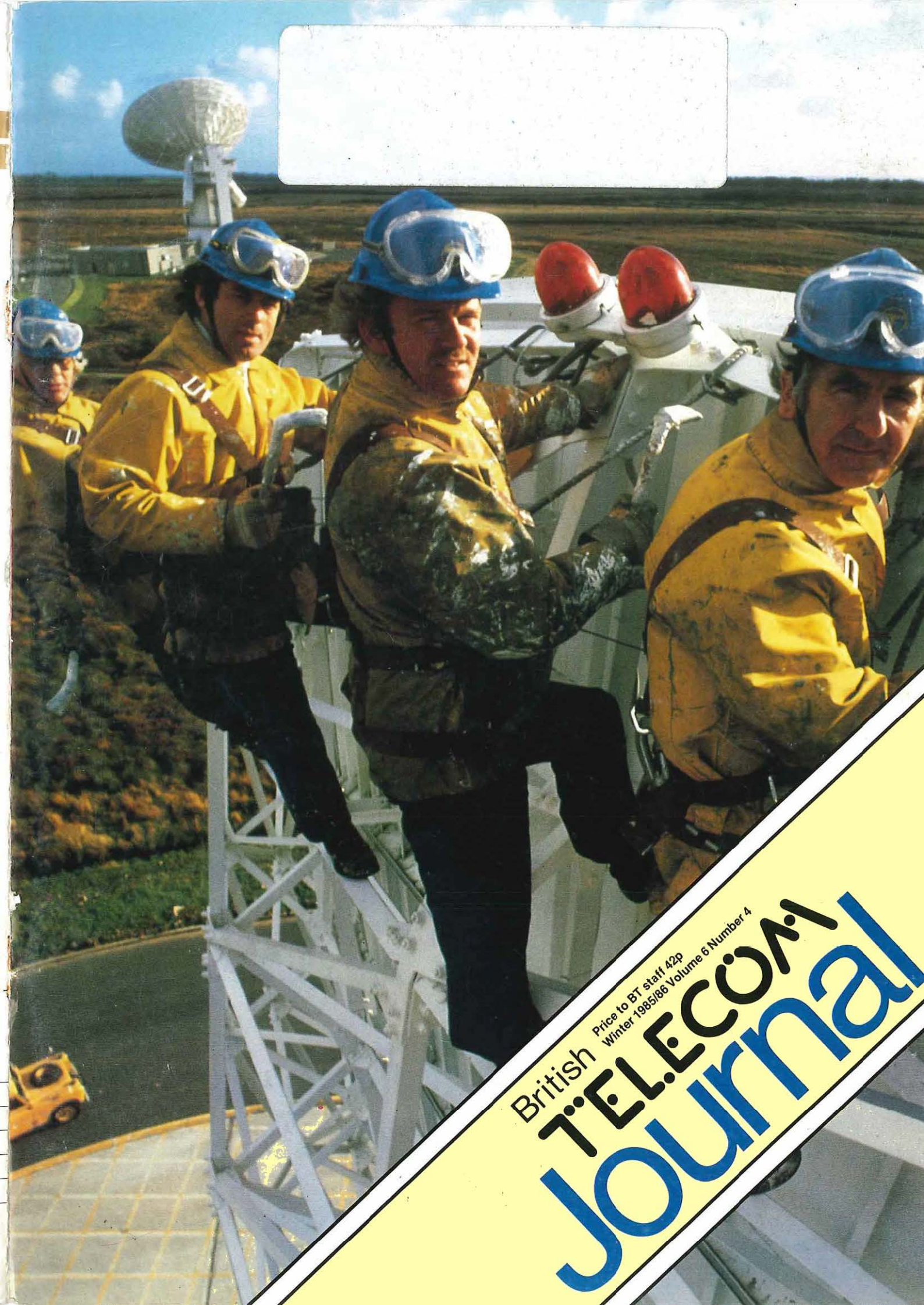
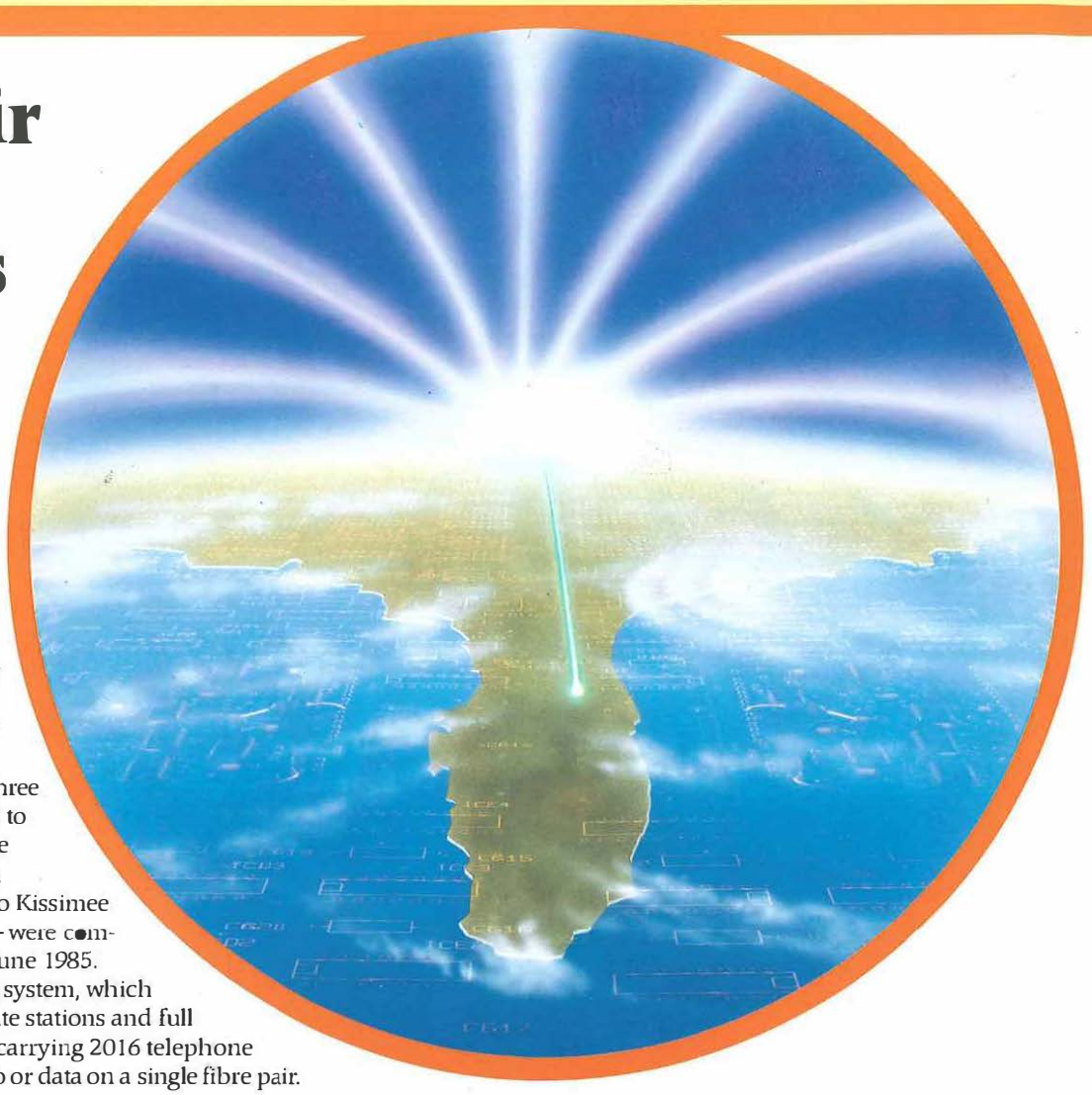


British TELECOM Journal

Price to BT staff 42p
Winter 1985/86 Volume 6 Number 4

PLESSEY INNOVATIONS FOR COMMUNICATIONS

Plessey flair starts the Lightwaves flowing in Florida



Plessey Transmission Systems is right on schedule with its 140Mbit/s Lightwave programme for the United Telephone Company of Florida.

Plessey was awarded a contract in October 1984 to supply 140Mbit/s Lightwave optical fibre system and M34E Muldex systems for Phases 1, 2 and 3 of United's four-year programme. These first three phases, from Winter Park, Orlando to Kissimee, Fort Myers to North Cape Coral, Fort Myers to Port Charlotte, Ocala to Leesburg and Avon Park to Kissimee – a total system length of 290 km – were completed on schedule, by the end of June 1985.

Each 140Mbit/s optical fibre system, which includes line terminals, intermediate stations and full supervisory systems, is capable of carrying 2016 telephone channels or the equivalent in video or data on a single fibre pair.

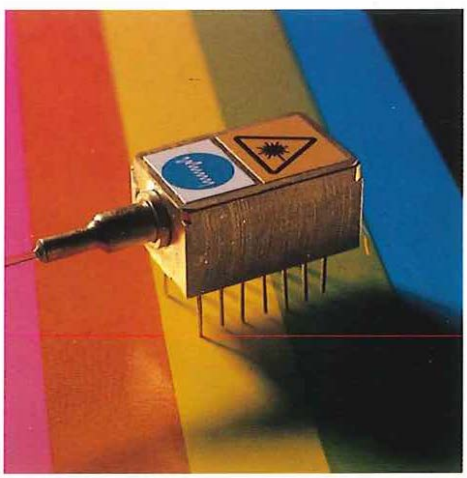
and notches up a string of fibre optic firsts.

Providing for future telecommunications needs like these is how Plessey Transmission achieves and maintains its leading capability in high-capacity optical fibre systems.

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

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

They include the first optical fibre systems put into normal traffic in the UK, the first long wavelength optical fibre system in normal traffic service in the world, Britain's longest optical fibre link, the longest operational unrepeatered optical fibre link in the world and the world's first commercial contract for a 565 Mbit/s optical fibre highway, now installed between Nottingham and Sheffield.



Plessey has started work on a second major US contract worth over $18 million, for US Telecom's Chicago-San Francisco fibre optic link, and is about to build another 565 Mbit/s communication highway between Sydney and Melbourne in Australia.

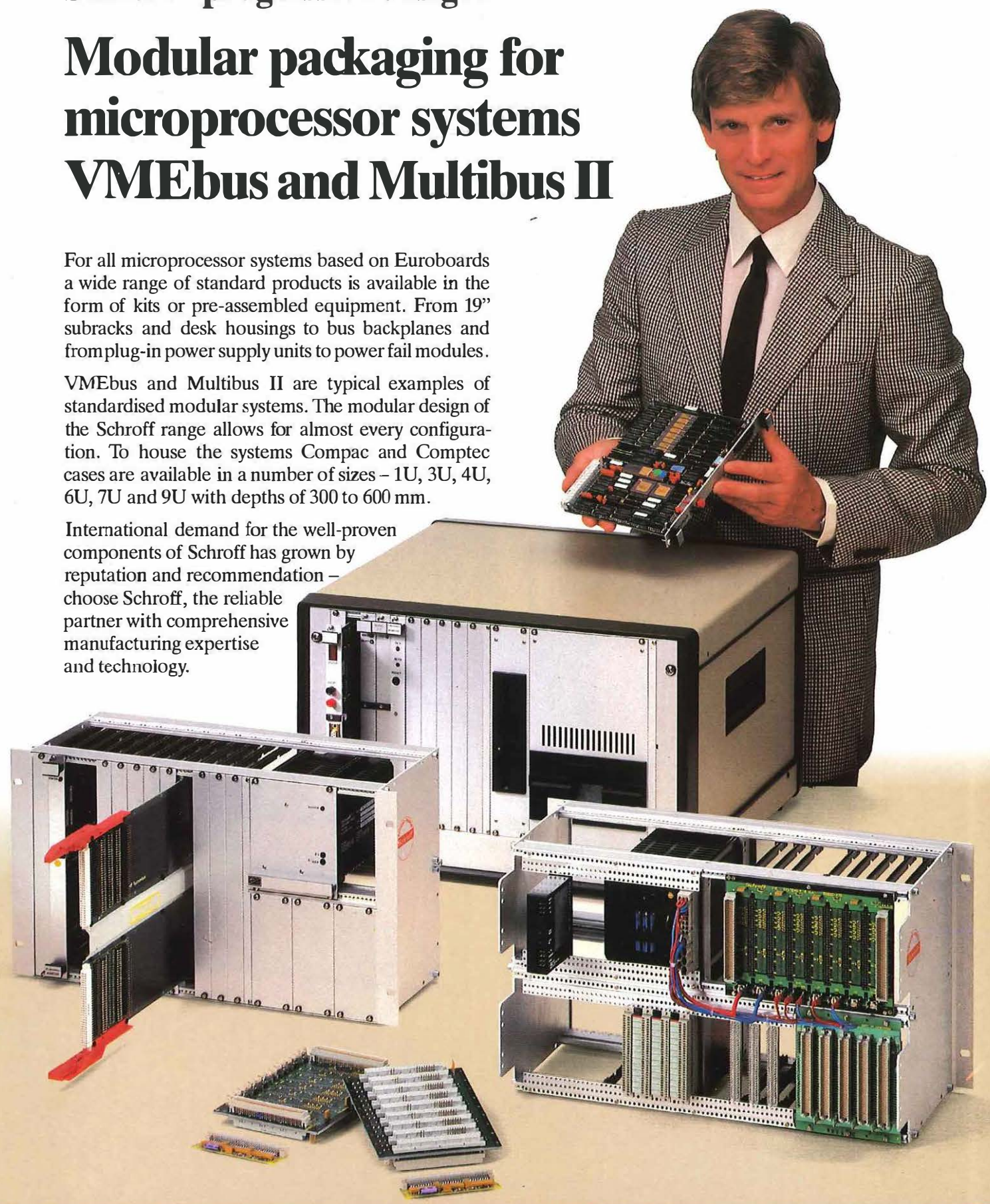
For further information, contact Mike Hocking, Transmission Systems, Plessey Network & Office Systems Limited, Beeston, Nottingham, United Kingdom NG9 1LA. Tel: Nottingham (0602) 254831, ext. 3542. International telephone: 44 602 254831. Telex: 37201.

PLESSEY

PLESSEY and the Plessey symbol are trade marks of The Plessey Company plc.

Schroff – progressive design:

Modular packaging for microprocessor systems VMEbus and Multibus II



For all microprocessor systems based on Euroboards a wide range of standard products is available in the form of kits or pre-assembled equipment. From 19" subracks and desk housings to bus backplanes and from plug-in power supply units to power fail modules.

VMEbus and Multibus II are typical examples of standardised modular systems. The modular design of the Schroff range allows for almost every configuration. To house the systems Compac and Comptec cases are available in a number of sizes – 1U, 3U, 4U, 6U, 7U and 9U with depths of 300 to 600 mm.

International demand for the well-proven components of Schroff has grown by reputation and recommendation – choose Schroff, the reliable partner with comprehensive manufacturing expertise and technology.

Schroff UK Ltd., formerly T. Foxall + Sons Ltd.
Maylands Ave · Hemel Hempstead · Herts HP2 4SG
England · Telephone (0442) 40471-9 · Telex 825658
Manufacturing and distribution

19" Systems for electronics packaging

Schroff UK Ltd.

THE LONDON NUMBER YOU ARE CALLING IS NOT IN SERVICE. PLEASE CALL 0344-51915".

From Dynamic Logic, Tadiran's UK-built DCI-270 Digital Changed Number Interceptor in action. Once installed at the Telephone Exchange, our computer controlled system is easily programmed to give each subscriber line a discreet number in the announcement.

- *Modular construction: 16 to 768 service lines*
- *Clear voice production • Choice of introductory message*
- *Numbers up to 10 digits • Keypad security lock*
- *Field proven reliability • Cost effective*
- *Self-diagnostics • Easy maintenance*
- *Software controlled charging*

"British Telecom's choice... now in service in the United Kingdom"

dynamic logic

TADIRAN

Please contact Mike Parsons on 0344-761317
Dynamic Logic Ltd., The Western Centre, Western Road
Bracknell, Berkshire RG12 1RW
Tel. 0344-51915; Telex: 849433

One telephone call

That's all it takes to set a nation talking

One telephone call to TCL will give you ready access to a total telecommunications service. With the vast resources of GEC and 50 years experience to call on, we have the capability to complete any-size network on a turnkey basis. We design, supply, install and commission . . . **one** call, **one** company.

TCL

Telephone Cables Limited, Dagenham, England.
Telephone: 01-592 6611. Facsimile 01-592 3876.
Telex: 896216 Drycor G

`Opening Time for the new Bix Cabinet´

OUTDOOR BIX*

External Cross Connect System

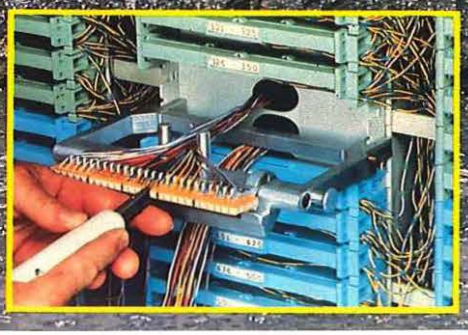
WEATHER BEATER

- Connector with sealant protection.
- Protective retainer.
- Self-closing cover.
- Moulded-in hinge.
- Salt fog tested.
- Perforate in all cabinets.

TIME SAVER

- 25 pair I.D.C. connector.
- Colour coded terminating fixture.
- Dual purpose connection tool.
- Colour coded retainers.
- Modular system.
- Designation labels.

The Bix System can be installed in all existing BT Cabinets, No's 1 to 5.



nt northern telecom

*A Trade Mark of Northern Telecom Ltd.

SOLE UK DISTRIBUTOR

EBONESTOS

A DIVISION OF CRYSTALATE ELECTRONICS LTD.

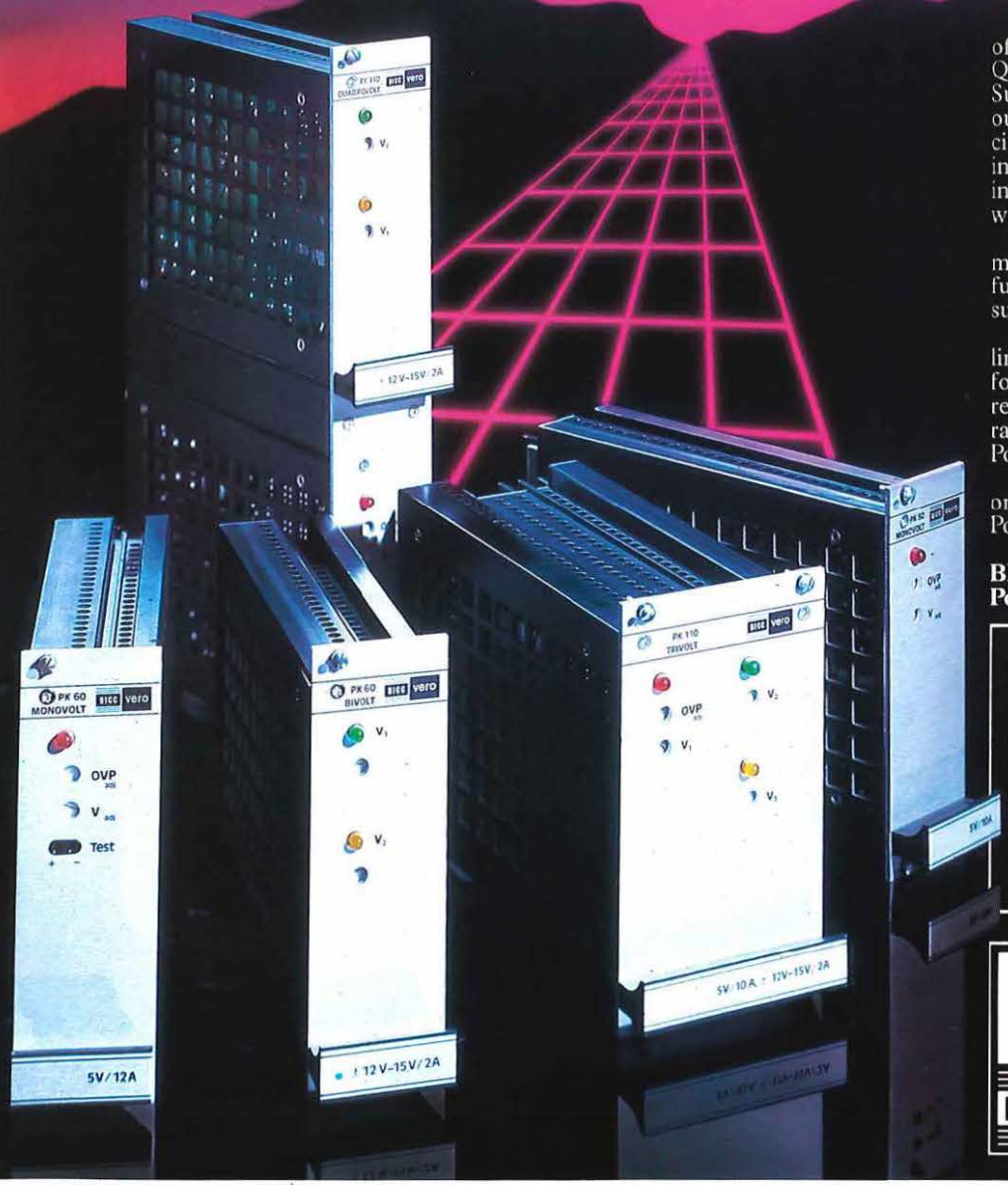
ROLLINS STREET, LONDON SE15

TEL: 01-639-2080 TELEX: 885843

If your system is dependent on a reliable plug-in Switched Mode Power Supply then you need to choose from the many options now offered by BICC-VERO.

Advanced MOSFET technology has enabled us to maintain and improve the high quality and performance for which we have become known. Thus ensuring longer life and maximum efficiency **well into the future.**

Mosfet Spacesaver power supplies will take you well into the future.



Our expanded and comprehensive range of primary pulsed Mono, Dual, Triple and Quad voltage rail Switched Mode Power Supplies range from 25 watts to 110 watts in output – all with remote sensor facility, short circuit protection and optional power fail indication. This range of power convertors include d.c. to d.c. as well as the more widely used a.c. to d.c.

Their compact design and plug-in ability maximises packaging densities, and they are fully compatible with the latest european 19″ subrack standards.

Also available is a range of high quality linear power supplies based on the Eurocard form factor and for those customers that require higher power outputs we have a range of open-frame Switched Mode Power-Supplies rated up to 400 watts.

Telephone or write for further information on the complete range of Switched Mode Power Supplies all available from stock.

Whatever your system requirements BICC-VERO have a Switched Mode Power Supply to support you.

DATA FILE

* Advanced MOSFET Technology
* Mono, Dual, Triple and Quad Voltage Rails
* Available in 3u and 6u High Modules
* New DC to DC Convertors – 60 Watts
* Primary Pulsed with Optional Powerfail Indication
* Expanded Range Including Open-Frame and Linear Models
* Compatible with European 19″ Subrack Standards

VERO

BICC ELECTRONICS

Also available from the following Distributors:
STC Electronic Services & Verospeed.

BICC-VERO ELECTRONICS LIMITED
Industrial Estate, Chandlers Ford, Eastleigh, Hants. SO5 3ZR. Tel: (04215) 60211.

MOSFET SPACESAVER POWER SUPPLIES

Leaders in electronic packaging technology

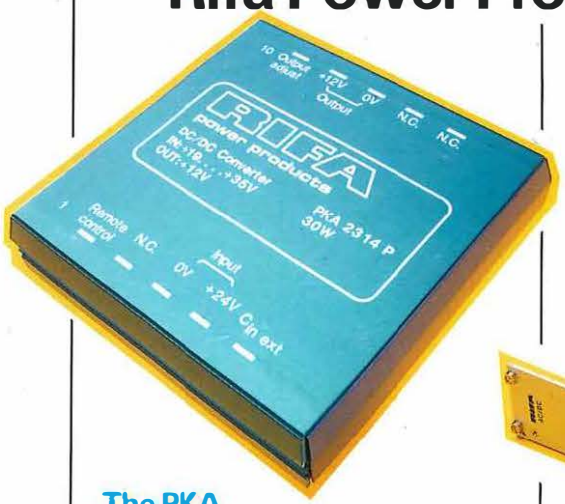
Telefault T50
Telefault-T50 is a 'state of the art' pulse-echo fault locator for telecommunication cables up to 4,000 metres long.
Microprocessor based and utilising a large LCD graphics panel, Telefault-T50 offers an entirely new degree of flexibility to meet specific customer requirements.
Simple and accurate location of 'disconnection' and 'contact faults'.
Can be calibrated to any type of cable insulation.
Unaffected by impressed or induced voltages on the pair under test.
Long periods of operation between battery re-charges.
Easily read display, even in bright sunlight.
Close-up faults located without using delay lines on extra coils of cable.
CSD
Circuits & Systems Design
CSD INSTRUMENTS LTD.
Unit 66, The Maltings,
Standsted Abbots, Ware,
Herts SG12 8HG
Telephone 0920-871634
Telex 81407 CSD INS
SEE US AT COMMUNICATIONS '86
*The Telefault-T50 under evaluation with British Telecom Northern Ireland.

"The challenge in power"

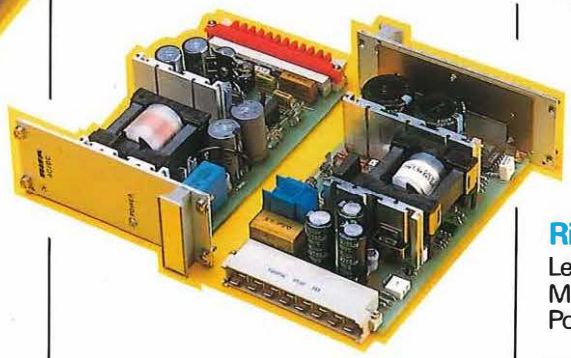
YOU CAN HAVE ANY POWER SUPPLY

So long as it's blue

Rifa Power Products Announce New Ranges



including professional DC/DC converters for telecommunications, and competitively priced AC/DC units in Eurocard format. Power ratings have been extended too, now covering from 10 to 300 Watts.



The PKA

Whilst it's true to say that our little blue box, the Rifa PKA DC/DC converter, has been a resounding success, we're the first to admit that it's not everyone's cup of tea. It is still, of course, the smallest, cheapest and most reliable 25-40W DC/DC converter of its type in volume production today. And its MTBF figure of 200 years has yet to be surpassed.

New Standard Products

But in order to satisfy every possible need Rifa now offers no less than 32 brand new standard power units,

New Custom Service

And if you still can't find a unit to suit your application you can now take advantage of Rifa's outstanding custom design and production service. We'll produce prototypes in 6-8 weeks and be in full production within 6 months. It's an unbeatable service for both AC/DC and DC/DC power supplies in ratings up to 300 Watts.

New Reliability Standards

With over 100 years experience in power, and more than 20 years in switched mode powersupplies, Rifa Power Products is setting new standards in quality (like 300 year MTBFs!) and offering a production capability which is unrivalled anywhere.

Rifa Power Products

Leading Europe in Power Supply Manufacture. Leading the World in Power Supply Technology.

RIFA
power products

Rifa Power Products
5th Floor, Market Chambers,
Shelton Square,
Coventry CV1 1DJ
Tel: 0203 553647

Please tick boxes for information on:
PKA Modular DC/DC converter ☐ Standard DC/DC converters up to 300 Watts ☐
Eurocard AC/DC power supplies ☐ Custom design facilities ☐

Name
Title
Company
Address
Telephone

See us on Stand 206
POWER UK 89
POWER SUPPLY & CONVERSION CONFERENCE/EXHIBITION

Exchange
FAULT
STATION
FAULT
Cable
FAULT

ALL THE SIGNS SHOW THAT 4 TEL REALLY WORKS

The introduction of 4 TEL lets you run your customer service organisation at the highest level of efficiency and economy. Faultsmen are directed straight to the trouble spot, cable, exchange or station, with high accuracy.

The evidence all points to the same conclusion. That 4 TEL is a most effective way of improving customer service and saving money. In the UK currently 4 TEL is working hard in Bath, Bristol, Birmingham, Chichester, Hull, Mayfair and Portsmouth. A total of more than 1.3 million lines.

It performs, on demand, a comprehensive series of line tests and diagnostics – enabling faults to be pinpointed quickly. In most cases well before your customer is even aware there's a problem.

In addition, 4 TEL tests every line every night for quality; the results are analysed and presented on a printer at the RSC the next morning.

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

For the full story contact Teradyne. Telecommunications Division, Teradyne Limited, The Western Centre, Western Road, Bracknell, Berks. RG12 1RW. Telephone: Bracknell (0344) 426899. Telex: 849713.

TERADYNE

British Standards from SMITH CASES

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

We are willing to design and manufacture to order, and many other systems are under development at the present time – enquiries welcome.

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

Monarch PCB Diagnostic
Monarch Console
Monarch 56508 Mk2 Kit
IBM System Base & LID
IBM System Tray
Herald 'A' PCB Diagnostic
Herald 'C' PCB Diagnostic
Merlin 52616
Merlin 56022
Cheetah T1x Monitor/Keyboard
Cheetah T1x PCB Diagnostic
Plessey IDX PCB Diagnostic
Plessey ACD Kit
Viceroy Powerpack Kit
Viceroy Console/PCB Kit
Kinsman/Regent 245/247 Console Kit
Kinsman PCB Diagnostic Kit
Regent PCB Diagnostic Kit
Rhapsody Kit
Ensign Kit
Senator Kit
TEP-1E Transit Case

REMEMBER, ESD COSTS MILLIONS GET INTO THE HABIT. DON'T ZAPP IT

For further information contact:

18 Betts Avenue
Martlesham Heath Industrial Estate
Ipswich, Suffolk IP5 7RH
Phone: (0473) 623301
Telex 987703
(prefix SMITHCASES)

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.

