for network protection which involves provision of gas discharge tubes within joints instead of in termination boxes on telephone poles. This follows successful trials at radio stations which are often on hills exposed to high levels of lightning activity.

It is an important part of LCS policy to improve the quality of local line plant and the emphasis is now on designing protection into the network when new work is planned and then providing it in a sealed system which is tamper proof. Use of within-joint protection is now gaining rapid acceptance in the field and is expected to provide a further improvement in maintenance performance.

Proper provision of lightning protection for British Telecom plant is now more important than ever because of the greater sensitivity of modern electronics. The international work of CCITT is setting high standards for electronic exchanges and customer equipment and new practices of within-joint protection will improve the quality of the local network. The result should significantly reduce lightning damage to British Telecom plant in the future.

Mr R C Adcock is head of the electrical protection group in LCS local line services and is secretary to the CCITT group responsible for the major lightning protection Recommendations.

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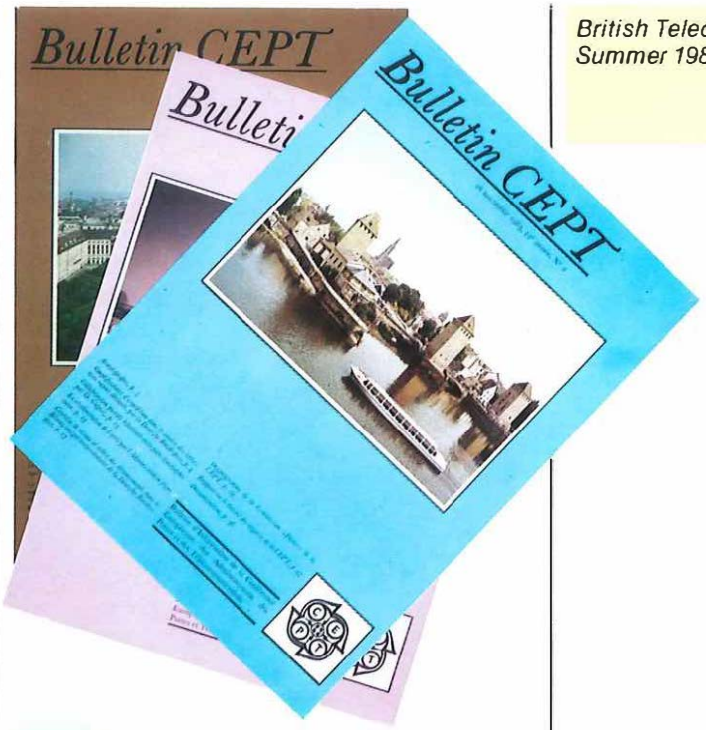


Forum for Europe

Frank Lawson

In this, the first of a two-part feature on the European Telecommunications scene, *British Telecom Journal* looks at co-operative developments through the European Conference of Posts and Telecommunications (CEPT).

There were silver celebrations this year to mark a special anniversary for European co-operation. The European Conference of Posts and Telecommunications (CEPT) was established in Montreux in 1959, and 25 years later representatives from the 26 countries involved met to celebrate and to improve links between themselves and the outside world.

A major problem still facing CEPT is how to make other countries more aware of its objectives and its achievements. CEPT represents both postal and telecommunications services even though they are controlled by separate organisations in a number of countries. In the United Kingdom the separation is total with the two corporations competing against each other in such areas as bureaux services and electronic mail. As any philatelist knows the postal elements of CEPT have tended to be more visible than telecommunications. This is because of the impressive annual issue of CEPT stamps, sometimes with a common theme – in 1984 depicting bridges.

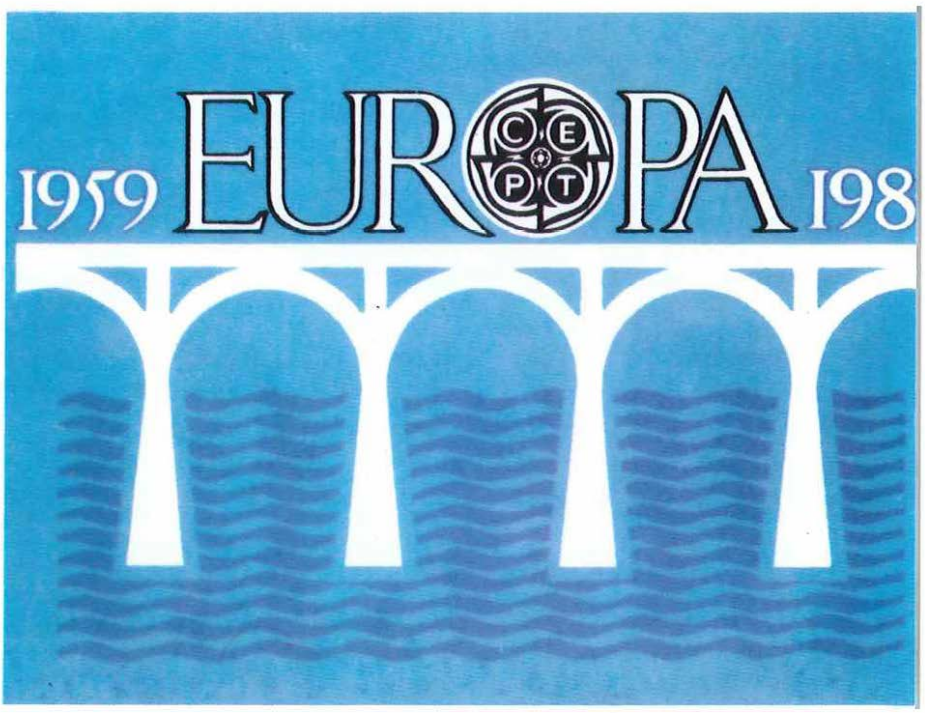
The telecommunications systems and philosophies of the 26 countries in CEPT vary considerably. Many are combined postal and telecommunications administrations and some are still government departments with a Minister in charge. A comparison of telephones in homes shows that some countries, such as Sweden and Switzerland, have reached a degree of maturity similar to that in North America. Others including France, Germany, Italy and the UK are tackling the difficult final marketing sector between about 70 and 90 per cent.

Innovative

Some are committed to enormous capital investment in changing from electromechanical to electronic switching and from analogue to digital circuits in the trunk network. They are also producing innovative products and services such as teletext, videotext and the integrated services digital network and are making the transition from telecommunications to telematics and information technology.

On the other hand, some countries are starved of capital investment and have practical problems in satisfying the demand for a basic telephone service. Some countries have substantial cable tv networks basically for entertainment, and others are moving into modern wideband systems using fibre optic and satellite technology. Many systems remain monopolies while others have a private sector element with the UK potentially at the extreme with the projected change to full equipment liberalisation, some network competition and the change to plc status. Despite these differences, the administrations work closely together and this co-operation is increasing rapidly.

Unlike some other organisations, CEPT has no substantial secretariat or central office. It relies on a small liaison office which preserves continuity when its governing administration changes every few years. The administration arranges and chairs the annual conference of the ▷



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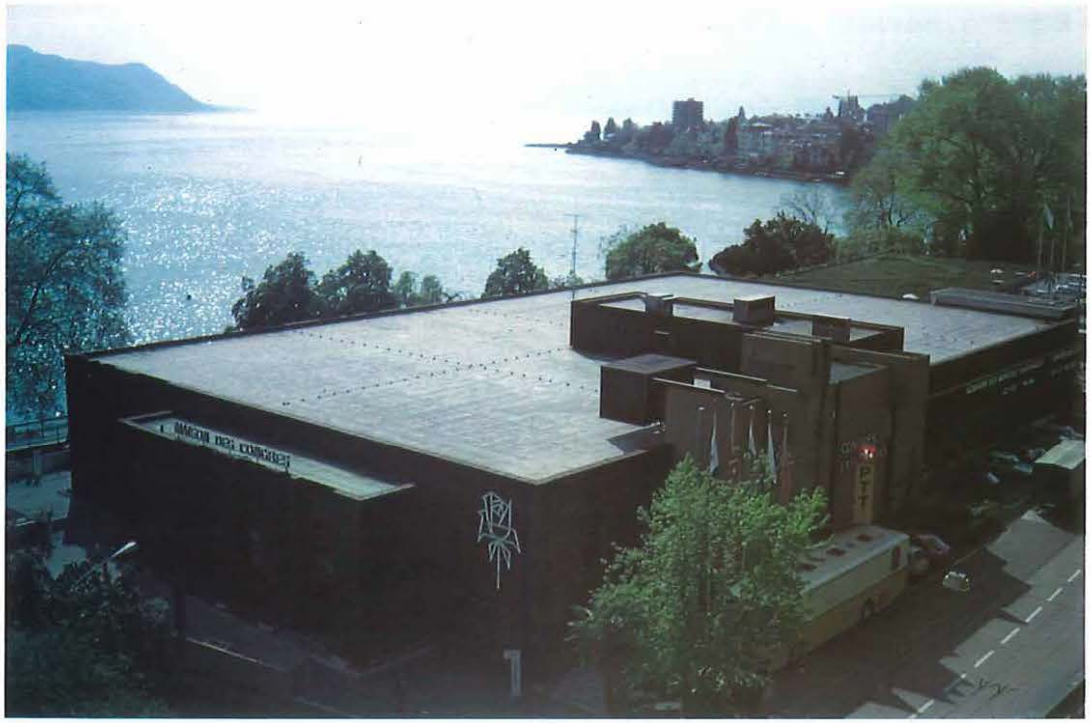

Telecommunications Commission and it also provides the secretariat for the meeting. The Commission's agenda covers reports from committees and working groups and the major common issues facing members.

Issues recently debated have included the impact of new technologies such as satellites, wideband systems and cellular radio. The influence of liberalisation in the United States and UK has also been discussed both within CEPT and in a number of countries. An important part of the annual meeting is to endorse recommendations from working groups. Although not mandatory or binding, recommendations are widely implemented.

Whether they should be binding and contain fewer options is discussed from time to time. The argument in favour is that it would help telecommunications suppliers to market their products more widely, but the move would

represent a fundamental change.

One working group – on services and facilities – studies customers' needs and takes a close look at new services. It does not simply list such services, but determines them, prepares definitions and ultimately after discussion with other working groups, makes detailed recommendations to the Telecommunications Commission, the governing body of CEPT.

Over the years, the group has made recommendations on major matters such as the long-term standardisation of national numbering plans; Confravision; facsimile machines; payphone services; cordless telephones and special help for handicapped phone users. Recently it has concentrated on analysing the integrated services digital network and the options for the next generation of mobile radio services.

A key recommendation harmonising the procedures for approval of terminals attached to the network was put to the Commission in Montpellier in June. This was a first step towards easing trade across European frontiers. The group has even produced a modest 'best-seller' – the *Handbook of Services and Facilities* – now in demand worldwide.

Group members are not full-time advisors who do nothing else. They are telecommunications experts with full day-to-day jobs who get together at the working group's annual meeting and more frequently at meetings of the sub-working groups. Much work is carried on by correspondence and meetings tend to be informal, friendly and stimulating.

Benefits

Goodwill extends beyond the meetings to day-to-day contacts on other matters. In the last few years, the ideal which led to the setting-up of CEPT is increasingly being realised and this leads to benefits for administrations, customers and manufacturers. One interesting development has been closer contact between a major committee concerned with harmonisation, the working groups, and representatives of manufacturers in the 26 countries. Agreement on CEPT priorities is a major theme, and ties in with the activities of the European Community to be described in the next issue.

Activities are also speeding-up. At first there was heavy emphasis on getting things right, reference back to meetings of the committees and working groups and formal circulation of papers between them. This is changing so that harmonisation of services can be achieved before incompatible services are launched by member countries. When firm recommendations cannot be made immediately, guidelines are suggested as a basis for introducing new services on a harmonised basis. Most recommendations are for wide circulation and a plan to publish and distribute information on a commercial basis in the form of manuals would be welcomed by European industry.

Language barriers and differences in terminology within the 26 member countries are not a great problem. At formal meetings, the host country provides simultaneous interpretation facilities. Interpreters are themselves experts and they often study the technical papers beforehand. Even when members get carried away in their enthusiasm for a debate, the interpreters' calm and beautifully modulated voices keep an even pitch. Informal meetings are held in the most convenient language for those taking part and documents are published in French, English and German.

Because there is no permanent machinery, except for the small liaison office, meetings are held by invitation in different countries. As a result, CEPT delegates are widely travelled but this does not mean they necessarily enjoy a life of elegant, leisured cosmopolitanism.

This year, the problems of telematics are becoming more complex and pressing and these problems have to be faced in a climate of organisational and structural change.

CEPT itself, the 'European telecommunications family', has seen many changes in its 25-year history and will no doubt see many more on its way to its Golden Jubilee.

How CEPT operates

CEPT's telecommunications activities are divided among four major committees, one of which is supported by three special groups.

In addition, there are ten working groups to study specialist areas.

The central Committee for Co-ordination and Harmonisation is supported by special groups covering integrated services, digital networks, mobile radio and wide band.

Other committees are the Commercial Committee; the Co-ordination Committee for Telecommunications by Satellite, and the Liaison Committee for Transatlantic Telecommunications.

The ten working groups cover: telegraph; telephone; radio; sound and vision transmission; tariffs; services and facilities; long-term studies; data communication; switching and signalling and transmissions.

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Far Left: CEPT's silver celebrations took place at this centre in Montreux on the shores of Lake Geneva in May.

In the Autumn issue of the Journal, Mr Lawson looks at important recent telecommunications initiatives within the EEC.

Mr F Lawson is director of marketing projects at British Telecom Headquarters. He currently chairs a CEPT working group on services and facilities.

Free
shares
for
staff
British
TELECOM

The government is to offer free shares and special deals to staff as a 'curtain raiser' to employee shareholding when shares in British Telecommunications plc are first sold to the public.

Provision is being made in British Telecom's pre-flotation Prospectus for employee shareholding to be maintained after flotation and the British Telecom Board intends to give employees further opportunities to obtain shares in the future. Initially the Government is making three offers to staff:

* **Free offer of about £70 worth of shares;**
* **Matching offer of two free shares for each share purchased up to a total of about £200 worth free for £100 purchased;**
* **Priority and discount offer giving priority over the public for applications to purchase shares and a discount of 10 per cent on up to £2,000 worth of shares.**

The purpose, according to the Government, is to give employees a stake in their company and to encourage their commitment so that they will contribute more effectively to the future of the company.

Similar free and matching offers were made to employees in earlier privatisations such as British Aerospace, Amersham International and Britoil, although in all these cases the matching offer was only one free for one purchased share. It has also been the practice to give employees priority over the general public for the purchase of shares, but there has not previously been a discount offer for employees.

The free and matching offers will be open to employees who are contracted to work for at least 16 hours a week and are continuously employed from 2 April 1984 until flotation. These shares cannot be sold or transferred immediately because a condition of the offers will be that the shares should normally be held in a Trust, at least for the first two years.

British Telecom is setting up a Trust to administer the employee share scheme, with rules designed to enable participants to take advantage of personal tax concessions. Without the Trust the free shares would be classed as a taxable employee benefit but, by leaving the shares in Trust for a total of seven years, employees will avoid paying any income tax on their value.

If the shares are sold or transferred between two and seven years after their purchase income tax will be payable on a proportion of the original value on a diminishing scale so that the longer the shares are held the lower the tax liability will be.

While the shares are held in Trust, the Trustees are the legal shareholders and the employees are the beneficial owners. In practice this means that the Trustees are named on the main company register of shareholders and are entitled to attend and vote at general meetings. The employees, who are listed on a separate sub-register, receive dividends and shareholder information and can instruct the Trustees how to vote on their shares.

The Government proposes to give telephone customers, who buy shares and hold them for a specified period, vouchers towards their telephone bill. For employees who are telephone customers, the shares purchased through the priority and discount offer will count towards bill vouchers on the same basis as for other telephone customers.

These shares can be sold or transferred at any time, but the benefits of the discount and vouchers could be forfeited if the shares are not held for a minimum period.

A major communication programme is planned to give staff all the information they need to decide whether to take up the offers. An explanatory booklet describing the offers in detail will be distributed to employees and a video is being produced for use in workplace presentations. Each major Division and Local Communications Services (LCS) Region has an Employee Shareholding Liaison Officer to organise the local communication programme for the months leading up to flotation and beyond.

John Bryant BT liaison officer for employee shareholding leads a discussion with Liz Trumper liaison officer for Maritime Radio and Tony Bray, liaison officer for international relations division.

Flotation special on the line

Accountants, brokers, bankers and solicitors boarded the Telecom Exhibition Train at its various stops throughout the country during June and July. The people who will be giving financial advice on the buying of shares in British Telecommunications plc were invited on board to learn more about the business and its flotation. Two extra coaches were added to the train which normally concentrates on British Telecom products and services.

The 'flotation special' coaches were manned by a team from British Telecom; stockbrokers Hoare Govett; Kleinwort Benson, the Government's merchant bank advisers; and Dewe Rogerson, the City marketing and public relations advisers on the flotation. They made three presentations a day to 30-strong audiences and described British Telecom's activities and management, the flotation and the role of intermediaries.

The presentations began with a 15-minute video about British Telecom and were followed by press briefings. British Telecom's speaking team included Board members in Birmingham, Manchester, Glasgow and Edinburgh together with a senior financial expert.

A team of regional co-ordinators has been set up by Hoare Govett, the Government's leading stockbrokers, to plan the marketing of shares. Co-ordination in the City and Greater London will be handled directly by Hoare Govett and the other two broking firms acting for the Government, de Zoete and Bevan, and Scrimgeour Kemp-Gee.

It is difficult to forecast the number of shareholders the flotation will attract but the potential is large with, for instance, 19 million account inserts to accompany British Telecom bills to customers.

The largest present shareholder register is held by ICI who have a total of 366,000. Most major companies have between 20,000 and 50,000.

Pictured at Truro before the 17 city 'flotation train' began its countrywide tour are from left to right John King, British Telecom board member for marketing and corporate strategy, Frank Lawson, director of marketing projects at BTHQ, Tony Parsons, general manager, Plymouth Area, Michael Francis (Hoare Govett) and Anthony Stanley-Smith (Kleinwort, Benson).

This, the eighteenth in our series on overseas administrations, looks at Switzerland, renowned for its international neutrality and home of the International Telecommunication Union.

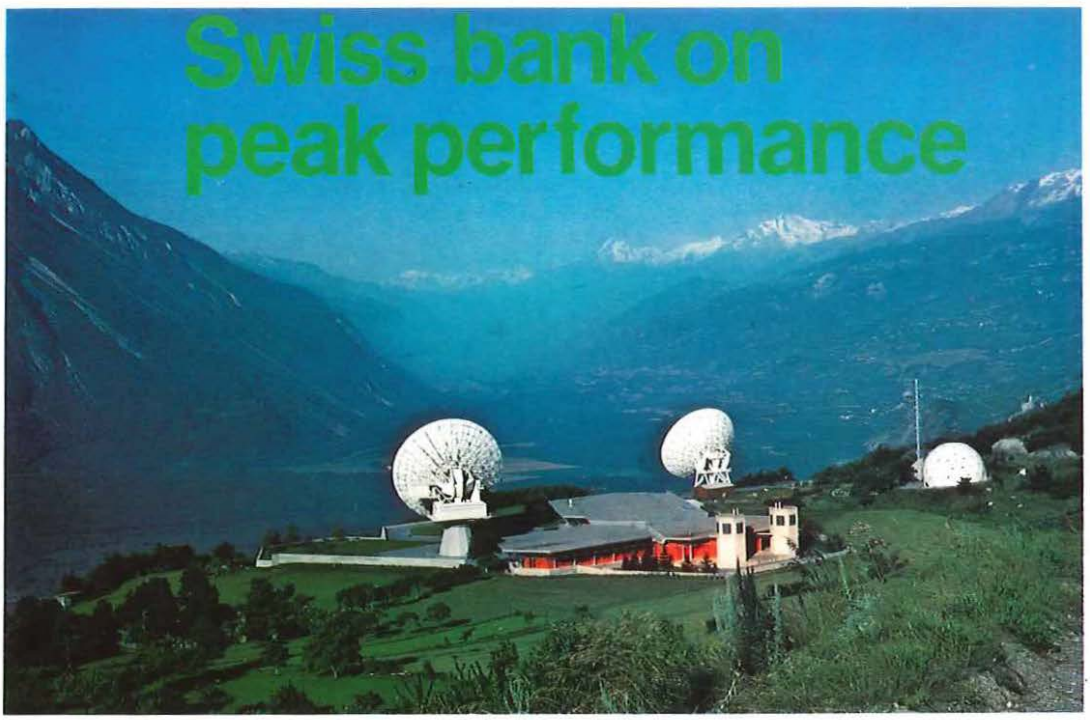
Swiss bank on peak performance

Switzerland is world famous for its recognition of the rights of the individual and its diplomacy. With an international reputation for banking and industry and a philosophy of neutrality, it has attracted many worldwide peace, health and industrial organisations to establish headquarters in its cities and all of them are serviced by a buoyant and expanding telecommunications system.

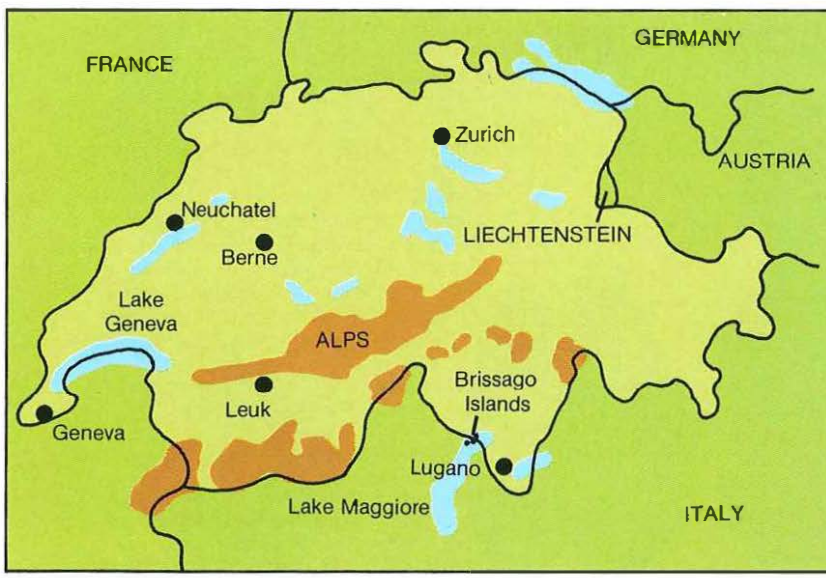
The federal structure of Switzerland consists of more than 3,000 communes in 23 Cantons (regions). With virtually no raw materials, the country is heavily dependent on tourism and industry for growth and development. These industries range from traditional farming and clockmaking to engineering, pharmaceuticals and hydro-electricity, blending traditional methods with modern industrial production.

The Swiss with many natural barriers to other forms of communications were quick to grasp the benefits and potential of telecommunications, and their first telegraph service opened more than 130 years ago. Since 1960, the Posts, Telephones and Telegraphic Organisation (PTT) has been administered and controlled by the Ministry of Transport, Communications and Energy. Indeed, the PTT, along with the railways, customs and defence are the only completely government-controlled organisations in Switzerland.

The PTT is the largest employer in the country with 55,000 staff – 16,800 in telecommunications. Organised into three departments, Postal, Telecommunications and Presidential, the PTT uses the Presidential department to provide many common services



Switzerland's only earth station is at Leuk and is the centre of the country's intercontinental communications.



Switzerland, a land-locked country of some 41,300 square kilometres is bordered by France, the Federal Republic of Germany, Italy, Austria and Liechtenstein. Sixty five per cent of its 6.5 million people speak German, 18 per cent speak French, 12 per cent speak Italian while the remainder use other dialects. Switzerland is one of the most densely-populated countries in the world with extremes of climate and geography ranging from the mountainous and sometimes bitterly cold Alpine areas to the continental climate of the low-lying Brissago Islands on Lake Maggiore with their palm trees and exotic gardens.

for the other two such as marketing and legal services.

The Telecommunications Department is divided into 17 districts along the lines of the Cantons and each is responsible in its own district for construction, operation and maintenance. Overall policy, planning and major building are the responsibility of the Telecommunications headquarters situated in Berne.

As a result of a treaty between Switzerland and the neighbouring Principality of Liechtenstein, postal and telecommunications services in the latter are provided by the Swiss PTT.

With around three million exchange connections (UK – 19.2 million), telephone penetration in Switzerland is, at 46.5 exchange connections per 100 population, third highest in the world after Sweden and Denmark. Local, national and international telecommunications are provided via 1,032 local exchanges, 43 trunk/transit exchanges and 23 international exchanges. About 88 per cent of switching equipment is rotary or two-motion Strowger with the remainder crossbar. The number of fault reports due to PTT equipment failure is among the lowest in the world at just 0.15 fault reports per station per year.

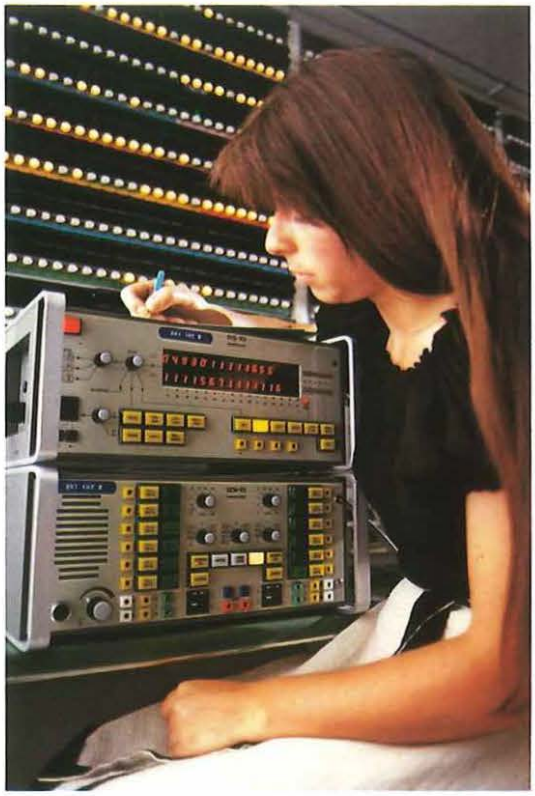
In 1959, Switzerland became the first country in the world to have a fully automatic national telephone system. Over the last ten years, the PTT has been researching the development of a digital exchange but because of the high development costs and the advances made worldwide in digital exchange equipment, they have now abandoned their own work in favour of buying digital exchange equipment from the three main Swiss suppliers – Hasler, Siemens-Albis and Standard Telephone and Radio. The PTT intends to introduce digital exchanges at a rate which will give a nationwide digital telephone network in the 1990s.

Microwave

Links between exchanges are provided mainly by underground cable or microwave with a few overhead cables. In the mountains, microwave is used extensively. Fibre optic cables are also under trial and next year should see the first fibre optic trunk link between Berne and Neuchatel – a distance of 50 kilometres.

Some 17,000 European and intercontinental cable and satellite circuits give customers access to 80 countries with the help of a satellite earth station at Leuk in the Valais region, which now handles most of Switzerland's intercontinental traffic. The Swiss PTT is also actively involved in both the major European satellite communications systems – ECS (telephone and teleinformatics applications) and SMS (satellite multiple services) as well as the French Telecom 1.

The Swiss PTT does not have total responsibility for the country's telecommunications. As a private organisation, Radio Suisse (in which the PTT owns 96 per cent of the shares) provides manual overseas telex, electronic mailbox services, access to overseas databases, intercontinental private leased circuits and Swiss maritime and air traffic control services.



Although wiring to the connection box outside customers' premises and subscribers' apparatus are both provided by the PTT, wiring within premises and fitting is carried out by licensed private installers.

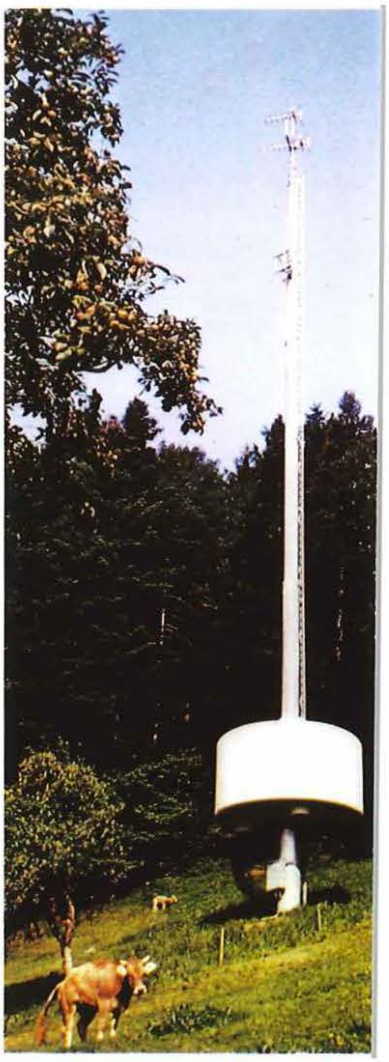
Maintenance, however, is the responsibility of the PTT, but during bad weather customers in remote areas may have to wait for fault repairs and in some cases may have to contribute towards the cost.

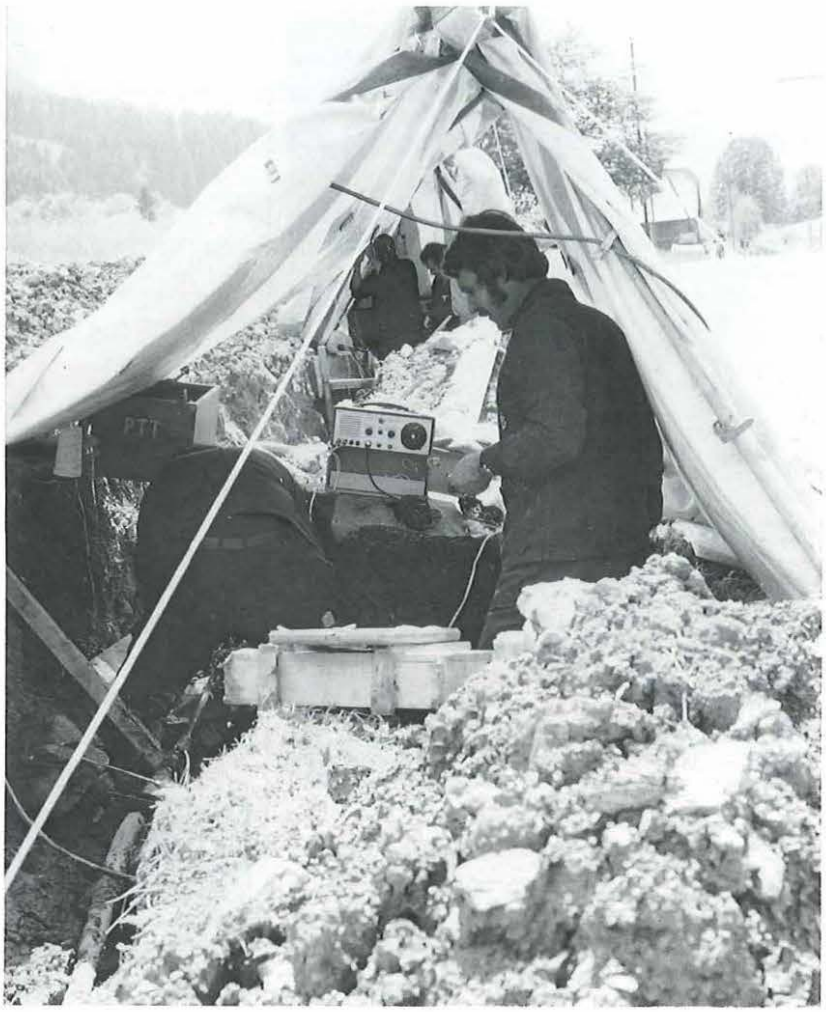
Under Swiss law, the PTT cannot charge business and residential customers differently ▷

Left: A technical telephonist carries out a routine test in a telephone exchange.

Bottom left: Switzerland's carphone system is well developed and fully automatic.

Below: The rolling pasture provides a pleasant setting for this transmitter relay station.





Engineers working in remote locations often need protection from the elements.

The authors – **Messrs P H Dabbs, F Cassidy** and **D Long** – are members of the international comparisons group in the organisation, performance and systems department of Local Communications Services. They acknowledge the help of **M Gilbert Dupuis**, Adjoint pour des Relations Internationales, Department des Telecommunications, Swiss PTT.

for the same services. Exchange line rental (including the telephone) costs up to 240 Swiss francs (£54) a year depending on the number of subscribers served by the local exchange. An installer would charge about 140 SF (£32) to provide wiring at the customer's premises and fit the telephone. Standard period call charges for a three-minute call dialled direct by the customer are 0.102 SF (2p) for a local call and between 0.40 SF (9p) and 1.20 SF (27p) for a trunk call, depending on the distance. Calls dialled direct from public coin boxes are subject to a surchage of 0.30 SF (7p).

All telephone customers, including public coinbox service users, have national and international direct dialling facilities and Switzerland has seven operator centres where staff handle enquiries on directory information, charging, postal and telecommunications services and international service. They also connect to the telegram service, vehicle breakdown services and the emergency services as well as international calls to countries which cannot be dialled direct. Calls for directory information or to vehicle breakdown and emergency services are charged at between 0.20 SF and 0.40 SF (5p and 9p).

Since the automatic telex network was introduced in 1936, the service has expanded rapidly, and today Switzerland has more telex machines per 1,000 head of population than any other country – with some 37,000 subscribers served by 19 automatic exchanges. To convert this rapidly-expanding service into a flexible modern communications medium, an automatic message switching system was commissioned in 1979 to provide 'store and forward' as well as broadcast facilities for telex customers.

A telex customer would pay an installer the cost of providing the necessary wiring within the premises and a further once-only charge of 120 SF (£27) to the PTT. Annual rental for the telex line and an electronic teleprinter is 1560 SF (£353) and telex calls within Switzerland are charged at 0.50 SF (1 1p) for three minutes.

There are close links between the telex and the telegram service with about one-seventh of all telegrams transmitted from telex subscribers. Today, 45 telegraph offices and some 500 teleprinter-equipped post offices using an automatic computer-controlled telegram switching system handle around 2.2 million telegrams a year.

Computers

There are many new telecommunications facilities in Switzerland and computers are increasingly being used for directory enquiries and compilation, customer records and fault maintenance. Eventually computers will be used for local network records, order handling and storing information about telex and private circuits. They will also provide possible network planning facilities.

A nationwide automatic carphone system has been provided offering full national and international subscriber dialling facilities in both directions over the public switched telephone network. A public facsimile service (Bureaufax) is available between post offices and, for subscribers with the necessary equipment rented from the PTT, a facsimile service is offered via the public network.

Last year saw the completion of a nationwide packet switched data network (Telpac) and, using an electronic processor-controlled switching system, customers can now use Datex 300 – a service four times faster than telex. Further developments include a plan to introduce Teletex which will enable an A4-size page of characters to be transmitted between various types of terminals in less than ten seconds. The introduction of a viewdata service called Videotex is also planned.

Despite already high telephone penetration levels, the Swiss PTT is currently investing about 1200 million SF (£272m) a year in telecommunications. Its plans for the future are directed towards modernising public exchanges and continuing to provide new and more sophisticated services. Ⓣ

Building power into system management

Hugh Stephenson and Roger Poole

British Telecom Journal
Summer 1984

A management system for building services and power plant – known as Ampere – has been developed by British Telecom to ensure that the best possible results are obtained from high-technology equipment.

High technology developments in exchange equipment are making the maintenance and day-to-day operation of power and building engineering services plant an increasingly important activity. This plant is valued at more than £400 million and is found throughout British Telecom's 9,200 buildings which include about 6,250 operational exchanges.

Operational maintenance is carried out by 2,000 specialists and local exchange staff. If energy and capital replacement costs are included with maintenance costs, the annual cost of power and building services plant is about £140 million.

Types of power plant vary and include DC rectifier plant with standby battery reserve; no-break AC supplies by inverter systems or motor-generator sets; and mains standby engine-generator sets. There is also a wide variety of building engineering services plant which includes ventilation and air-conditioning plant, heating plant, lifts, electrical distribution systems and a multiplicity of domestic or 'hotel services' equipment.