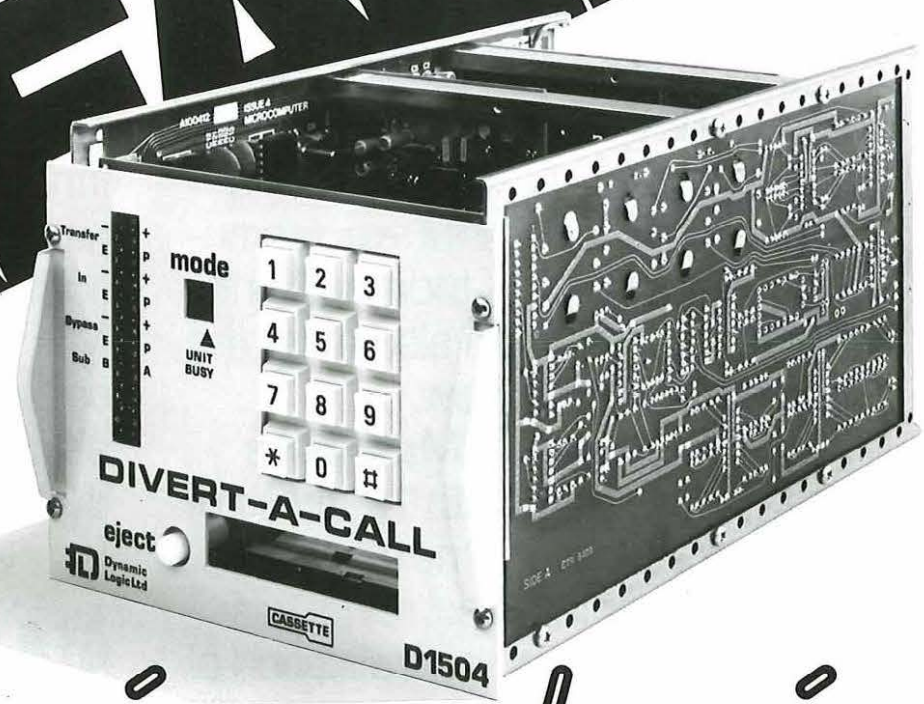
The subscriber can select or change destinations from any location within the telephone network using a synthesised speech facility which is protected by a security code.

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.

THE PHANTOM OFFICE BECOMES A REALITY



dynamic logic

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

THE PRINCIPLE BEH NETWORK MACHI

AT&T and Philips Telecommunications is uniquely qualified to plan and design a range of telecommunications network systems to meet the needs of any administration in the world.

Our star performer is a digital switching system, called the 5ESS-PRX. Although we prefer to refer to it as 'The Network Machine'. It is the latest and most advanced development in the area of public switching. 6 million lines have already been installed proving its flexibility and reliability.

When we started out to develop this system, we recognised that all its advanced technology had to be focussed to satisfy one simple need – flexibility – simply because the successful telecommunications system of today will only be the one that can also meet the demands of tomorrow.

The Network Machine is designed to grow with the needs of any administration – no matter how vast, or complex. It achieves this through the effective application of micro-processor technology.

It can expand or reconfigure to meet the changing needs of any given administration at any point in time. It does so economically, too. These changes can be achieved without replacing the system – but by adding or taking away from it. Nothing could be easier.

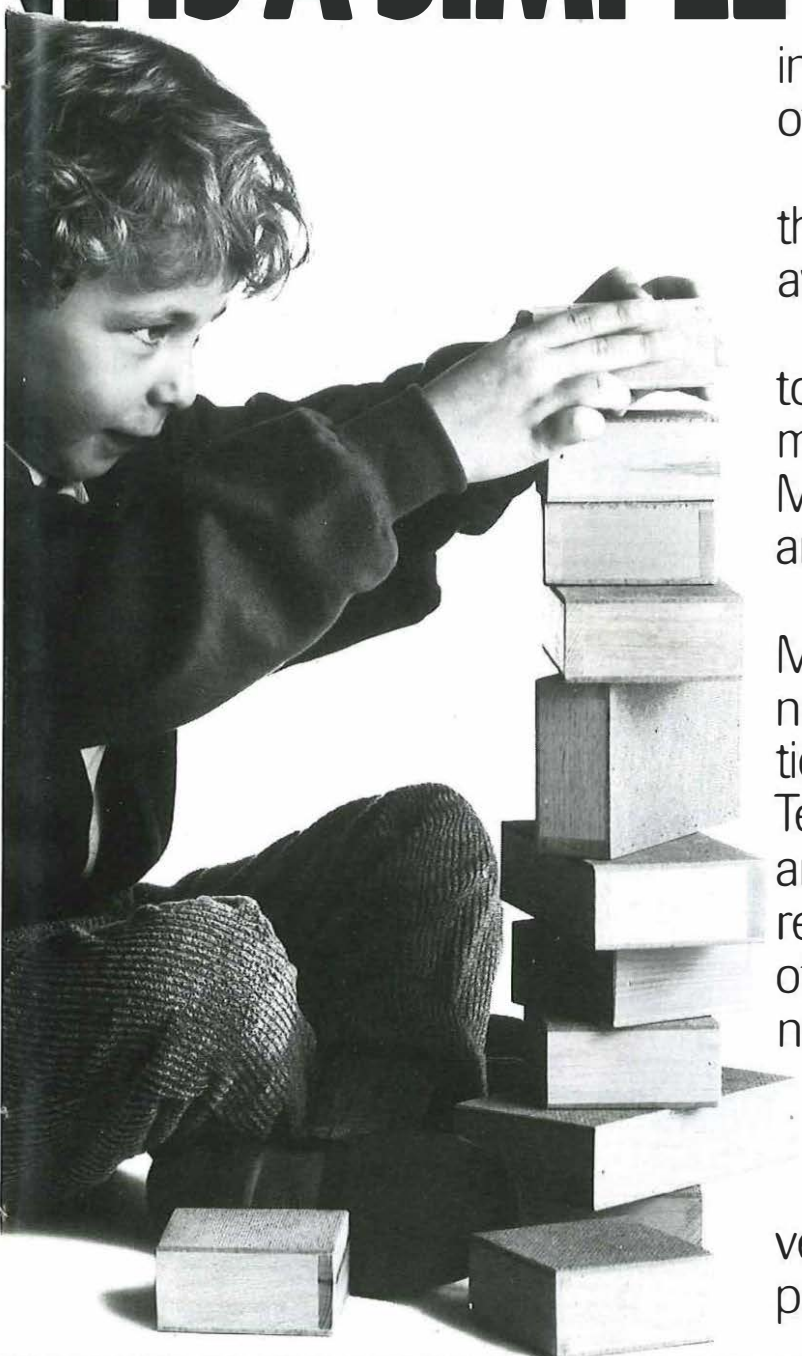
No matter what type of function it serves: local, tandem, transit, national or international, the Network Machine always operates at optimum efficiency and profitability in any network topology.

It can also look after the

AT&T AND PHILIPS TELECO

AT&T

IIND THE 5ESS-PRX
NE IS A SIMPLE ONE.



needs of business as well as those of the private individual, with such services like freephone dialing and the powerful combination of ISDN and Centrex.

In fact, it offers more features than any other system currently available.

So much so that it's difficult to imagine any advanced telecommunications task that the Network Machine cannot perform, reliably and cost-effectively.

The 5ESS-PRX Network Machine is designed to meet the needs of all types of administrations. And AT&T and Philips Telecommunications is qualified and experienced to act as a reliable partner in the formulation of a national telecommunications network.

AT&T and Philips Telecommunications, J. v.d. Heydenstraat 38, P.O. Box 1168, 1200 BD Hilversum. The Netherlands. Telephone: +31 35 87 31 11. Telex: 43894.

MMUNICATIONS. YOUR CONNECTION WITH THE FUTURE.

PHILIPS

Improving Customer Services

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

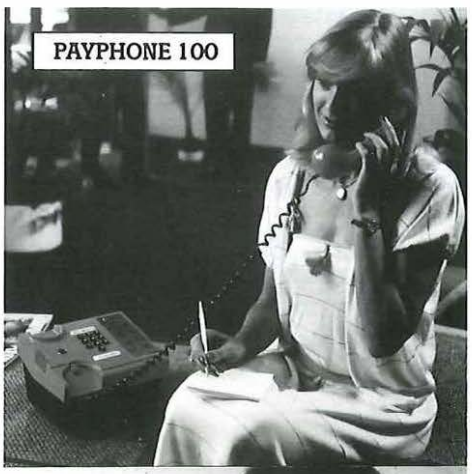
PAYPHONE 100
Table Top Payphone
Extremely convenient to use either as a normal telephone or as a payphone for calls made in clubs, restaurants, bars, hotels, guest houses, etc.
The renter has access to the cash box and all calls are charged at the subscriber rate.

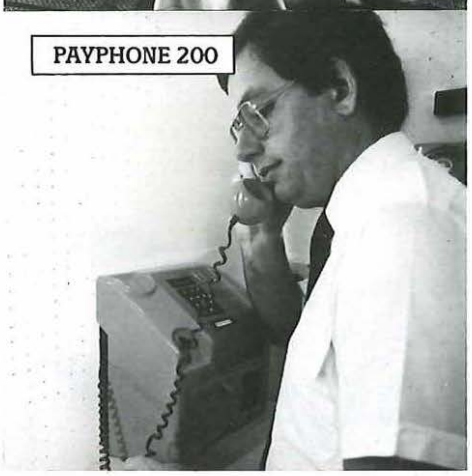
- DUAL MODE OPERATION
  Coin or no coin operation—payphone or subscriber mode as determined by renter.
- MULTI-COIN ELECTRONIC VALIDATION
- COIN STORAGE AND REFUND FACILITY
- SIZE: 230 x 200 x 152mm

PAYPHONE 200
Indoor, Wall Mounting Payphone
A worthy successor to the current electro-mechanical payphones, the Payphone 200 capitalises on the reliability and many other inherent advantages of today's microprocessor technology.

- MULTI-COIN ELECTRONIC VALIDATION
- LARGE CASH DRAWER
- STEEL WALL MOUNTING FRAME
- SIZE: 310 x 260 x 190mm

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





AGI

A member of the LANDIS & GYR group

Aeronautical & General Instruments PLC,
Company Headquarters and Central Marketing,
Wickham House, 12 St. Thomas Street,
Winchester, Hants.
Tel: (0962) 67035 Telex: 47610

'Information from a very reliable source...

If you are relying on an ordinary telephone answering machine to give out information to a large number of telephone enquirers, you are probably having to minister to it on a regular and expensive basis.

And what about all those frustrated callers who don't get the information they require and you promised?

The Storacall Multi Line Announcer is a professional answer-only system capable of coping with just one line or many hundreds. It is designed to operate year in, year out without problems.

The Storacall Multi Line Announcer is available on rental or outright purchase and is backed by Nationwide Field Service.

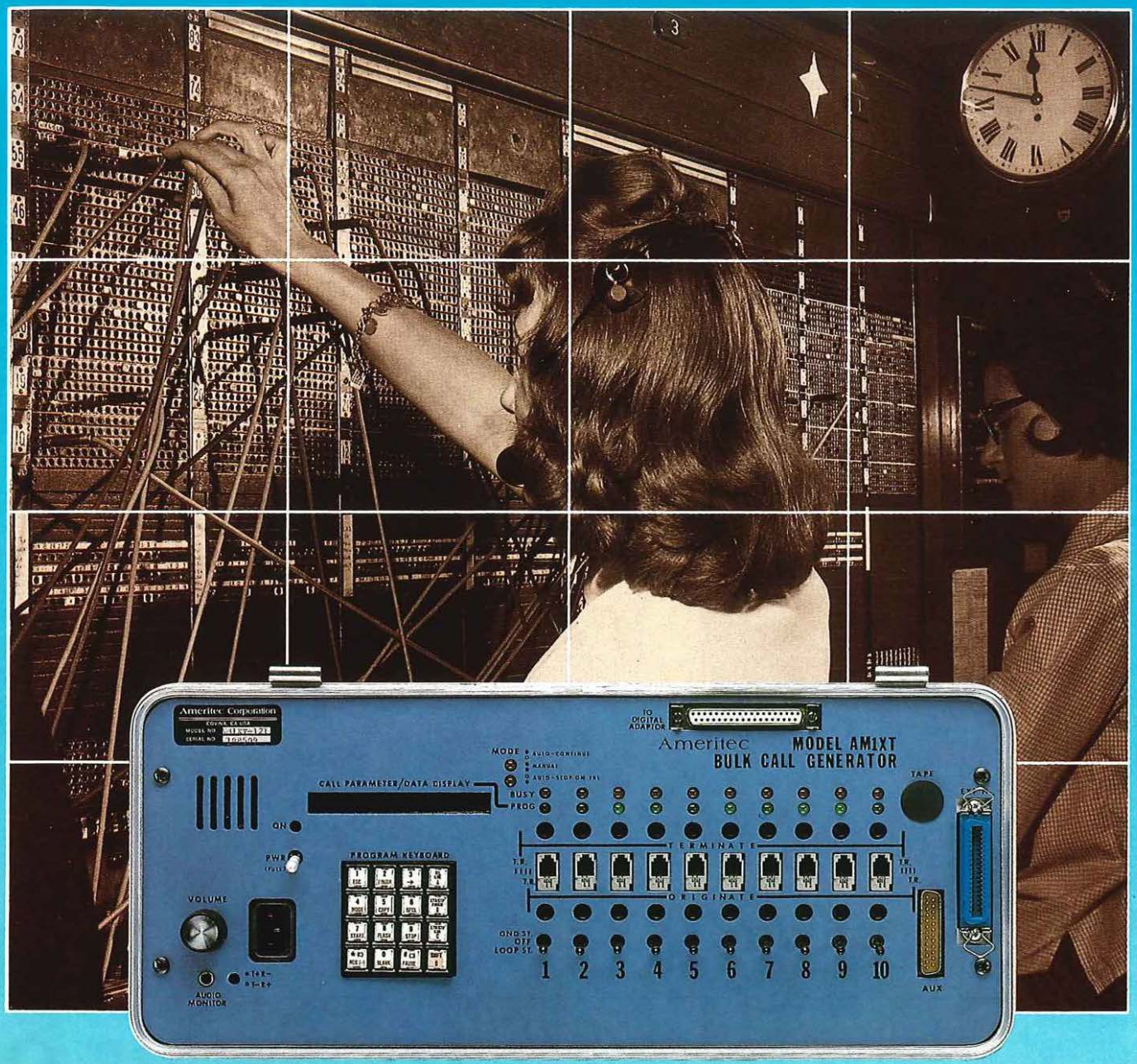
If your business involves you in giving out information over the telephone **reliably** — then get details of "the reliable source".

Find out about the Storacall Multi Line Announcer.
Clip the coupon or **ring 01-891 3321** anytime.

Storacall
MULTI LINE ANNOUNCER
The right answer every time-all the time

Regional Offices. Head Office 28 York Street, Twickenham, Middx. TW1 3LJ 01-891 3321.
1 Campfield Arcade, Tonman Street, Deansgate, Manchester M3 4FN 061-833 0860.
6 Alfreton Road, Canning Circus, Nottingham NG7 3NG 0602 705907.
49 High Street, Cheltenham, Gloucestershire GL50 1DX 0242 33181. 55 Eastern Esplanade, Southend-on-Sea, Essex 0702 63336.

To: **Storacall, 28 York Street, Twickenham, Middx TW1 3LJ** **01-891 3321(24hours)**
Please send me the brochure and details about the MULTI LINE ANNOUNCER
Name _____
Company _____
Address _____
_____
_____ Tel.No. _____



Now there's an easier way to load test up to 75,000 calls per hour.

The fully programmable Ameritec AM1XT series has been designed for simple, convenient automatic load-testing on telephone switching equipment. Bulk call generation has never been faster, more reliable or more precise.

Compact and portable, the modular units comprise everything you need to simulate a traffic load on 1-450 ports, handling anything up to 75,000 calls per hour. The perfect answer to debugging and proving switching hardware during development and to testing every channel in PBX digital switching systems. Two modes of testing are available either random access or flood.

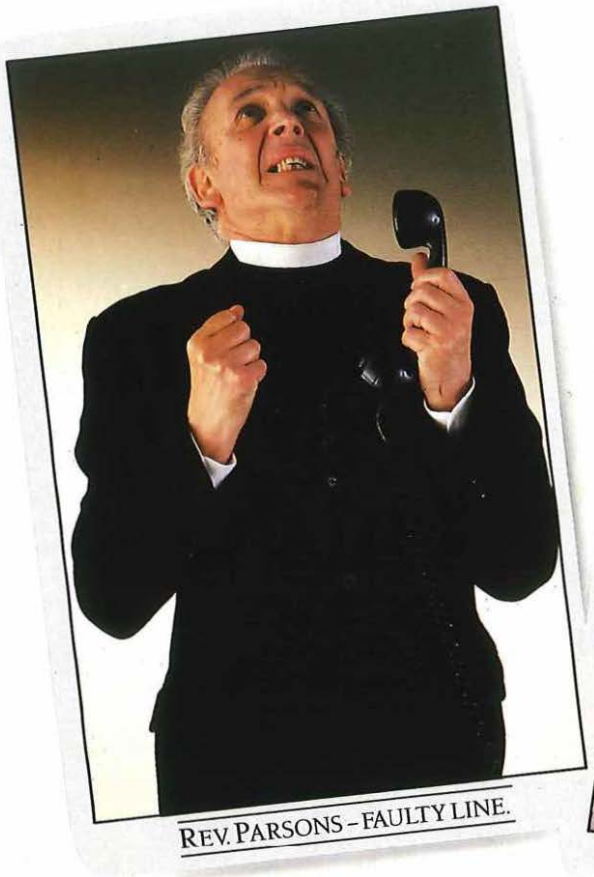
Comprehensive completion/failure statistics are recorded in memory for later read-out, and the system can also be linked direct to an external printer, terminal or computer. The AM1XT can be operated in continuous mode or stop-on-trouble mode.

Ameritec. Making light of load-testing.

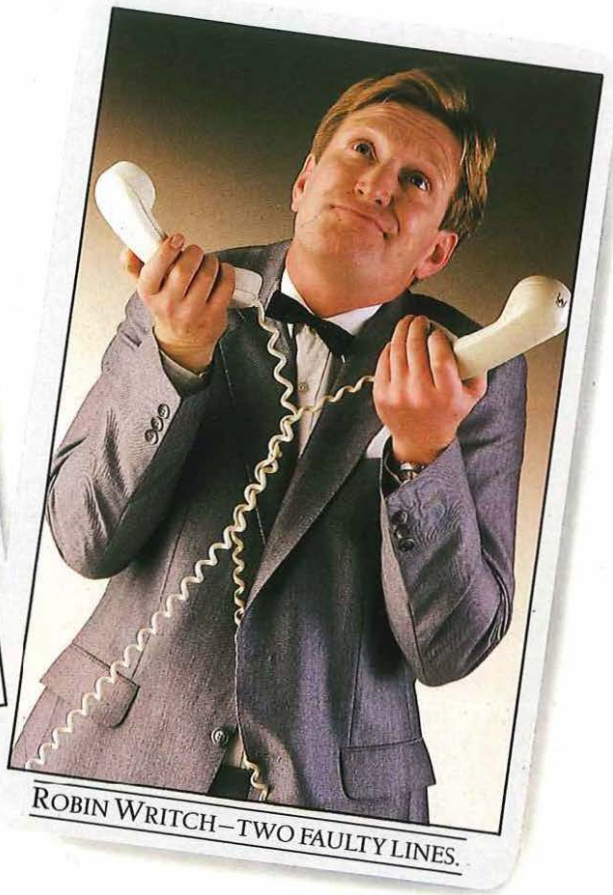
CAE GROUP

General Audio and Data Communications Ltd.
64-82 Akeman Street, Tring, Herts. HP23 6AJ. Telephone: Tring (0442 82) 4011/5551
Telex: 82362 BATECO G Cables: RAHNO TRING
Regional Sales and Service: Manchester, Unit 5, Fivefold Industrial Park, Manchester Street, Oldham, OL9 6TP. Manchester (061) 626 3371

Associated Companies Teleprinter Equipment Ltd. Communication Accessories and Equipment Ltd.
Morse Equipment Ltd. Teleprinter Rentals Ltd. Datacare – a division of Teleprinter Equipment Ltd. Parent Company: William Batey & Co (Exports) Ltd. (Founded 1946).



REV. PARSONS – FAULTY LINE.



ROBIN WRITCH – TWO FAULTY LINES.

MICK MORRIS

You've got 25 seconds to in order of

If your Repair Service Centre takes longer than 25 seconds, you've got a problem.

Because while all your customers are important, some, such as business lines, are more so than others.

So how do you decide which repairs need priority?

Your administration system can help to an extent, by organising your engineers properly and sending them to the right place with a clear picture of what they have to do.

But to do that, it needs to have accurate, reliable details on the condition of the line, the type of fault, and its location.

And most of all, it needs them quickly. Which is where the LRS-100 fits in.

Because as an advanced line-tester, it will do everything that's expected of it, and more.

As well as giving superior information about existing faults, it'll test groups of lines overnight to locate potential faults.

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

But perhaps its biggest advantage is in producing a 'System Recommended Action.'

This means the LRS has the ability not only to identify, analyse, and determine the severity of a fault, but also to assign it to the appropriate work group.

All within 25 seconds.

Combined with the quality of its testing,

arrange these customers importance.

that's why the LRS-100 will help reduce 'double-handling' of faults by engineers, and the number of repeat reports.

In turn, the performance of your existing administration system is improved, no matter which one you use.

LRS is compatible with current BT RSC administration systems, and in a few months will be integrated with CSS.

And at this moment, it's operational in BT London South, Glasgow, and soon in Belfast, Middlesbrough, Sheffield, plus several other Districts.

Making LRS the BT approved line-test system with a track record.

If you'd like to work with a line-tester that gets the best out of your RSC, ring Tony Hart on 0628 72921. Or write to Northern Telecom plc, Langton House, Market Street, Maidenhead, Berkshire SL6 8BE.

Because with the LRS-100, you'll be putting each and every one of your customers first.

nt northern telecom

LRS 100
ADVANCED LINE-TEST SYSTEMS

Right down the Line SEAWARD instruments lead the way to fast fault Location & Performance Monitoring

CL250 the unique contact locator replaces conventional bridge instruments, offering fast, accurate, fault location on telecom and signal cables up to 25 kms. long, with no preliminary adjustment, and single button operation.

OSCAR 250 A versatile, easy to use dB meter and oscillator, specifically designed for fault location and line up of speech and data carrying systems.

PT250 A crystal controlled, digital, sine wave oscillator with self calibrating level output amplifier is specially designed to improve installation and restoration times of data and VF circuits.

Manufactured under Licence from British Telecom.

For full details on Seaward's, compact, lightweight, low-cost answer to efficient cable management, write or call for full descriptive literature.

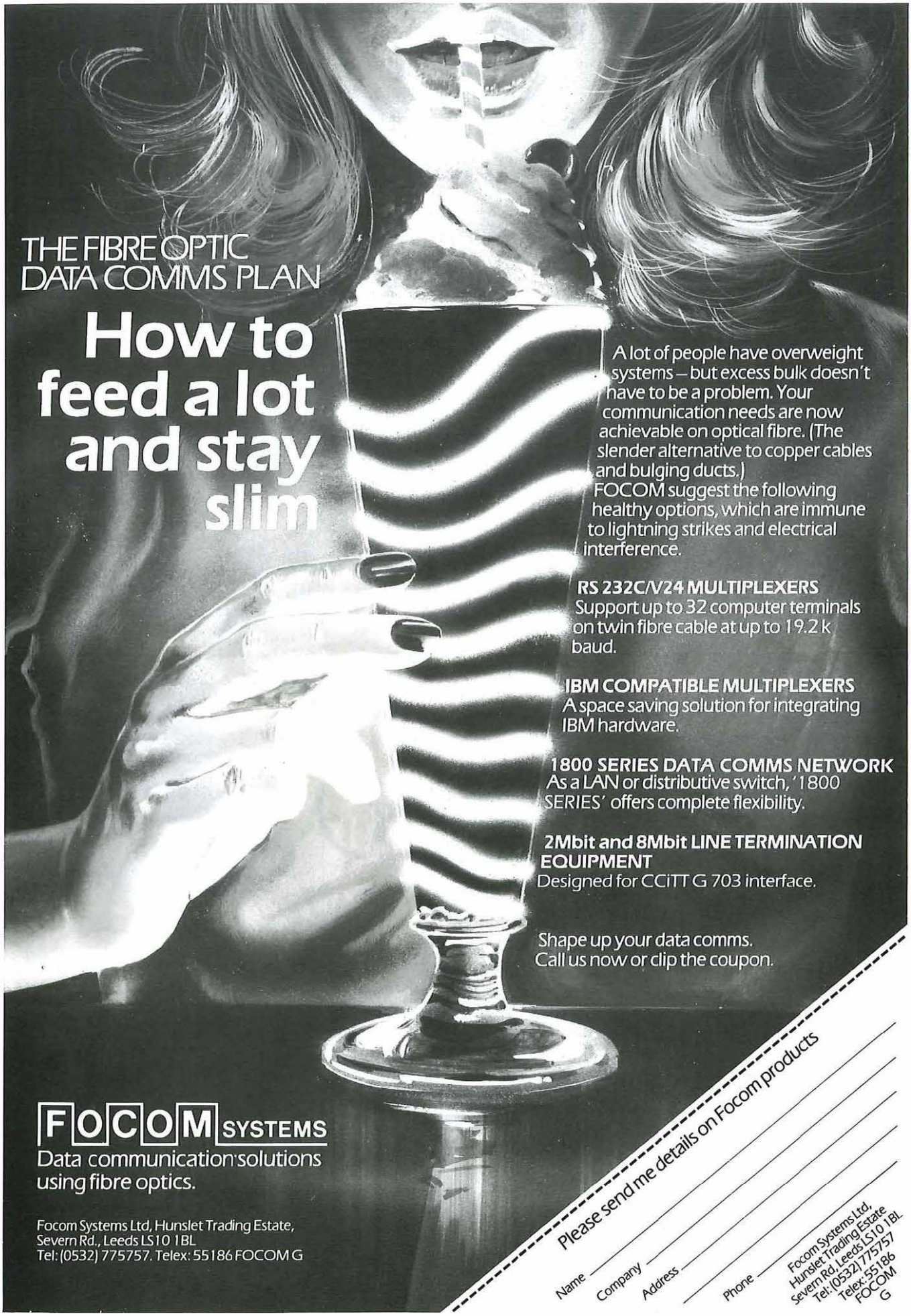
Designed to keep your System on-line...

SEAWARD

Bracken Hill, South West Industrial Estate, Peterlee, Co. Durham, SR8 2JJ England
Telephone (0783) 863511 Telex 262284 (ref: 128)

For supply within British Telecom, the CL250 may be obtained as tester 360A, item code 314 552 from BT Procurement Executive M6.3.2.3.B., Swindon. Contact Mr. Carroll. Tel: 0793 484 254.

For supply within British Telecom, the PT250 may be obtained as oscillator 174A and the Oscar 250 as Level Measuring Set 246A. Both available from BT Procurement Executive M6.3.1.2.A. Contact Mr. D. Lifford. Tel: 0793 484549.


THE FIBRE OPTIC
DATA COMMS PLAN
How to feed a lot and stay slim
A lot of people have overweight systems – but excess bulk doesn't have to be a problem. Your communication needs are now achievable on optical fibre. (The slender alternative to copper cables and bulging ducts.)
FOCOM suggest the following healthy options, which are immune to lightning strikes and electrical interference.
RS 232C/V24 MULTIPLEXERS
Support up to 32 computer terminals on twin fibre cable at up to 19.2 k baud.
IBM COMPATIBLE MULTIPLEXERS
A space saving solution for integrating IBM hardware.
1800 SERIES DATA COMMS NETWORK
As a LAN or distributive switch, '1800 SERIES' offers complete flexibility.
2Mbit and 8Mbit LINE TERMINATION EQUIPMENT
Designed for CCiTT G 703 interface.
Shape up your data comms.
Call us now or clip the coupon.
FOCOM SYSTEMS
Data communication solutions using fibre optics.
Focom Systems Ltd, Hunslet Trading Estate, Severn Rd., Leeds LS10 1BL
Tel: (0532) 775757. Telex: 55186 FOCOM G
Please send me details on Focom products
Name
Company
Address
Phone
Focom Systems Ltd, Hunslet Trading Estate Severn Rd, Leeds LS10 1BL Tel: (0532) 775757 Telex: 55186 FOCOM G

We design systems, networks and PBX's.

We analyse information systems, test packet switched networks and evaluate tenders.

We advise on all aspects of network management and telecommunications.

At Tallis, we can even see into the future.

No other independent Consultancy can claim the resources, expertise and continuous contact with research and innovations in British telecommunications. If you want the whole picture, talk to Tallis.

Tallis

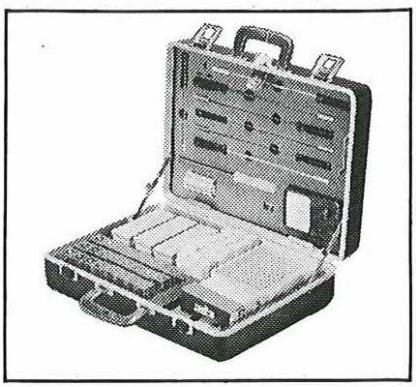
BT TALLIS CONSULTANCY, 12th FLOOR, 151 GOWER ST., LONDON WC1E 6BA. TEL: 100 FOR FREEFONE TALLIS CONSULTANCY.

Topper Instrument Cases

Every industry has its special requirements for cases – instruments, computers, components, meters, tools – they all need special protection in transit or *special presentation* if you are marketing a new product.
Many companies use our standard designs but *many more* use our custom design and manufacturing facilities to produce the *exact case they want.*
We will meet your specific requirements and can deliver in tens, hundreds and thousands and at the prices that make us the Number One in specials.

Only if you want the best

Topper Cases



Topper Cases Ltd, St Peter's Hill, Huntingdon, Cambs. tel (0480) 57251 telex 32389

* Write for our colour brochure

CYCLOC POWER SUPPLIES

Harmer + Simmons

Manufacturers of
Rectifiers, Battery Chargers, Switch Mode Power Supplies, Power Units, Battery Eliminators, Control Cabinets.

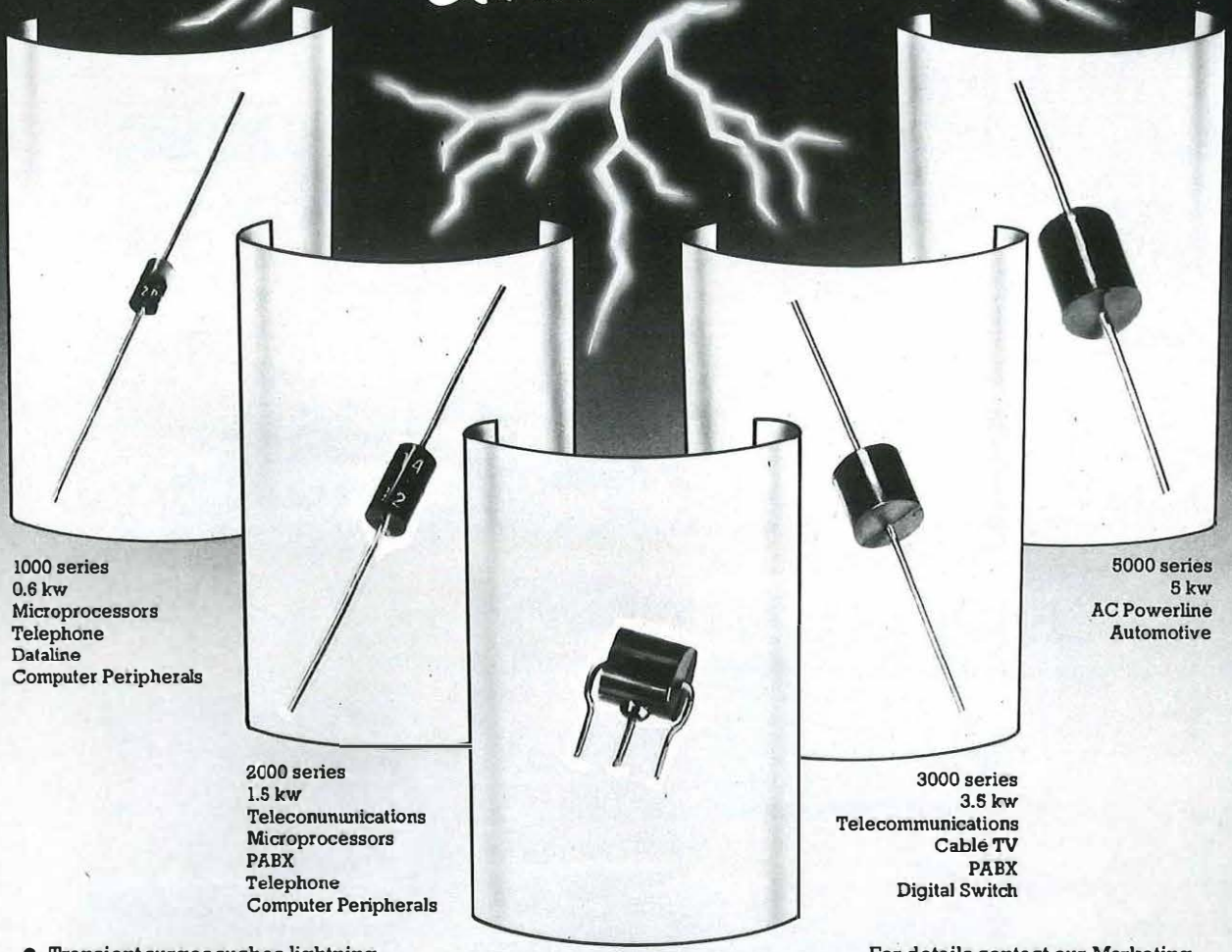
Telepower Systems

Suppliers of Rectifiers and Complete DC Power Systems
Diesel, Solar, Batteries, U.P.S., Design, Installation and Commissioning.

Peregrine Road, Hainault, Ilford, Essex, IG6 3XJ, England. Telephone: 01-500 1211 Telex: 896010

PRESENTING THE TRANSHIELD® SURGE SUPPRESSOR

Strike Force



1000 series
0.6 kw
Microprocessors
Telephone
Dataline
Computer Peripherals

2000 series
1.5 kw
Teleconununications
Microprocessors
PABX
Telephone
Computer Peripherals

DFP series
3.5 kw
3 line
Telecommunications
PABX
Digital Switch

3000 series
3.5 kw
Telecommunications
Cable TV
PABX
Digital Switch

5000 series
5 kw
AC Powerline
Automotive

- Transient surges suchas lightning, electrostatic discharge, electro-magnetic pulses and powerline induction can strike at any time.
- To combat the problem Lucas has developed the Transhield range of surge suppressors incorporating latest technologies such as FOLDBACK.
- Whatever the equipment — datalines, power supplies, communication lines, electronic systems — there is a Transhield to suit.
- Approvals to BS9000, and CECC, DEF Standard 05-21, CAA, BT19A.
- So for complete protection call in the STRIKE FORCE.

For details contact our Marketing Department or one of our distributors.

Lucas Semicomps Limited
Halifax Road, Keighley
West Yorkshire BD21 5HR. Tel: (0535) 67921

Semiconductors Supplies Int. Limited
Dawson House, 128/130 Carshalton Road, Sutton, Surrey
SM1 4RS. Tel: 01-643 1126

Microelectronics Technology Limited
Unit 2, Gt. Haseley Trading Estate, Oxfordshire OX9 7PM
Tel: 08446 8781

LUCAS TRANSHIELD® SURGE SUPPRESSORS

Lucas Electrical

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

Built on better understanding

Feedback Data products are made in the U.K. and sold throughout the world to major corporations and government bodies. This is because we at Feedback have remained one step ahead of market requirements, for new techniques, technologies and customer support.

In short, we've gained a better understanding of industry's needs. And a better understanding of how best to satisfy them. From the design and manufacture of industrial terminals for shop floor data collection and time and attendance systems, to magnetic recording products for computer and telecommunications industries and bar code readers for retail, distribution and data processing systems.

What's more, you don't have to be a major corporate body to take advantage of this wealth of capability.

Let us tell you more. You'll be surprised at how well we understand your requirements.

Send for a copy of our brochure today.

PSA Peripheral Suppliers Association

Feedback

built on better understanding of industry's needs

Feedback Data Limited
Uckfield, E. Sussex TN22 1PT
Tel: Uckfield (0825) 61411. Telex: 95607.

TOWARDS TOTAL CONTROL OF THE CURRENT ACCOUNT

Margaux Building Management Systems solve the most pressing problems in estates management.

With over 9000 buildings, and a huge inventory of equipment, British Telecom's Current Account runs into millions of pounds.

Margaux has the means to reduce your Current Account and to provide rapid returns on investment.

The mathematics are very attractive

Margaux systems pay their way by saving energy and maintenance costs.

Whether retrofitting or re-fitting in existing buildings, or undertaking a new construction programme like TXD, Margaux systems can be installed quickly and simply – to start saving you money from day one.

Experience with Bell – and now with British Telecom – has shown that Margaux can also achieve significant reductions in the Capital Budget too.

The effective control technology provided by Margaux will highlight over-sized heating, refrigeration and power systems. On future projects, these can be reduced. Some components will even be eliminated completely!

Margaux gives you four management benefits...

- ★ **Reduced costs on the Current Account.**
- ★ **Reduced Capital Expenditure.**
- ★ **Better control of your budgets.**
- ★ **Better property management of the Estate.**

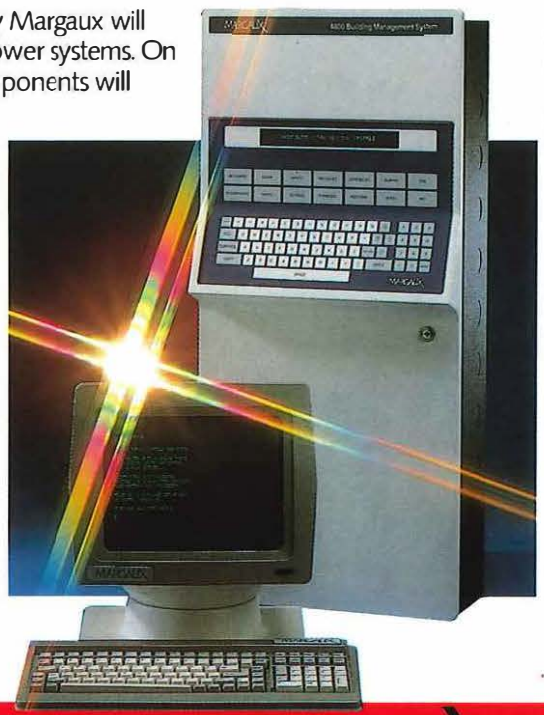
And we work closely with you to solve your problems...

Before installing, we conduct an in-depth analysis of equipment and operational practices. We finally submit a management report including return-on-investment projections.

Your system is planned to meet your needs.

Margaux gives you all this:

- ★ **Electricity and services usage monitoring and reporting.**
- ★ **Energy targeting and cost control.**
- ★ **Equipment usage and maintenance scheduling alongside AMPERE.**
- ★ **Automatic alarm routing to defined fault control locations.**
- ★ **Security of the Network and the Buildings.**
- ★ **Direct Control of Heating and Cooling Plant.**



Proven where it counts

Margaux has a proven track record in the telecommunications industry – systems working hard and saving money in the highly cost-conscious environment of British Telecom and Bell USA.

Following initial installations, British Telecom are seeing the benefit.

Call us for a presentation and a progress report – and an appraisal of how Margaux can help you.

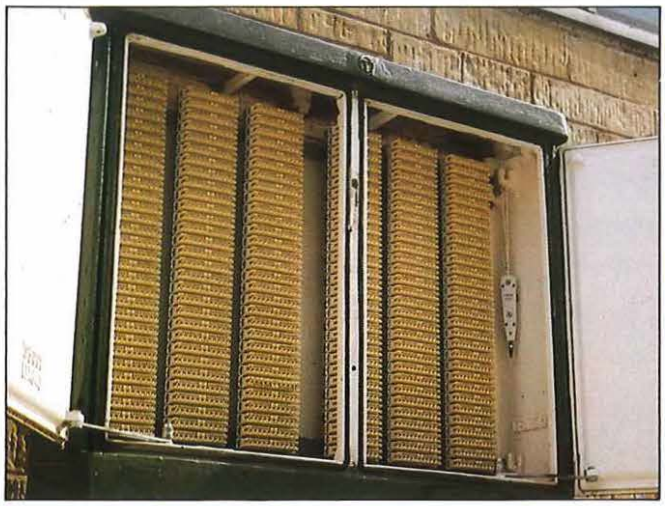
Call Chris Jackman on 0784 31101 or Steve Dillon on 061-488 7356 to find out more.

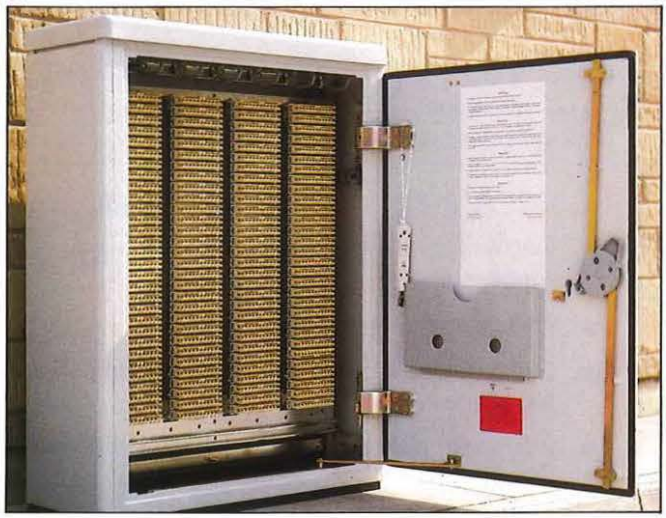
BUILDING MANAGEMENT SYSTEMS

MARGAUX

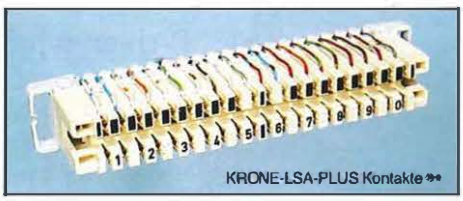
ESTATES MANAGEMENT SOLUTIONS

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

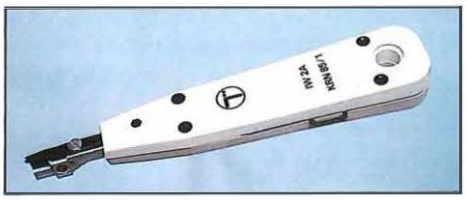




EXTERNAL CHOICE



KRONE LSA-PLUS MODULE



ONE SIMPLE TOOL

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

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

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

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

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

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

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

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

Phone us now, and make that decision.

Ideas Creating Products

KRONE

KRONE (U.K.) TECHNIQUE LIMITED
Runnings Road, Kingsditch Trading Estate,
Cheltenham, Glos GL51 9NQ
Telephone: Cheltenham (0242) 584900
Telex: 43350
A subsidiary of
KRONE GmbH, Berlin, West Germany
*Trademark of KRONE GmbH, Berlin

An exciting future — but with no short cuts

It is now more than a year since British Telecom became a public limited company. The transition from state-owned corporation to private enterprise not only triggered the most spectacular flotation of all time but also focussed unprecedented media attention on the company's activities with newspapers devoting countless column inches and radio and television jostling for interviews and comments.

And now, in 1986, British Telecom looks set to remain under the microscope. The initial bally-hoo may have subsided but the coming months are crucial for the company's future. The first year of privatisation has already presented many challenges but it's as sure as shares in the company that the future will provide even more.

Although the range of products offered to customers is now greater than ever and service is vastly improved, there is absolutely no room for complacency. Indeed, the real impact of competition has yet to be felt and it is essential that all staff are aware of the need to concentrate their efforts on providing the best quality products and services at the right time, at the right price and in the right quantity.

There can be no short cuts. The future for telecommunications is an exciting one and British Telecom is uniquely placed to take full advantage of opportunities as they present themselves. The key to success is to recognise opportunities and grasp them. If that happens throughout the business, the future will be both exciting and prosperous.

A little extra

The circulation of *British Telecom Journal* continues to increase steadily but, unfortunately, so do paper and production costs.

To ensure that we can continue to produce the high-quality publication that our readers have come to expect, it is necessary to raise the cover price to staff subscribers by 6p a quarter to 48p from the Spring issue this year. The rise is the first for two years and at 16p a month, or less than 4p a week, we are confident that the Journal will remain excellent value for money and will continue to be the major source of reference for telecommunications developments in the UK.

Cover: Mammoth painting tasks cover a wider variety of man-made structures than the famous Forth Bridge. Giant satellite dishes, for instance, need constant re-painting to protect them from the ravages of dirt and weather. At British Telecom's Goonhilly earth station in Cornwall, the aerials also suffer attack from sea salt and algae from the surrounding moorlands. The job of re-painting each aerial takes British Telecom riggers two years and more than 1,000 gallons of marine paint.

British Telecom Journal costs 42p per issue for staff. External subscribers pay £15 for two years including post and packaging. Full details on page 46.

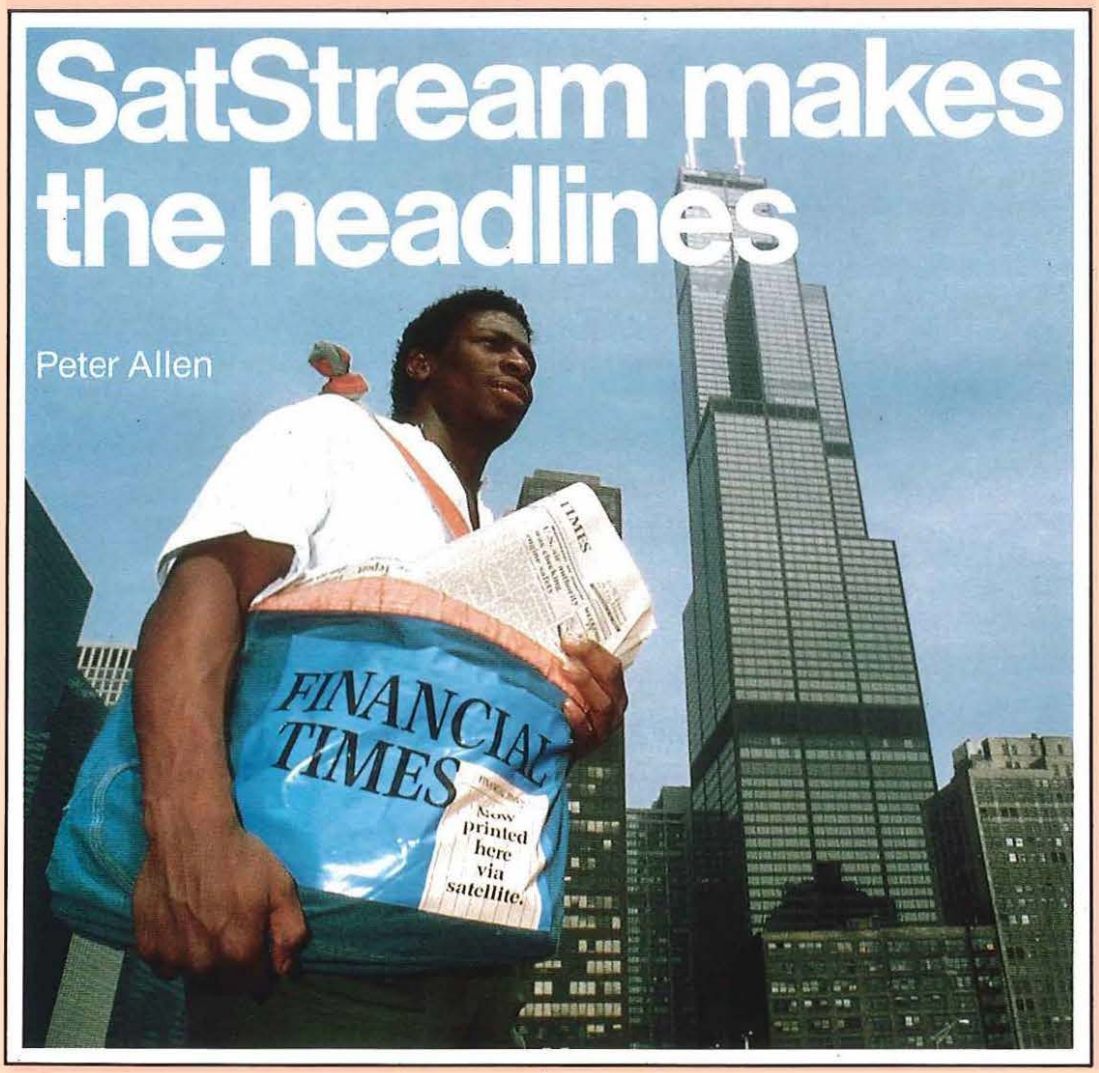
In this issue

SatStream makes news	2
Faster fault-finding	4
Oftel's watchdog role	7
Managing materials	11
Progress on sites	14
Animal magic on TV	16
Sorting out Strowger	19
Ruling the waves	21
London's new look	25
Better by design	26
A testing task	28
The approvals process	30
Interest in Voicebank	33
Apprentice awards	37
Newscene	38
Annual index	45

British Telecom Journal
Winter 1985/86 Volume 6 Number 4

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

SatStream makes the headlines



Hot off the presses – the Financial Times hits the streets of New York.

Developments in small-dish antennas and the use of higher frequency bands by satellites now make it possible to locate earth terminals in the centre of cities. The trend has added a new dimension to meeting the need for flexible communications and presents an exciting opportunity for the newspaper industry.

Opposite page:
The traditional picture of newspaper production – stories are gathered in the newsroom and later the presses roll. Far right: Ealing earth terminal is used to transmit the Financial Times to New York via SatStream.

Growing competitive pressure from satellite TV news services is forcing newspapers to come to terms with new technology for information handling and printing. But satellite communications can also benefit newspapers because information can now be transmitted simultaneously to a large number of reception points within the satellite coverage area or 'foot print'. New technology, therefore, could revolutionise news distribution and enable the remote printing of newspapers in several locations simultaneously.

British Telecom International's SatStream service – the small-dish business service introduced in 1984 – offers part-time transmission facilities which are particularly suitable for regular daily operations such as remote printing and an experiment was undertaken for the Financial Times in late 1981. Page copy for the FT's international edition was successfully transmitted by 154 kbit/s facsimile from a small-dish antenna on the roof of the FT building in London to a similar dish on the premises of the Frankfurter Societäts Drückerei in Frankfurt.

Last July, the FT implemented a 128 kbit/s link between London and New York via the Ealing earth terminal. Established on a fully commercial basis, it enabled the newspaper to print part of its international edition in the USA. Circuits were provided by SatStream and the link eliminates the expense and potential delays inherent in airfreighting copies from Europe. The high data rates available on SatStream enable the FT to meet the tight timescales required for printing and distributing nationwide in the United States and Canada.

Now, the leading Japanese daily, Asahi Shimbun, is also using BTI satellite services for a remote printing operation. They are using a 56 kbit/s international KiloStream circuit to link type-setting computers in London and Tokyo and produce a breakfast time edition of the paper for Japanese expatriates in Europe. As Tokyo is about nine hours ahead of London, high capacity communications circuits provide the only solution to the problem of timely delivery of an up-to-date international edition.

Satellite communications also offer new possibilities in news gathering and distribution which lie behind the actual production of newpapers. The development of transportable earth terminals offers a method of setting up digital links from remote areas to enable news and other material to be sent back over high quality data circuits.

Last June, BTI demonstrated the distribution of real-time financial data, news pictures and other material over a one-way SatStream link received on a 1.8 m antenna at the SMS Symposium in Rotterdam which celebrated the introduction of small-dish satellite services for

British Telecom Journal
Winter 1985/86
SatStream makes the headlines

Facsimile is used to transmit whole pages of the Financial Times to New York via the Ealing earth terminal.

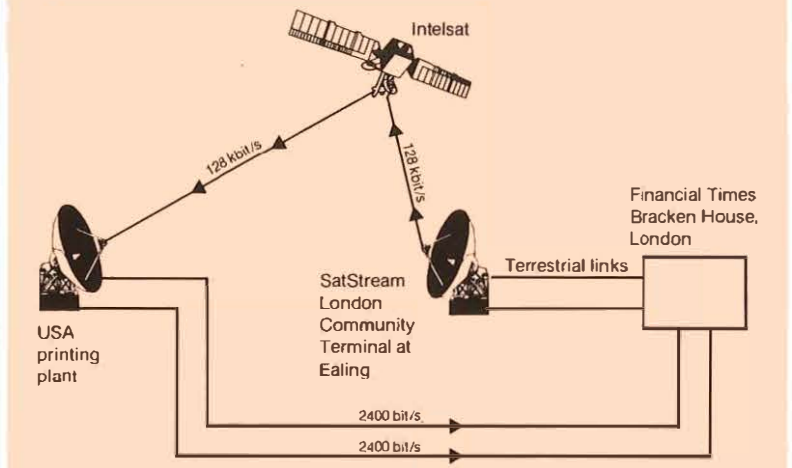
Mr P Allen is BTI's head of private services.

business in Europe. Standard analogue 60 × 120 ppm news pictures were received in digital form at 7.2 kbit/s, along with AP Dow Jones (Telerate) foreign exchange data and AP general news services at an aggregate data rate of 6.0 kbit/s.

BTI's digital satellite facilities will serve as the foundation for some of the exciting possibilities in newspaper technology which are just round the corner. In the future, there will be completely computerised newspaper production with direct input by editorial staff and journalists to computers for typesetting.

The next stage will be the publication of newspapers and specialist information by electronic means in the form of a constantly updated database. Users anywhere in the coverage zone of an appropriate satellite will down-load an edition for local hard copy preparation over an economical one-way link.

How the Financial Times is printed via satellite



British Telecom Journal
Winter 1985/86

Keeping up the pressure—by computer

Tim Cowell

Traditional methods of locating sheath faults in underground cables are being replaced with a microprocessor-based system which is faster and more accurate and enables damage to be repaired before it can affect service.

All the external metallic cables used by British Telecom incorporate a sheath to contain the conductors and prevent moisture entering which could lead to a major disruption of service.

For the last 20 to 30 years, most of these cables – over 350,000 km – have been fed with dried, compressed air from the exchanges to raise the internal pressure above atmospheric. This enables the integrity of the sheath to be monitored so that maintenance staff can be alerted when a sheath defect occurs and, in all but the most severe cases, the air pressure keeps any water out pending repair.

But the need was recognised some years ago for improved surveillance and control of the pressurised cable network, and the automated monitoring systems produced by other countries (mainly the USA) were studied.

Unfortunately, they had been designed to cater for different pressurisation systems which had no provision for monitoring the flows. The expensive electro-mechanical pressure transducers used also failed to provide sufficient resolution to aid fault location so the systems proved unsuitable for the UK.

As a result of this British Telecom Research Laboratories, at Martlesham, were set the task of developing an Automatic Cable Pressurisation Monitoring System (ACPMS) capable of satisfying the requirements of the network. They have now produced a system which has been designed around existing equipment so as to reduce costs and minimise site disturbance during installation.

The ACPMS enables contractors and pressure gauges to be replaced by addressable pressure transducers which are capable of providing up-to-date readings of cable pressure for selected points along the route. The existing flowmeters can also be simply modified so that they remotely provide information on the instantaneous flow of dry air into the cables.

A Rack Monitoring Unit (RMU) – a microprocessor based interrogation and data collection unit – is located near the racks at exchanges or repeater stations which house the existing equipment for supplying the dry air, flowmeters and pressure gauges. Each RMU routinely scans its associated addressable pressure transducers and modified flowmeters at high speed.

Whenever the RMU detects an alarm condition, a report is automatically transmitted over the public switched telephone network (PSTN) to a distant site such as the External Plant Maintenance Control (EPMC). If the distant site first selected is unmanned, then alarms can be automatically diverted to a second location by the RMU.

Fault information is then down loaded to a printer via a Remote Control Unit (RCU) containing a microprocessor at the distant site. Alternatively, a small business computer can be employed to analyse the data and provide information trends in cable performance over the previous 50 days and to give a graphical presentation of cable pressure with predicted fault locations.

If the cable warrants further investigation, staff at the site may interrogate any RMU under its control by dialling via the RCU over the PSTN to obtain the information required. At a predetermined time each day – typically before staff arrive at the control point – status reports on each exchange or repeater station system are obtained by the RCU polling every RMU.

The addressable pressure transducer utilises an integrated circuit type pressure sensor relying on the piezoresistive effect of silicon to convert changes in pressure to changes in resistivity in a similar manner to strain gauges. By including temperature compensation in the integrated circuit, pressure changes are measured to a high resolution. A differential amplifier is then used to boost the output to that required for transmission down the line after transformation in a voltage to frequency converter to modulate the line voltage.

Recognition

The current required to operate each transducer and its associated circuitry is of the order of a few milliamps and if all the transducers were continuously powered, the voltage drop along the length of a monitoring pair would be excessive. To overcome this problem and also to enable each transducer to be individually monitored, an address recognition circuit was incorporated.

The circuit uses complementary metal-oxide silicon components (CMOS) which only require low operating currents, and it is powered all the time from the line, awaiting a train of address pulses. If the address received compares with the pre-set address, a power-up signal is applied for

Speedy repair of underground cable faults is a vital element in the quality of service provided by British Telecom.

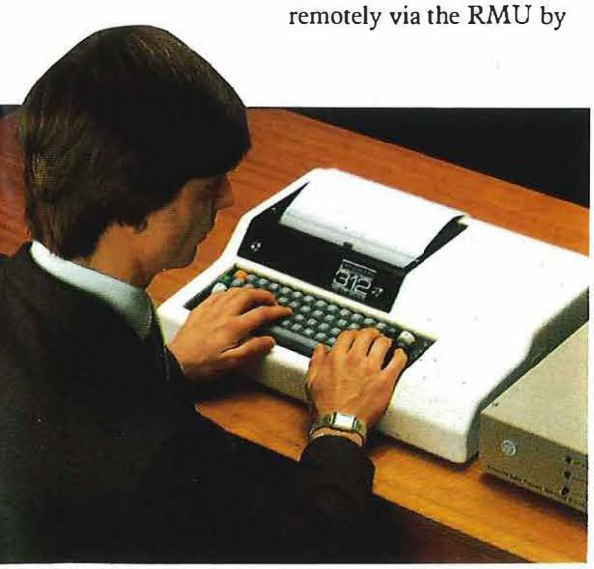
Below: Technician Bert Terry checks the callibration of one of the air flow thermistor cards on the automatic cable pressurisation monitoring system at Shepherd's Bush exchange.

Below, left: An engineer at the EPMC at Ealing uses a teletype to request further information on a cable fault pinpointed by the automatic cable pressurisation monitoring system.

approximately two seconds to the pressure sensor circuit.

The addressable pressure-transducer is small enough to be fitted inside a cable joint, to eliminate external pneumatic connections which could increase the fault liability. Alternatively, the transducer can directly replace the existing contactor in its housing mounted on the outside of the joint. The method significantly reduced the fitting time where both wires of the monitoring pair have been extended to the housing.

Existing flowmeters can be easily converted to enable them to be monitored remotely via the RMU by fitting a small bead negative temperature coefficient thermistor in the air flow. Mounting the thermistors into aluminium blocks has enabled the assemblies to be fitted directly to the back of the existing flowmeters in exchanges. Circuitry within the RMU conditions each thermistor on a routine basis to provide highly repeatable records of the cable flows via a simple bridge arrangement. ▷



The RMU consists of line interfacing circuits and a microprocessor to control the output of the address pulses and receive the line signals from up to 2016 addressable transducers and 60 modified flowmeters. It is also capable of moitoring the status of the equipment producing the dry air or any other designated equipment via up to 16 separate alarm indications.

The complete system meets the requirements for improved facilities to effectively monitor the state of the pressurised cable network. Sophisticated reports not only identify problem cables or network trends, but also assist in planning the direction of staff to optimise the use of resources.

The traditional way of doing things . . . Bert Terry records the air flow into underground cables at the exchange.

The conventional method of monitoring cable pressure involves the fitting of pneumatically operated switches (contactors) at selected points along the cable. When the air pressure within the cable falls to a predetermined level the contactors operate an alarm circuit but they give no indication of the amount of change in pressure.

Bourdon tube pressure gauges fitted with a pointer-operated electrical contact assembly are also used to monitor the pressure. But they do not provide an indication of trends and are also liable to indiscriminate adjustment.

When a pressure alarm is detected, exchange staff are required to determine the operated contact by measuring the resistance of the monitoring circuit. They then pass this information to the External Plant Maintenance Control (EPMC) who are responsible for the upkeep of the cables emanating from a number of exchanges.

The EPMC then sends a team to determine the location of the fault by taking a series of pressure readings along the route using a manometer, plotting the values of a graph to give an approximate location.

Unfortunately, this procedure can take many hours since manholes have to be accessed during which time the pressure is changing and this can lead to further inaccuracies in fault location. If this method fails to locate the fault, either a tracer gas is injected into the cable and its presence detected where it is leaking, or the noise of the leaking air is located with the aid of a microphone and amplifier.

The rate of flow of air at cable inputs is measured on flow meters fitted at exchanges. These are vertical tapered clear tubes containing floats which simply give a visual indication of the flow. By recording the flow at regular intervals further information on the state of the pressurised cables can be obtained but effective results depend on exchange staff being available to read the meters and transfer information to the EPMC.

The existing monitoring system provides only a limited scope for preventive or defensive maintenance. It does not provide day-to-day measurements of flow or pressure readings to cable network maintenance staff and it cannot identify the whereabouts of a fault on a particular cable, or provide any indication of its priority. As a consequence, the system is not only technically incomplete, but is also labour intensive because of its limited management capability.