Asset management

It is to carry out maintenance more effectively that Ampere – asset management of power and (building) engineering resources – has been developed. Asset management is a combination of engineering, management, financial and other practices aimed at achieving economic life-cycle costs. It deals with the design and specification of plant for reliability, maintainability and availability. It also covers the installation, commissioning, modification and replacement of equipment and the feedback of information on plant performance.

Power and building engineering services plant is frequently installed for up to 20 years and assessing performance and cost over such a long period can be complicated. Essential data is provided by area maintenance managers and their staff who maintain the plant during its working life. Costs cover three main areas; preventive or routine maintenance, corrective maintenance to repair faults, and indirect costs incurred through loss of output.

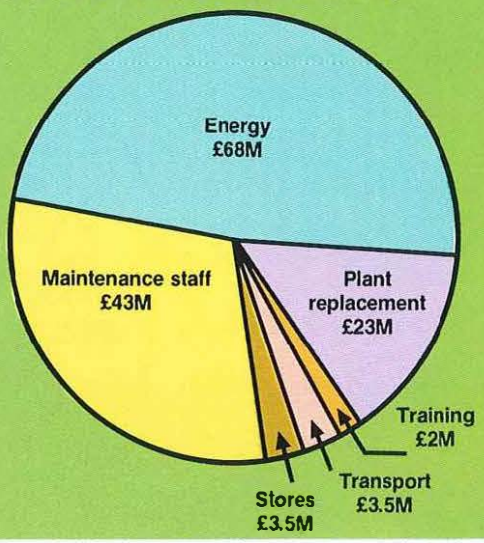
A maintenance manager aims to minimise costs by balancing costs of preventive maintenance against those of corrective maintenance and indirect costs. Other important, but less tangible, benefits of sound, planned maintenance include improved safety, a higher grade of service, extended plant life and better morale – machinery breakdowns are both frustrating and embarrassing.

Ampere has been developed from ICL's computer-based planned maintenance package which is a general-purpose management tool for industrial and commercial applications. Local Communications Services (LCS) power division and building engineering services division have sponsored Ampere's development, with the Information Services Department (lately Data Processing Executive) providing computing skills. Project co-ordination is by the Organisation Performance and Systems Department in Harrogate and representatives from areas provide important local knowledge.

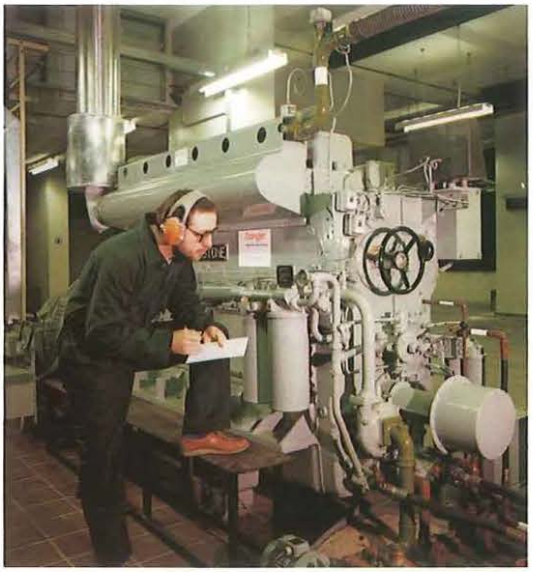
Ampere aims to provide both an operational tool so that planned preventive maintenance can be carried out more effectively and to provide a comprehensive information system for management. Any planned maintenance system must be able to programme the work and be ▷

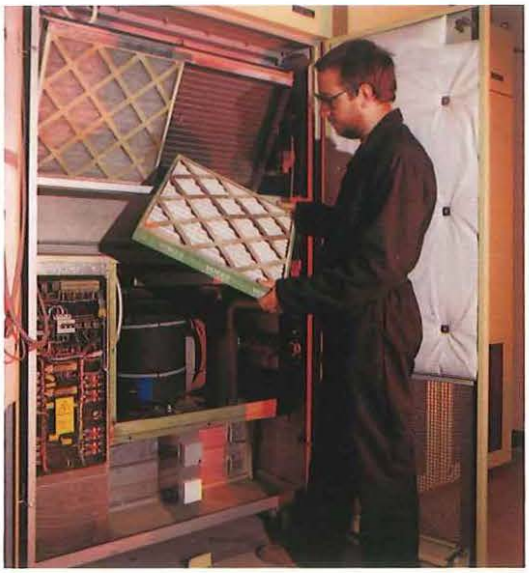
The power of Telecom

Managing building engineering services and power plant in British Telecom is an enormous task. Throughout the country, it involves the day-to-day operation and maintenance of plant such as lifts, boilers and rectifiers valued at more than £400 million in some 10,000 buildings. The cost of both energy and work carried out by more than 2,000 staff comes to £143 million a year - more than £2 million a telephone area. In areas, the responsibility for maintaining this plant falls to a power 'Band C' - assistant executive engineer - and a staff of around 25 technicians.



Estimated annual national maintenance and energy costs – 1982/83.





Ampere programmes all planned maintenance for building services and power plant.
Here maintenance group technical officer Nigel Law:

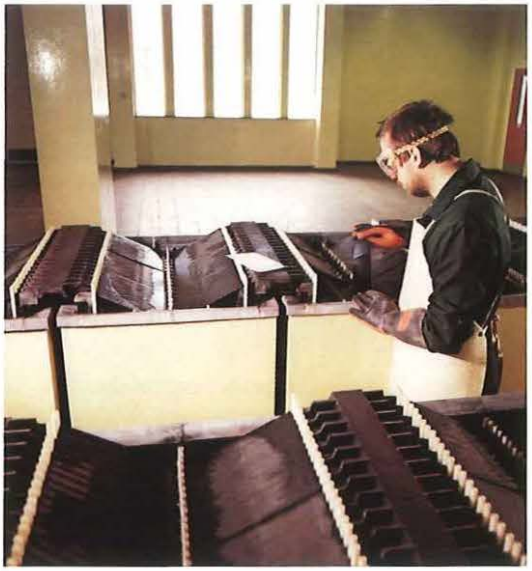
- runs a routine on a standby engine generating set in Guildford telephone exchange (right)
- checks an air filter on a British Telecom air-handling unit (centre)
- monitors the condition of cells in one of the exchange's battery rooms (far right).

flexible enough to react to changes. It also needs a disciplined management and control system to ensure that the work is carried out and results are reported back.

The system programmes all planned maintenance work and records and controls reported faults, records asset values and costs of maintenance and provides a basis for establishing staffing levels. Plant engineering information is held in the engineering asset register and covers specifications, drawings and diagrams; information on important sub-assemblies within equipments, and local information such as the names, addresses and telephone numbers of suppliers.

The financial asset register (FAR) carries information on capital costs and plant lives. With the changing structure of British Telecom, particularly the introduction of profit and cost centres, accurate knowledge of the asset value in terms of net and gross book and replacement values is essential. Ampere's FAR has been designed to provide this information automatically, once the basic data has been put into the computer file. Allocation of shared plant costs can then be made automatically to LCS,

Right: Senior technician Peter Guppy, one of Guildford Area's power maintenance control team, processes completed routine dockets and logs fault reports onto the Ampere database.



National Networks (NN) and sub-divisions for example.

Ampere runs on mainframe computers, these dictated by the size of the database, at multi-access data centres. The area's visual display units (VDUs) and printers are connected either by the public switched telephone network or by private wire. In simplified form, Ampere's software system is based on four files – plant, routines, routines/faults history and plant data.

When setting-up Ampere, an area has first to identify and code all plant to create a file. Coding of plant (systems) and assemblies provides computer identification codes which are not normally used by the operator in everyday running. Once the plant has been identified, the routines are allocated to each plant, together with the resources to carry them out, the date from which they are to start and the cycle-time.

A library of routines is provided in the routines' file as guidance for areas. Only local managers will have the necessary knowledge to make allowances for such factors as the age of plant and difficulty of access which will effect the amount and frequency of maintenance required. Using the library, areas can create their own routines as they require them, and they can also modify existing library items.

Running on the same computer, and available to all users, is a general enquiry software package called Querymaster which uses plain language and can interrogate all Ampere files. This facility is designed for one-off and occasional enquiries, but for regular reports standard sub-routine software will be provided as needs are identified.

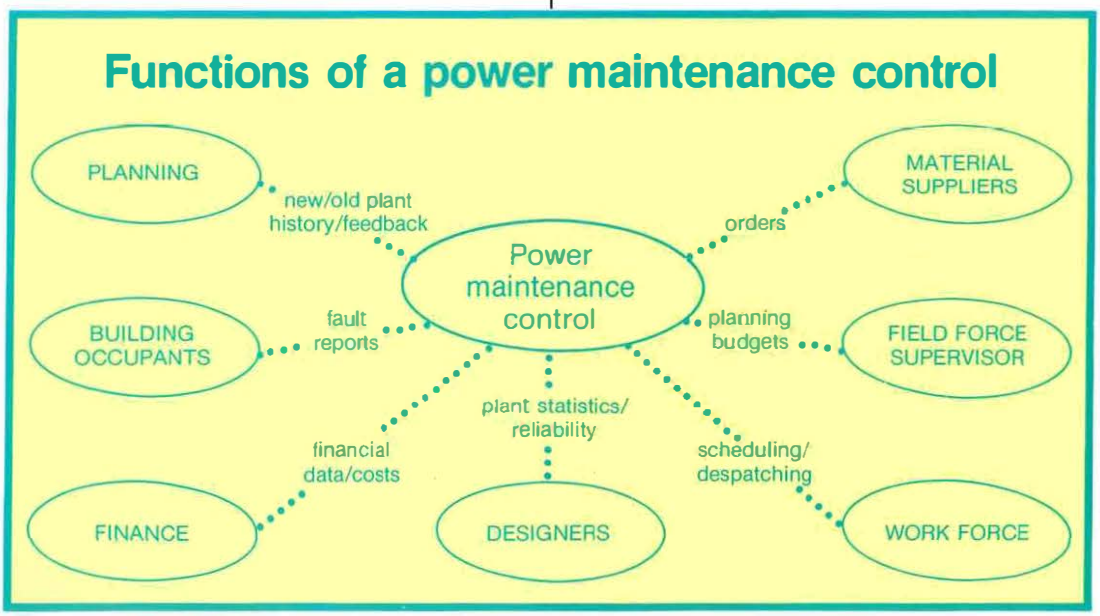
Essentials

Ampere has been developed with the telephone area power group very much in mind. The essentials of the job were identified through surveys in four typical areas. The key co-ordinating job was the power maintenance control, envisaged as the operator of the computer-based management system. While Ampere is area-orientated, each area having exclusive control of its own database for the global asset management potential of the system to be realised, some limited access to areas' database nationally is required. Access is needed to extract data for information on plant performance and cost, but with built-in safeguards so that the area's data is not affected in any way.

In the future, Ampere may also be used to manage a wide range of plant such as telephone kiosks and portable equipment. In fact any plant, equipment or system which can be coded can be managed by Ampere. As a fully documented and supported optional system Ampere can:

- Schedule planned maintenance.
- Monitor plant performance.
- Enable staffing requirements to be assessed.
- Provide an engineering asset register.
- Provide a financial asset register.
- Apportion maintenance costs to profit or cost centres.

In short, Ampere meets existing and foreseeable requirements for plant management and information. ⓣ



Left: Functions of a power maintenance control.

Mr A H Stephenson of LCS Power Division and **Mr R R Poole** of LCS Building Engineering Services Division have been members of the Ampere project team since it was formed over two years ago.

British Telecom Journal
Summer 1984

Specialised services success

With the launch and growth of two more Prestel services – CitiService and Farmlink – British Telecom's innovative and Queen's Award-winning public viewdata service is well on its way to achieving more market success.

Jan Shearer

For the past four or so years, Prestel has concentrated on identifying and building specialised services, providing full information for a definable sector or profession which stimulates sales while continuing to provide a wide-ranging database for general use.

Sectors now with their own database include finance and investment, agriculture, travel, microcomputing, home banking, law and messaging. Closed-user groups are used in these 'trigger' products, usually with extra subscription or service charges, but with many frames on general access.

This approach is in marked contrast to the marketing policies of the late 1970s when the emphasis was on publicising its general benefits and enormous potential. But it soon became clear that this was not going to be enough to attract the number of customers needed to make Prestel commercially viable. What was needed was a range of specialised services providing comprehensive databases for a readily-identified sector or profession.

More general information on the Prestel database — such as news, sports results, weather, entertainment guides and travel timetables — must also be kept to a high standard. Although none of these are themselves 'trigger' products — that is no-one is likely to buy Prestel because of such general information — once someone has bought it, say for the financial information, research has shown that frequent use will be made of such general information.

Prestel CitiService was launched in April last year providing an easy-to-use, comprehensive and continuously updated package for those in the financial world. The latest development from CitiService, launched earlier this year, is a Stock Exchange prices service, developed especially for investors and their professional advisors, the result of co-operation between the London Stock Exchange, ICV Information Systems and British Telecom.

Sophistication

CitiService has developed three grades of service, based and priced on its level of sophistication. The first level — a general service — is open to all Prestel users. It lists some 200 of the largest UK companies and updates share prices three times a day at 11 a.m., 1.15 p.m. and 3.30 p.m. Each frame, reporting 20 prices, costs 5p to access, plus standard Prestel and British Telecom charges.

The second level service is directed at the active private investor who needs comprehensive and regularly updated share price information. It features 1,500 securities, including government stocks, equities, unlisted securities and the overseas securities listed on the London Stock Exchange. Selection is made weekly by the Stock Exchange on the basis of trading activity. Prices are updated five times a day at 90-minute intervals, starting at 10 am. Each frame shows an average of ten securities to a page and reports on latest, closing and the day's high and low prices for each. As well as frame, Prestel and British Telecom charges, there is a subscription of £18 for access to the closed-user group.

The third and most sophisticated service level is directed at the professional user who must have comprehensive and up-to-the-minute prices information. It provides the very latest stocks and shares prices continuously available throughout the day from the floor of the Stock Exchange so that every time a user looks at a page, each share price is displayed as it was last updated. Charge for this level is £90 per quarter.

But all users of this new service will have access to other Prestel pages as well as the rest of CitiService which provides financial news, company announcements, the FT30 index, the Dow Jones Index, foreign exchange rates, key interest rates and the Spot Gold and all commodity and financial futures markets.

The latest service to be launched on Prestel, however, is Farmlink, a specialised database for the agricultural industry. Farmlink was

Below: A Stock Exchange prices service is the latest development from the Prestel CitiService.

British Telecom Journal
Summer 1984
Specialised services success

Left: A West Country farmer checks local farming reports by using the new Prestel service.

launched in April in south-west England, the first region to be covered by the service which will be progressively extended nationwide, region by region. Farmlink is a comprehensive farm management service designed to help farmers make the most of their own experience and judgement, cutting down on time spent looking up and telephoning around for information or talking to sales representatives.

Today, more than ever, the efficient and profitable running of a farm depends on having the right information at the right time and this Farmlink provides 24 hours a day. Providing local and national information, the service gives, for example, latest news on crop problems, weather, market prices and pest warnings.

The three main categories of the service are farming information, product services and supplies, and management advice and programmes.

Organisations providing farming information include Adas (the Ministry of Agriculture, Fisheries and Food's Agricultural Development and Advisory Service) which gives facts and figures, pest and disease alerts and localised farming reports; the Meat and Livestock Commission which provides up-to-date daily livestock market reports; the Meteorological Office which issues weather warnings and five-day rolling forecasts, and Prestel CitiService which shows cereal, pig meat, soya and potato futures.

Enquiries

The product, services and supplies category gives farmers information on the availability and prices of products and services. Using Prestel's two-way communications capability, farmers can easily make further enquiries and even place orders at any time of day or night.

Because Prestel can link up to other computers through 'Gateways', the Farmlink customer can perform wages and ration formulation analysis calculations using nothing more than a basic Prestel set. Full user-to-user messaging is also offered in the third category dealing with management advice and programmes.

The all-in cost of subscribing to Farmlink is some £4 a week for the average user — including cost of equipment rental and service subscription.

These latest services give an idea of the comprehensive nature of the specialised databases. Skytrack, the database for registered travel agents, allows customers to access airline computers, check availability, book flights and holidays and receive immediate confirmation. Prestel Microcomputing offers the rapidly-expanding number of home computer users a library of software and information through Prestel. Games, educational and other programmes — free and for sale from top software houses — can be automatically taken off the Prestel services and 'downloaded' directly into a microcomputer from the telephone network.

Homelink — a three-way partnership involving the Nottingham Building Society, the Bank of Scotland and Prestel — provides the world's first commercial viewdata banking service. Customers have complete control over an impressive range of banking services, 24 hours a day. Through Prestel, a Homelink user can check his bank and building society accounts, transfer money between them, pay bills, request statements, apply for a loan — all from the comfort of home.

Prestel also offers customers an electronic message service — Mailbox. Users can compose and send short messages or choose from a wide range of standard texts and electronic greetings cards. One Mailbox application is Telexlink which allows a user to type a short telex message on screen, press a button and send it to arrive as a normal telex anywhere in the UK.

Prestel is set to continue its two-part strategy — to expand and maintain the high quality of established services and to continue to identify and develop areas for future services. Education, teleshopping and extensions of Mailbox and Telexlink are in the forefront of this strategy and the launch of these services is planned for later this year.

The success of the trigger product marketing strategy can already be seen in recent registration figures — more than 43,000 terminals are attached to the network, 63 per cent in businesses, 37 per cent in homes. This has been encouraged by the expansion of local call access — with more than 94 per cent of the UK telephone population now able to use Prestel for a local telephone call — bringing the service within much easier reach of many more people.

And, of course, Prestel has already made its mark abroad. The winning of the prestigious Australian public service contract in June brings to ten the number of countries which have bought national videotex systems from Prestel.

With more than 320,000 page frames now on the system and an average monthly access total of some 15.2 million, Prestel has begun to achieve the marketing success it has always been striving for. In the competitive climate of the 1980s, it is proving it can offer its customers the services they need.

Ms J Shearer is Prestel publicity officer.

British Telecom Journal
Summer 1984

Staff from Telconsult at work with local engineers in Zimbabwe.

Expert exports

Tony Hawkins

The expertise of Telconsult, British Telecom's Overseas Consultancy Service, has now reached almost 50 countries and ranges from network planning in Chile, to frequency planning for the Hong Kong police.

The buying of increasingly sophisticated telecommunications systems by third world countries has put a premium on the expertise and knowledge of well-developed telecommunications administrations. British Telecom is in the forefront of the drive to market this expertise. Already Teleconsult, which has to compete against many other similar international organisations for each contract, has been actively involved in more than 80 projects worldwide.

A division of British Telecom International, Telconsult operates as a profit centre and has about 50 permanent staff and a further 60 to 70 contract workers overseas at any given time. Senior staff travel extensively abroad in the quest to market British Telecom's expertise and may each travel 100,000 miles a year.

Overseas consultancy projects are often the subject of international competitive tendering and it is usually necessary to prepare documents to very short lead times. This requires a high level of professionalism as proposals have to conform to the details of the invitation to tender, yet be accurately and competitively priced and meet the legal requirements of the country concerned.

Competition is fierce and includes well-established consultancy organisations from Germany, France, Italy, Sweden, Holland, Norway and Japan as well as American and Canadian companies. It is not unusual to find 15 competitive bids submitted for a single consultancy tender. Competition from UK includes Cable and Wireless and Ewbank Preece.

Despite the fact that many competitors have been established for many years and have become well-entrenched in some markets, particularly in the oil-rich countries of the Middle East, Telconsult has succeeded in winning many contracts in the face of this tough

competition. Some overseas competitors are subsidised by their governments or industry, but Telconsult is not and is therefore ideally placed to offer completely impartial advice without bias to any particular equipment manufacturer.

The core of Telconsult's business is the planning, specification and adjudication of all types of equipment provision and the supervision of the subsequent installation work. Other work includes financial and technical appraisals, training, management, operation and maintenance projects. Suitable turnkey projects and joint ventures are also undertaken.

The total value of contracts awarded to date exceeds £40 million and work in hand extends as far as 1991. The income in 1983 was about £5 million mainly from activities in Europe, Africa and the Middle East but general world recession and particularly the problems of South American and African economies has had an adverse effect on the number of projects being undertaken in these areas.

Opportunities

Africa, with its shortage of trained manpower at all levels, needs a wide range of assistance but lack of finance and the dependence on foreign aid for major projects, limit the number of opportunities. The substantial consultancies which do arise are generally associated with money from the World Bank, European Development Fund, a regional Development Bank or bilateral aid.

UK aid is often concentrated on the roads, agriculture and resources. Telecommunications rarely gets high priority although in recent months Telconsult achieved a notable success in the winning of a substantial consultancy in Malawi financed by British aid. This project includes the supply of three UXD5 exchanges together with interconnecting 2GHz digital microwave radio systems.

The equipment is being provided, installed and commissioned by GEC and Telconsult is responsible for project management and will:

*Prepare a project plan and monitor progress.
*Co-ordinate all activities.
*Supervise equipment installation, commissioning and testing.
*Advise on training schedules and future maintenance techniques.
*Carry out maintenance on the equipment for two years after installation.

The Malawian administration, like many others in the world, has decided to use digital technology gradually to develop its telephone network with the ultimate aim of creating a fully integrated services digital network (ISDN). At present the telephone network consists of many small groups of fewer than 100 subscribers in rural areas and the Martlesham-developed UXD5 is ideally suited for such areas.

UXD5 exchanges will be provided at Kasungu, Mangochi and Balaka and will replace existing L M Ericsson ARK exchanges. They will be connected to Blantyre and Lilongwe by multi-hop 2 GHz digital radio systems as part of the move towards a complete digital network. As well as upgrading existing plant, radio repeaters are to be built at two new sites at Nambande and Zomba Peak. Telconsult will supervise the construction of access roads, buildings and antenna structures in virgin territory and solar power is being considered for use at Nambande.

Compatibility

Integrating UXD5 equipment with L M Ericsson ARM and ARK equipment presents its own particular difficulties and software programmes have had to be modified to ensure compatibility. Another area of concern is that Malawi has a high incidence of lightning strikes and appropriate protective measures will have to be applied (see page 10).

In nearby Zimbabwe, Telconsult has supplied a team of nine lecturers for three years to the Posts and Telecommunications Corporation Training College in Harare. The team is helping the PTC to recover from the effects of staff leaving at the time of independence in 1980.

Further to the north Libya continues to be an important client. The first major project was a study of telephone traffic patterns, followed, in 1978, by a £4 million contract to construct overhead open-wire carriers systems (see *Post Office Telecommunications Journal Winter 1979/80.*) This involved 65 routes, covering a total distance of about 1,200 kilometres. The work included the erection of 24,000 poles and the commissioning of terminal equipment – supplied by NEC of Japan.

The traffic study also pointed to a long-term need for a countrywide coaxial system and Telconsult was subsequently awarded a £20 million contract to plan and survey the 6,800 kilometre network, formulate contract specifications, adjudicate tenders and supervise the installation work which is being carried out by an Italian company. ▷

Left: One of Telconsult's latest contracts. This rural exchange will house one of three UXD5 exchanges due to be installed in Malawi.

Below: This map of Malawi shows the locations of new radio systems supplied by Telconsult.

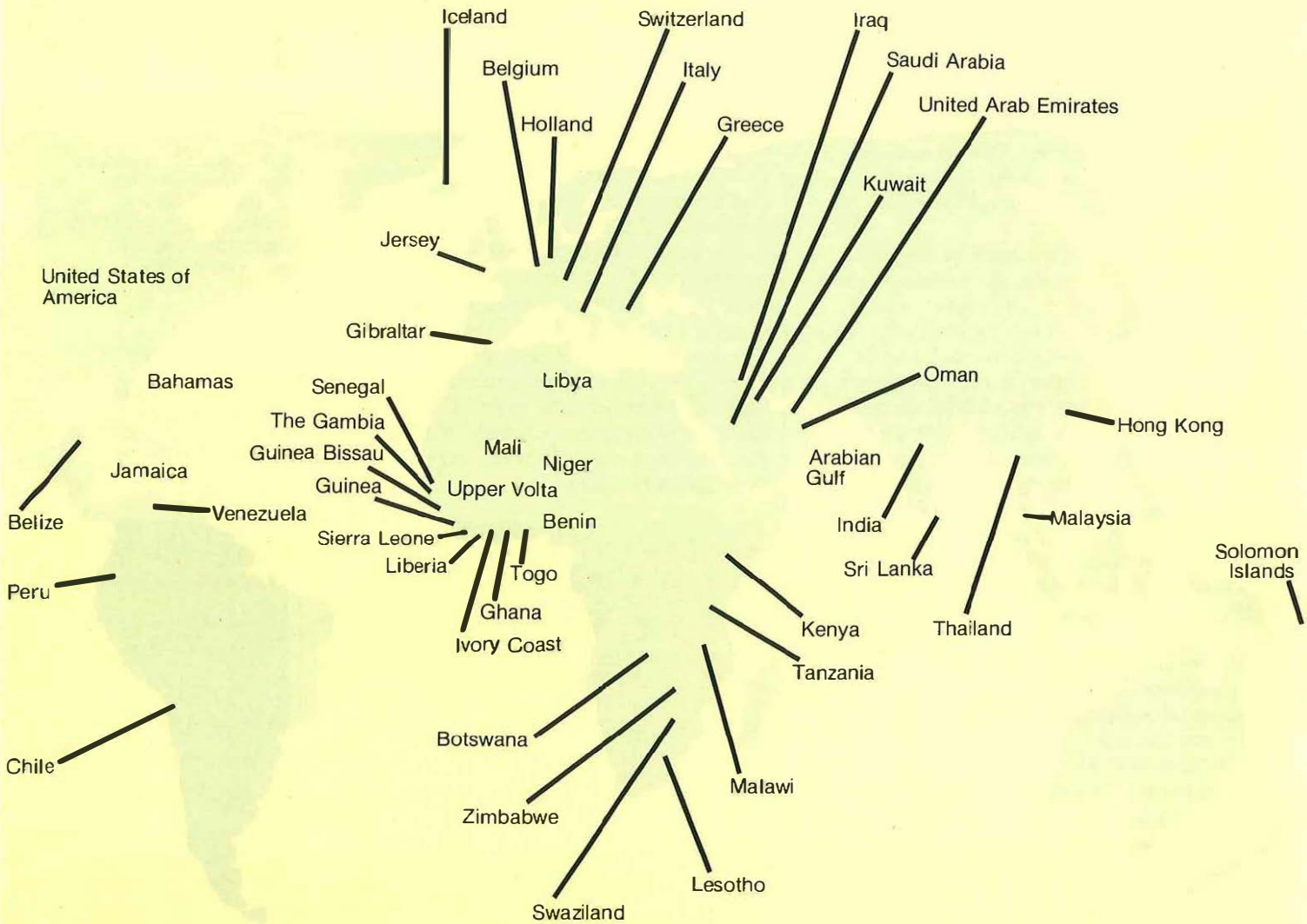
Another major area of operation in Libya has been the expansion of local telephone networks. In 1978, Telconsult began supervising the installation of 110,000 local lines in Tripoli and a year later an international automatic telephone exchange. Similar work on a new international exchange in Benghazi has been recently completed and equipment for both projects was supplied by L M Ericsson.

In the Middle East, Telconsult's clients include telecommunications administrations and major oil companies, such as Aramco (Arabian American Oil Company) in Saudi Arabia; Adnoc (Abu Dhabi National Oil Company) in the United Arab Emirates; and PDO (Petroleum Development Organisation) of Oman. In the quest to extract more oil from the ground, good telecommunications have become vital and many companies are prepared to modernise completely their telecommunication networks, rather than delay oil extraction due to poor communications.

Major contracts have recently been won with Oman to design the local line network for Muscat and to design and supervise the installation of the local line expansion for Salalah. In French-speaking Ivory Coast, against competition from French consultants, a contract has been won to design, specify and supervise installation of a digital local exchange.

In the past few years Telconsult has established itself as one of the leading telecommunications consultancy organisations in the world and its success in marketing British Telecom expertise against fierce competition is proving invaluable. ◑

Mr A P Hawkins is Chief Executive of Telconsult.



The Telconsult influence

Map showing the route of the first transatlantic telegraph cable 1858.

Below: *Agamemnon* laying the first cable under the Atlantic in 1858.

Battle for the Atlantic

In this, the second of his two articles on the history of submarine cables, departmental record officer Pat Panton traces the development of undersea links between Britain and North America from the first crude attempts in the mid-1850s to the first transatlantic telephone cable laid a century later.

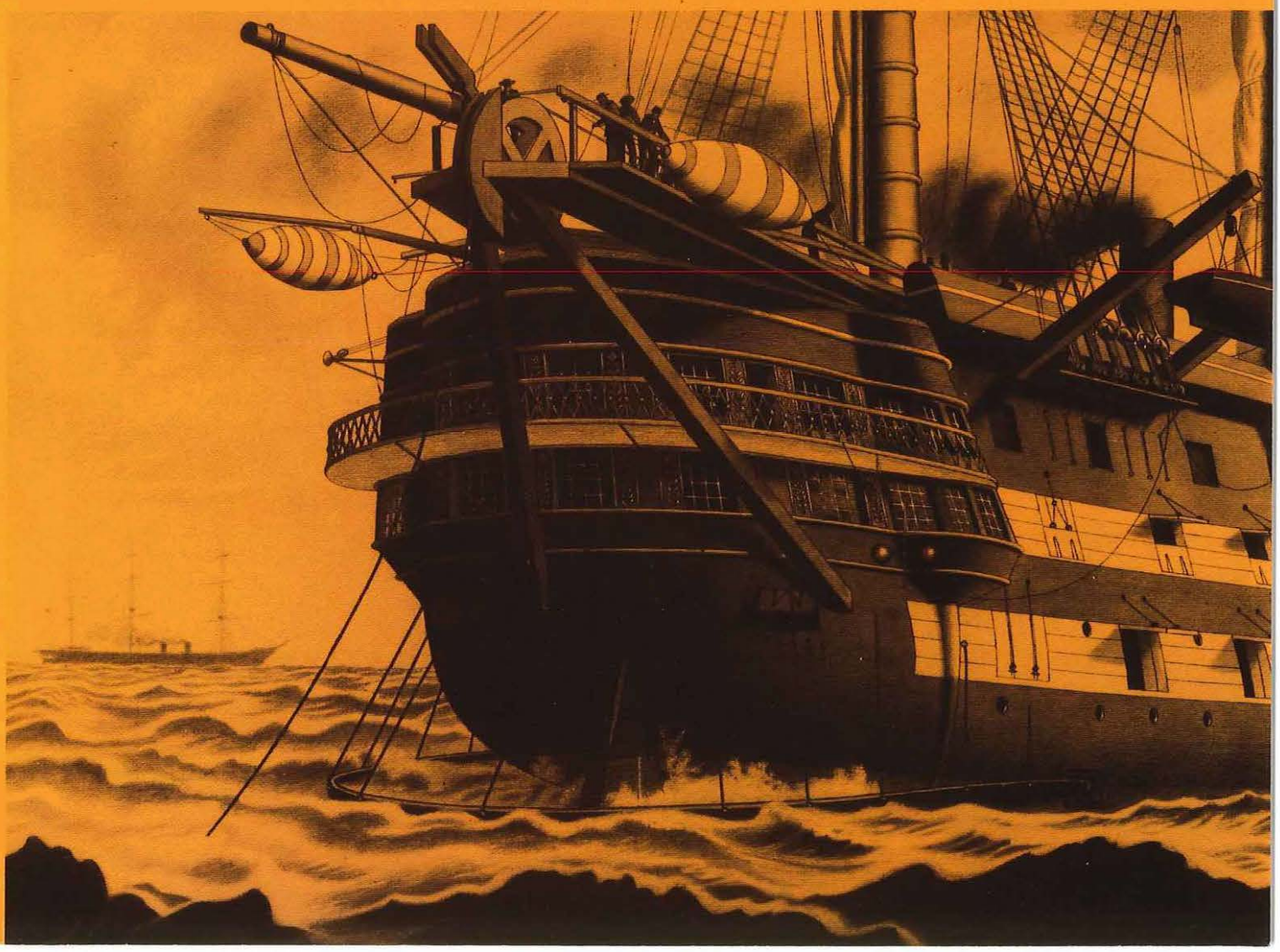
The significance of 5 August 1858 is probably lost on all but the most assiduous telecommunications historian. It was, however, the first milestone in a 100-year quest to establish undersea communication links between Britain and the New World across the Atlantic.

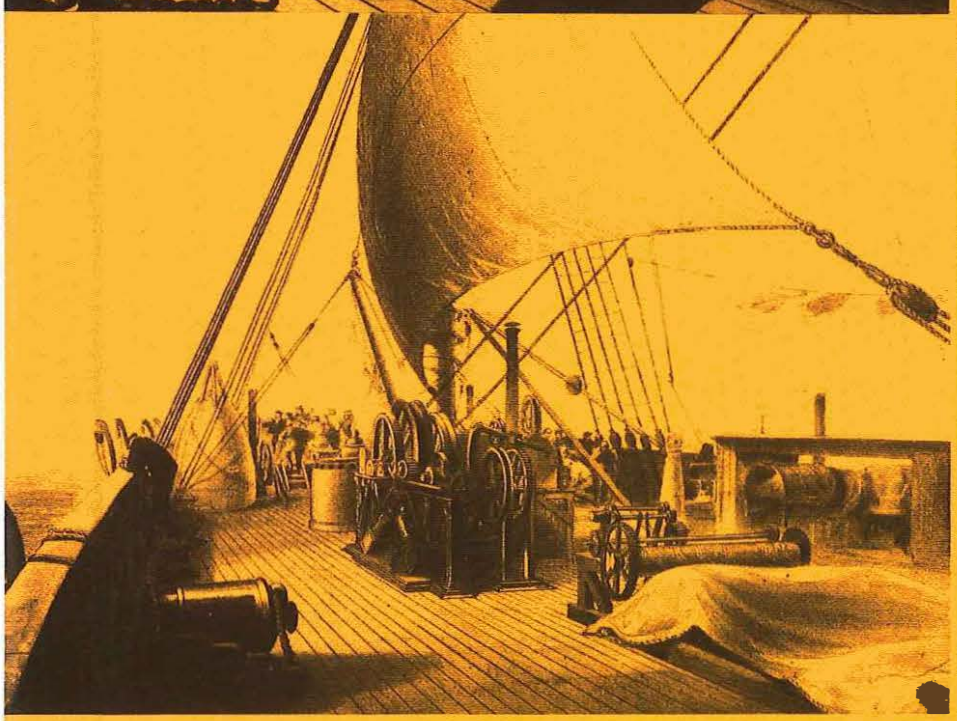
After three earlier unsuccessful attempts in which the cable finally broke beyond repair, the American vessel *Niagara* and the British warship *Agamemnon* had headed in opposite directions from mid-Atlantic. On 5 August *Niagara* landed its cable end at Trinity Bay, Newfoundland, and almost simultaneously the *Agamemnon* did the same at Valentia on the south-west tip of Ireland.

The impossible, it seemed, had been achieved. The joy, however, was short lived. Owing to disastrous attempts to work the new cable with too powerful a current, the insulation was ruined and within three months, no further signals could be transmitted.

Seven years later in 1865 the *Great Eastern*, working alone, made another attempt, and succeeded in laying 1,600 miles of cable before it broke. The following year, after several fruitless attempts, the same vessel located the 1865 cable, spliced a new length on the broken end, and triumphantly completed the work.

At this stage, it should not be overlooked that Professor Thompson – later Lord Kelvin – invented the mirror speaking galvanometer which was introduced at the same time the 1858 Atlantic cable was being laid. In 1867, he ▷





invented the siphon recorder which had the advantage of incoming signals, their message received on a paper tape in the form of an undulating line of morse code.

By this time, the Atlantic Telegraph Company, formed in 1856, had been reconstituted as the Anglo American Telegraph Company and appears to have had almost a clear field until 1874 when the Direct United States Cable Company (DUS) of Britain laid a cable from Ireland to the USA via Nova Scotia. This cable was bought by the Government in 1921, and at that stage passed via Newfoundland. A French company laid a cable from Brest to St Pierre and on to the US in 1879 with connecting cable to England laid in 1880, and a direct France-to-US cable in 1898.

In 1881 and 1882, the American Telegraph and Cable Company laid two cables between Penzance, England and Canso, Nova Scotia, but leased them in 1882 to the Western Union Telegraph Company for 50 years.