Mr T A Cowell is an executive engineer in the External Plant Division of LCS/Local Lines Systems.

Oftel - the watchdog with teeth

Larry Stone

'Trust us,' says Oftel

Della Bradshaw reports from the TMA conference in Brighton

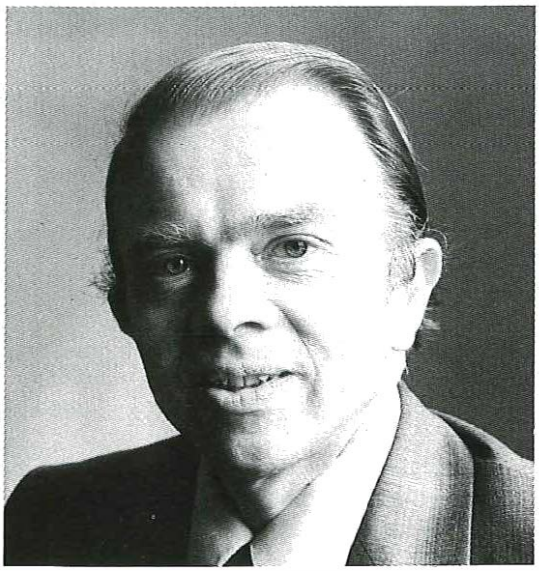
BT rejects Oftel plan on restricting purchases

BY JASON CRISP

The action of the Office of Telecommunications (Oftel) on interconnection between the British Telecom and Mercury Communications networks should have dispelled any misconceptions about the effectiveness of its powers.

Bryan Carsberg, a professor of accounting at the London School of Economics since 1981, is Director General (DGT) and was appointed for three years beginning on 1 July 1984. When he assumed his responsibilities Professor Carsberg said that he intended to be even-handed but vigilant and that his job and the overriding objective of Oftel was to promote the development of the telecommunications industry and enhance the effectiveness of its contribution to the UK economy.

He considers that in the field of consumer protection, the most effective weapon is competition and places a high priority on its promotion. The media, for their part, have termed Oftel a watchdog, a terrier, and even David to British Telecom's Goliath!



The legislative regime for telecommunications has changed radically since the beginning of the decade in line with Government policy. The Telecommunications Act 1984 abolished British Telecom's exclusive privilege to run telecommunications systems, paved the way for its privatisation and established a licensing and regulatory regime (see 'Operating by Licence', *British Telecom Journal, Spring 1984*).

The DGT and Secretary of State for Trade and Industry form the main constituent parts of the regulatory regime. The Minister sets the main lines of policy through the issue of licences and the setting of conditions in those licences. All operators of telecommunications systems, British Telecom, Mercury, Hull, the cellular radio ventures, cable TV operators and customers who run PBXs must now be licensed.

In this way ministers can decide how much competition to bring in and, through licence conditions, provide protection for consumers, small competitors and suppliers of telecommunications equipment. The DGT has been given the job of ensuring that holders of telecommunications licences comply with their licence conditions.

The DGT's duty in exercising his regulatory functions and the Minister's in licensing, is to exercise their functions in the manner best calculated to secure provision of all telecommunications services for which a reasonable demand exists and also to ensure that any UK operator who is required to provide such services, is able to finance their provision. They have a number of subsidiary duties:

*to promote the interest of consumers in respect of the prices, the quality and variety of telecommunication services;

*to maintain and promote effective competition in the industry; ▷

Set up under the 1984 Telecommunications Act, the office of Telecommunications (Oftel) has responsibility independent of government ministers for supervising telecommunications activities in the UK. Its status is similar to that of the office of fair trading.

Left: Professor Carsberg

British Telecom Journal
Winter 1985/86

Oftel – the watchdog with teeth

TUA lobbies Oftel on BT plan to put up cost of renta

By Oliver Tucker

The Telecommunications Users' Association (TUA) has complained to Oftel about British Telecom's (BT) proposed increases for private circuits rentals following BT's record year end results.

BT is proposing to implement rental increases from September of this year. They will average 11% for inland, analogue and digital private circuits, including a 13% increase for Megastream and a 12% hike for Kilostream.

An official for the TUA said: 'We welcome BT's increased profits and, in particular, the growth in inland and overseas calls and other services.

'However, the substantial increase in profit and growth must lead to the maintenance of existing prices for a further period.'

She added: 'The recently announced increases should now be deferred and reviewed.'

Last week BT reported pre-tax profits for the year to the end of March 24% up at £1.48 billion.

The figure was £130 million over the minimum fi[gure] dicted in the prospec[tus] end of last year.

Ironically, the £1.48 billion was investors as being enough to alert George Jefferson of BT, said BT wo[uld] achieve further ments in efficie[ncy] vices.

Turnover for 11% higher at £

Smart cards

Oftel demands pledge on confidentiality from British Tele[phones]

BY RAYMOND SNODDY

THE OFFICE of Telecommunications, the statutory regulatory authority, yesterday issued a warning to British Telecom that it must guarantee the privacy and confidentiality of customers' information.

Professor Bryan Carsberg, Oftel director general, made it clear he was not happy with BT's proposed code of practice. Oftel is concerned about the risk of unfair competition which could result if an employee received an order for telephone lines and used the information to try to sell other forms of equipment.

"I am very much concerned that the privacy and confidentiality of customer information is safeguarded and I am looking for guarantees from British Telecom that will ensure this," Prof Carsberg said.

He explained that the principle behind his approach is that BT should not be able to use its position as operator of the public telephone system to gain an advantage over its competitors.

BT's licence provides for restrictions on disclosure between BT employees.

But Oftel is anxious that BT should not gain unfair advantages from using employees' information which does not involv[e] Prof Carsberg day that if it pr[o]ceed to reach agreem[ent] he will consid[er] statutory power adequate safeguar[ds] entiality.

One suggestion is employees might have undertakings on confiden[ce] — but Oftel is putting responsibility on BT to produ[ce] suitable safeguards.

It is also investigating whether remarks about competitors' in a BT magazine for sales staff amount to unfair competition.

Telephone Rentals are seeking an injunction for alleged libel over the remarks. Legal proceedings have been opened in the High Court against BT.

● BT has ordered £20m of automatic equipment to test telephone lines. It tests lines during the night and can pick up deterioration before it develops into a fault. The equipment will be installed in 100 of BT's 360 repair service controls from March.

Two systems will be used Badger equipment from Vanderhoff (UK) and Northern Telecom. Both will be manufactured in the UK.

Oftel will clamp down on telecomms malpractices

The new Office of Telecommunications (Oftel) is to keep a tight eye on the effect of British Telecom's service contracts.

Oftel director general, Bryan Carsberg, issued the threat as BT fulfilled its undertakings by publishing a code of practice for its customers. He also plans to ask for comments from the telecommunications industry on a code of practice on anti-competitive practices.

Said Carsberg: "I am well aware of the widespread level of public concern being expressed about practices by the operators of networks which could inhibit the growth of competition."

A spokesman Carsberg said he had strong powers and intends to use them if needed.

Oftel has received more than 1,000 complaints about BT from customers, and complaints are still arriving at a rate of 300 a month.

Around 30 firms have also complained to Oftel about BT's sales practices when the company's equipment is rejected in favour of a rival's.

The paper will outline action Oftel can take to boost competition in telecomms. The new version of BT's code of practice makes some changes to reflect consumer concerns. BT's new status as a public company.

All transactions between BT and customers are now governed by a contract, which has accompanied BT service provisions since August this year. Earlier transactions are automatically under the relevant contract.

In the code, Oftel has lifted the limit for the financial size of disputes with BT which can be settled outside the courts under binding arbitration from £500 to £1,000.

Oftel functions include:

a) Advising DTI on the licensing of telecommunications systems.

b) Modification of licence conditions.

c) Enforcement of licence conditions and criminal offences under Section 5 of the 1984 Act (running an unlicensed system, unauthorised connection, unauthorised provision of telecommunications services).

d) Exercising powers under fair trading legislation in relation to monopoly situations and anti-competitive practices.

e) Approval of contractors, apparatus, etc — for the purpose of licences.

f) Keeping registers of licences, approved contractors and approved apparatus.

g) Reviewing all activities connected with telecommunications.

h) Publishing appropriate information and advice for consumers and other interested parties.

i) Investigating complaints about the provision of services and the supply of apparatus.

Functions (a) and (e) may only be exercised by the DGT with the consent of the Secretary of State.

*to promote efficiency and economy and the undertaking of research and development; and

*to promote effective competition by UK organisations in international trade.

A number of important powers are vested in the DGT (see Panel 1) including wide-ranging information gathering powers. The Act provides for the DGT to be able to undertake most of the current role of the Director General of Fair Trading (DGFT) in respect of fair trading and competition legislation for telecommunication matters.

This includes powers to make references to the Monopolies and Mergers Commission (MMC), which are laid out in the Fair Trading Act 1973 and Competition Act 1980. The reference to the MMC of the proposal by British Telecom to acquire the Canadian PBX manufacturer, Mitel, is a case in point.

Preference

In addition, telecommunications licences contain a number of fair trading conditions. In the case of British Telecom, for instance there is prohibition of undue preference and discrimination and of unfair cross-subsidies. (Oftel are currently investigating cost allocations behind British Telecom's pricing of accesslines and private leased circuits.) The DGT has made it clear licensees are free to set commercial and marketing policies within the boundaries of their respective licences – though he is given significant powers of discretion and determination within licences – and fair trading legislation. As part of the monitoring process, Oftel intends to promote a number of ideas to independently review British Telecom's quality of service such as the proposed national network of 3,000 'watchdog' opinion surveys.

Oftel has a complaints handling function similar to the Post Office Users National Council (POUNC) but unlike POUNC has effective powers which may be able to resolve issues when the circumstances justify their use.

A recent example was the DGT's investigation of British Telecom's decision to purchase System Y digital exchanges from Thorn Ericsson came about as a result of representations, including an approach from an all party delegation of MPs, who complained that British Telecom was exercising its unique buying power against the public interest.

The Department of Trade and Industry (DTI) has retained the responsibility for granting licences and apparatus approvals but may well delegate certain powers to the DGT. The

Opposite page: Cellular radio, cable TV, and radiopaging are all licensable activities. British Telecom's procurement of digital exchange equipment has been investigated by Oftel.

enforcement of licence conditions, however, is entrusted wholly to the DGT with the courts to back him up. Where the DGT is satisfied that a licensee is in contravention of a licence condition, he may issue a licence enforcement order specifying steps the licensee must take to comply with the condition.

An order may, as an emergency measure, take effect immediately or after the DGT has given at least 28 days notice of his intention to make an order and considered any representations or objections. If a licensee fails to comply with an order, he can be sued for damages by any injured party and the DGT can enforce the order by civil proceedings for an injunction. Continued failure to comply could eventually lead to criminal proceedings for contempt of court.

The DGT may amend licence conditions but only by agreement with the licensee and after other interested parties have had their views taken into account. For example, British Telecom agreed an amendment to its 'Radiopaging' licence requiring the introduction of separate billing. British Telecom's plans to introduce separate radiopaging billing were, however, well advanced before Oftel's investigation. If a licensee objects to a proposed change the DGT may still impose it, but only if the MMC agree that the proposed variation would remedy something which was against the public interest.

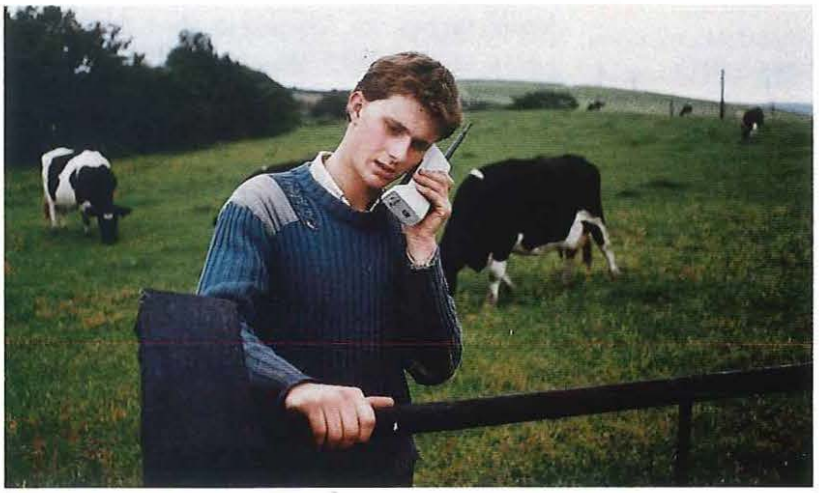
Obligations

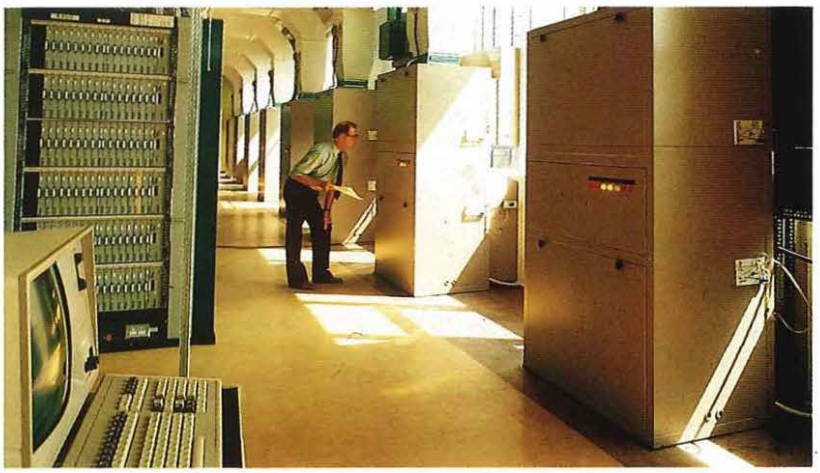
Following complaints, the DGT reviewed British Telecom's price increases last November and concluded that the company had not broken its licence obligations which limit increases on a 'basket' of services to no more than three per cent below the level of the Retail Price Index. He said that there was no case for changing the formula after only 18 months and that the company's profits, in relation to capital invested, were not excessive. He promised, however, to continue to review the situation.

Schedule 2 to the 1984 Act, the 'Telecommunications Code' gives authorised operators certain powers to install apparatus in the street and, given the necessary agreements, on private land. Oftel is empowered to give advice, or help settle disputes without the need for litigation in relation to the operation of the code. The DGT is required to make to the Secretary of State an annual report on his activities and any MMC reference.

Besides the 1984 Act, which confers various duties and powers, conditions in operators telecommunications licences give the DGT a substantial degree of discretion in their interpretation because excessively rigid conditions would almost certainly have proved unworkable. He is referred to 163 times in the conditions of British Telecom's Licence.

In some cases, he is given power of determination, as in interconnect agreements where the parties have failed to reach agreement: he alone can determine whether preference and discrimination are undue and direct steps to ▷





British Telecom Journal
Winter 1985/86

Oftel – the watchdog with teeth

Mr L W Stone is a regulatory policy manager in Government Relations Department.

cease the practice. The way in which the DGT exercises his powers has been and will be an important factor in establishing the impact of the new regulatory regime.

Oftel, employs about 90 staff, organised into five branches, which report via a deputy DGT to the DGT (see panel, below). This structure is backed up by the National Advisory Committees (NAC) for England, Scotland, Wales and Northern Ireland who provide Oftel's prime link with consumers and also a channel of communications between consumers and the suppliers of services and apparatus – and a technical advisory committee chaired by Professor Kenneth Cattermole of Essex University.

The DGT may also commission reports by specialists such as a study of rural telephone boxes and services in Wales in conjunction with the Wales Advisory Committee.

The Act also provides for the DGT to establish advisory bodies for matters affecting small businesses – chaired by Harry Kleeman, a member of the CBI and Small Firms councils – and for matters affecting the disabled or pensioners – chaired by David Hobman, Director of Age Concern. The latter committee is known as DIEL, the former, BACT.

Oftel's expenditure is provided by Parliament, but the cost is almost entirely met from licence fees of which British Telecom pays by far the lion's share.

Undoubtedly, Professor Carsberg is faced with a set of difficult and complex tasks and has established at the outset a set of priorities in facing up to them (see panel, above). He considers that good information is needed to exercise effective control and strong powers to put things right if they go wrong. Oftel, he says, have both. He believes that the success of the industry depends on the existence of several sound and profitable enterprises for operating public systems, for the manufacture and supply of apparatus and for the provision of value added services.

One thing is clear. Oftel will have a highly significant influence on the shaping of the UK telecommunications scene. Indeed, given his remit, the DGT is in a position to investigate and assess trends of behaviour by licensee whether or not that behaviour is orchestrated. The attitudes of staff in carrying out British Telecom policy to compete positively, aggressively, lawfully and ethically are of vital importance. Both UK and European Community fair trading legislation could bite heavily on the company given its influential market position, as could the robust use of the DGT's powers.

There is already ample evidence of Oftel's role of defender of competitors (not just consumers), including its advice to the Minister that for reasons of competition policy British Telecom and IBM should not be granted a licence to run a joint venture providing managed data network services and British Telecom's proposed acquisition of Mitel should be referred to the MMC. Further, the DGT advised that British Telecom should not be allowed an involvement in the running of private mobile radio networks (Band III) – radio spectrum was released with the closure of 405 line black and white television services – nor should it be allocated additional channels from those currently on offer for wide-area paging.

The next few years will be of paramount importance to the development of the industry. A number of issues spring to mind: the political climate may alter, there is the question of resale of circuits (which the Government has said it will not introduce before 1989), the pace of technological change must be managed; and although it is Government policy not to license any additional operator other than British Telecom or Mercury (the duopoly) to provide basic fixed link message conveyance domestically and internationally, that policy provides for the position to be reviewed at the end of the decade.

Professor Carsberg has indicated that 1986 will be a year of making competition work and that the following two years will be a period of assessing how it is working and its effectiveness.

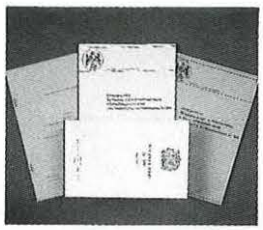
Oftel priorities

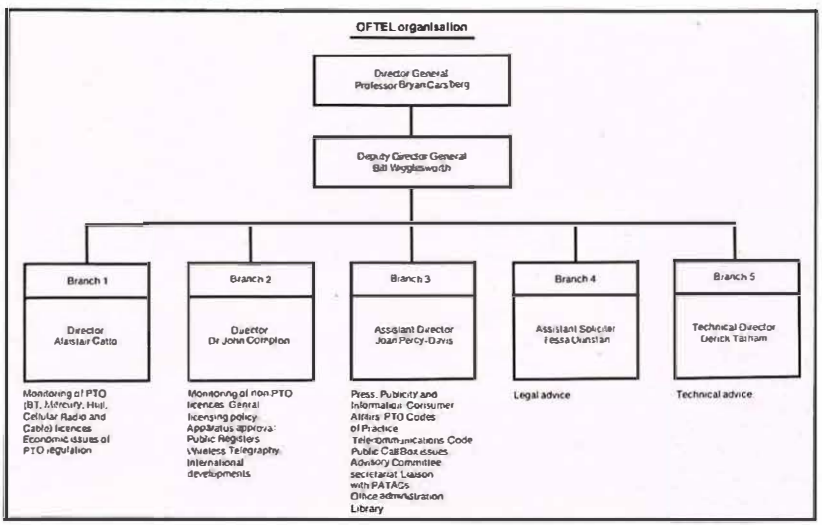
In broad terms, these have been expressed as:

- information gathering on the industry, to help formulate advice on the need for further structural changes;
- encouragement of developments leading to greater competition, such as the possibility via Cable TV of competition in local voice telephony;
- monitoring and enforcing operators' licences to balance the rules of fair competition against reasonable commercial freedom;
- strengthening consumer protection;
- enforcement of service obligations, including the disabled, rural services and public call boxes;
- open debate of issues bearing in mind the need for some confidentiality;
- looking for indicators of compliance with licences.

Oftel insists on clean-up for BT within one year

roline Shaw
has given British Tele-
(T) one year's notice to
p its trading practices.
telecom watchdog
an appeal for more
ion.
ving a deluge of com-
from the industry
T. Oftel is making
up guidelines for its
h must be heavily
within the com-
sure that staff are
e of the serious
es of contraven-
licence.
n. Oftel is plan-
ish a discussion
outlining what
yan Carsberg,
has described
cks'. The docu-
on the public
any breach of
– which lays
under which
e.
Carsberg: 'I
a survey by
consultant to
look for bad practices in a
year's time, so BT has notice
to get its house in order.
Given the powers I have, BT
will want to do this.
Oftel has defined anti-
competitive practices as BT
using its market power un-
fairly to run others out of
business. This could be done,
for example, through cross-
subsidies within BT, uncom-
petitive pricing and BT discri-
minating against customers
who have bought equipment
from other suppliers.
According to John Kelly,
chairman of the Telecom-
munications Managers Asso-
ciation: 'one of the
areas of most concern for our
members is the different poli-
cy of BT managers in diffe-
rent areas of the country.'
'For example, there are
some areas where BT has
refused to connect Plessey's
IDX telephone exchange.
The local BT people seem to
think they are carrying out
national policy,' Kelly said.
Oftel is aware that a lot of
companies are nervous of
complaining about BT. While
it is unable to take up a case if
a company does not want its
name mentioned, it is still
eager to hear these com-
plaints in order to know what
is going on.
'I am very happy to treat
complaints from companies
in strictest confidence,'
Carsberg said.





Changes in store

Raymond Sandford

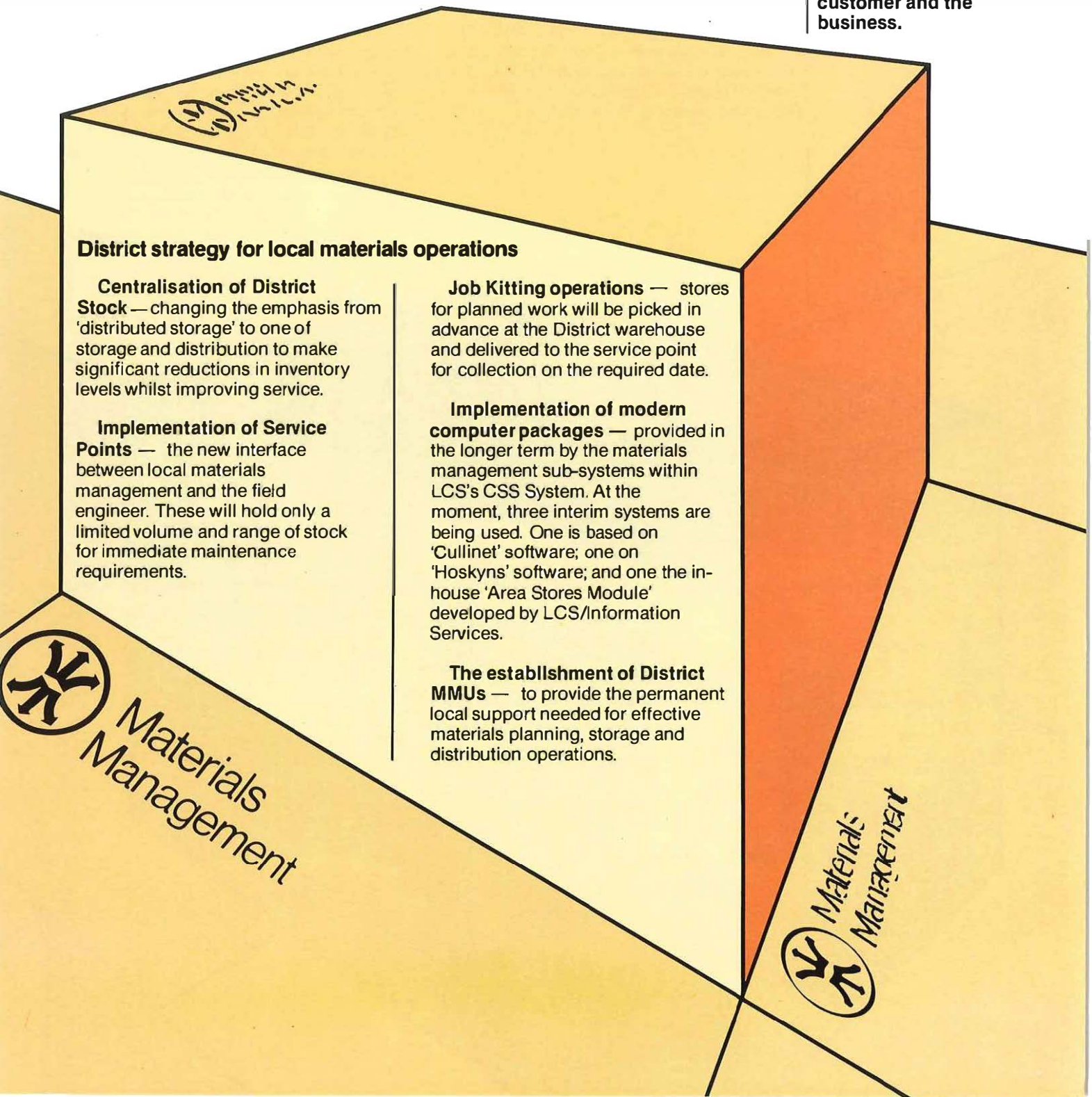
British Telecom Journal
Winter 1985/86

A new strategy for materials handling in British Telecom's Local Communications Services division will give a major boost to efficiency and lead to benefits for both the customer and the business.

A company-wide survey, carried out by British Telecom in 1983, found that stock levels and handling costs were too high, that there was inadequate information and control and that service levels were too low. In some cases the probability of materials being available for any particular job was as low as 70 per cent.

The company's largest materials user, Local Communications Services (LCS) made a swift and positive response by launching its own Materials Management Unit (MMU) to co-ordinate District effort. Its aims were to:

- improve materials service to the field engineer and customer;
- improve local professionalism in materials management;
- reduce inventory and logistics costs, and
- improve information and control systems. ▷



District strategy for local materials operations

Centralisation of District Stock — changing the emphasis from 'distributed storage' to one of storage and distribution to make significant reductions in inventory levels whilst improving service.

Implementation of Service Points — the new interface between local materials management and the field engineer. These will hold only a limited volume and range of stock for immediate maintenance requirements.

Job Kitting operations — stores for planned work will be picked in advance at the District warehouse and delivered to the service point for collection on the required date.

Implementation of modern computer packages — provided in the longer term by the materials management sub-systems within LCS's CSS System. At the moment, three interim systems are being used. One is based on 'Cullinet' software; one on 'Hoskyns' software; and one the in-house 'Area Stores Module' developed by LCS/Information Services.

The establishment of District MMUs — to provide the permanent local support needed for effective materials planning, storage and distribution operations.

Below: Centre Area's main storage and distribution unit.

Bottom: Storekeepers unload one of the twice daily deliveries to Centre Area's depot.

The Unit worked with experts from the Cranfield School of Business Management to develop an intensive, task-oriented training package. Twelve Districts each appointed a Materials Manager to develop a comprehensive strategy and the rest of the country quickly followed suit.

Replenished

Traditional stockholding was based on more than 400 large 'Section Stocks', each holding an inventory range of about 2,000 items and each monitored and replenished independently. There was a lack of reliable information and some stockpoints held an excess of an item while others had a shortage. Expensive jobs often failed for want of a single, inexpensive, item.

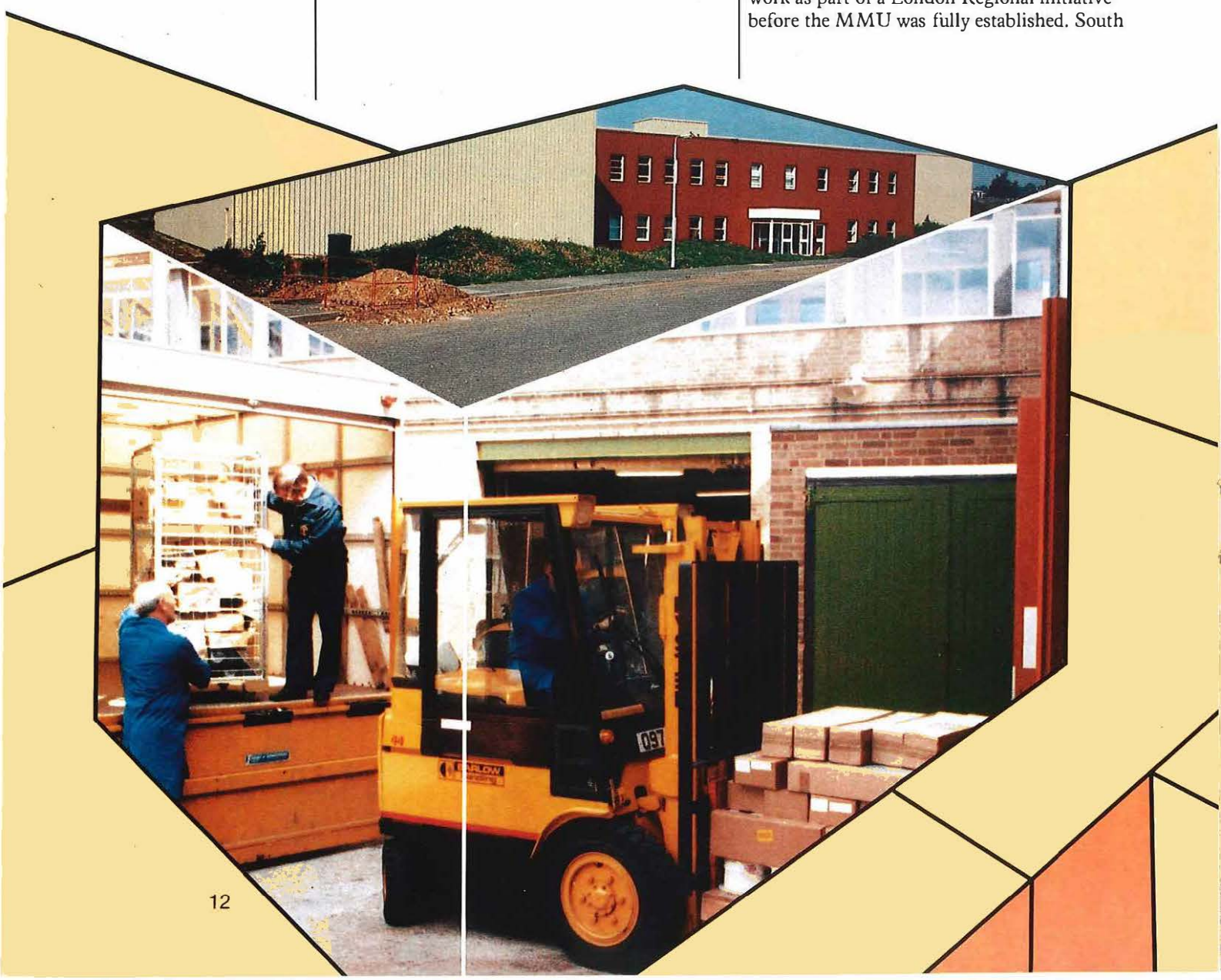
In developing their local strategy, the Materials Managers realised that good service does not depend on holding massive stocks 'just in case', but on getting the right goods to the right place 'just in time'. They also recognised that LCS is a number of different 'businesses' each with its own characteristics. The division is a maintenance business, whose commercial customers expect service in a matter of hours. It is also an apparatus supplier, whose customers expect supply in a matter of days, and a construction business which plans major developments months, sometimes years, ahead.