The same year, Anglo, DUS, the French company and Western Union entered into a 'pooling' arrangement to divide traffic. This agreement continued until 1920, and may well have been negotiated in anticipation of competition from the Commercial Cable Company formed in 1883. Commercial laid two cables between Nova Scotia and Ireland in 1884, a third in 1894, and a fourth via the Azores between 1900 and 1901. A German company laid a cable between Emden and New York also via the Azores in 1900.

An inter-departmental committee under the chairmanship of Lord Balfour of Burleigh reviewed cable communications between 1901 and 1902. Main concern was with companies operating what is now the Cable and Wireless system, but they did touch on transatlantic cables so far as the two British companies, Anglo and DUS, were concerned. Unlike some, the (British) North Atlantic cables were not subsidised.

There is little evidence as to volume of traffic other than a statement that around 1900, the ten England-US cables carried 20 million words yearly.

In 1869 the basic rate was £3 7s 6d (£3.37½p) for a message not exceeding ten words; in 1901 it was one shilling (5p) per word.

Exclusive rights

From the turn of the century until the First World War, other cables were laid and Anglo's exclusive rights in Newfoundland either lapsed or were waived. During and shortly after the war, the two German cables were diverted by Britain and France, with the effect of creating cables running Porthcurno-Azores-Halifax and Brest-Azores-New York, operated by the British and French Governments respectively.

From about 1920, radio became a serious competitor to cables for international telegraphy and the cables themselves also underwent technical development. In 1921, regenerators were developed which enabled re-transmission at

intermediate landing points to be carried out automatically. A US source quotes the capacities of the 1923 Commercial cable and the 1924 Western Union (Azores) cable as 200 and more than 300 words per minute respectively. In 1945 the same source quotes the eight Western Union UK-US cables as providing a total capacity of 1040 wpm and four of Commercial's cables (two were interrupted) a total 475 wpm.

The first major change in the period between 1920 and 1956 was the elimination of the DUS Company. They had a single line of cables from Ireland (Ballinskellings) via Harbour Grace and Halifax to Rye Beach, New Hampshire. Unlike the lease from Anglo, that from DUS required the owners, not Western Union, to keep the cable in repair. And that gave Western Union the right to terminate the lease if the cable was interrupted for a continuous period of 18 months or more which happened between September 1917 and June 1919.

Throughout 1918, DUS had been trying to get the cable repaired, but war conditions, coupled with an unfortunate series of mishaps, prevented the work being done. But Western Union were dissatisfied with the working of the lease, and suggested a fresh one which DUS refused.

Leasing

DUS approached the Post Office with a view to leasing the cable. But the Post Office offered to buy it for about £½ million and the purchase was completed in 1921. DUS went into voluntary liquidation in 1923. The eastern terminal of the cable was diverted from Ireland to Penzance in 1922.

At the same time there was disquiet in the US about the extent of international cable communication under British control. There was, however, little mention of the US near-monopoly of North Atlantic cables, though acquisition by UK and France of the ex-German cables was represented as an outrage. British participation in traffic between North and South America caused most concern and it was suggested that messages passing over British cables had been improperly disclosed to British commercial interests!

Western Union testified largely in favour of Britain. They stressed that Britain alone gave them very favourable inland facilities and pointed out that in all other countries they were subject to much greater Government control.

A new Newfoundland-Waterville via Azores cable was laid by Commercial in 1923 and a new Newfoundland-England cable was laid by Western Union three years after their first wholly-owned cable from America to north west Europe. More cables followed and by the outbreak of the Second World War, 20 were operating between Europe and North America.

On the German occupation of France in 1940, the French company's two cables were cut, some Western Union cables were 'rearranged' and Commercial's cables underwent various changes. Cable and Wireless' direct (ex-DUS) cable was interrupted in 1943 and not restored until 1952.

In 1950, the UK operations of Cable and Wireless were taken over by the Post Office. The Porthcurno-Harbour Grace cable was almost entirely renewed in 1952.

A year later came the announcement of the first transatlantic telephone cable, completion of which was expected in 1956. In addition to telephone calls, the cable would carry a number of telegraph channels, and would be used for telegraphy between UK and Canada. In 1954 Commercial proposed to lay a cable from the US to Scotland via Nova Scotia, Newfoundland, Greenland and Iceland – a repeatered link offering many telegraph channels and one or two telephone channels.

The following year, Western Union put forward a plan for the sale of its overseas telegraph interest to an American textile and general financing company (Textron). The plan was dropped because Anglo refused their consent but this led to a decision by the UK Government to issue fresh licences to the Western Union and Commercial Companies.

In 1956, a new era began with the opening of the first transatlantic telephone cable (TAT1). Now nearly 30 years on, and several more increasingly sophisticated cables later, links across the Atlantic are a far cry from the pioneering days of 1858. Ⓣ

Landing the shore end of the 1865 cable at Foilhummeran Bay, Ireland.

Far left: Scenes on board the *Great Eastern* during the 1865 cable-laying operation.

Top: Preparing iron plating for the capstan in the forge.

Centre: Splicing the cable.

Bottom: The forward deck cleared for a final attempt at grappling.

Nearly 100 years after the first telegraph cable was laid, the shore end of the first transatlantic telephone cable is brought ashore at Newfoundland.

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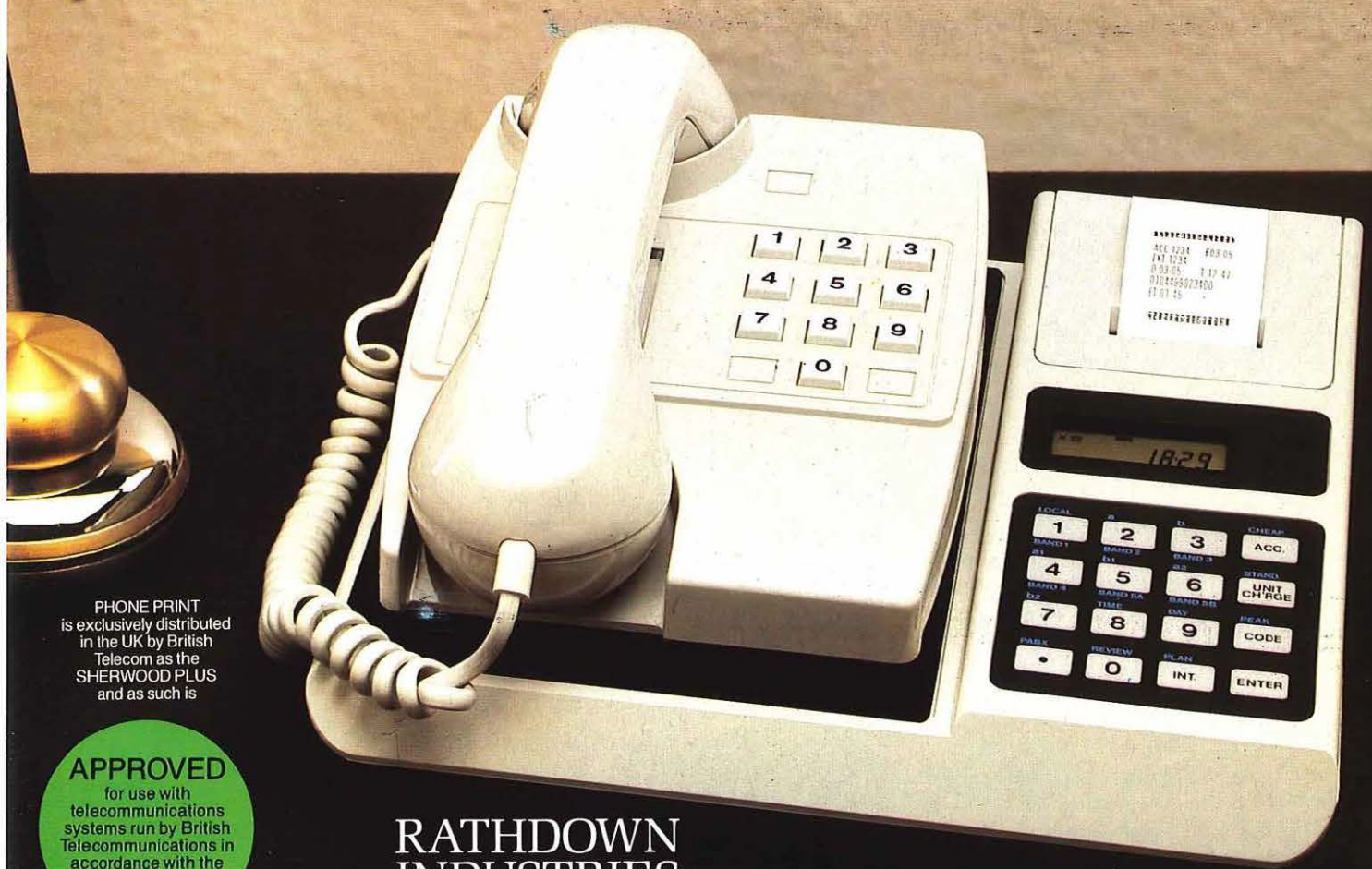

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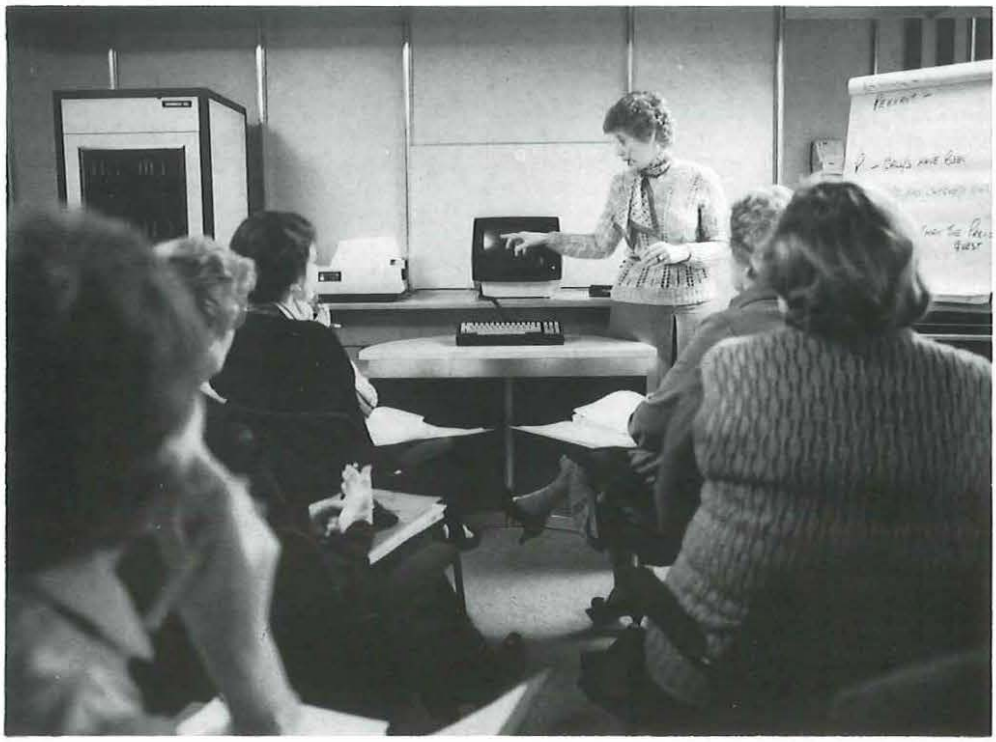


Instructor Jean Baldock discusses the operation of the 'Hotel' Pennant system with a group of sales support officers from all over the country.

Putting sales support staff in the picture

Bob Benbow

British Telecom is well aware that its continuing viability lies in customer goodwill – fostered not only by the selling of attractive products, but by the whole package of benefits offered in support of each sale. It is therefore vital that its sales support officers are properly trained.

In preparing to face competition, British Telecom has dramatically changed the basis of its operation and has become a commercial and competitive supplier of both products and services. And nowhere has the change been more marked than in the range of equipment available for the business user. An impressive, if somewhat bewildering array of call-connect systems is now available for the small to medium-size business. For larger organisations 'big switches' are also being marketed, each with networking capabilities for multi-located businesses which will support value added network services (VANS) in the future.

The sales support officer (SSO) has replaced the old-style telephone and telex service representatives (TSRs and TxSRs) to become more of a sales-driven force. Their responsibilities have expanded to include elements of selling, prospecting and systems programming. However, the role fulfilled traditionally by the old-style TSR/TxSR of training customer staff and operators continues. To be effective, the SSO must be thoroughly conversant with the operation and facilities of any system he or she might encounter. This is becoming an onerous task for many reasons:

- Proliferation of new systems over the past two years and progressive system enhancements have led to an increase in the number of models of the same basic system. There are now, for instance, five models of the Monarch. The SSO is likely to encounter all of these, and therefore acquires and maintains detailed operational skills and knowledge. Involvement with a system does not cease when its marketing is discontinued.
- Increasing sophistication and complexity of call-connect systems are further factors. An expanding range of facilities is becoming available together with user-programmable systems, enabling the customer to tailor the system to his needs. The SSO must be thoroughly familiar with these, and capable of giving advice, help and training. The introduction of call management and information systems requires specialised knowledge including expertise in any systems with which they may be used.
- Important large commercial users buying 'big switches' are entitled to expect at least as good a sales support service as they can get from competitors. SSOs will be involved in training some of the customers' staff in the operation of ▷

the console, service printer, call logging and documentation. In addition, success of this system (and medium-size systems) depends on the extent to which facilities and features are used, and extension user training, undertaken professionally, can offer a valuable opportunity to finally sell the system to company users.

Knowledge

● Finally, the SSO must be able to give customer and sales demonstrations. This requires the SSO, in consultation with the field sales force, to have prior knowledge of potential customers' requirements.

A valuable – and perhaps underrated – part of the SSO job, however, remains 'after sales' service. By establishing and maintaining regular contact, the SSO helps build a relationship of mutual trust and confidence. Acting as liaison between various parts of the company, potential problems can be identified and tackled at an early stage.

To enable the SSO to acquire the necessary skills as effectively as possible, initial training comprises a series of modules on the more common systems. Each module is available separately. In addition there are modules for 'big switches', specialist call management and information systems as well as a number of supporting general modules.

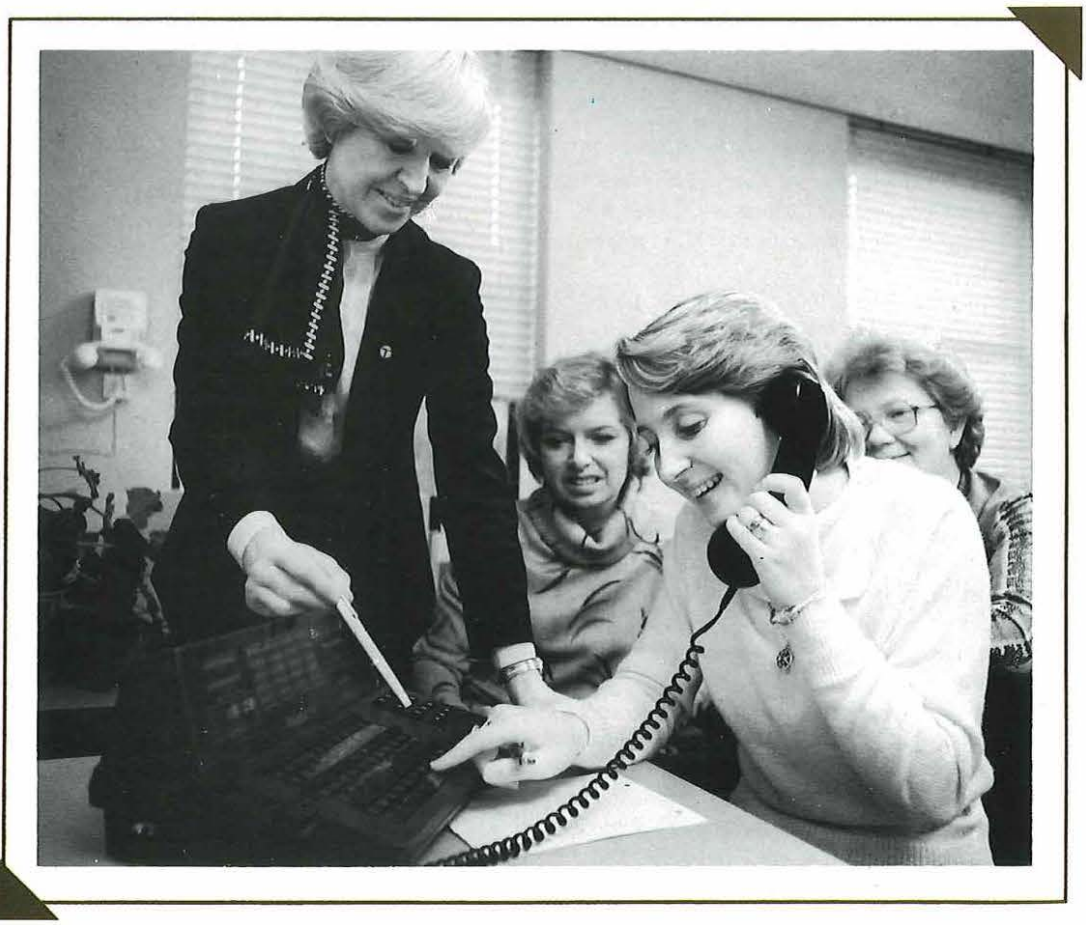
Much of the training is conducted in Bournemouth and London where most current and new systems are available for practice. It is hoped to begin training also at Bletchley during this year. Courses are usually for six students at a time, the best number to give adequate 'hands-on' experience and the instructor adequate time to give individual attention.

Effective training is, of course, expensive. Because SSOs are a valuable resource it is necessary to use them effectively. There is no point in training, for instance, if the SSO does not get immediate experience of a system. Also it is difficult for them to maintain their expertise if they are not involved frequently with a particular system. Some specialisms like keyboard skills are useful in some circumstances but this would depend on local organisation. What may suit a rural telephone area is unlikely to work in Central London.

The SSO must also have effective back-up with product information and changes readily available. The SSO manager is responsible for all these aspects and needs to know how best to plan the work of his SSO or force of SSOs. To help give an appreciation of the SSO job a one-day appreciation course can be made available. A further course for team managers and substituting officers can also be made available.

The job of the SSO has undergone substantial change. It needs a mix of selling and service skills in the right measure at the right time.