The different functions, too, have different priorities and to enable the various needs to be met within a flexible infrastructure, the Materials Managers defined 'Service Channels' – groups of activities which share the same material service requirements characteristics.

Implementation will vary but for most Districts the local Materials Management strategy represents a multi-million pounds project. All have now completed their plans. Most will be fully operational by March next year and many are already well advanced towards earlier targets.

Anglian Coastal District have pioneered development of a computing system based on 'Cullinet' software. The construction and commissioning of their warehouse has yet to be completed. Lancs and Cumbria District have taken over an existing warehouse and are implementing their Cullinet system. East Midlands District and Thameswey District, too, are on target for operations this spring.

In London, South and Centre Areas started work as part of a London Regional initiative before the MMU was fully established. South



pioneered and were first to implement the 'Hoskyns' based computer system, but Centre Area (West End District as it will become) is perhaps more typical of the District materials operations of the future.

Centre Area have now implemented four major elements of their proposed materials management infrastructure: a central warehouse; dedicated transport fleet; service point; and interim MM computer system. Situated in Kentish Town, the warehouse was built in just six months and commissioned late in 1984. Overall, the site covers some 90,000 sq ft, of which 5,600 is office space; 43,000 covered and 40,000 external storage.

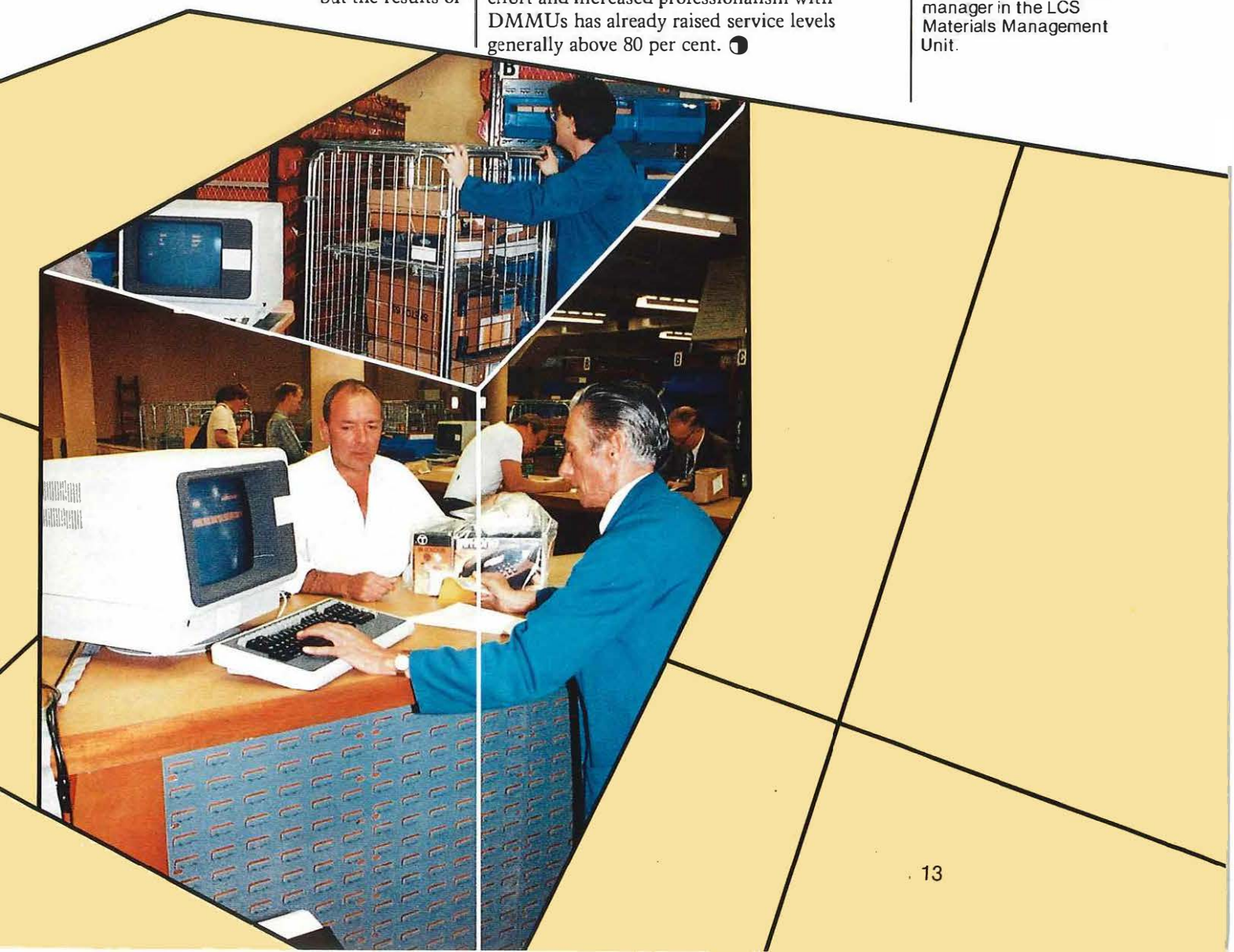
Transition

There was a smooth transition to modern computer supported operations thanks to the expertise of the implementation team and the early pioneering work in South Area. One of the many functions of the Hoskyns system is the production of picking lists for service point deliveries – of both job kits pre-assembled at the warehouse and of maintenance stock replenishments – and these deliveries can be made twice daily because of Centre's compact geography.

The first service point itself is located at the site of an old section stock but the results of redesign and refurbishment – which took only ten weeks to implement at a cost of less than £12,000 – are clear to see. As well as the support and control facilities that the Hoskyns system provides, the service point boasts clearly-defined, well-organised operational zones, a variety of modern mechanical aids, and comprehensive modern racking and shelving systems. But the space occupied is half that previously used and there could be further reductions in future.

Operations, too, have improved. Advice notes used to be translated into requisitions at the stores counter before availability could be checked and items selected. Today, the field engineer presents his identity card and advice note, and the system terminal displays the necessary details to issue a pre-assembled kit and to record the issue – all in a fraction of the time.

The LCS programme was not launched on the basis of specific percentage reductions or improvements because circumstances vary from District to District. With the establishment of permanent District Materials Management Units (DMMUs), the initial programme objectives will be replaced by the permanent objective to minimise costs and optimise service levels. On average, service levels may be as high as 95 per cent – higher still for LCS's customers – and even without the planned facilities, the effort and increased professionalism with DMMUs has already raised service levels generally above 80 per cent. ◑

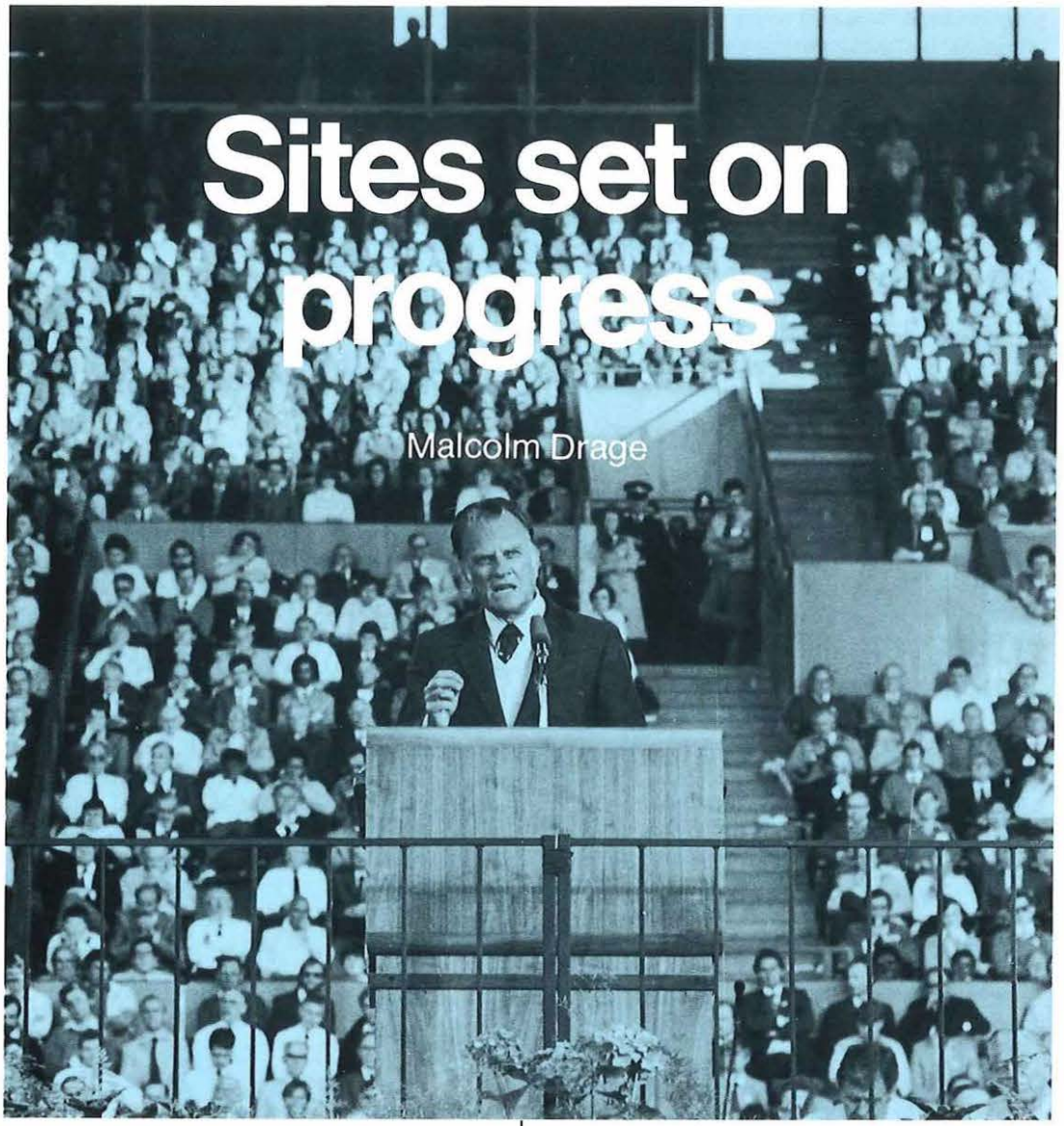


Below: the Hoskyns computer system gives bin location details. Transaction over – a storekeeper returns the passcard and issues a complete kit to his customer.

Mr R Sandford is programme integration manager in the LCS Materials Management Unit.

Sites set on progress

Malcolm Drage



Banner products were used to convey evangelist Billy Graham's message to the masses on his lecture tour of the UK last year.

Building services technology is expanding rapidly and a new Local Communications Services (LCS) unit – British Telecom Site Services – has been set up nationally to handle a comprehensive range of on-site communications services.

Competition is growing for British Telecom's wiring interests at more than 25,000 sites across the UK. Customers are keen to exploit the boom in new information technology products and are demanding more sophisticated on-site services for public address, intercom, local paging, security and television surveillance systems.

British Telecom Site Services is a new national marketing and technical support unit bringing together resources and expertise within the business to provide these services and products commercially. The unit also plans to be in the vanguard of developing centralised computer control and integrated cabling distribution schemes for building services – a strategy which follows the example set by US telephone companies of providing a complete package of telecommunications and wiring related systems from a single supplier and maintainer.

Site Services also provides design and consultancy services and recently won a major contract with the Property Services Agency (PSA) to design a security scheme for a large site which involved over 150 closed circuit television cameras and a video transmission network.

Site Services was set up in response to British Telecom's new Districts recognising that demand from customers for site service products was growing and that this was a new revenue opportunity which would be particularly important as their PABX modernisation programme neared completion. The decision to enter the market was backed by an independent consultancy report which indicated that a significant market share could be achieved.

Market research has also indicated that there is a strong demand from customers for British Telecom to provide site services and the one stop shopping package concept is highly attractive. Site Services national marketing is strengthened by local knowledge and market intelligence which is available in Districts.

Many Site Services products are a natural adjunct to PABXs and can be offered by District sales staff to their existing customers as part of the switch package. Central purchasing ensures high profit margins and District staff can install using the same skills and expertise required for normal customer premises equipment.

LCS Marketing have also been concerned about the erosion of British Telecom's building cabling markets by electrical wiring contractors. To meet this competition, Site Services are

enabling Districts to offer a comprehensive package of services with integrated wiring schemes which could include power distribution.

It is essential that services for new and refurbished buildings are discussed with developers at the project conception stage and Site Services will co-ordinate this activity centrally and take the lead in national product marketing.

Alert system

A strong technical support team enables the unit to offer a design and development capability to meet customers' special requirements and recent developments have included a store detective alert system for Marks and Spencers based on a standard on-site paging system.

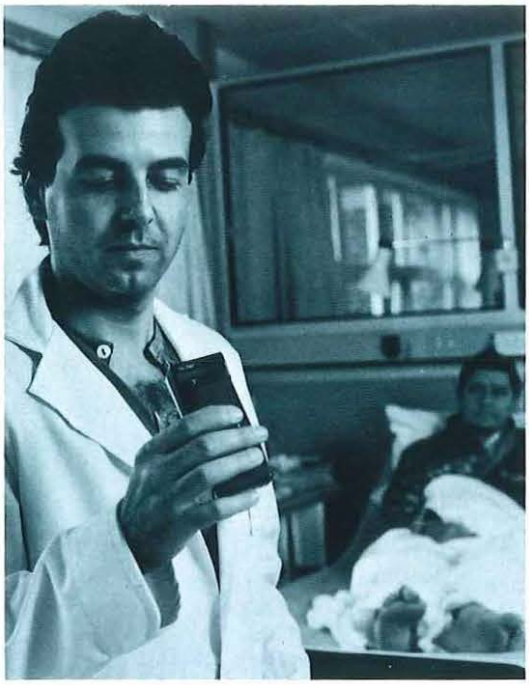
Site Services have also developed the Banner Public Address 1000 series integrated amplifier and interface unit, fully approved for connection to most modern call-connect systems. The Banner on-site paging system has similarly been granted approval for use with call-connect systems. Compatibility and interlinking of Site Services products with network services are essential features of Site Services applications.

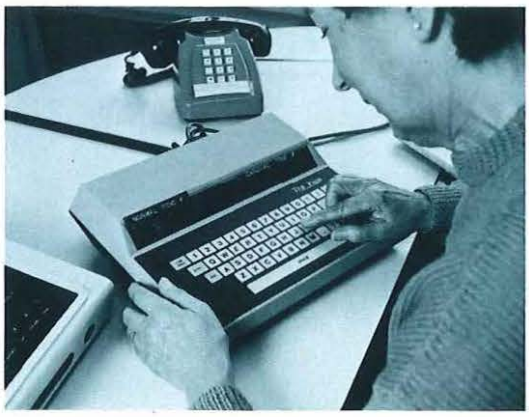
A range of standby power systems for customer equipment developed by LCS/Energy, Transport and Accommodation Department's Power Division also feature in the Site Services portfolio and a revolutionary track power system which has compartments for computer and telecoms cabling is available. And Site Services together with other headquarters units are now looking at products and services to form part of a wider portfolio including access control systems and alarms.

Work at British Telecom Research Laboratories, Martlesham on optical fibre transmission is a major contribution towards installing cable and satellite television networks and this will lead to more exciting opportunities for compiling a more complete package of services for entire buildings.

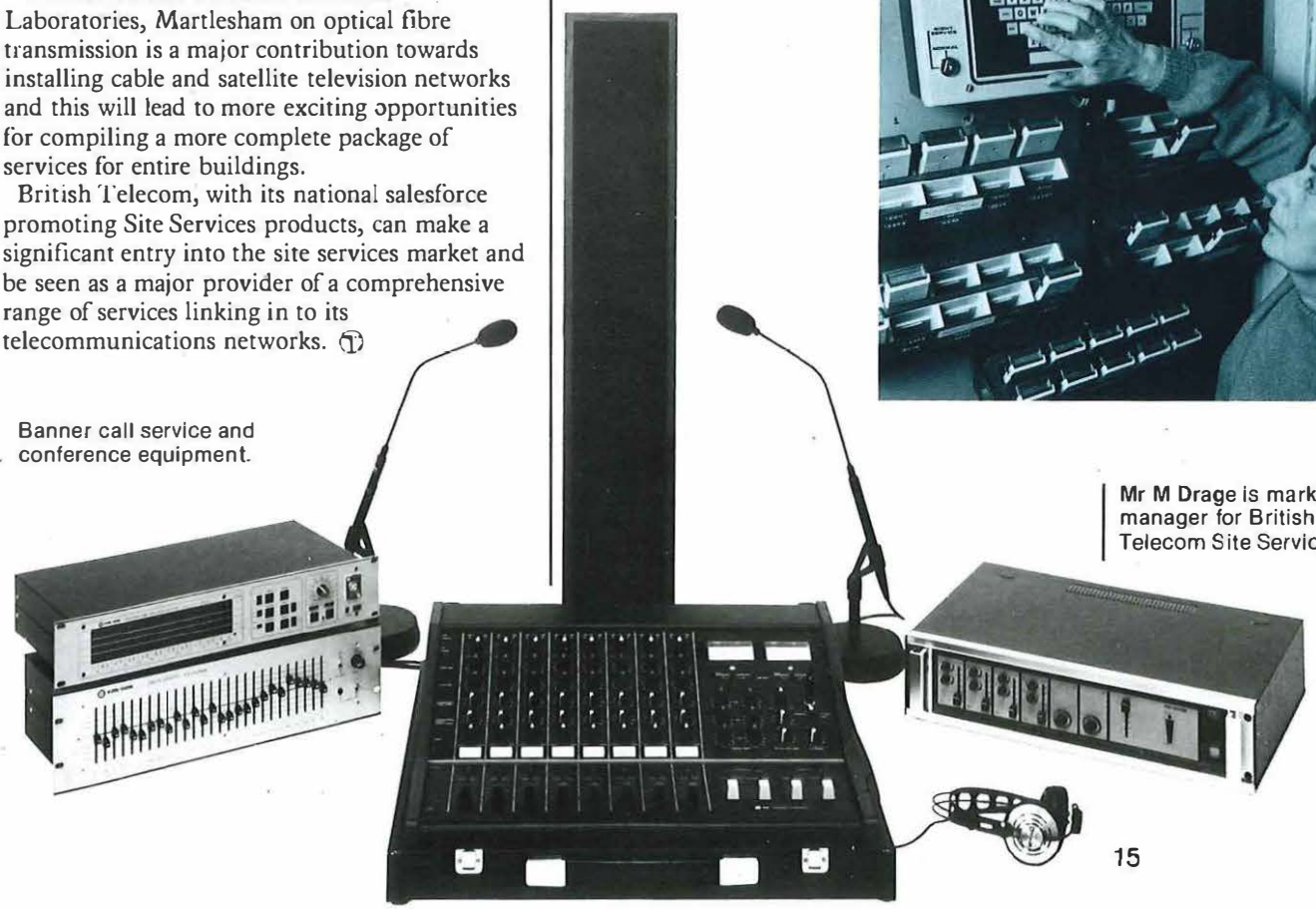
British Telecom, with its national salesforce promoting Site Services products, can make a significant entry into the site services market and be seen as a major provider of a comprehensive range of services linking in to its telecommunications networks.

Mr M Drage is marketing manager for British Telecom Site Services.



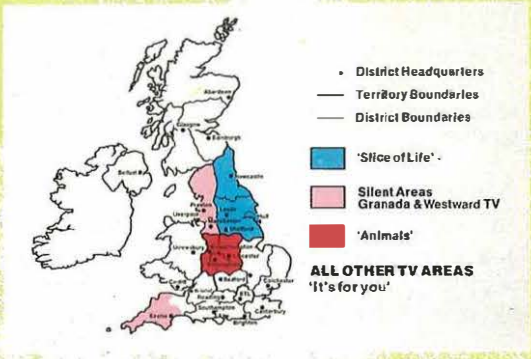


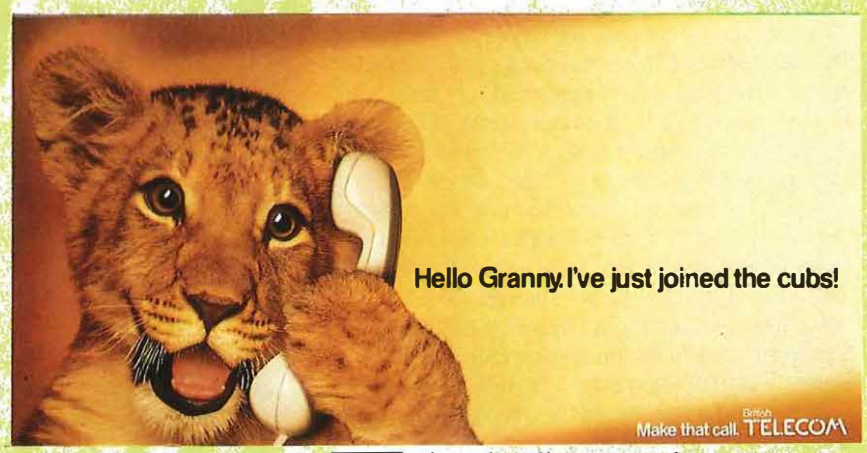
Fast communications are often a matter of life and death in the medical world and the Queen Victoria Hospital at East Grinstead is the first hospital in the country to be equipped with 'The Page', Banner's on-site paging system designed for speed and flexibility. Here, plastic surgeon Roy de Vita reads a message on his pager as he tours the wards. Messages in plain English 'scroll' on the pager and a variety of different codes and tones can also be relayed by a desk-top keypad in the hospital's switchboard room. When not in use, pagers are stored in a charging rack above which is a wall-mounted fully automatic message relaying unit. The unit can send pre-programmed messages to groups or individuals at the touch of a button.



Banner call service and conference equipment.

This map shows the areas used by British Telecom to test the three selected advertising campaigns described on page 18.





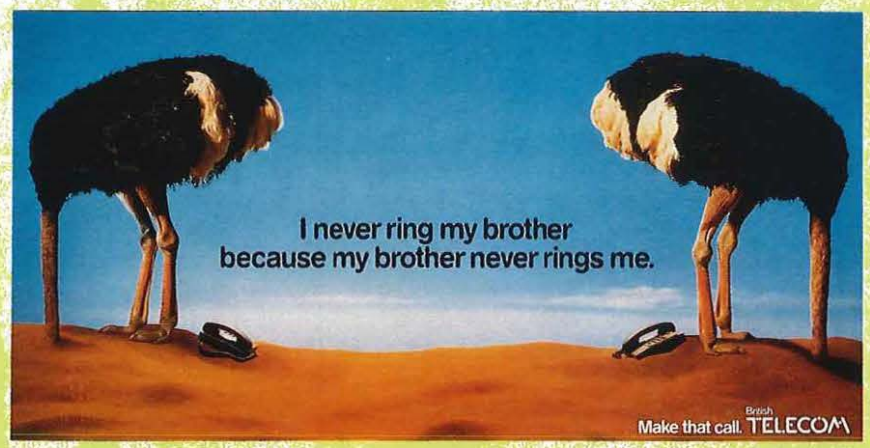
Cuddly animals are now helping British Telecom to increase its £3 billion a year revenue from telephone calls. The break from the popular 'It's For You' advertising campaign followed careful research to find the right approach.

Today, virtually everyone has access to a telephone, either at home (80 per cent of households are connected), the office or through the vast network of public call boxes. But even with the small unit cost – less than six pence – the British spend only half the time on the telephone that some other Europeans do and just one quarter of the time of the Americans.

The amount of traffic on the network is the single most important factor in British Telecom's success and even a small percentage increase can have a dramatic effect on call revenue currently running at more than £3 billion a year. Advertising, particularly on television, is the most successful way of stimulating more telephone calls as proved by the memorable Buzby and 'It's For You' campaigns.

But to make sure the most successful approach was being used, British Telecom embarked on a sophisticated testing procedure to find a campaign that not only stimulated an immediate increase in calls, but also had the potential to maintain its performance and convey the real and emotional benefits of using the telephone both at work and at home.

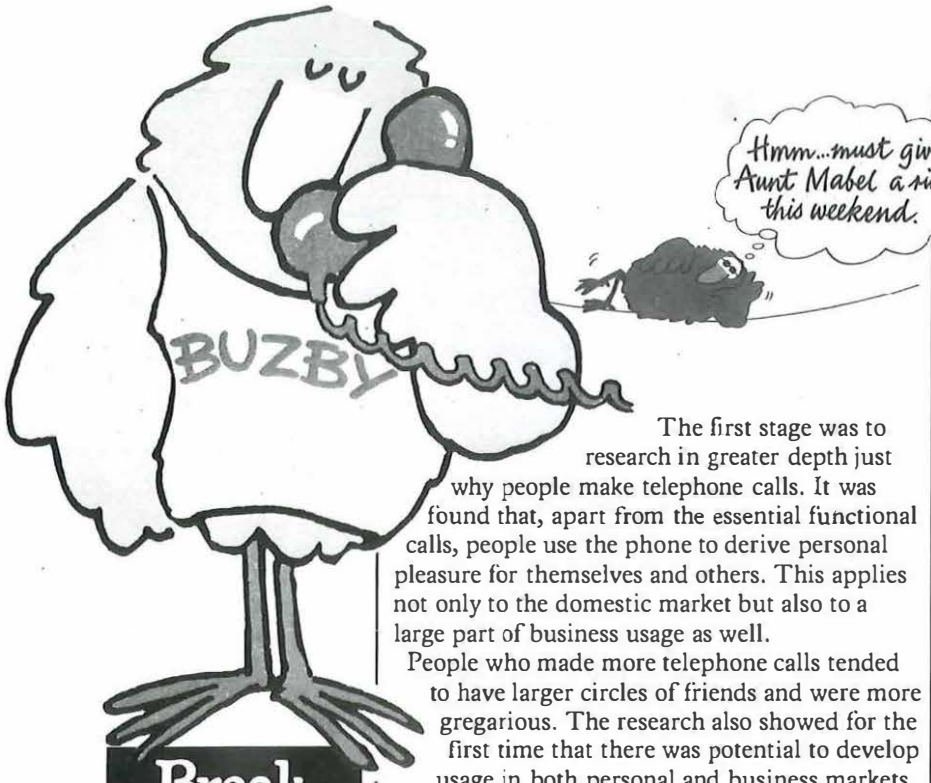
Call of the



wild!

Adrian Hosford

Fur and feathers in the shape of animals and birds have become television favourites throughout the country as they bring to life British Telecom's most recent call stimulation campaign.



A familiar and popular favourite from past campaigns was Buzby.

Mr A J Hosford is head of LCS/Advertising and Sales Promotion Unit.

The first stage was to research in greater depth just why people make telephone calls. It was found that, apart from the essential functional calls, people use the phone to derive personal pleasure for themselves and others. This applies not only to the domestic market but also to a large part of business usage as well.

People who made more telephone calls tended to have larger circles of friends and were more gregarious. The research also showed for the first time that there was potential to develop usage in both personal and business markets through one campaign.

To probe this opportunity British Telecom approached the best advertising agencies in the UK, including the KMP Partnership, the agency behind 'It's For You' and Buzby. The brief to each was the same: to create a single campaign addressed to individuals in both domestic and business environments, aimed at all adults in the UK, but particularly those with the greatest potential to call more often.

Each had to strive to convey the personal rewards and values of a call in both domestic and business contexts, and increase the relevance of the phone to each individual's life. They also had to exploit all forms of media, not just television, to increase the impact. From the initial list of seven agencies, a shortlist of three, including the KMP Partnership, was drawn up.

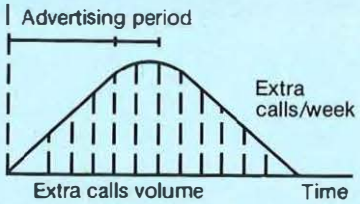
More than any other company British Telecom has the ability to test its advertising, with a sophisticated mixture of qualitative and quantitative research, and call logging.

Qualitative research explores people's perceptions and attitudes to using the phone and to advertising designed to encourage calling; quantitative research establishes and can then track consumers' changing attitudes and behaviour and call logging equipment on the network – installed nationally for the first time – can give a precise picture of calling patterns both when advertisements are running, and afterwards.

A typical four-week advertising campaign, costing between £1-2 million, increases the number of calls made by between five and 12 per cent.

The effect of a campaign is usually detectable four to six weeks afterwards and the extra income raised — which far exceeds the cost of the advertising involved — is additional direct profit for the company because campaigns are timed to make use of spare network capacity.

Classical call advertising effect



It was decided to test the three different campaigns in practice, using the above techniques to compare their performances in different parts of the country. Test areas were carefully selected based on television regions, with two 'silent areas' which featured no advertising at all to enable a true comparison of performances.

The KMP Partnership, the existing agency, had handled call stimulation advertising since 1976. Their work included both Buzby and 'It's For You' and other clients include Carlsberg Lager and Pentax cameras. KMP developed a campaign to extend the messages of residential calling into the business sector as well, and created advertisements to run in posters, the Press and on radio.

In the test, two of the existing 'It's For You' commercials alternated with two new films and were seen across most of the country. The new treatments included an oriental Kung Fu fanatic rescued from a tricky situation by a phone call from his 'honourable father'. The benefits of phoning to the business world were illustrated in a 'Godfather' style sketch urging business people to keep in touch with the office or the 'family'.

Human interest

Abbott Mead Vickers, a British agency with an impressive growth record, proposed a 'slice of life' theme built around realistic people in real life situations with a high emotional content – a similar theme had proved successful for AT&T in the United States. The campaign projected the emotional benefits of the phone to both callers and recipients in a variety of specified call situations. All featured powerful human interest with a broad appeal and advertisements ran in the Yorkshire/Tyne Tees television area with the theme 'A call can say it all'.

The third agency J Walter Thompson, second largest in the UK, and highly regarded for its professionalism and creativity, chose to use animals to help evoke the emotional responses, similar to the famous Brooke Bond chimps, the Kosset cat, the Dulux dog and the Andrex puppies.

The campaign ran in the Central television area in a variety of forms of media. Treatments included an ugly duckling who discovered he was a swan, a pair of courting camels making up after an argument, and a businessman ostrich who 'reverses the charge' of his angry rhino manager with a well-timed call.

At the end of the summer test, the results were assessed and combined with historical data. There was no doubt about the winner. J Walter Thompson's cuddly animals had not only captured the imagination and heart of the public, but helped to exploit calling opportunities more than ever before.

Part of the initial J Walter Thompson plan was to vary the adverts as much as possible, providing a wide range of new and fresh messages. The agency calculated that there are 4,367 different animals in the world, so there should never be a shortage of variety!

British Telecom Journal
Winter 1985/86

Exchange fault-finder boosts efficiency

David Salmon and John Horspool

An automatic system which can quickly pinpoint faults in Strowger telephone exchanges and thereby reduce repair times, is now being introduced extensively throughout British Telecom.

The advantages to the customer of British Telecom's fully digital network in terms of increased facilities and greater reliability have been well publicised. The problem from the service provider's viewpoint is that consumers want these facilities now, whereas the new systems and services will not be nationally available until the end of the decade – despite the determined efforts being made by British Telecom.

Meanwhile, each British Telecom District still relies extensively on the electromechanical switching system invented by Almon Strowger, a Kansas City undertaker, in the 1870s. The system has been a faithful and willing workhorse for many years but some exchanges are almost 40 years old, which is well beyond their design life. The problem is how to maintain them to bridge the gap until electronic systems arrive and the answer for many British Telecom Districts has been Strowger Central Office Tester (SCOT), a system manufactured by the Bracknell-based automatic test systems company, Teradyne.

As existing Strowger systems grow older, more problems tend to occur reducing service availability to customers and causing a heavy and uneven workload for staff.

Electromechanical switching systems require a high degree of routine preventive maintenance but current engineering manpower levels mean that a high volume of fault conditions reduces the preventive maintenance time and thus more faults are generated.

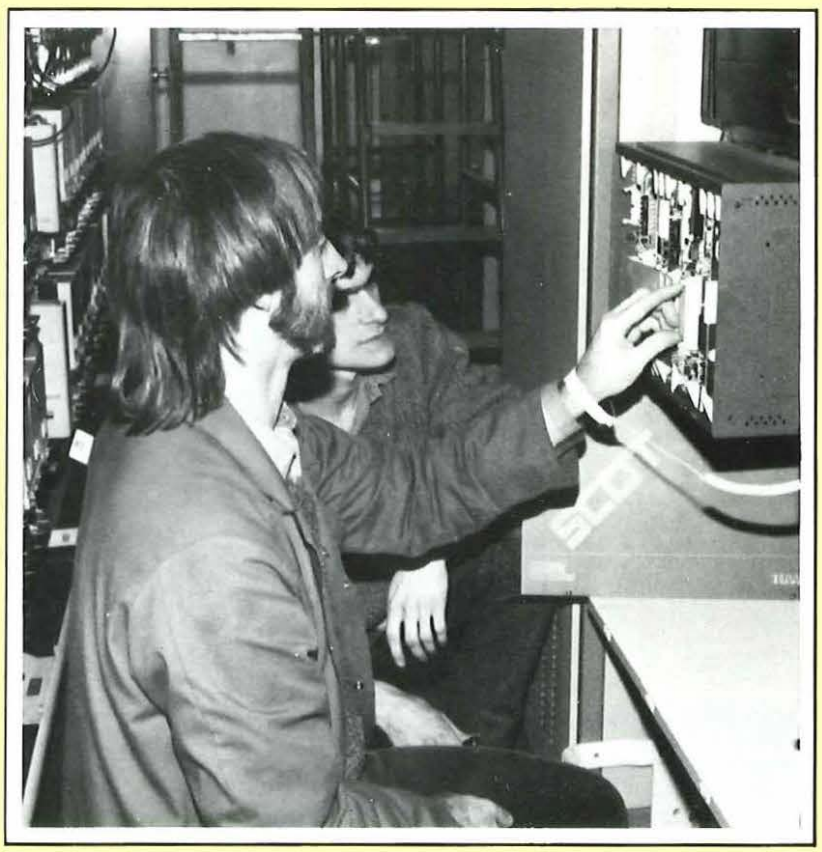
This is not, of course, a new problem as all Strowger systems, with their large number of mechanical switches, are prone to wear and noise. The problems have been made more apparent by the ageing equipment and the high level of demand from users.

In Leicester, a mainframe computer was used for several years to run Computer Aided Maintenance Project (CAMP). In addition to testing small line samples through the exchanges in the area, this system analysed customer complaints and service reports, but the increase in the numbers of common control exchanges made the system redundant. Shortly after this Measurement Analysis Centres (MACs) were introduced nationally to supercede Telephone Service Observations (TSOs).

MACs test a predetermined number of lines against predetermined criteria and generate statistical results on a daily, weekly and monthly basis. The system enabled, for the first time, the establishment of maximum fault targets for exchanges. MACs make a number of tests but the most significant from the Strowger viewpoint is the percentage of calls which do not succeed. A thousand test calls are made and the maximum permitted failure rate is one per cent or ten calls.

The advantage of MACs is that British Telecom managers can highlight exchanges with particularly high failure rates and mark them down for further investigation. It is in this situation that SCOT is particularly valuable for investigating and analysing problem areas.

SCOT is a microprocessor-based system installed in the exchange and connected into it by a simple back plate. It can automatically originate and terminate test calls on all the ▷



Technical officer Peter Thompson checks SCOT equipment at Glenfield exchange watched by Paul Whistler.

possible numbers available through a Strowger exchange and report the results via a printout in the form of call completion rates. In large exchanges, SCOT can be a permanent fixture and in the smaller exchanges, typically less than 5,000 lines, the system can be installed for short periods to improve performance.

During quiet periods, SCOT is programmed to test a certain number of lines chosen by instructing the system to test only numbers ending in certain digits. By varying the digits nightly the whole exchange can be tested over a short period. During these tests SCOT originates and terminates each chosen customer line against established criteria and stores the data for subsequent analysis.

Remedial action

Typically the system will test about 4,000 lines in 12 hours but this varies depending on the complexity of the tests the technician requires. The lines which fail the criteria are then printed out for remedial action by service staff.

The ability of the system to pinpoint faults in this way means that the time for repair is thus much reduced. When first installed a high volume of fault reports are generated many of which would not have come to light without the testing system but, after this initial hump, fault report volumes fall rapidly thus freeing the service technicians for preventive, routine maintenance.

East Midlands District was one of the first to use SCOT, and results have improved dramatically since the system was first installed late in 1984. Many of the smaller exchanges which previously were struggling to achieve the one per cent failure rate are now attaining figures well below this without difficulty and an impressive example is at Glenfield where figures show a fall in call failures from 1.5 per cent in October 1984, to under 0.5 per cent a year later. Other smaller exchanges with historical problems of reaching targets have achieved similar, if not such dramatic, results.

One of the major problems facing all Strowger exchange managers is the reducing pool of Strowger expertise. No new technicians are being trained in electromechanical technologies and erosion by retirement and promotion means there are fewer technicians with the basic diagnostic and mechanical skills.

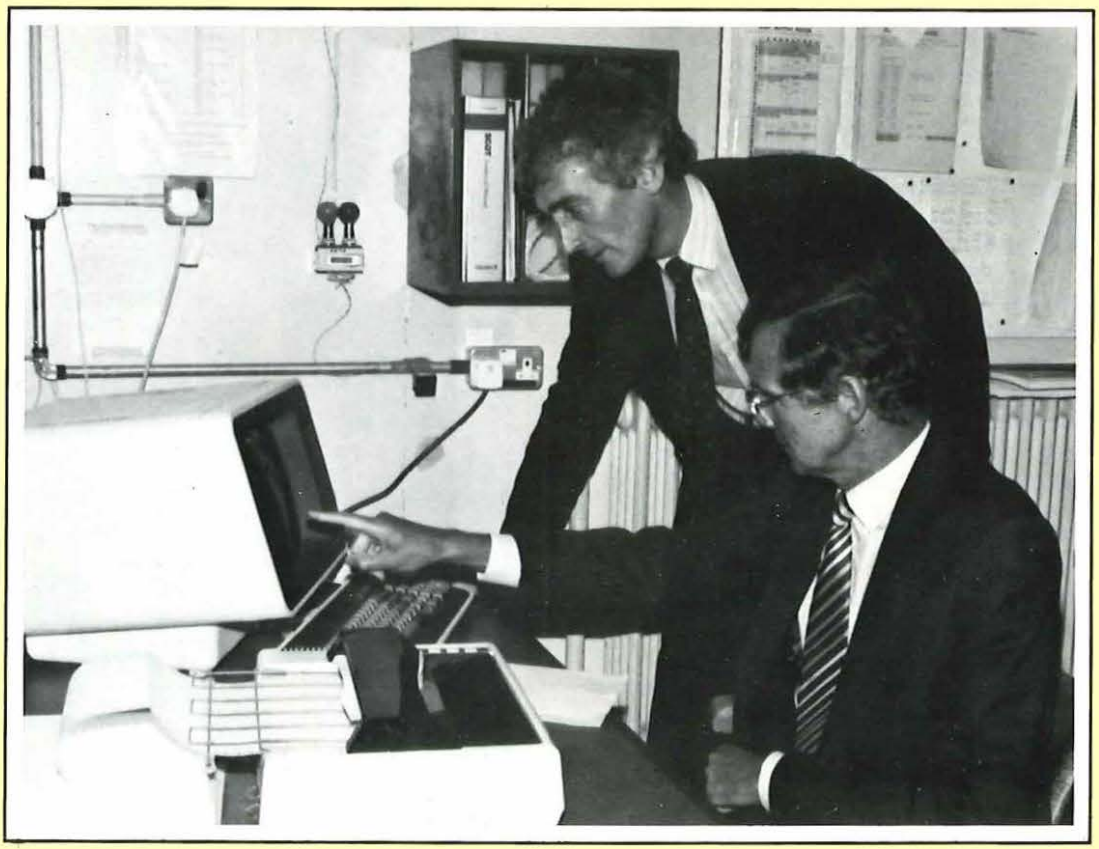
Another serious problem in Strowger exchanges is noise and SCOT has been enhanced by a field-upgradeable module which measures the noise heard by the customer on his own line. Broad band noise measurements are made as the call progresses either in an automatic routine mode or on demand where particular lines have been identified as having problems.

SCOT also has a hold-on failure facility which enables technicians working alone on small exchanges, to program the system to continue routine line testing during the day to generate an alarm when a fault is found.

To date 175 SCOT systems have been delivered of which 90 have the noise detection enhancement. Twenty-one of the 24 British Telecom Districts, have SCOT and it is equally widespread throughout London and the Hull Telephone Company. Future plans include further enhancements which will assist in maintaining a good level of service to subscribers on Strowger exchanges until the full deployment of the digital network.

Mr D Salmon is Operations Group Manager in East Midlands District Operational Services Division.

Mr J Horspool is Exchange Unit Manager.



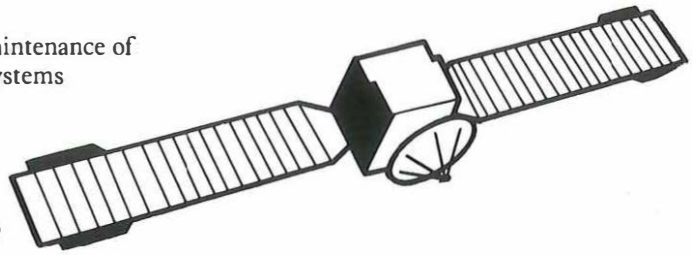
Authors David Salmon (seated) and John Horspool study the night routine summary display on a VDU at a local Strowger exchange.

Better service for all at sea

Serinda Hundal

British Telecom International's (BTI) Assistance, Maritime and Aeronautical Radio Executive (AMA) operates one of the world's largest maritime radio networks. Its operations extend from planning to installation, operation and maintenance of its communications network. Its major activities include provision of:

- ★ communications to shipping and to offshore exploration rigs in the North Sea;
- ★ air-to-ground radiotelephony service to aircraft;
- ★ support to government departments and search-and-rescue organisations on distress and safety-at-sea communications;
- ★ agency services for the Departments of Transport and Trade and Industry in ships' radio and radar equipment surveys and approvals, training of equipment surveyors and in holding radio officer competency examinations;
- ★ installation and maintenance of communications systems and consultancy services in radio communications to other British Telecom divisions, government departments and private organisations.



Global maritime communications are provided by high frequency (HF) radio links via Portishead Radio Station near Burnham-on-Sea in Somerset and by satellite via BTI's Inmarsat service through Goonhilly coast earth station in Cornwall.

Communications up to a range of 300 miles at sea are provided on medium frequency (MF) bands by 11 coastal radio stations around the UK coast line. Most MF traffic is generated in the North Sea where public communications services are augmented by leased radiotelex circuits to oil exploration rigs and their support vessels.

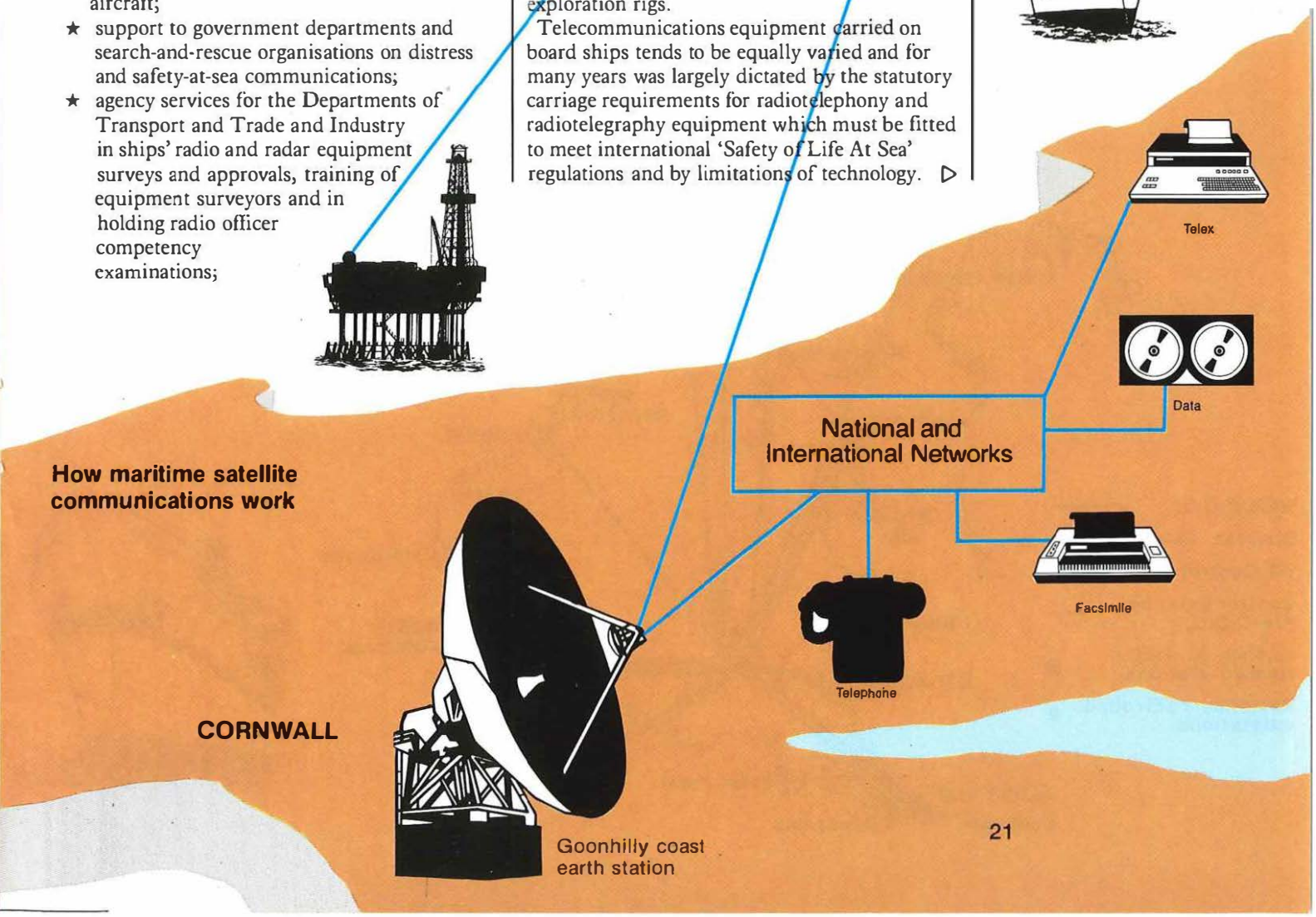
Vessels up to a range of about 45 miles at sea also have access to a radiotelephony service on very high frequency (VHF) bands available through 34 radio stations around the UK coast line of which 24 are remotely controlled.

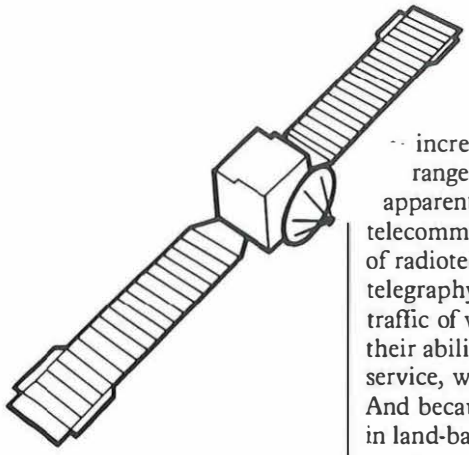
AMA provides a wide variety of services and the mix is such that it can meet the different communications requirements of different types of ships which range from small commercial fishing boats, tugs and pleasure craft to deep sea cargo and passenger ships, supertankers and oil exploration rigs.

Telecommunications equipment carried on board ships tends to be equally varied and for many years was largely dictated by the statutory carriage requirements for radiotelephony and radiotelegraphy equipment which must be fitted to meet international 'Safety of Life At Sea' regulations and by limitations of technology. ▷

Despite the decline in the world shipping fleet, demand for more advanced maritime communications services is increasing. British Telecom International (BTI) is responding by enhancing existing services, introducing new ones and improving the methods of providing them.

How maritime satellite communications work





Later, as international trading became increasingly sophisticated, the need for long range ship-to-shore communications became apparent. Ships began to install additional telecommunications equipment to widen the use of radiotelephony, radiotelex and morse telegraphy. With this came a growth in maritime traffic of which AMA's coast radio stations, with their ability to provide a high quality operator service, were handling a significant proportion. And because of the technological developments in land-based telecommunications products and services which have transformed international communications, the maritime community has begun to expect a similar degree of sophistication in ship and shore communications.

AMA's response has been an acceleration in its programme of innovating its services. In 1983, for instance, it introduced a maritime satellite service which now provides a range of facilities from automatic ship-to-shore telephony to 56 kbit/s high-speed data.

Two years later, AMA accounts for nearly 50 per cent of the total maritime satellite traffic in the Atlantic Ocean Region which, in the Inmarsat space segment context, stretches from the east coast of Africa to just west of the Panama Canal. Within this area – which includes the Red Sea, the Mediterranean, the North American routes, the Caribbean and the Panama Canal – are nearly 70 per cent of the world's shipping movements.

Worldwide

In the last two years, telephone traffic passing through Goonhilly coast earth station and the terrestrial coast radio stations has increased by 56 per cent and telex traffic by 86 per cent.

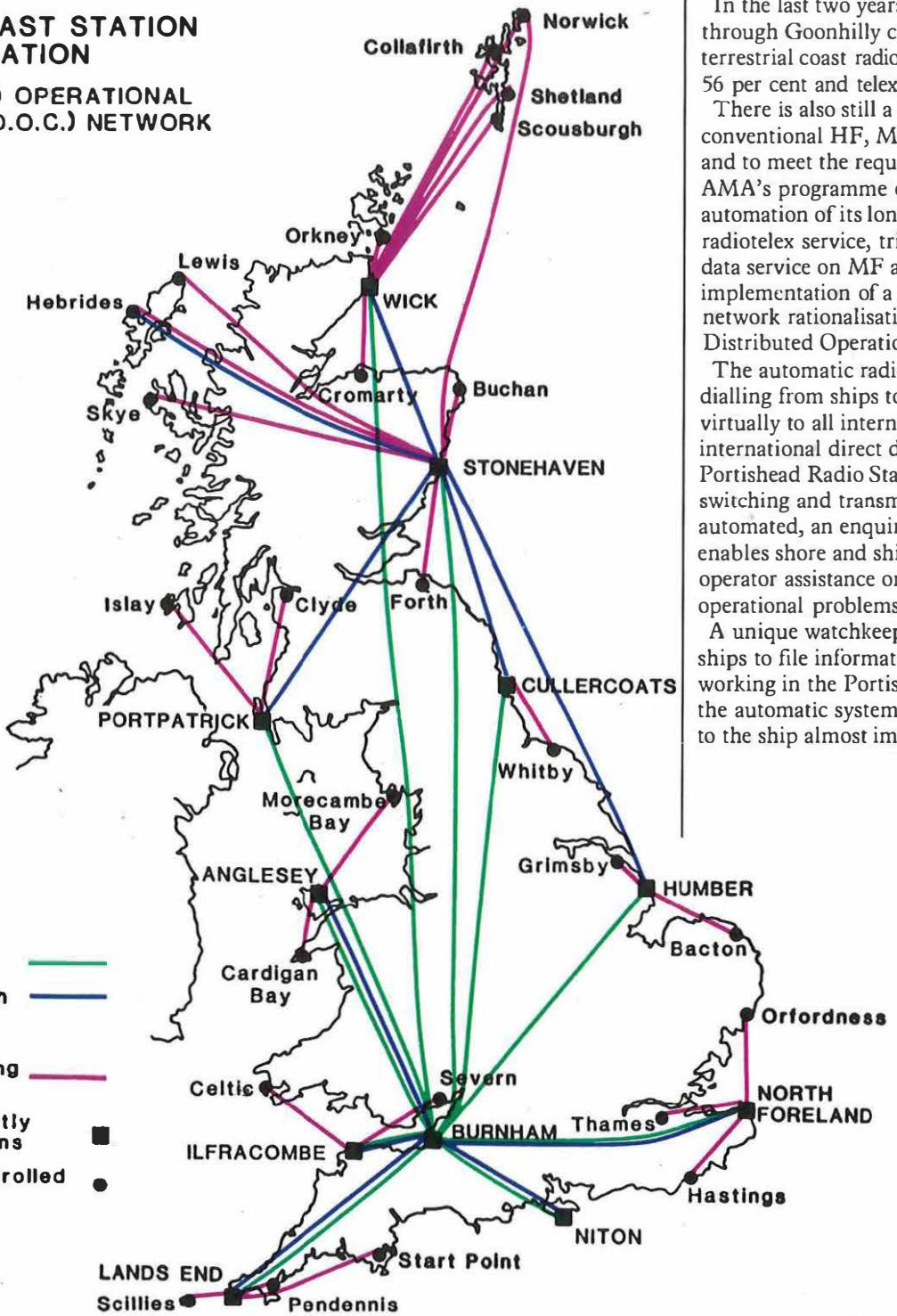
There is also still a significant use of the more conventional HF, MF and VHF radio services and to meet the requirements of this sector, AMA's programme of innovation has led to the automation of its long-range and medium-range radiotelex service, trials with a medium-speed data service on MF and VHF and implementation of a coastal radio station network rationalisation scheme known as Distributed Operational Control (see map).

The automatic radiotelex service enables direct dialling from ships to any UK number and virtually to all international customers on BTI's international direct dialled telex network via Portishead Radio Station. Although the switching and transmission system has been automated, an enquiry point at the station enables shore and ship-based customers to obtain operator assistance on general queries or specific operational problems.

A unique watchkeeping facility also encourages ships to file information on their frequency working in the Portishead computer to enable the automatic system to send telex messages on to the ship almost immediately.

BTI/MR COAST STATION CENTRALISATION

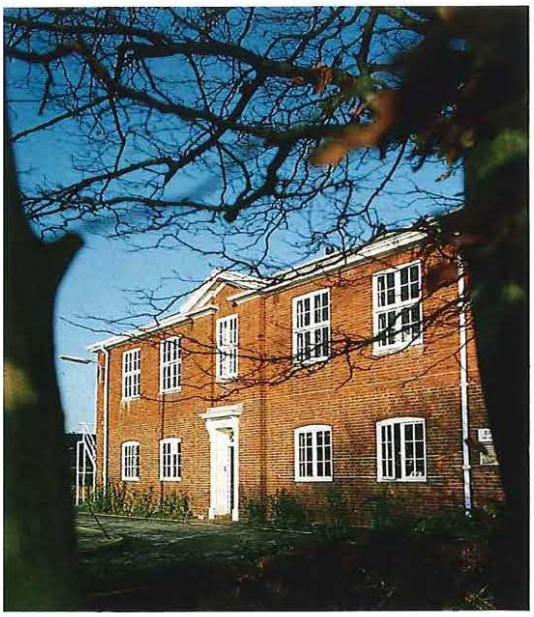
DISTRIBUTED OPERATIONAL CONTROL (D.O.C.) NETWORK



Aerial V at Goonhilly coast earth station – used by BTI's Inmarsat service.

AMA is also currently market testing data communications facilities on radio channels in the 2MHz band and coupling these channels to specially designed modems handling data up to a speed of 2.4 kbit/s. Data trials with commercial VHF channels have demonstrated the feasibility of computer-to-computer communications allowing shipboard micros to communicate directly via the VHF data services to other shore-based micros or databases accessible via British Telecom packet switch systems.

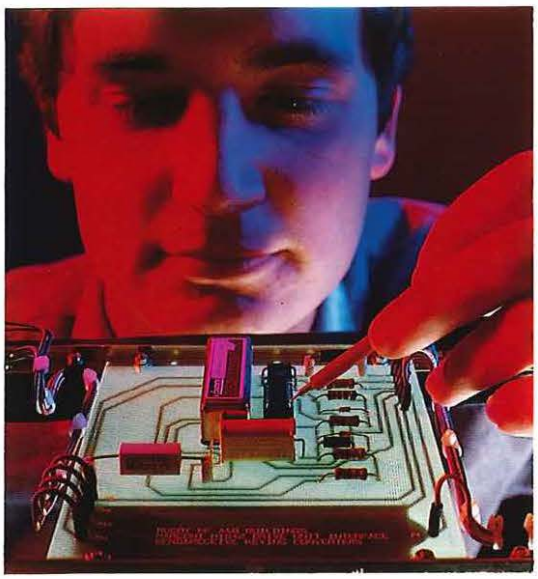
But perhaps the most strategic move by AMA to exploit its radio communications capacity to the full has been the development of air-to-ground telephony service for aircraft. This service operates on HF simplex channels and allows calls to be made from airborne craft to all countries on BTI's international telephone network. AMA is also evaluating aeronautical communications services in the UHF bands and via the Inmarsat system. ▷

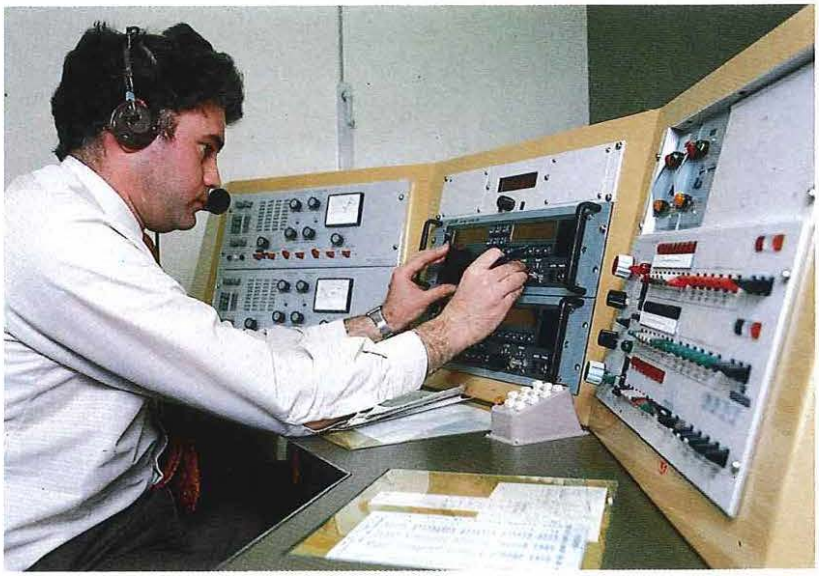


Portishead Radio station near Burnham in Somerset provides wireless telegraphy, radio telex and radio telephony services for shipping all over the world.

Below: An operator at Portishead Radio connects a ship-to-shore radio telephone call.

Below, left: Research is a vital element in AMA's activities. Here an engineer works on a drive unit interface for a radio station transmitter.





Right: A ship fitted with the equipment necessary for communication by satellite.

Dr S Hundal is head of marketing and forecasting in Assistance, Maritime and Aeronautical Executive, BTI.

Below: Riggers from AMA played a major role in the installation of satellite dishes at BTI's London Teleport.

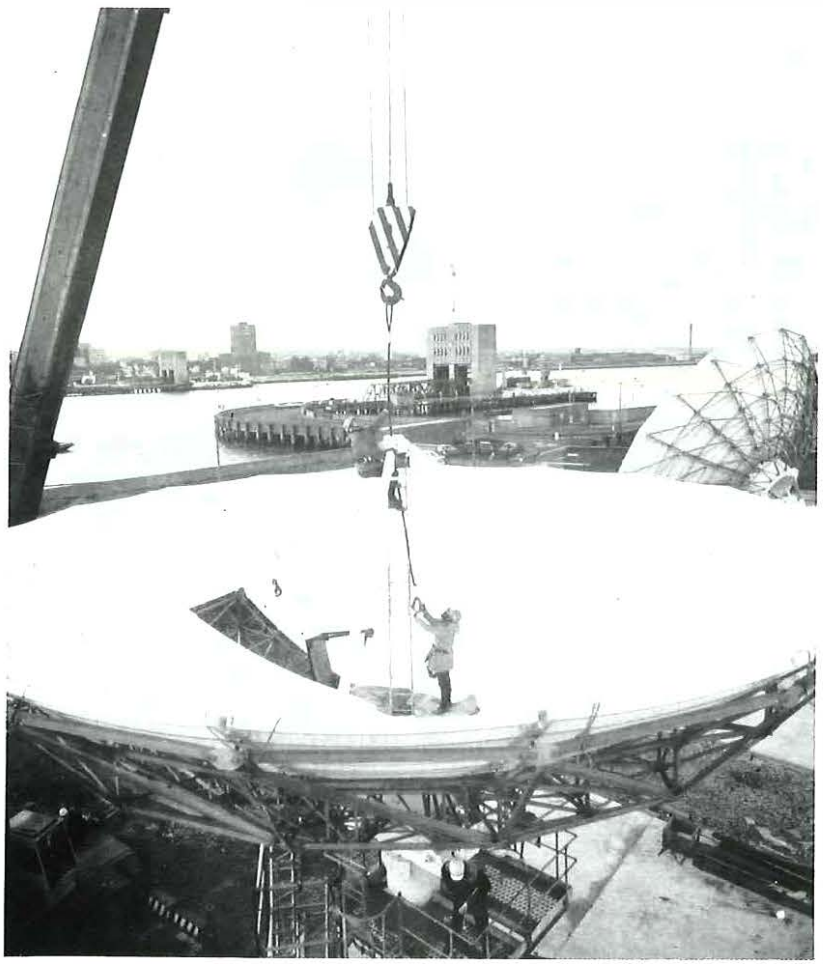
The other major AMA project, Distributed Operational Control (DOC), is a traffic management scheme with which it will be possible to balance the manning of coast stations anywhere in the station network to the overall traffic load and to respond more quickly to changes in demand.