A good grasp of technical aspects is also essential. SSOs are responding well to the challenge and following training, they should be even better equipped to fulfil their increasingly important role. ⓣ



Anne Sore, sales support officer instructor demonstrates the workings of the Regent call-connect system at Bournemouth TMC.

Mr R J Benbow is the deputy commercial training manager in the LCS training department at BTHQ.

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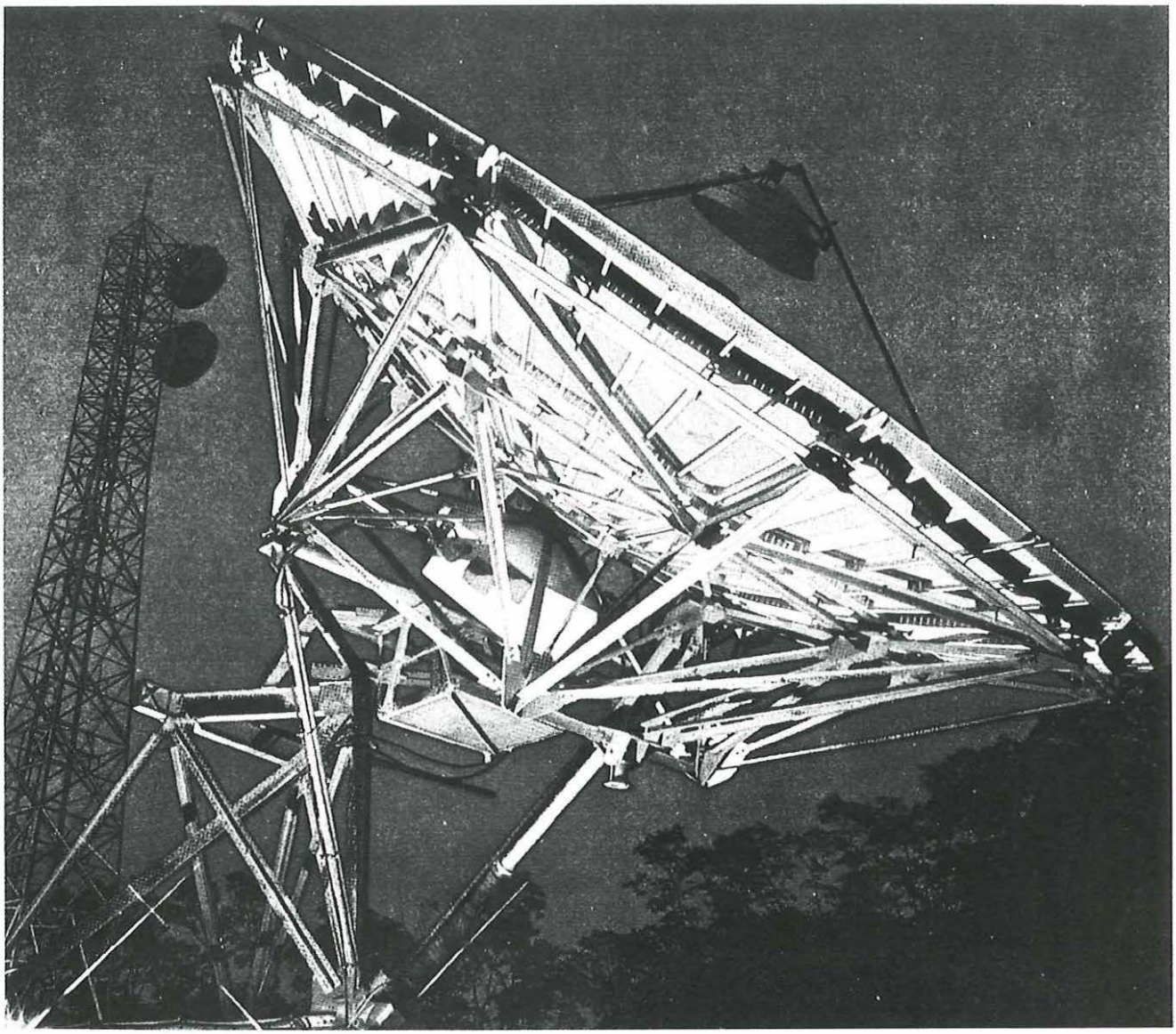

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Licence 'balanced'

Another important step on the road to flotation, was the publication of the Licence under which British Telecom plc will operate.

Chairman Sir George Jefferson said that the Licence followed the broad lines of the draft published last autumn, modified in the light of concerns expressed in Parliament and elsewhere.

He said he recognised that British Telecom's position as a monopoly or dominant supplier of services in some sectors of the market concerned some manufacturers, competitors, and customers. He understood why it was considered necessary to have in the Licence specific provisions to ensure that British Telecom traded fairly, and was seen to do so, and that it did not enjoy unfair competitive advantages.

"I believe that the Licence strikes a balance between giving reassurance on these aspects, while making it possible for British Telecom to manage and develop its business on a sound commercial basis," said Sir George.

Faster overseas calls

Britain's first computer-based international operator centre has been opened at Mondial House, in London.

It is to be built in a British Telecom International modernisation programme to replace older 'plug and cord' centres.

A £3.5 million contract was awarded to Thorn Ericsson for the project which includes the provision of an associated operator switching unit.

The new centre will handle customer requests for operator assisted calls from an area stretching from the Isle of Wight to Folkestone, and also requests for help from overseas operators requiring aid in contacting UK customers.

It is equipped with 28 visual display terminals served by minicomputers and a further 30 terminals will be installed next spring.

Customers' benefits from the new centre will include:

- Faster connection of overseas calls and quicker handling of general enquiries.
- Presentation of calls in order of arrival to the first operator who becomes free.
- Storage in the exchange's electronic memory of calls which have to be deferred.
- Automatic calculation of call duration and charge advice.

Lift off for ADEKS

A sophisticated new communications system has been installed by British Telecom at Gatwick Airport. Known as ADEKS (Advanced Design Electronic Key System) it features processor-controlled keyboards to put air traffic controllers in instant touch with their colleagues and telephone lines.

Multiple processors and back-up cable routes ensure maximum integrity and self-checking facilities and battery back-up give further assurance of reliability. Microchip electronics are contained in a cabinet a fraction the size of previous equipment, and the interconnecting cables are smoke and fire resistant. Special immunity to radar and radio interference has been built in.

Voicebank opens

A new telephone message service, called Voicebank, has been launched by British Telecom.

Unlike any other telephone message service, it can be used with British Telecom's Radiopaging service. The pager 'bleeps' every time Voicebank has a new message.

To use the system, callers simply dial a dedicated Voicebank number and the message is automatically stored in the customer's personal electronic mailbox.

Customers can later listen to their messages by dialling the Voicebank number and sending instructions through a multifrequency tone keypad, held against the telephone mouthpiece, or by dialling a retrieve-only Voicebank number. Voicebank uses advanced computer software and the latest digital technology to provide an excellent sound quality for seven messages, up to 25 seconds long.

An advanced telephone system, including a new switchboard and more than 460 extensions, has been installed by British Telecom at the Gleneagles Hotel, Edinburgh.

The electronic system with digital switching units provides every guest at the 260-bedroom hotel with worldwide direct-dialling facilities.

The system, which cost £220,000, includes features such as the ability to log calls from individual extensions to help with billing. Other facilities include automatic early morning calls for guests, and multi-conversation capabilities for conference delegates.

Pictured is general manager Mr Peter Lederer with some of the old telephone equipment.

Young ideas wanted

A national competition aimed at encouraging youngsters to develop practical aids for disabled people has been launched by British Telecom.

Backed by MP Jack Ashley, chairman of the All-Party Parliamentary Committee for the disabled, the competition will stimulate research into new ways of using telecommunications to help disabled men, women and children in their daily lives.

Winning entries could eventually be produced alongside British Telecom's already extensive range of aids which help people cope with disabilities.

Mr Ashley, who is himself deaf, said that British Telecom had done a 'splendid amount' of practical work to help the disabled and had set a standard for other large organisations to follow.

The competition is open to all secondary school pupils and sixth-form college students in the UK, aged between 11 and 19 on 28 September this year.

Winning entries will be studied for production potential at British Telecom's research laboratories at Martlesham, Suffolk.

Judging will take place in November and the prize presentation ceremony will be in December.

▷ 39

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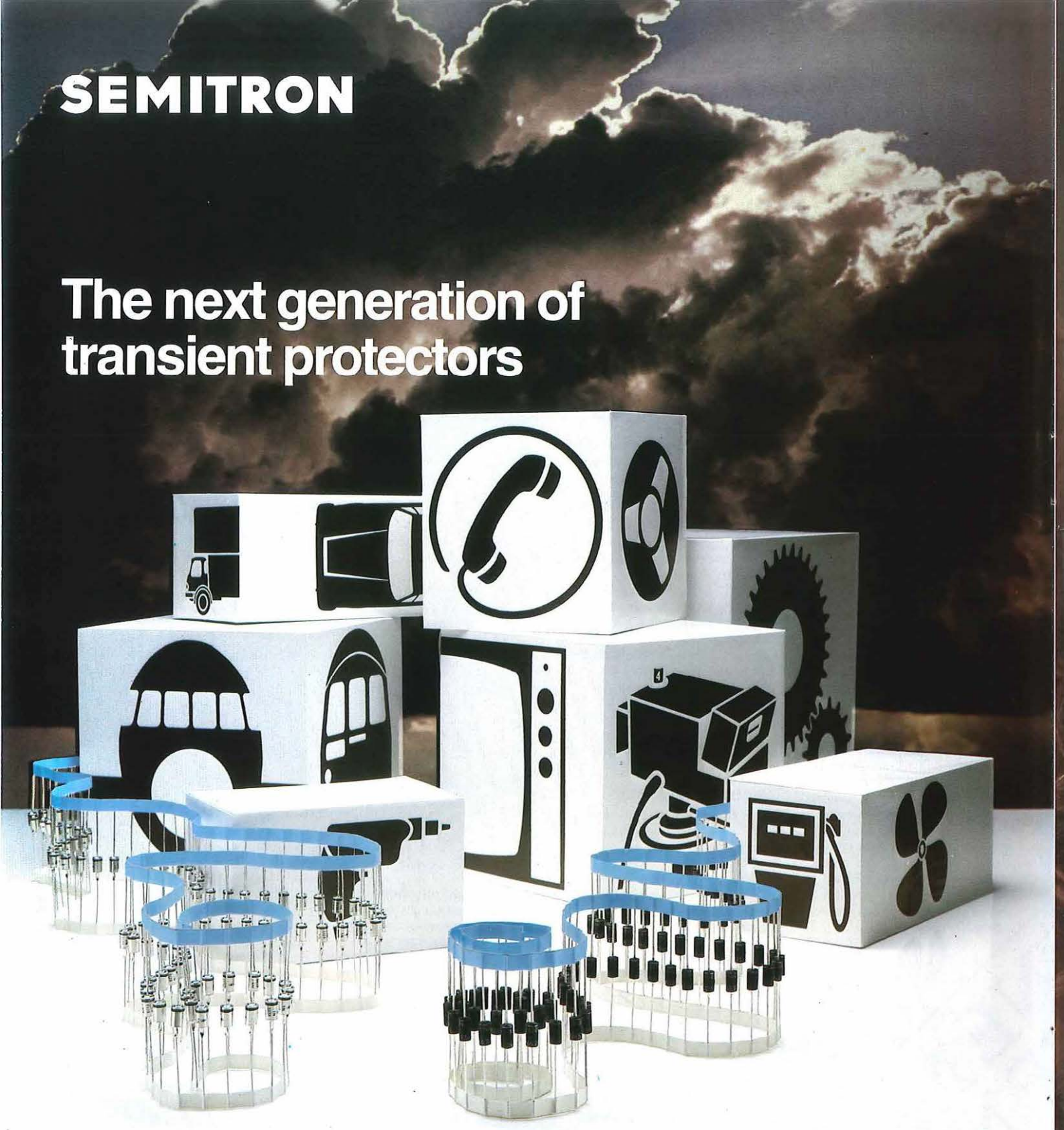
The next generation of transient protectors



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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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Tel. (0793) 751151. Telex: 44848.

Semitron – Putting protection into perspective

Summit 'task force'

A major communications exercise was mounted by British Telecom for world leaders and almost 4,000 journalists and broadcasters who attended the 1984 London Economic Summit.

British Telecom set up a special task force led by Dr Sidney O'Hara, Chief Executive, Specialised Services, to liaise with government bodies.

Among the services available at the conference was the first working pilot system of Cellnet, the cellular radio mobile telephone system opening next year.

A 16-channel closed-circuit TV system was installed to relay events and information to more than 130 TV sets. Delegates were able to view all four UK TV services, live broadcasts of special interviews, and recorded news bulletins from Germany, France, Italy, Japan, and the USA.

The Voicebank service offered 4,000 personal electronic mail boxes and a telephone bureau, staffed by more than 150 British Telecom operators, enabled journalists from all over the world to file their reports.

Nearly 200 of the latest electronic payphones, including Cardphones, were installed together with an operator-assisted data bureau with more than 50 telex machines, four facsimile machines, and three micro-computers.

Other facilities included direct circuits from the Press Association, Reuters, and Associated Press, a specially configured Monarch 250 electronic PABX, and special arrangements for sending TV and radio broadcasts over high-quality sound and vision circuits.

● A £140,000 project is underway to ensure that Fleet Street benefits from 21st century telecommunications. British Telecom London's City area is to increase its capacity to allow newspapers and other customers to exploit a wide range of new services. These include digital transmission which enables computers to talk to other computers, high-speed facsimile, video-conferencing, electronic mail, and rapid teletex links.

Contracts

Austin Rover has been awarded a contract for 500 Maestro and 150 Montego saloons for use by British Telecom sales staff throughout the United Kingdom. The cars are worth a total of £3.4 million at showroom prices.

Ebonestos Industries Limited has won a £1.5 million order from British Telecom for telephone line jack units.

The company has also been awarded a contract, worth £130,000, to provide wiring harnesses for distribution boxes.

Ferranti Computer Systems Limited has supplied terminals worth more than £250,000 to increase British Telecom's network of PT7-156 systems.

The terminals are being installed in telephone area sales offices and were manufactured by the company's Wythenshawe Division in Manchester.

The division will also manufacture a further 32 PT7 controllers and more than 350 VDUs for the Junction Network System.

Lake Electronics (UK) Limited of Swindon has won an initial £5 million order from British Telecom to design and manufacture a new telephone system aimed at small businesses.

With a potential market of 300,000 users the low-cost, computerised system comprises a compact PABX (Private Automatic Branch Exchange) which allows up to ten extensions to have access to two exchange lines.

Plessey and STC have won an order worth a total of £30 million for new British Telecom packet-switching exchanges to meet doubling demand for services ranging from credit card validation to the control and clearance of air freight.

Racal-Milgo Limited is to supply equipment worth more than £500,000 for trials of BitStream, a new data service aimed at home users and small businesses due to start next spring.

Radio review

British Telecom's Radio Interference Service is to be transferred to the Department of Trade and Industry and a review of RIS resources is to be conducted over the next 18 months.

Industry Minister Mr Kenneth Baker has announced that the transfer will take effect from the day on which the assets and liabilities of the Corporation are transferred to the successor company.

The Radio Interference Service investigates interference to authorised radio and television broadcasts, land mobile radio and emergency services and, where possible, takes action to stop it.

The service comprises 260 technical officers with managers and support staff. It has been performed by British Telecom on behalf of the Secretary of State. But the Government has agreed with British Telecom that it would be inappropriate for this arrangement to continue after flotation.

BTI in New York

British Telecom International (BTI) has opened a New York office as a contact point between London and customers with leased circuits in the US.

The office will provide a sales and service facility to meet the growing demand from large businesses and multi-national firms in the US. Staff will also answer questions on all aspects of telecommunications services in the United Kingdom, and will contact the various sectors of the freshly de-regulated US communications industry.

Located in mid-Manhattan the liaison office will form a focal information point for users and potential customers. It will be directly linked to BTI's information database in London, providing US enquirers with immediate access to assistance concerning BTI's business services.

The office will also gather information for BTI, enabling it to react more effectively to the needs of its major customers in the United States.

Atlantic video link

A digital videoconference service between London and New York has been set up jointly by British Telecom International (BTI) and AT&T Communications. Initially, it will operate between British Telecom's studios in London and other cities in Britain, and AT&T's studios in New York and 13 other American cities.

SatStream to US

SatStream – the small-dish satellite business communications service of British Telecom International (BTI) – can now operate to the United States. Following a decision by the Federal Communications Commission, SatStream North America is to be extended from Canada to the eastern States of the US, with increased coverage when new satellites are launched in 1985.

BTI is installing small-dish earth terminals, with antennas between 3.7 and 5.5 metres in diameter, in key city centres throughout the UK to provide access for customers. The first is already operational at West Ealing, London, using a 5.5 m diameter antenna designed by British Telecom to give improved performance. SatStream terminals may also be located on customers' own premises for private use.

Unique cable plan

TAT-8, the proposed new optical fibre transatlantic submarine cable due to come into operation in 1988 will feature a unique ocean floor junction box. The cable will branch into two sections and will connect the United Kingdom and France with the United States.

The project will be funded by 29 co-owners and the largest share will be borne by AT&T Communications. British Telecom will contribute the second largest share followed by the French telecommunications administration.

Standard Telephones and Cables will make the 283 n mile segment from the junction box, located just off the European continental shelf, to the UK landing point at Widemouth Bay, Cornwall. The French will make the 170 n mile segment to Penmarch, on the Brittany coast, and AT&T the 3,150 n miles from Tuckerton, New Jersey.

New customer services

A new customer enquiry service has been launched to help small companies learn more about British Telecom International's business communications facilities.

The service will offer advice across the range including Telex Plus, the computerised store-and-forward telex service; international data and packet-switching services; private circuit and network facilities; and international videoconferencing.

Where bureau staff are unable to answer specific questions about particular services, customers will be put directly in touch with BTI experts.

Customers can reach the enquiry service by telephoning the Operator (100) and asking for Freefone International Business Enquiries.

Taking CARE

The latest in a new range of British Telecom security communications systems, has been launched on 40 exchanges in central and north London. Communicating Alarm Response Equipment (CARE) is offered by British Telecom in conjunction with major alarm companies. It uses customers' ordinary telephone lines in the links between their alarm systems and has 24-hour monitoring facilities.

A fail-safe system, CARE operates without any need for dialling, and is controlled by two parallel computer systems. A special signalling device is connected to the customer's telephone which generates continuous monitoring signals inaudible during conversation.

Appointments

Mr William Jones, 42, has been appointed British Telecom's senior director for Development and Technology. Following a career of 24 years, starting as a Post Office engineer, Mr Jones is an acknowledged authority in the telecommunications industry on switching and transmission systems. He has been closely concerned with the evolution of System X.

Mr Richard Luff, at present Surveyor to the City of London, is to be British Telecom's first director of Property Management.

Mr Luff, who will take up his post on 1 October, will head a new property management department responsible for formulating corporate policies towards property and the acquisition, development and disposal of property assets.

Voice choice

A nationwide search has been mounted to find a new voice for British Telecom's speaking clock before the end of the year.

A competition, open to all British Telecom staff, is being held with elimination rounds in all areas and regions leading to a national final in the autumn. The winner will receive £5,000, the runner-up £2,500, and third place £1,000.

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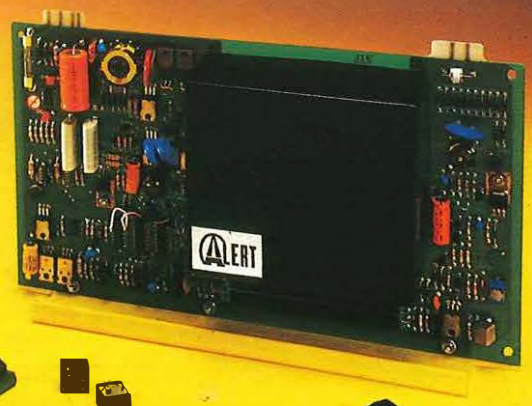

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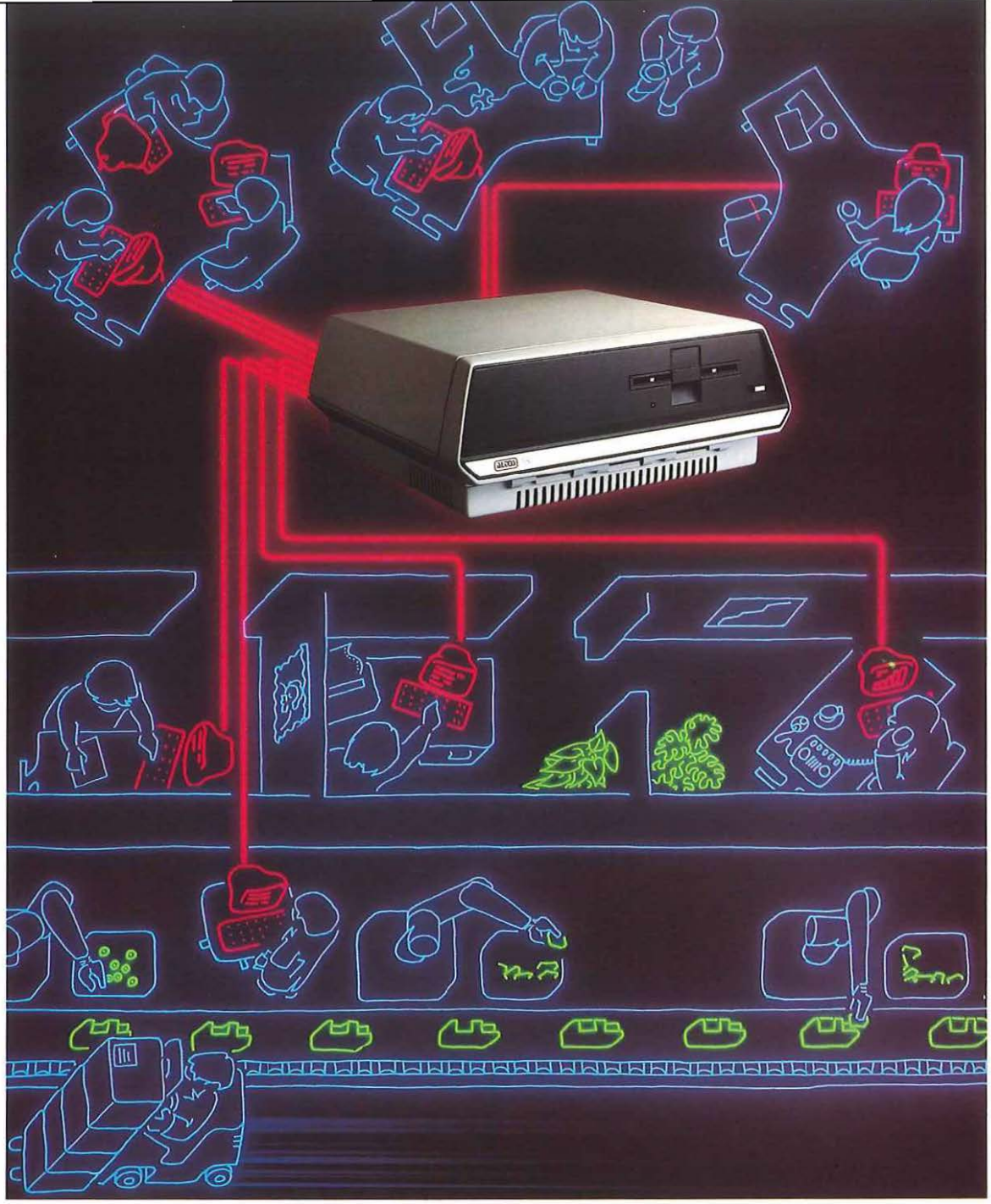

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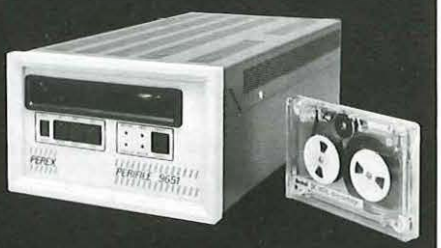

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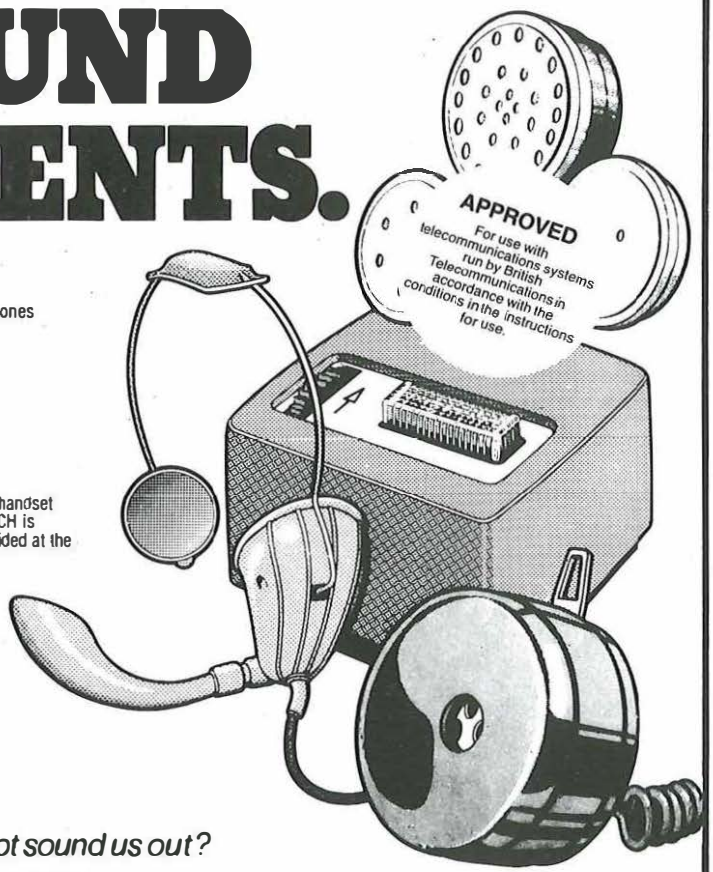

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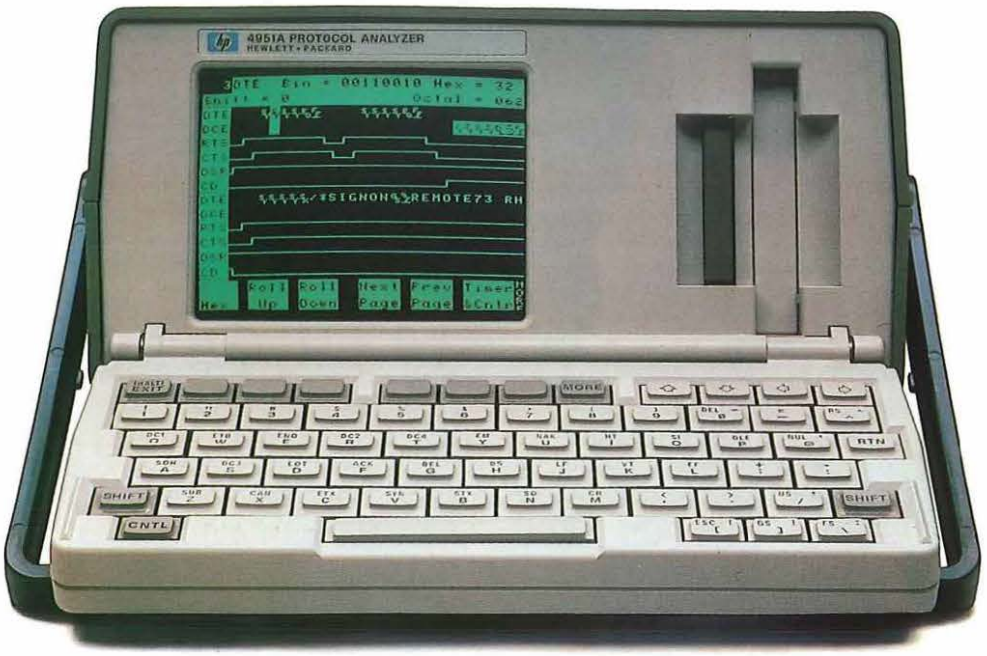

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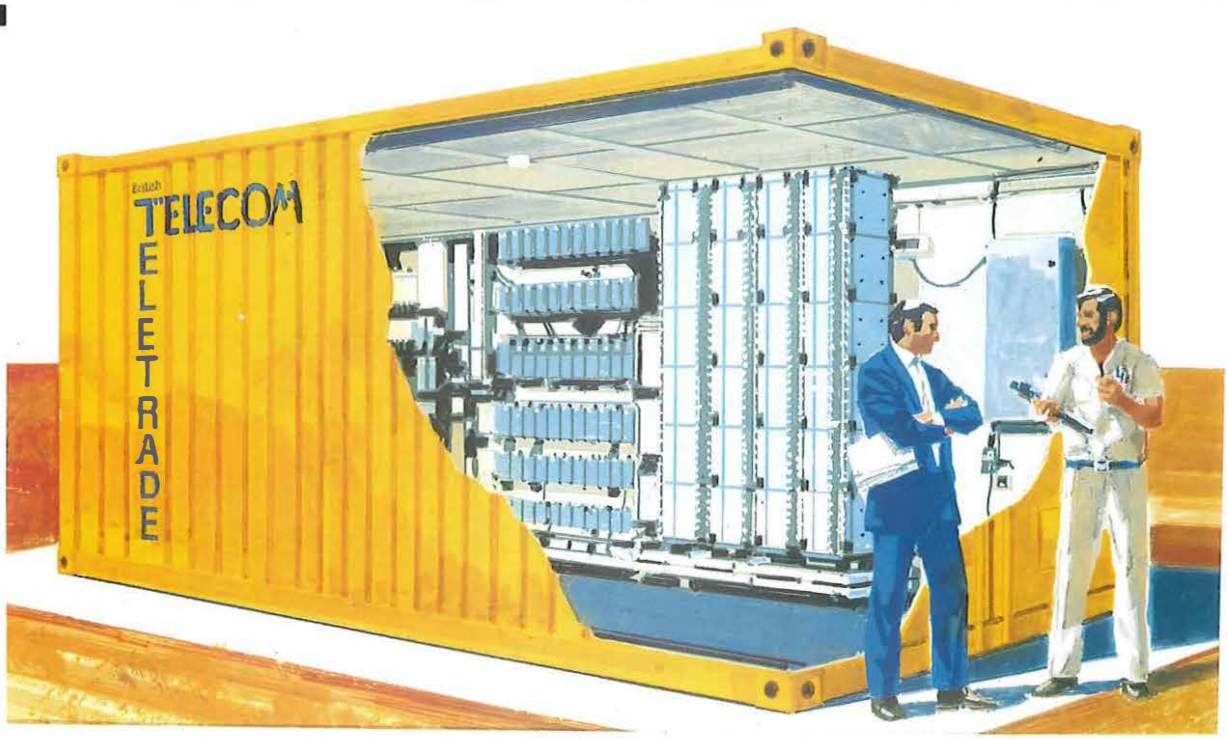

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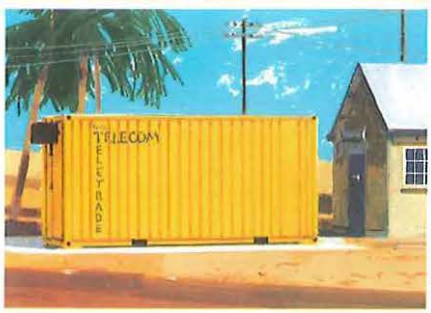

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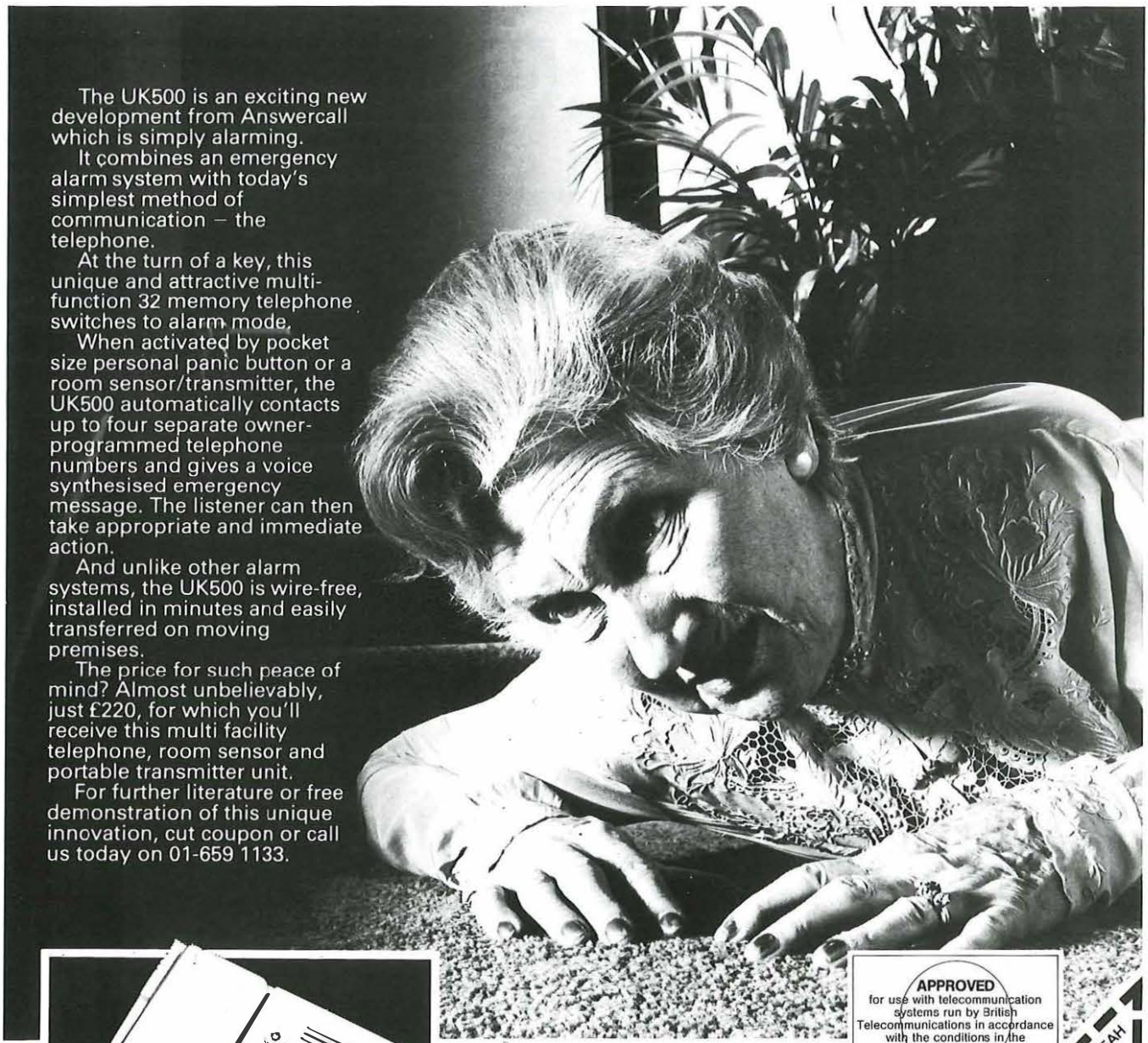

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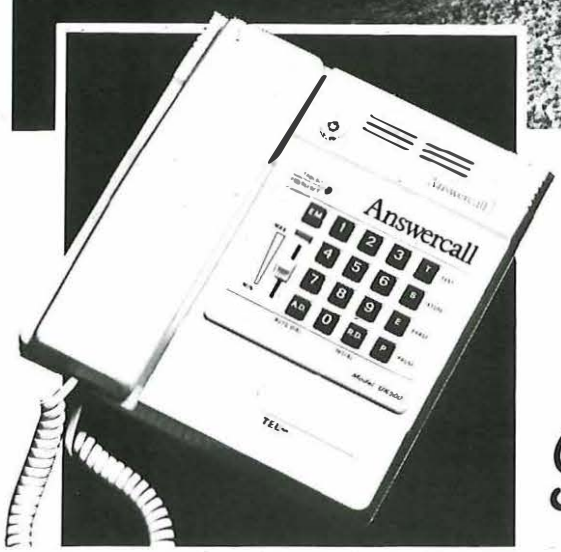