The scheme, which will be introduced during the next year or so, will maintain the present high quality of service, but in providing the maximum amount of flexibility to traffic management, will make the provision of service to the customer more cost-effective and efficient. Under the DOC scheme, the commercial communications facilities of all coastal radio stations will be controlled via a central processor at Portishead Radio although provisions will be made for local control.

Consultancy

The contact that AMA had with the customer has not only been confined to a provision of service from its coastal radio stations and its Goonhilly earth station. Over the years, it has also offered a consultancy service to government departments, private organisations and to overseas telecommunications administrations.

In the 75 years that AMA has operated radio communications it has built up expertise in operational radio engineering which makes it unique. It plans, designs, constructs and maintains external and internal equipment at its coastal radio stations. As a result, it has accumulated a wealth of experience in aerial



construction and maintenance, coastal radio station design, equipment and management, radio equipment design and construction and radio systems research and development.

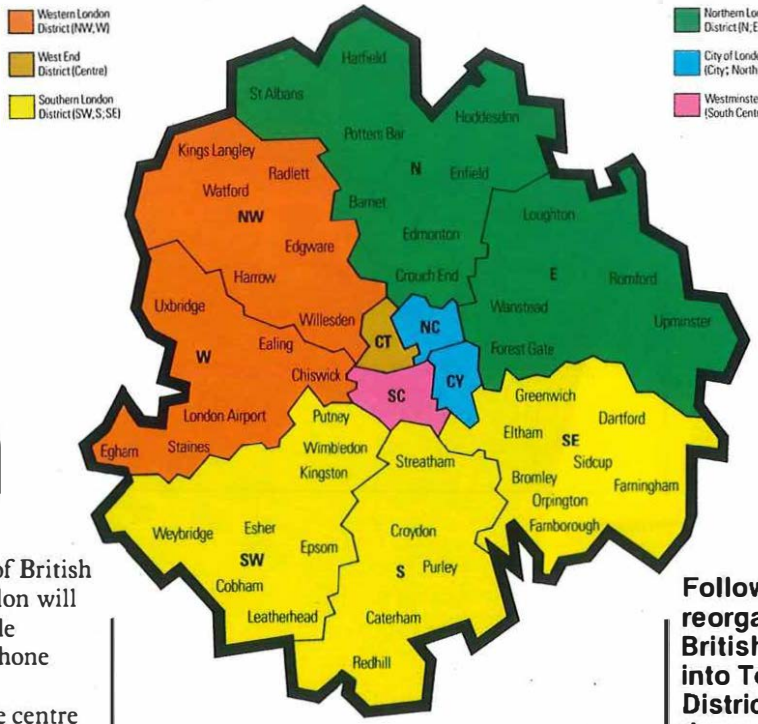
AMA has, for instance, responsibility for aerial systems throughout the UK carrying from very low frequency (VLF) to ultrahigh frequency (UHF). These include not only systems AMA operates for public and private communications services, but also for other British Telecom departments and external organisations. Rigging aerials for Cellnet's mobile cellular radio network is a prime example.

AMA is also skilled in the assembly of small and medium-sized satellite dish aerials for commercial communications and broadcasting systems. Dishes for BTI's SatStream service and satellite dishes at BTI's London Teleport were assembled by AMA riggers.

Much of the advanced equipment at radio stations is designed and built in AMA's own electronic and mechanical workshops. Control and switching systems, radio transmitters and components for aerial systems and other radio station equipment are a few examples of the items constructed 'in-house'.

AMA's offering of consultancy service in radio communications is clear indication that it seeks optimum return from its investment in personnel, physical, technical and financial resources and it will be well able to meet the challenges that lie ahead. ◑

New look for London



Following the reorganisation of British Telecom into Territories and Districts throughout the country, sweeping changes are about to be made in London to bring BT's business closer to the needs of the capital's customers.

Major changes in the structure of British Telecom's operations in London will see the creation of six new-style Districts to replace the existing 11 telephone areas in April.

The Chief Executive will remain at the centre with about 50 staff and a new and unique organisation will be set up to provide those paid-for services which can be carried out more economically from a central point.

Known as the London Service Organisation, this new body will provide common and London-wide services to the new Districts and the BTL Territory headquarters. It will charge Districts for its services and will be accountable to the Chief Executive for the efficiency of its activities.

The organisation will provide finance development, recruitment, computing services and there will also be units concerned with network planning and engineering and operational support. It is also intended that the organisation should be responsible for the management of London's operator services.

The basic work of British Telecom London – installing equipment, providing support services and billing customers – will continue. But the reorganisation, one of the biggest in London's history, will affect all staff as the process of devolution of work and authority to the new Districts continues. The aim, however, is that customers and the business as a whole benefit from improved efficiency and service.

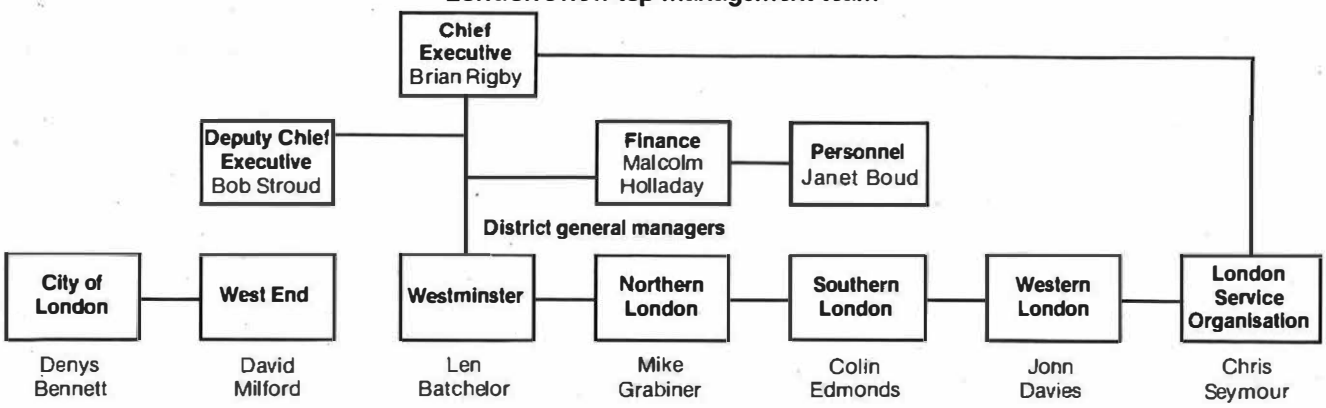
South Central and Centre areas will be known as Westminster District and West End District respectively. The other two inner London areas – North Central and City – will link up as City of London District.

The existing North and East areas – from Hatfield to Upminster – will combine to form the Northern London District. North West and West areas will come together as the Western London District.

The southern half of the region – South West, South and South East areas – will join forces as the Southern London District, stretching from Weybridge in the west to Farningham in the east, and Putney in the north to Redhill in the south.

The reorganisation has been designed to achieve a number of key objectives, the most important being to improve service to customers in London. The new Districts will be in a better position to carry out the LCS business strategy more effectively and District managers will have more scope in the long term development as well as the day to day running of their businesses. ⓣ

London's new top management team



Advance and be recognised!

Chris Bourne

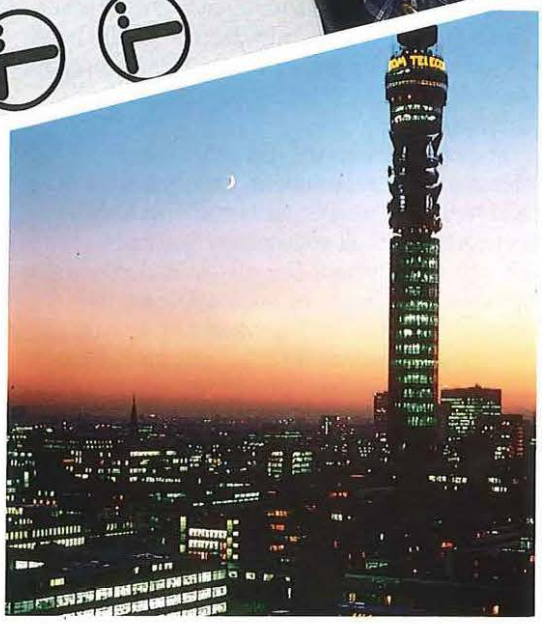
The old adage that 'things either happen by accident or by design' illustrates the importance of the work of British Telecom's Corporate Design Unit which exists to ensure that wherever the company expresses itself visually, as little as possible happens by accident.

Above: Design Unit has sole responsibility for the development and application of the corporate identity wherever it appears.

Above right: Designer Malcolm Brown selects slides for a presentation on the role of corporate identity in business.

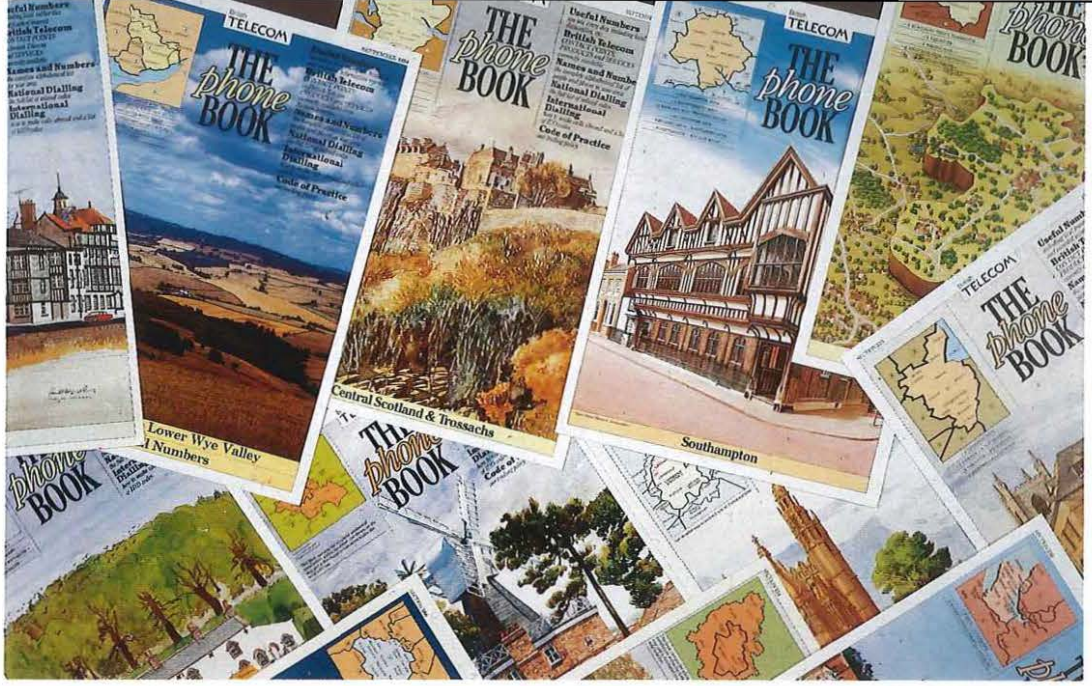
Right: A major interior design project was carried out at the Telecom Tower.

Below: An example of Design Unit's promotional work was the livery of this lorry used in the Nationwide Faraday Lecture tour on telecommunications.



Design Unit, which is part of Corporate Relations Department based at the British Telecom Centre in central London, has the task of developing an overall design philosophy for the organisation and the strategies needed to apply it. The job requires a continuous monitoring of the company's structure and an awareness to ensure that its identity is responsive to changing needs.

More tangibly, the unit produces a series of identity leaflets which cover everything from how to apply the livery on a van to how a board



A selection of the new phone book covers commissioned by Design Unit from well-known illustrators.

member's stationery should look. In addition, the unit publishes technical manuals on subjects like signposting systems, as well as the main corporate identity manual soon to be re-issued in revised form.

But the unit is not only concerned with enforcing the minutiae of design detail required by any large organisation. While this is an important aspect of its work, there is also a great deal to be done before a publication can even be considered.

So why is this all taken so seriously? What is it about corporate identity that is so important to British Telecom?

Every organisation has a corporate identity. An identity is simply what an organisation thinks of itself in terms of attitudes, sense of direction and status. The visual aspects of identity – the logos, symbols and colours – help the company to communicate these corporate beliefs but if the elements are applied inconsistently or if ad-hoc alterations are permitted, then the organisation will appear to be confused about itself and lacking in purpose.

Liberalisation

British Telecom's identity has undergone radical change over the past five years and the liberalisation of the telecommunications market and the flotation of the company into private ownership placed a new set of demands on British Telecom's methods and structure.

The rise of marketing as the 'leading edge' management skill is an example of one of the more significant and permanent changes. Corporate design has a vital role to play in marketing to help the company both advance and be recognised.

Two important ingredients of continued commercial success in the competitive arena are 'presence' and 'credibility'. If a company does not use its identity at every opportunity and use it consistently, then its presence in the market place will be reduced. Customers must be aware of British Telecom and that requires 'presence' and if they are going to buy, they must have confidence in the products and services on offer: this requires 'credibility'.

One company who has recognised this is IBM. IBM have always used their identity with great conviction and relentless consistency. Very few people in the West have not heard of them and most know what they do. IBM's identity and the way it is used says: "We know what we are, what we are doing and where we are going." This combination of confidence and presence has been fundamental to IBM's market leadership.

Presence and credibility are vital for British Telecom. The repeated exposure of its name and image helps to present to the public the fact that it is more than just 'the phone company'. The level and range of expertise is an important factor in generating confidence in all its new products and services.

As a privately owned company the confidence of investors is very important. If the image is allowed to break down then it would appear that the company was fragmenting. Its presence would be reduced because the public would not be able to recognise its activities.

As British Telecom is now a public limited company it is essential to capitalise on its name and image as a valuable business asset. Any changes, however subtle, to the corporate logo and symbol can have detrimental effects.

The precise form of the company name, the precise drawing of the logo and symbol are all registered and legally protected. If individual business units deviate from the registered form in any way then the company's claim to exclusive use is weakened.

Corporate Design Unit works closely with the Intellectual Properties Division to ensure that British Telecom's position is kept strong and that any new product or service names are protected from abuse in the same way.

Design Unit's task is growing more complex all the time. Each new development has to be judged against an extensive overview of what the business and the market place is doing. This is not the place for guesswork, no matter how well inspired. The unit is the only body authorised to develop British Telecom's identity and its constructive, professional advice costs nothing but a little time. Mistakes cost a lot more! Ⓣ

British Telecom Journal
Winter 1985/86
Advance and be recognised !

Mr C Bourne is head of interior and information design within Corporate Design Unit.

British Telecom Journal
Winter 1985/86

PUT TO THE TEST

This two-part feature looks at a new electromagnetic compatibility testing laboratory in Birmingham and the equipment approvals process carried out by an independent test house within British Telecom.

Opposite page:
The new Birmingham laboratory has its own anechoic chamber which is used as an alternative to 'open field' sites to ensure that equipment conforms to standard test requirements.

Interference–the unseen menace

Brian Jones

Materials and Components

British Telecom's Materials and Components Centre (MCC) is now able to test items ranging from small terminals to main exchange switching equipment for electromagnetic compatibility – an increasingly important factor in telecommunications development.

The electromagnetic spectrum is becoming ever more crowded with the increasing allocation of frequencies to licensed broadcasts. Also, the growing use of electrical and electronic equipment generates energy which may propagate as electromagnetic waves. This can 'pollute' the environment, possibly causing disturbance to authorised transmissions.

Equipment must be designed to operate harmoniously with the environment in which it works. The problems caused by failure to meet this criterion are apparent everyday, from crackles on the hi-fi when electric light switches are operated, to interference on car radios when unsuppressed motor cycles are adjacent. More seriously, errors, data corruption, and even complete system crashes can be caused by radio frequency interference – either radiated, or conducted via power or signal leads.

Electromagnetic compatibility (EMC) is the ability of equipment to operate in its intended environment, without emitting electromagnetic energy which will degrade the operation of other equipment or systems, or suffering degradation itself from the electromagnetic emissions of other equipment or systems. EMC is a relatively new term which encompasses the correct term Radio Frequency Interference (RFI). There is, however, an important difference: EMC is desirable but RFI is not!

Lack of EMC is usually apparent by problems encountered with the 'victim' equipment, and the source of the problem is usually termed the 'culprit'. The 'coupling path' between the two may carry conducted or radiated intereference – or a combination, such as radiated interference picked up by a signal lead, and conducted into the equipment.

One method of reducing the problem is to limit the spurious radio frequency power generated by culprit equpment, through legislation. Such legislation exists for certain equipment: for example, the Statutory Instrument which calls up the British Standard BS 800 limits emissions from equipment such as electrical household appliances and tools 'and other electrical equipment causing similar interference'.

The recently issued BS 6527 provides similar limits for data processing and electronic office equipment – covering many British Telecom systems. This specification, in slightly updated form, may be expected to be legally enforced in the UK within the next three years. Performance requirements for the 'victim' equipment immunity to interference are not likely to be covered by legislation in the foreseeable future, and this is an area where 'buyer beware' still applies.

Environment

British Telecom, as an enlightened purchaser and supplier of equipment, is keen to ensure that its equipment is electromagnetically compatible with the environment in which it will work, and that it conforms with legislation. Such performance is not achieved by accident. It must be designed in during the equipment development or – usually a more costly solution – modifications must be made to the finished product.

The performance of equipment is verified by testing, either to national or international standards, or the customer's requirements. In the USA, emission testing is normally performed on 'open field' sites which are, as the name implies, simply open air sites, but having ▷

Materials and Components

Mr B Jones is head of the Electromagnetic Compatibility and Circuit Protection group at the Materials and Components Centre in Birmingham.

Technical officer Don Malin sets up an automated test run to check radiated emissions.

particular characteristics of electromagnetic wave propagation.

Although one such test site exists in the UK, the variable weather can cause delays or cancellation to testing, and it is more difficult to find a site with sufficiently low background electromagnetic energy. An open field site is also not suitable for radiated susceptibility testing, since the high field strengths which must be generated may cause problems to other electronic equipment in the vicinity, and would constitute an unauthorised broadcast!

An alternative to open field site is a radio frequency screened anechoic chamber and, recognising the need for such an EMC test facility throughout British Telecom, Development and Procurement Division's Materials and Components Centre have built such a chamber at the laboratory site in Birmingham. The facility consists of a test chamber, with two smaller measurement rooms.

The test chamber consists of a radio frequency shielded room, lined on the walls and ceiling with radio frequency absorbing wedges. The floor is ground-plane reflecting and functions in the same way as an open field site, but without the problems caused by open-air testing. Radiated susceptibility measurement can also be performed. The test chamber has usable internal dimensions of 6.1 m×4.25 m×3.65 m. It can accommodate equipment ranging from telephones and desk top computers to a suite of switching or transmission equipment.

Attenuation

One of the small chambers houses the measuring equipment, and the other can be used for any 'driving' equipment needed to ensure that the equipment under test functions in its normal manner. Each room is shielded from the others and the outside world – the attenuation between rooms and to the outside being in excess of 106 dB over the range 10 kHz to 1,000 MHz. All supplies to the facility are filtered.

The test chamber is directly correlatable to the NBS open field site in the USA which is used for compliance testing to Federal Communications Commission (FCC) requirements. Conducted and radiated emissions can be measured to British Standards, the German VDE specifications, the USA standards (FCC and Military), IEC recommendations, or customers' requirements, over the range 10 kHz to 1,000 MHz.

Conducted and radiated suceptibility can be measured in accordance with International Electrotechnical Commission (IEC) recommendations, US Military specifications or customers' requirements over the same frequency range, up to a field strength of 10 V/m.

But the work is not limited to testing and reporting. The laboratory is available to offer suggestions on improving the EMC of equipment which fails to meet requirements, and can also advise at the equipment design stage. Advice can also be offered on techniques to reduce the ease with which the interference couples into the victim, by using shielding techniques or appropriate filtering.

Although the laboratory opened only last year, a wide variety of equipment, from point-of-sale terminals through small PABXs to transmission equipment and main exchange switching equipment, has already been tested. As most of this equipment has not been designed to meet emerging EMC requirements, it is not surprising that many of the results show non-compliance. It is however only by such evaluations, and subsequent remedial work, that British Telecom equipment will perform reliably and meet new statutory obligations.

British Telecom Journal
Winter 1985/86

The apparatus of approval

Alistair Cockburn and Catherine Davies

Technician Ray Beard adjusts the artificial ear piece on the equipment used to test telephone handsets.

Teleprove

People who buy telecomunications equipment are familiar with the green spots and red triangles which signify whether products are approved or not. The approval process has changed dramatically in recent years and is now carried out independently but British Telecom maintains its involvement through its Teleprove laboratories in central London.

The last ten years have seen a dramatic upheaval within the United Kingdom telecommunications market. Before the introduction of the British Telecommunications Act in 1981, British Telecom operated what is best described as a benevolent monopoly whereby over 10,000 types of apparatus were granted approval – significantly more than any other European country.

British Telecom has, in fact, evaluated products for connection to the network since the 1950s when manufacturers were first allowed to supply direct to the customer such apparatus as modems, answering machines, public address systems, call loggers, attachments to private circuits, PAXs and large PABXs.

Evaluation technician Micky Devett takes oscilloscope readings during a telex test programme.

The 1981 Act was the initial step in a move away from British Telecom writing standards, evaluating products and finally granting approval. It was essentially enabling legislation to permit the Government to formally liberalise virtually the whole of the telecommunications market.

As a result, the market opened up and products which had previously only been available on rental terms from British Telecom, could be bought from a whole range of suppliers. On the other hand, the Act also gave the opportunity to compete against traditional suppliers in certain markets which had previously been banned. In short, liberalisation necessitated a change in the approval process.

The nature of the changes necessitated long term goals rather than sweeping short term effect and to hasten the process, British Telecom played an important role in the instigation of the new standards. It also aided the new independent body set up by the Government – the British Approvals Board for Telecommunications (BABT) – by providing its own modernised laboratories and undertaking testing on an agency basis.

The preparation of British Standards Institution (BSI) standards has involved extensive discussions by committees, comprising representatives from the telecommunications industry, trade associations, user organisations, the Government and British Telecom. Standards must be designated by the Secretary of State for Trade and Industry, or the Director of the ▷

One of Teleprove's computerised evaluation laboratories.

Office of Telecommunications (Oftel). It should be noted that the designated standards are the mandatory requirements but that standards are published before designation and may be used to hasten the approvals process. Because the process has taken longer than originally planned, British Telecom standards have continued to be used and Government (Department of Trade and Industry) standards drafted, as an interim measure. The majority of the interim standard for cordless telephones was written by British Telecom.

BSI standards are under preparation for different product types, general network requirements and product facility requirements. They set out the electrical characteristics necessary for correct interworking with the network and have three main aims:

- ★ to ensure that apparatus connected to either British Telecom or Hull City Corporation networks has no adverse effects on the service available to others;
- ★ to protect both users and personnel operating the network from hazards which might arise;
- ★ to ensure that such things as telex are compatible with both the network and other equipment so that satisfactory end-to-end performance can be maintained.

The aims are not necessarily the same as the old British Telecom standards which often included operational considerations. For example, the evaluation of PABXs now tests compliance with safety, signalling and transmission but in the past, maintenance and the actual working of the product were considered too.

Another difference is the need for BSI standards to be applied objectively by an independent authority. BABT need to be able to make clear decisions as to whether products comply with the standards and can be approved. When British Telecom was applying its own standards to its own network, there was no reason why professional engineering judgement could not be exercised in assessing the overall effect that products would have on the network.

The role of Teleprove has evolved to match this different environment. Teleprove is no longer British Telecom's independent approvals authority as it was when part of Regulatory Affairs but still remains at the forefront of the approvals process. It is now a test house for both BABT and the Government, and, as a condition of the British Telecom Licence and necessary for its own credibility, it is an independent centre within the company.

Testing is carried out to all UK statutory telecommunications standards, as part of the evaluation process for approval. The standards, whether British Telecom Technical Guides, British Standards or Interim Standards have all benefited from substantial contributions from Teleprove's expertise.

Products tested include PABXs, Key Telephone Systems, telephones and modems, Data Terminal Equipment, telex and power supply units, answering machines, call loggers, and all other PABX attachments, as well as apparatus for connection to the digital networks.

The diverse and unique role played by Teleprove within the telecommunications market requires it to have substantial resources. There are over 80 highly qualified technicians and engineers and two main purpose-built test centres. Investment in testing resources alone has accounted for well over £1 million and is continually rising.

Teleprove also offers compliance testing to certain non-statutory standards, for such things as teletex services and parts of the new standard for digital and private networks – DPNSS1. Teleprove envisages a heavy involvement with information technology in the future and will adapt to best serve future market needs.

The organisation now offers its resources on a consultancy basis to aid suppliers through the aprovals process. This can be in the form of explaining the present regulatory and approvals regime, advising on and interpreting standards and carrying out pre-evaluation testing in its laboratories.

Teleprove is actively involved in expanding its service to cover both Europe and the USA. This would allow interpretation of foreign standards and policies and pre-evaluation testing within the UK, with the obvious benefits for UK manufacturers of removing one of the hurdles to their exporting of telecommunications apparatus. Teleprove now has the capability to test certain products to the north European standards and the capacity is continually expanding.

Mr A G Cockburn is Teleprove's marketing manager.
Ms C S Davies is a former Teleprove marketing manager now working for National Networks Trunk Services.

British Telecom Journal
Winter 1985/86

Interest grows in "VOICEBANK"

David Thoms

Voicebank, British Telecom's voice messaging system now offers a new package of facilities and is being extended to cover major cities throughout the UK.

Since its launch early last year (see *British Telecom Journal, autumn 1984*) Voicebank has grown to attract more than 2000 customers from a wide range of industries and has now grown into a separate unit within British Telecom Mobile Communications.

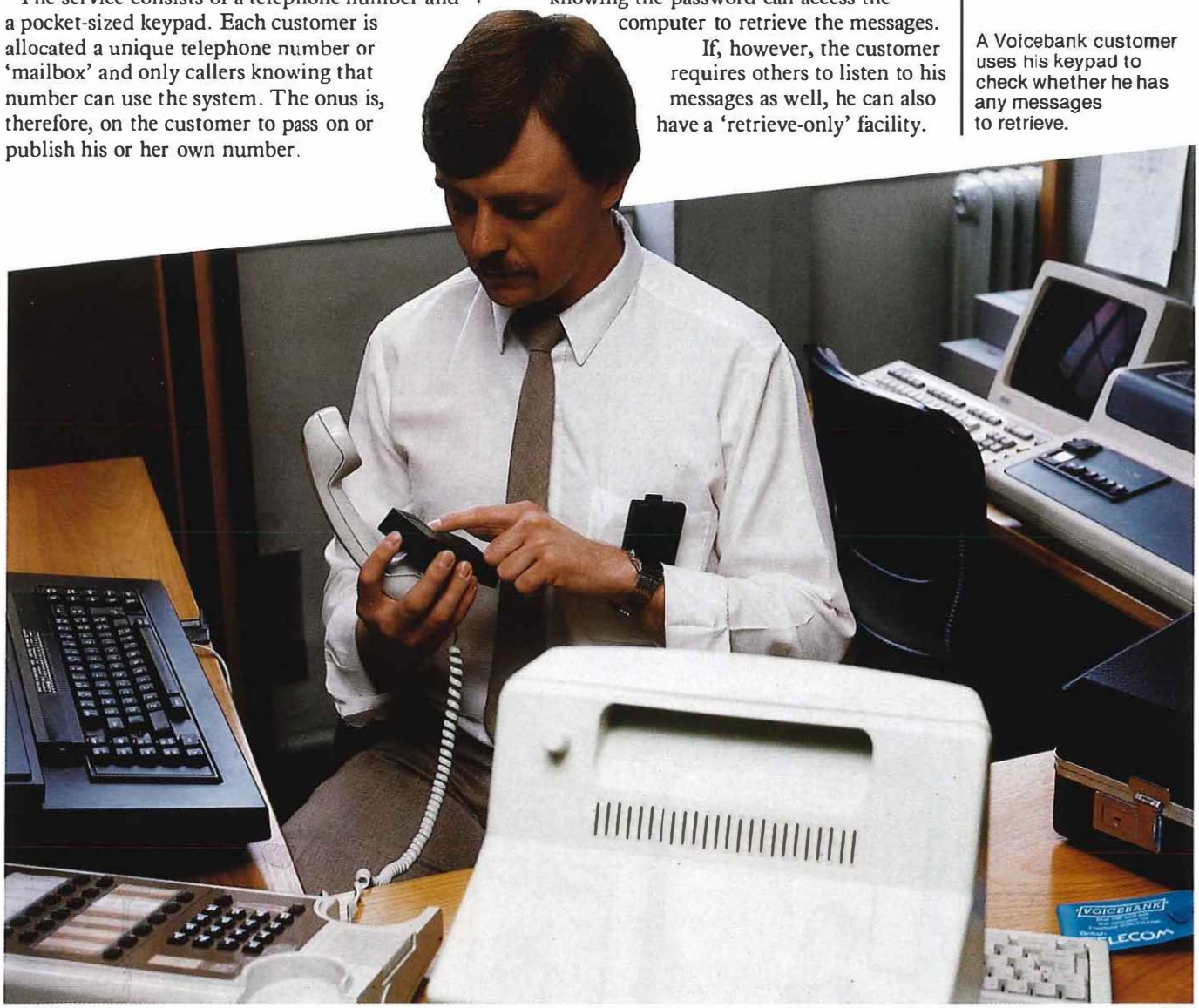
Basically, Voicebank is a computer messaging system through which a customer can send or receive verbal messages. It can also be used as a telephone information provider for businesses where the supply of up-to-date information is vital.