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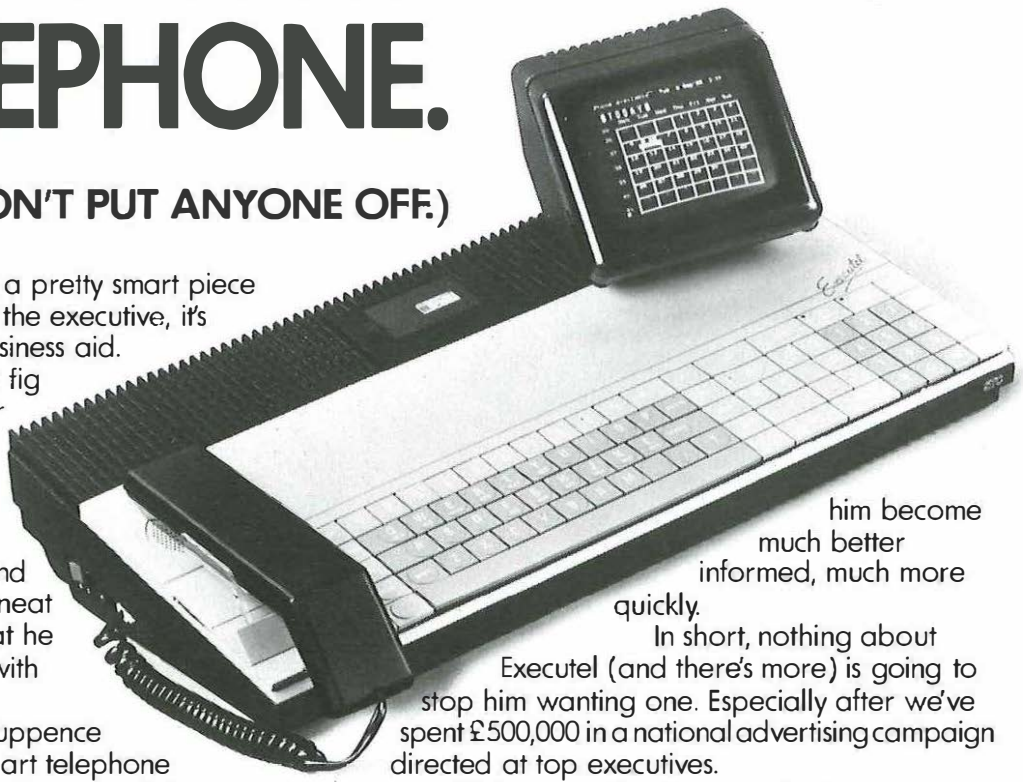

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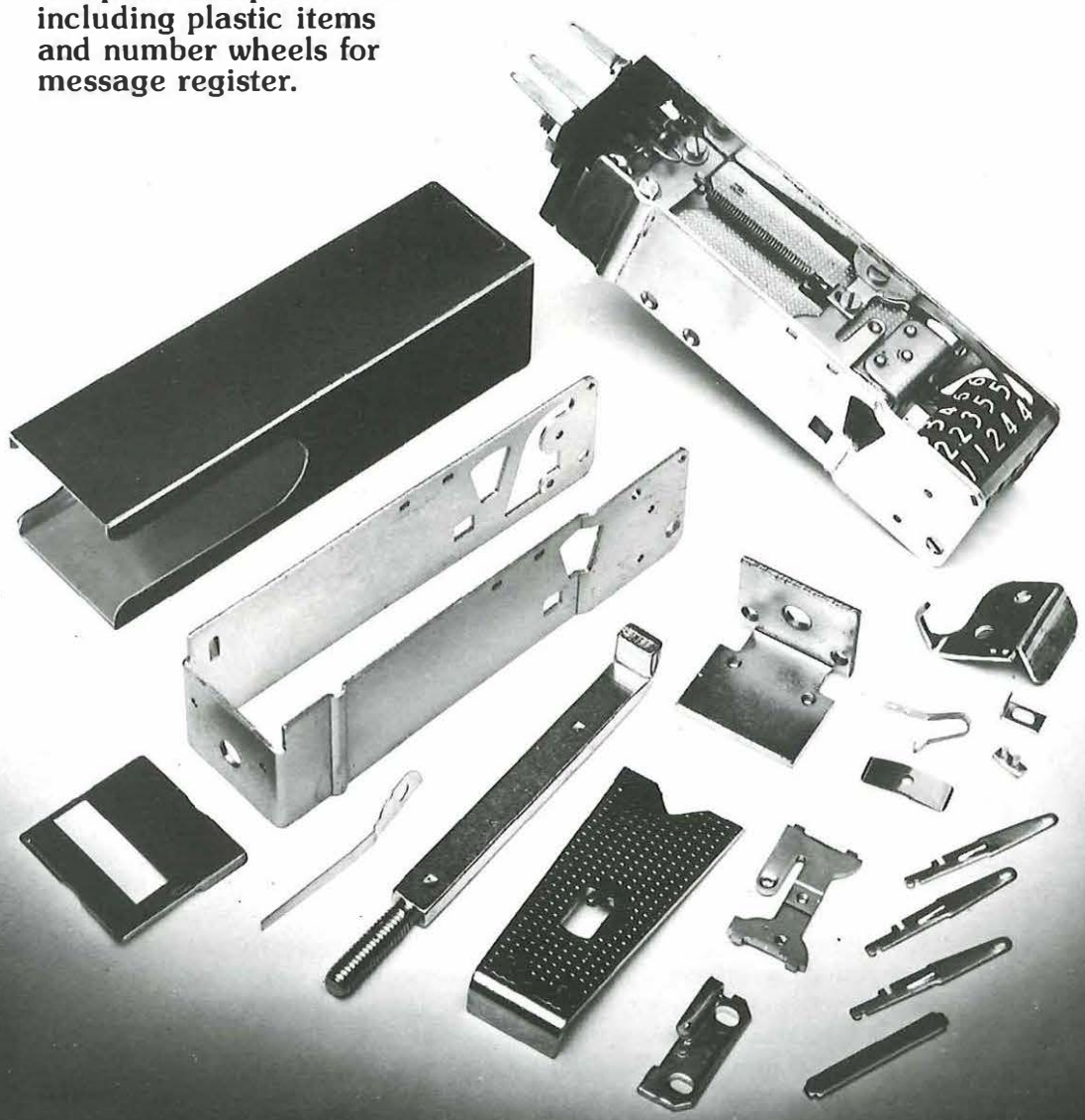

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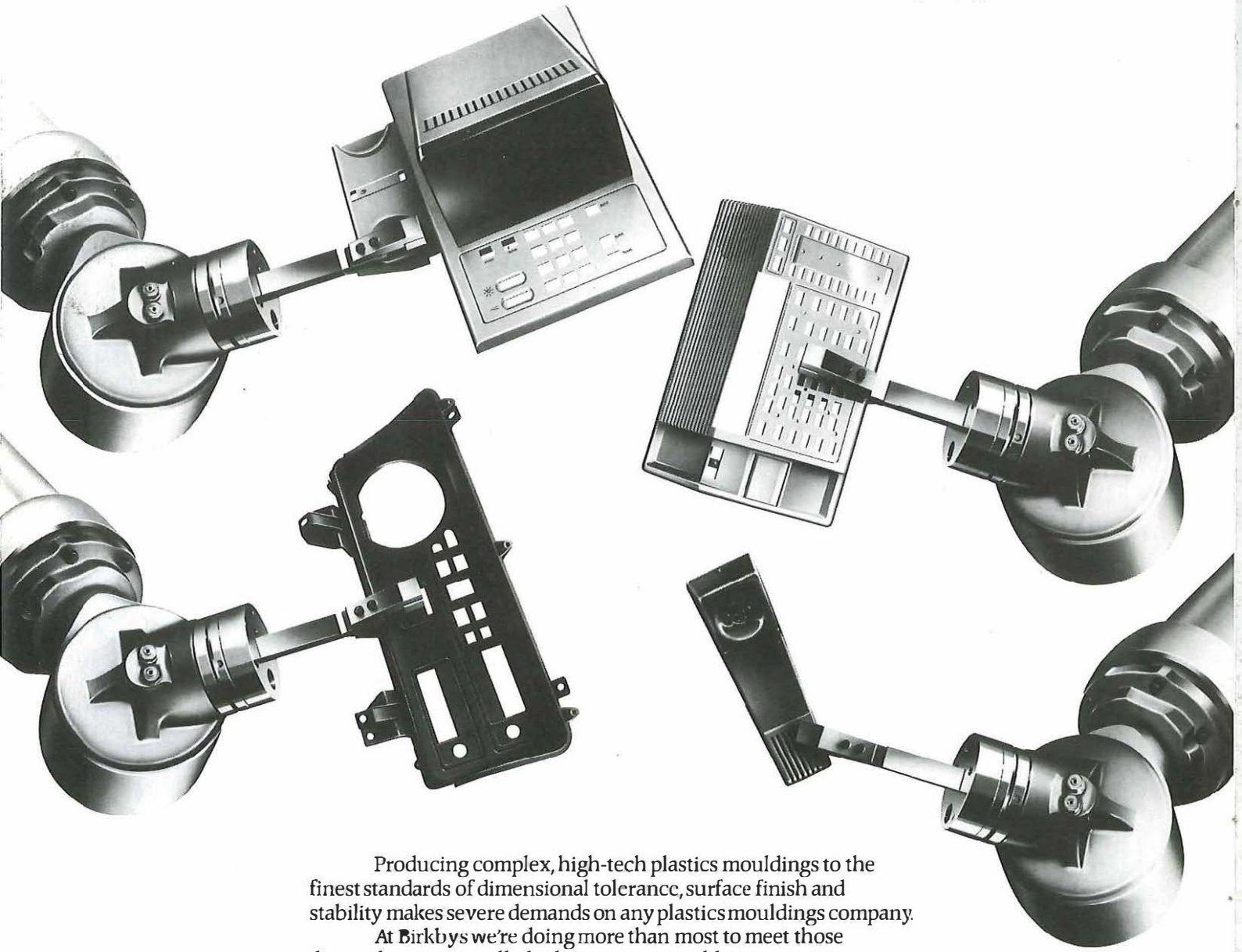

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All of which brings us to this phone's greatest attribute of all. The part you don't see.

The system behind it.

Called MD 110, it is far and away the most sophisticated telecommunication system available. And it has one priceless advantage.

It has the ability to accept any communications equipment. Either in use today, or even beyond the foreseeable future.

Obsolescence is just not part of its vocabulary.

It is digital. It will handle voice and data transmission simultaneously. It can operate as a single system in one location, or as a multi-location system spread across the country.

Distance makes no difference.

It undertakes all internal and external communication and it is cost effective from as few as 150 extensions, to as many as 12,500.

It is endlessly adaptable to change – expansion, relocation, computerization – any change in voice or data transmission needs.

You simply cannot outgrow it.

It can be phased into an existing system without disruption. Even accommodating existing telephones.

No company can afford to ignore the importance of communication. But the pace of change is such that most of today's telephone systems are out-dated before they can be installed. MD 110 changes all that – at the same time providing substantial savings in cost and time.

It is the single most effective step yet in taking business communications into the future.

Think about your company's needs over the next few years – for the next few decades. Then let us show you what MD 110 can do. Your present phone system can put you in touch with us.

But that is where any similarity ends.

THORN ERICSSON
Partners in Communication
THORN EMI ERICSSON

Viking House, Foundry Lane, Horsham, West Sussex. Tel: (0403) 64166

CUT THE COST OF LIGHTNING STRIKES

Lightning discharges are as unpredictable as they are unavoidable. The induced voltage surges which result can play havoc with modern microcircuitry. As electronic telecommunications equipment and data processing equipment grow in popularity, protection from these high energy transients becomes more and more vital.

Whilst gas discharge tubes have been used for primary protection from lightning strikes, their relatively slow response time lets through the leading edge of the surge, and for complete protection, a secondary surge suppressor is essential.

Lucas surge suppressors, which have been developed in close co-operation with British Telecommunications, are already specified for the lightning protection of System X line cards and are also used on a number of PABX and other subscriber apparatus.

The new range of Lucas surge suppressors offer the following advantages:

- Excellent clamping ability (either standard or FOLD BACK)
- Sharp breakdown, low slope resistance, and long-term voltage stability
- Wide operating temperature range
- Fast response times (1×10^{-12} seconds)
- Good average power dissipations
- Superior energy rating over standard zener diodes
- Insulated body enables greater packing density
- Generally fail-safe to short-circuit

Designers working to specific Government or Industry standards are invited to contact the Marketing Department at the address below for advice on the best choice of suppressor for their particular application.

Lucas Electrical

Lucas Surge Suppressors
Lucas Electrical Electronics & Systems Limited
Mere Green Road, Four Oaks, Sutton Coldfield, West Midlands B75 5BN
Telephone: 021-308 3501 Telex: 338461

No other Microwave Counter can give you performance like this!

This new frequency counter is a real workhorse that is compact, sturdy, and capable. No frills, just the performance you need at the price you'll like. Its 10Hz to 20GHz range is ideal for production and maintenance in civil and military communications, radio links and satellites.

Resolution is to 0.1Hz, with sensitivity of −20dBm from 10GHz. And with an acquisition time of only 200 ms, test time, and costs are reduced.

To cater for today's complex signals, the 2440 has high immunity for both f.m. and a.m. modulations. And the +27dBm damage level provides front-end reliability. Keyboard entry of offset frequencies allows the 2440 to display frequency changes as small as 0.1Hz on the clear LCD display.

The Microprocessor control gives simple operation, as well as allowing rapid service turn around. Integration into Microwave ATE systems is easy through the integral GPIB interface – with full programmability.

All this performance is efficiently housed in a case only half rack width – and supported by Marconi Instruments world wide distribution and back-up.

Where there's microwave counting to be done, choose the 2440. It's the performance you can count on.

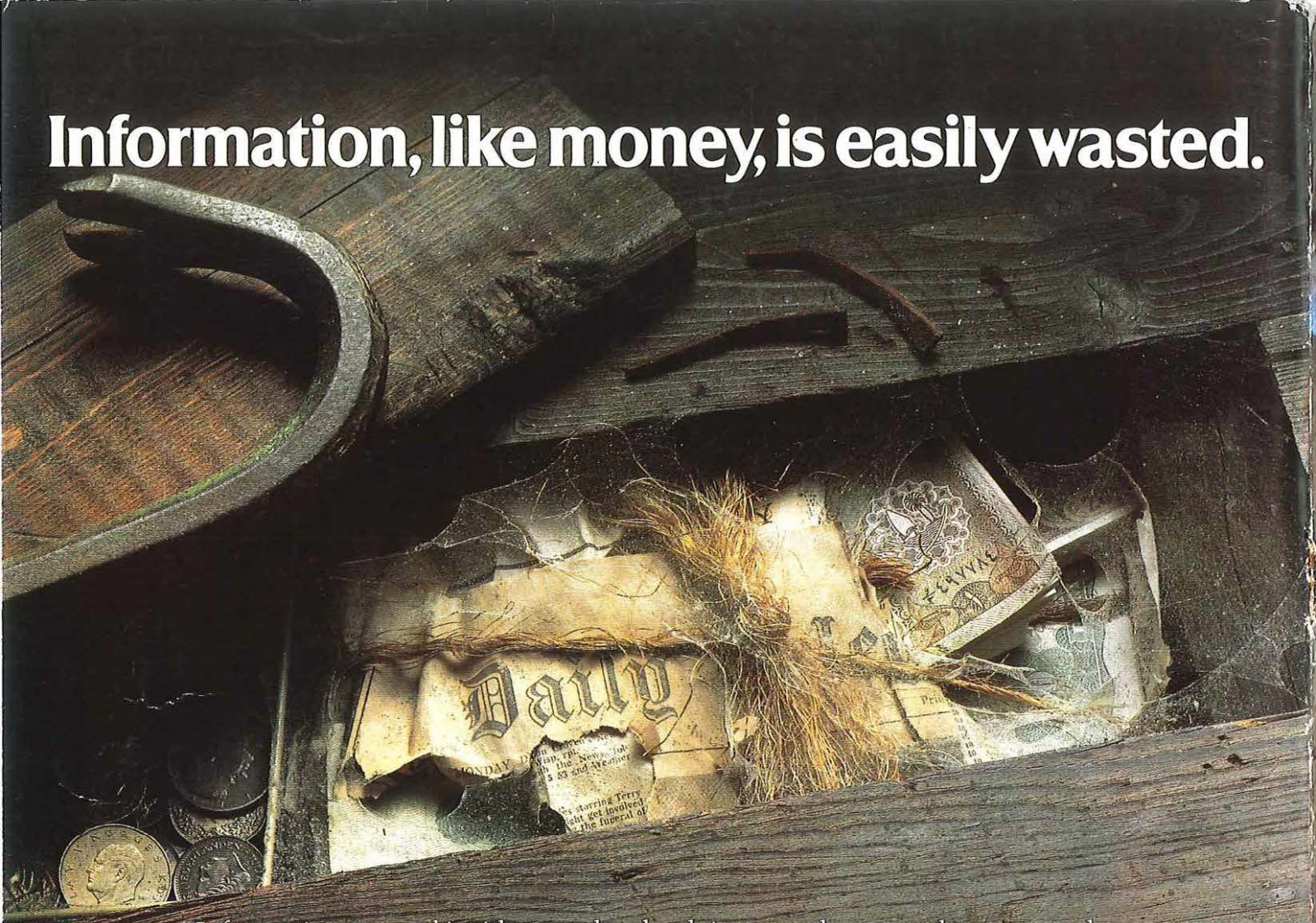
Marconi Instruments 2440 Microwave Counter

*Domestic UK price only.

marconi instruments

Marconi Instruments Limited, Longacres, St Albans, Herts. AL4 0JN. Telephone: (0727) 59292. Telex: 23350. FAX: (0272) 57481.

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.

Interactive Terminal Manager, based on PT7, offers multi-function VDU's and shared personal computing. Argus Pro-Personal Computer can be linked to ITM or, via Teletex Adaptor, to teletex.

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

From a company that's used to working alongside British Telecom – a cost-effective total Data Communications package.

For more information contact:
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Telephone: 061-499 3355, Telex: 668084

Information Systems expertise you can bank on.

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British Telecom Journal is printed by Alabaster Passmore & Sons Ltd, London and Maidstone, and is published quarterly in February, May, August and November by British Telecommunications plc. Design by Pencil, Reading