The service consists of a telephone number and a pocket-sized keypad. Each customer is allocated a unique telephone number or 'mailbox' and only callers knowing that number can use the system. The onus is, therefore, on the customer to pass on or publish his or her own number.

After dialling the mailbox number the caller listens to the pre-recorded greeting from the subscriber and leaves a message. Customers find it sophisticated and flexible and can use the service as a round-the-clock computer messaging system which is accessible from any telephone almost anywhere in the world.

A keypad is used to input commands into the computer and the customer can listen to, repeat, delete or save his messages. Keypad retrieval ensures confidentiality because each customer is given a unique password and only those knowing the password can access the computer to retrieve the messages.

If, however, the customer requires others to listen to his messages as well, he can also have a 'retrieve-only' facility.



A Voicebank customer uses his keypad to check whether he has any messages to retrieve.

British Telecom Journal
Winter 1985/86

Interest grows in Voicebank

The facility dispenses with the need for a keypad and enables anyone knowing the mailbox number to retrieve messages. A second telephone number is allocated to the customer and messages can be listened to simply by dialling this number. It is, therefore, suitable for those who rarely need to change their greeting and who do not require the confidentiality of the password-protected retrieval system. A keypad is also unnecessary when using a telephone with DTMF4 tone signalling.

Voicebank's new package

The facilities which are new to London customers but which are part of the total package for the regions are all designed to strengthen Voicebank's function as a business efficiency aid. They include:

- A 'broadcast' facility which enables a customer to leave a message in more than one mailbox. For example, a sales manager can leave the same message in each of the sales force's mailboxes without having to make individual calls.
- 'Message re-direction' which offers a means of transferring a message from one mailbox to another. For example, Caller A can leave a message in B's mailbox. B listens to it and passes it on to C with comments added if required.
- 'Future delivery' which enables customers to send messages to colleagues or friends which will be delivered into the receiver's mailbox at a specified time and date in the future. This is particularly relevant for colleagues going on holiday or away on businees.
- 'Message delivery check' which enables a customer to check whether a message has actually been accessed and listened to by the recipient. A second 'high security' password can also be included for Voicebank customers whose messages are confidential. In addition to the seven digit identity number, a password of up to eight digits can be selected and input by the customer to ensure that no-one else can access the message either by error or intent. This password can be changed by the customer at any time.

Voicebank's second major function is as an information provider. Instead of a greeting, a detailed message can be left on the mailbox in the form of an announcement. As this does not take up staff time or existing telephone lines, this function is ideal for a wide range of businesses where up-to-date information is required. Up to ten callers can simultaneously listen to the information and each will hear the message from the beginning to the end.

Potential users include:

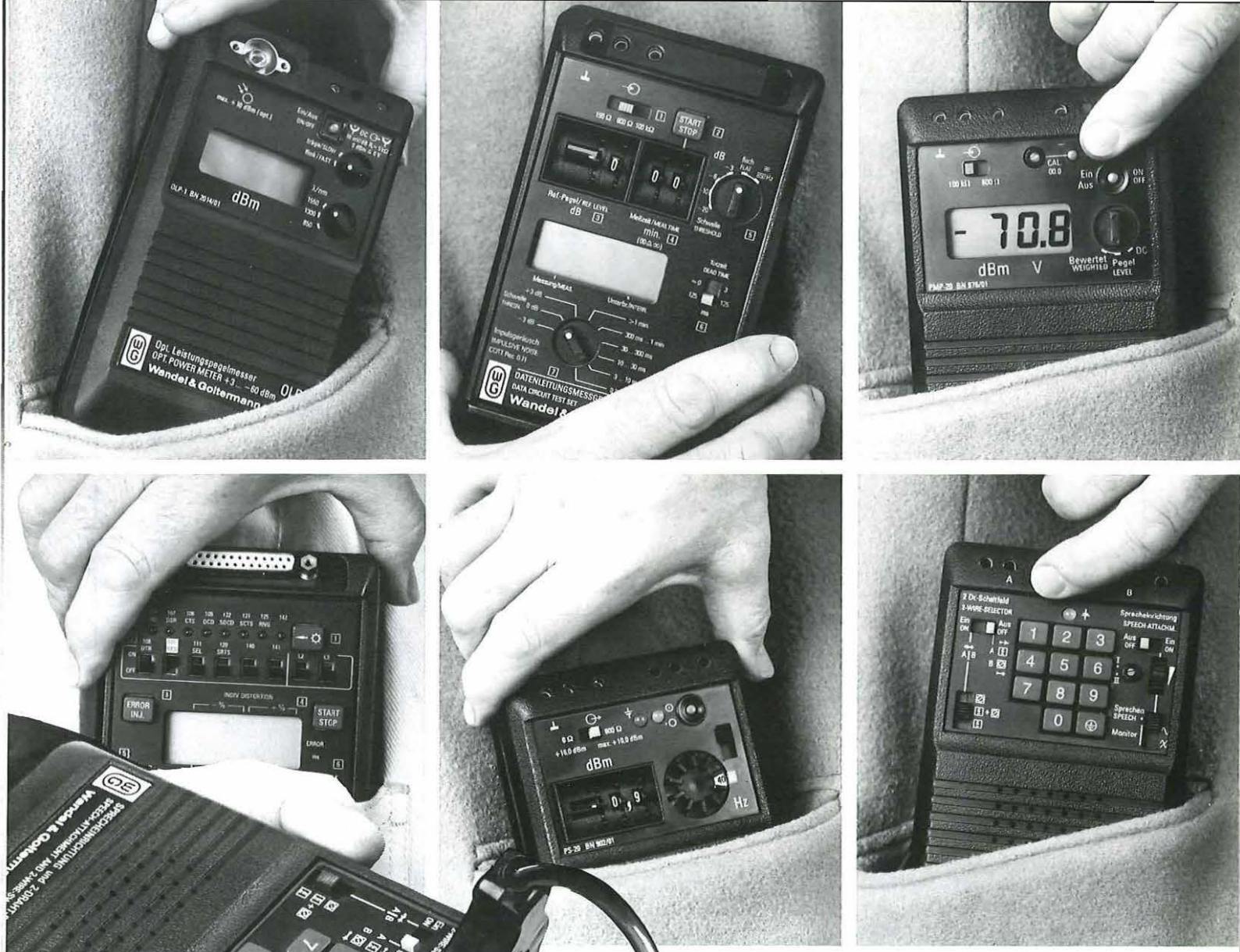
*travel agents, coach operators and airlines who need to advertise late sales details;
*large industrial companies who need to announce duty rosters so that staff can check their shifts without taking up supervisors' time;
*organisers of sports events or conferences for details of matches, results or timings for seminars.

Voicebank technology is totally integrated into the other areas of British Telecom's mobile communications — paging and cellphones. A mailbox can be linked to a radiopager so that the customer is paged almost at once when a message is left. The system can also be linked to a cellphone so that if the cellphone is not answered within a preset number of rings, the caller can be diverted into Voicebank and then be paged.

The service currently costs around £40 per quarter to rent plus an initial payment of £10 to set the customer's details up on the Voicebank computer. The first keypad unit is provided free and all charges are added to the customer's telephone bill.

The price includes a mailbox which holds 48, one-minute messages which are stored for 72 hours but the system can be modified according to the customer's needs. A retrieve-only number costs an additional £5 per quarter.

Mr D S Thoms is commercial manager for Voicebank.



Pocket a whole measuring system.

You can carry a whole measuring system in your pockets when you use Wandel & Goltermann instruments. Private circuit line-up is made even easier by using a complete generator-receiver setup housed in super lightweight cases.

First in the field and world leaders in the design of pocket level meters including the smallest ever psophometer, Wandel & Goltermann offer a comprehensive range of instruments for the critical measurement and the monitoring of telephone and data circuits.

Also included in the range is a pocket-sized optical power meter.

Each instrument weighs around 500 grams and is of robust construction for field use. Features include automatic digital level readings with 0.1dB resolution and Nicad or dry batteries with alternative a.c. adaptor/charger.

Wideband Level Meters:
PM-10: 80Hz to 20kHz, −50 to +10dBm, internal 820Hz test level generator. PM-20: 15Hz to 20kHz, −50 to +30dBm, 0 to 100V d.c. PMP-20: CCITT weighting filter, −85 to +10dBm.

Level Generators:
PS-10: 200Hz to 4kHz, 10 fixed frequencies, sweepable. PS-20: 20Hz to 20kHz, 30 fixed frequencies, level settings in 0.1dB steps.

Optical Power Meter:
OLP-1: 850, 1300, 1550nm, −60 to +3dBm.

For a great variety of problem-free measurements in laboratories, broadcast and recording studios, test departments as well as in field service, Wandel & Goltermann pocket-sized level measuring instruments offer many useful advantages.

Write or telephone for information on the complete range.

Wandel & Goltermann Ltd.
Progress House
412 Greenford Road
Greenford
Middlesex UB6 9AH
Tel: 01-575 3020
Telex: 934489

The name for precise measurement.

NATIONAL EXTENSION COLLEGE

Report Writing for British Telecom staff

A new course for any BT personnel who need to write informative, organised and effective reports.

- based on a specially prepared distance learning text which you can work on in your own time
- assignments planned by your NEC tutor and BT supervisor to fit your needs at work as closely as possible
- telephone support to guide you through the course
- regular reports on your progress
- the option to enter for a City and Guilds Report Writing qualification

Report Writing is a skill in increasing demand. It needn't be a chore. If you, or your trainees, are judged by the effectiveness of what you write, find out more about this course. Send off the coupon today.

NEC, 18 Brooklands Avenue, Cambridge CB2 2HN

Electronic Assembly Facility

Wound Components

Audio Transformers

Power Supplies

Converters

Inverters

Gardners

Def. Stan. 05-21 &
BS 9000 (BS 9720) Approved

1934-1986

Gardners Transformers Limited, Somerford Road, Christchurch, Dorset BH23 3PN, England.
Tel:(0202)482284 Telex:41276

Rewards for top young workers

The 'outstanding' qualities of young apprentices at British Telecom's research laboratories at Martlesham, near Ipswich, have been highlighted in the BTRL Apprentice of the Year Awards.

A number of young men and women have been honoured for both their technical achievements and their approach to work during the past year. The awards, presented by Mr Bill Jones, Chief Executive, Technology, reflect the importance which British Telecom places on training and on fostering talent for the future.

Distinctions

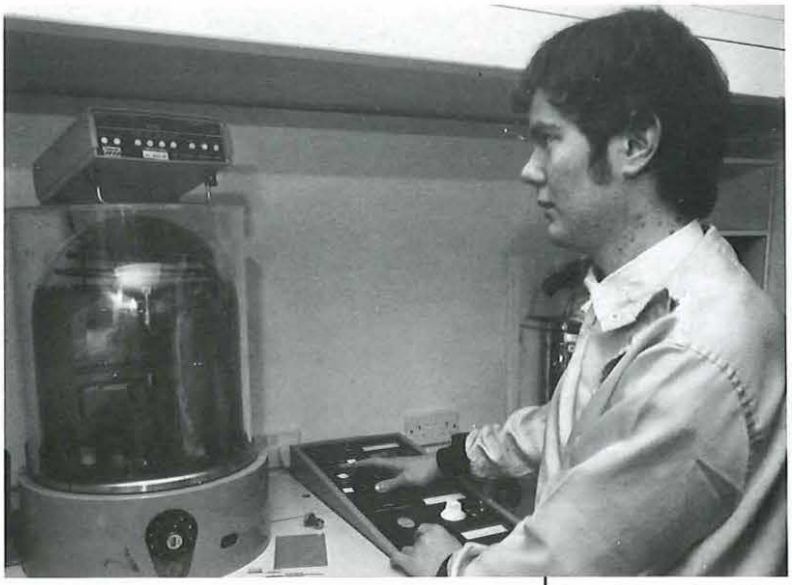
Apprentice of the Year was Mark Harris who is currently working on fibre optic transmissions and in the final year of his apprenticeship. Mark, who was also the best apprentice in his group in 1984, joined the company with eight O-levels and obtained his Business Technical Education Council certificate in electronics with 15 distinctions and five merit grades. Now in his first year of study for his higher BTEC certificate, he has gained distinctions in all seven subjects and his laboratory appraisements have been judged well above average.

Winner of the first year apprentice award was Miles Wilkins, who joined Martlesham with 11 O-levels. He gained several distinctions and merit grades in his electronics course and obtained an 'outstanding' appraisement for his laboratory training period.

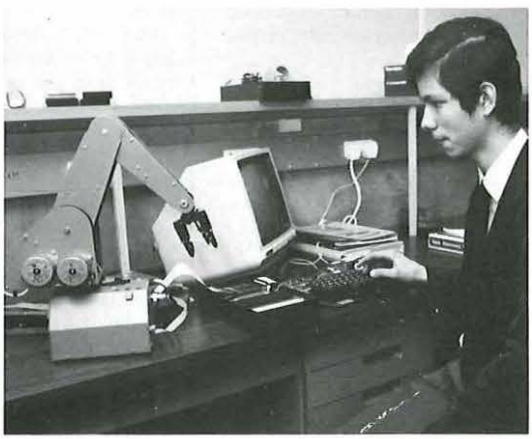
Laboratory

Second year winner was Lisa Lakey, who joined with nine O-levels and last year gained her BTEC certificate in electronics with distinctions in all the essential subjects. She has made steady progress in laboratory work.

Excellent laboratory work and steady progress generally helped Jane Fulcher to win the third year award. Jane obtained her BTEC certificate in electronics with merit grades and completed the first year of her higher certificate with merit grades and one distinction.



Apprentice of the Year Mark Harris operates titanium vacuum coating equipment.



Above: Second year apprentice award winner Lisa Lakey sets up a diffusion furnace for preparing optical devices.

Centre: First year top apprentice Miles Wilkins operates a microprocessor training aid.

Below: Third year winner Jane Fulcher, works at a computer-aided engineering work station.

In touch on the move

Passengers using certain London taxi cabs can now keep in touch with their offices and homes whilst on the move, or stuck in traffic.

Under a pilot scheme about 50 cabs have been fitted with British Telecom taxiphones in their passenger compartments.

The instruments, which operate for outgoing calls only, are based on the standard Cellphone with a charging mechanism attached.

Call costs are currently 50p a minute in the UK and £1.50 for international calls and the bill is paid for at the same time as the fare. A special phone meter enables the cab driver to see the call charge separately from the taxi fare – and allows him to recall phone usage statistics. It also drives a special customer display which shows the taxiphone user how much the call is costing.

Each taxiphone incorporates a 'credit lock' mechanism to minimise the risk of non-payment of potentially large bills. The cab driver is billed for calls as if he were a standard Cellnet customer and pays the Cellnet subscription like other cellular users.

Record savings?

A new world record for optical fibre transmission set by British Telecom promises to help contain the cost of expanding the network. A team of engineers have succeeded in transmitting data over 32 km of singlemode fibre at a rate of 2.4 Gbit/s, the fastest rate yet achieved over an installed cable.

A key factor in the trial was the use of a ridge-waveguide distributed feedback (DFB) laser, made in British Telecom's Martlesham research laboratories. But unlike previous laboratory demonstrations the feat was achieved over an existing cable linking Birmingham with Tamworth.

The trial illustrates the feasibility of upgrading existing optical systems without the need to replace cables. Considerable sums could be saved in the future by providing only new terminal electronics to expand the capacity of cables rather than replacing complete systems.

Banking on data

British Telecom's new 4962X modem has been chosen by Barclays Bank for its new data communications network.

Conforming to the CCITT V32 specification, the modem which also incorporates an auto-dialler, offers 9.6 kbit/s full duplex transmission on less expensive two wire private circuits.

Private circuits will link each of Barclays' 3,000 endpoints into the new network, and about 150 Kilostream circuits will provide high speed interlinking between the X25 switching nodes. Extensive use will also be made of British Telecom's 2 Mbit/s digital transmission service, MegaStream.

Informative talks

Efforts are being made to pull together data processing skills within British Telecom following reorganisation and the move away from a centralised computing system.

An information systems conference, organised jointly by Local Communications Services and National Networks, attracted more than 100 of the company's senior managers to Cheltenham to discuss the role of information and how to use relevant staff to the best effect.

Talks were given by experts both from within and outside the company, and guest speaker was Bob McLaughlin, chairman of the British Computer Society.

A similar two-day conference will take place next year and will alternate with a one-day workshop at six-monthly intervals.

TWA network deal

Trans World Airlines has selected British Telecom International (BTI) to run its international data communications network which covers 14 countries mainly within Europe.

The contract, secured by BTI's Business Communications Service, is for a range of related services, such as network enhancements, fault location and repair, and liaison with network users and operators.

BTI has set up a management team to handle the TWA network. A network manager will have overall BTI responsibility for the European network and an operations manager will act as TWA's 'troubleshooter' to resolve difficult or persistent problems which cannot be cleared from the BTI-controlled network hub.

A special feature of the package is the creation of a dedicated fault reporting centre which will be manned 24 hours a day all year round.

Overall control of TWA data communications will still remain with the Kansas City administration centre at the airline's computer centre. This and other TWA locations around the world will have direct communications with the network management facilities in London.

New Army network

A £10 million contract for the first phase of a project to re-equip the Army's private communications system in the UK has been won by British Telecom's National Networks.

A total of 43 Merlin DX exchanges and some 16,000 telephones will be provided for the new all-digital network called FASTNET. When complete in 1991, FASTNET will be Britain's largest private integrated digital network, handling speech, data, fax and teleprinter messages.

The new exchanges will be used as private automatic branch exchanges and as tandem and sub-tandem switches in the new network. National Networks will also bid for the MegaStream digital circuits necessary to connect these locations, and maintain the entire system.

FASTNET is the first large-scale implementation of DPNSS, the digital private network signalling system marketed by British Telecom, which ensures that advanced facilities can be networked from one PABX to others regardless of make or type.

Over the next six years, when the second and third phases are complete, many of the Army's 1,340 sites in the UK will be linked by the integrated digital voice and data network. The network will also link into the modernised networks of the Navy, RAF and British Forces in Germany, and will replace the Army's existing 375 electro-mechanical exchanges leased from British Telecom.

Quicker quotations

A new British Telecom Prestel service will soon make the business of obtaining a quotation for insurance cover much simpler and quicker. Prestel Insurance Network and Service (PINS), based on Prestel, British Telecom's national videotex service, will allow insurance brokers and agents access to major insurance company databases so that they can give immediate quotations for insurance cover at point of sale.

A broker uses his terminal to enter his client's personal details, then feeds the information through a Prestel gateway to the selected insurance company's computer which then calculates a quotation and transmits it back to the broker's terminal.

Potential outlets for the service include high street insurance brokers, building society branches, bankers, accountants, estate agents and insurance company direct sales forces.

PINS has been set up with the support of 16 major insurance companies, and will be fully available to agents this spring.

● Use of Prestel grew by 44 per cent in the 12 months up to last November with more than one million pages a day being accessed and more than 100,000 electronic mail messages a week.

Largest link up

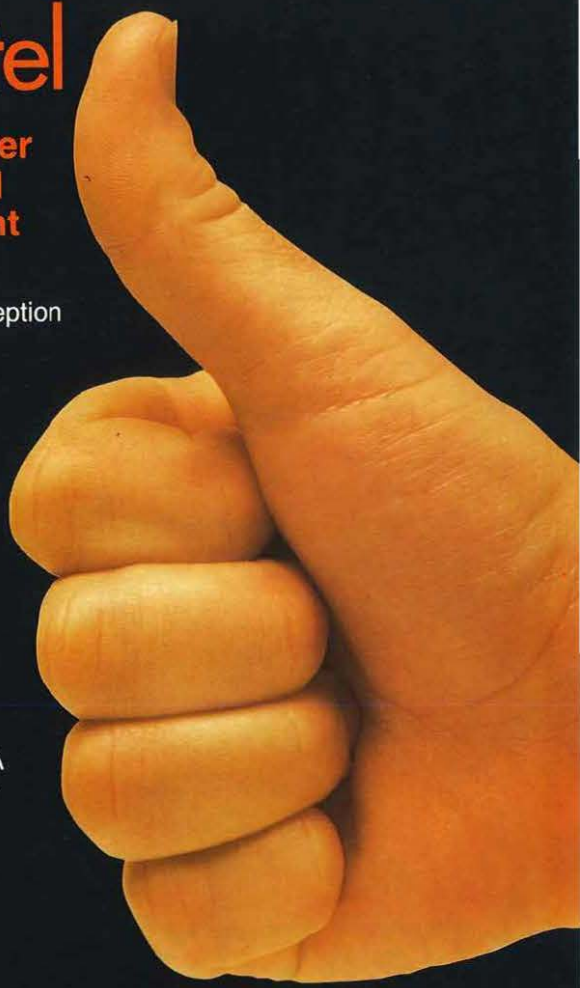
British Telecom International (BTI) set up the world's largest satellite sound and vision network during December to link 93 locations in 52 countries for Explo 85 an inter-continental satellite congress linking up to 15 million Christians around the world. Seven satellites were used for the four day event. ▷41

100%

TO BRITISH TELECOM'S STATEMENT OF REQUIREMENT

Telspec-Ceptel

automatic changed number interception and general announcement equipment



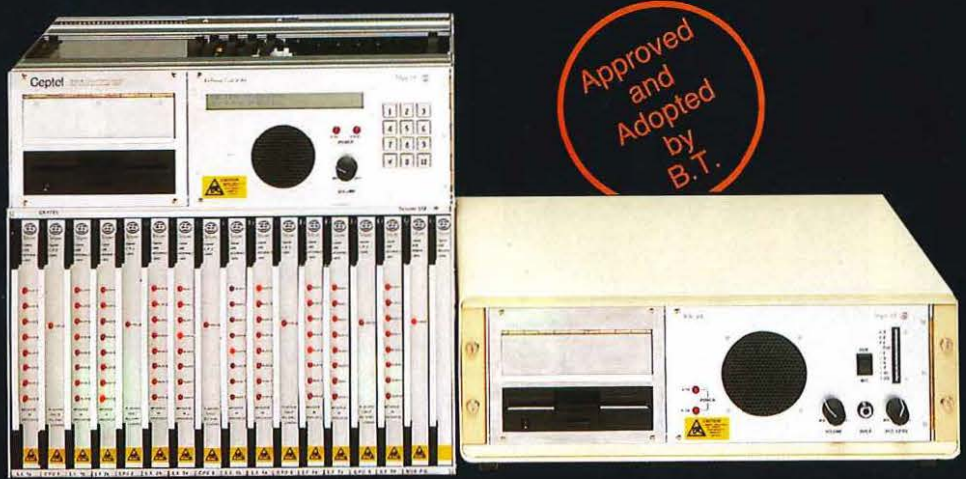
Telspec's CEPTEL system provides automatic interception and announcement for changed telephone numbers configured in the equipment. The service is provided without the interception of an operator as CEPTEL works on a digital speech storage technology using a microprocessor. It can be used with all types of British Telecom Exchanges employing 2 wire (A & B wire) or 3 wire (A, B & P wire).

The CEPTEL exchange based equipment consists of two units, the exchange control shelf and the line interface shelf, being modular in sub units of 8 lines – a total of 80 terminations can be provided on a single line interface shelf. Further expansion is provided for a maximum of 960 terminations using a single exchange control shelf and 12 line interface shelves fully equipped. The CEPTEL has a 3v 100mA hour re-chargeable battery to support the memory for 4 days if the power supply is disconnected.

CEPTEL FACILITIES
— message loading.
— message modification.
— traffic analysis.
— audio monitoring.
CEPTEL continuously carries out self-diagnostics.

CEPTEL STUDIO UNIT
The Ceptel studio unit is desk mounted and mains driven and is used to prepare the floppy disc for the CEPTEL exchange unit. The system is flexible, allowing options for changes of steering data etc.

ALL THIS BACKED BY TELSPEC'S NATIONAL SERVICE.



Approved and Adopted by B.T.

To check out CEPTEL in detail send for your full colour brochure to Telspec Limited CEPTEL, Lancaster Parker Road, Rochester Airport, Rochester, Kent. ME1 3QU. Tel: (0634) 687133. Telex 965617 TLSPCG.

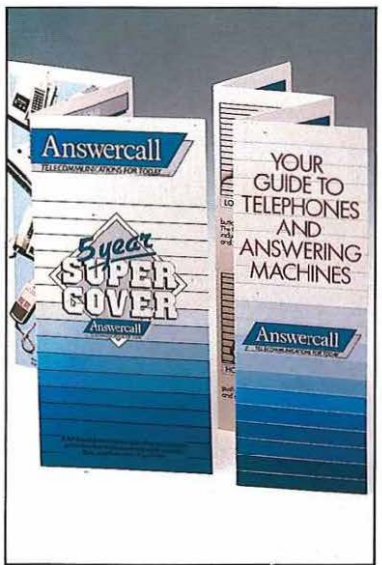
THE TELSPEC CEPTEL SYSTEM.....100%

Answercall

TELECOMMUNICATIONS FOR TODAY

APPROVED
for use with
telecommunications
systems run by
British Telecommunications
in accordance with the
conditions in the
instructions for use.
S/1016/3/F/500306

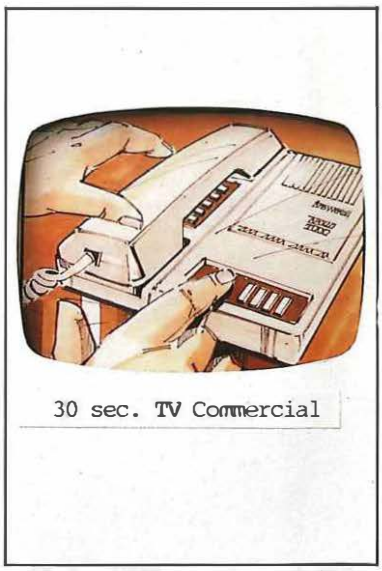
Answercall-
The complete package.



Comprehensive guide for consumers plus 5 year guarantee option.

Complete merchandising for all products.

Extensive national press advertising.



30 sec. TV Commercial

National TV campaign early '86.

Contact Trisha Silvester now! at **Answercall Limited,** Kangley Bridge Road, London SE26 5AH. Telephone: 01-659 1133.

New company born

A new high-technology company is to be formed as a result of an agreement between British Telecom and McDonnell Douglas.

Known as Edinet Ltd, the new venture provides and markets the range of information technology services called Electronic Data Interchange (EDI).

EDI provides direct computer-to-computer exchange of business documents such as business orders, invoices and statements which are sent in electronic form to reconcile differences in computers and document formats. It will help companies to slash the cost of their business transactions and cut inventory and stock-holding costs.

The agreement was signed by Mr Ron Back (left), Managing Director of British Telecom's National Network division, and Mr Jerry Causley, President of McDonnell Douglas Information Systems International.

'Super' link installed

Britain's most advanced optical fibre communications link, with four times the capacity of existing systems, has been successfully installed for British Telecom.

It is a 565 Mbit/s digital link – equivalent to nearly 8,000 simultaneous phone calls – spanning 45 miles between Sheffield and Nottingham, and was supplied by Plessey Network and Office Systems Ltd.

It will serve as a high-capacity, long-distance 'highway' in the company's national digital network, carrying phone calls, computer data, high-speed facsimile, graphics and pictures.

A second trial system of the same capacity and basic characteristics, with equipment designed by British Telecom's Research Laboratories at Martlesham and made by Fulcrum, the company's manufacturing subsidiary, has been installed between Birmingham and Derby for evaluation.

This second link makes telecommunications history by using only one regenerator in its 45 mile route giving the longest span for an installed system anywhere in the world.

British Telecom's £1,000 million-a-year network modernisation programme is well advanced and about half the national digital network will be optical fibre by 1990.

Network Nine grows

British Telecom is setting up a £2 million Network Nine office in Aberdeen – the first of its kind in the UK outside London.

The move follows a Scottish Development Agency study which identified a demand by local businesses for advanced telecommunications services.

The Aberdeen office, known as the Aberdeen Network Business Centre (NBC), will be fully operational later in the year.

It will contain high quality offices in a range of sizes available fully furnished on short licences, plus a number of meeting and conference rooms.

● Network Nine has launched a major marketing campaign in North America through an exclusive agreement with TCOM Systems Inc of McLean, Virginia.

'Best ever' cable tv

The world's most advanced large-scale cable tv system has been launched by British Telecom chairman, Sir George Jefferson.

British Telecom, which has a 20 per cent shareholding in the Westminster Cable Company, is installing a switched star network, designed and developed by its Martlesham Research Laboratories.

Sir George said that the project was a 'significant response' to the Government's initiative in promoting local broadband cable networks.

Contracts

BICC Telecommunication Cables has been awarded contracts worth £2.5 million for the supply of 850km of optical fibre cables for installation in British Telecom's trunk network.

Datapoint has received a £1 million order from British Telecom for its newly launched Automatic Call Distributor ACD 86 on behalf of Access – the major credit card company. The order is part of a contract won by British Telecom Anglian Coastal District to supply a complete switching system for the new Access Service Centre at Basildon. Installation starts in April and the system will be fully operational by the end of the year.

Isovel International has won a further order for four ISOPAK 2000 close control air-conditioning systems, to be used at British Telecom offices in the Ipswich area.

Jarvis has been awarded a £2.7 million contract to build a major new Telephone Service Centre for British Telecom's Western London District at Hayes. It will cover an area of 4408sq m providing workshop accommodation in a single-storey building plus office facilities in a three-storey block. When completed and handed over, the new complex will house 450 staff.

John Laing Construction, Midland Region, have been awarded two contracts worth a total of £4 million by British Telecom.

Alterations and additions costing £3 million will be carried out at Shrewsbury to form a new District Office and computer centre. At Coventry, about £1 million will be spent on completing a partially constructed telephone engineering centre.

STC Telecommunications Electronics Division, based at Newport, Gwent, has won an order worth more than £2 million for the manufacture and supply of subscriber carrier systems to British Telecom. The equipment enables subscribers, who would otherwise have to share a party line, to have complete privacy and uninhibited access to the telephone network.

Systime Computers is installing an order for a further £240,000 worth of equipment for British Telecom's telephone answering sales bureau, Telecom TAN, based in Bristol. The order is for two Systime 'D' 8750 processors and more than 30 TS Series visual display units.

Tri-Test have been awarded a new contract from British Telecom, for the preparation of telecomms board test software in connection with TXE4A and UXD5 projects.

Thorn Ericsson Telecommunications and **AT&T** and **Philips Telecommunications** have been awarded orders worth more than £30 million by British Telecom for two new large international telephone exchanges of advanced digital design.

The two exchanges – an AXE10 design from Thorn Ericsson and a 5ESS PRX from AT&T Philips – are being bought for British Telecom International (BTI) and will both come into service in 1988 at London's Kelvin House and Mondial House respectively. By 1990, they will provide an extra 80,000 lines, to help meet continuing high growth.

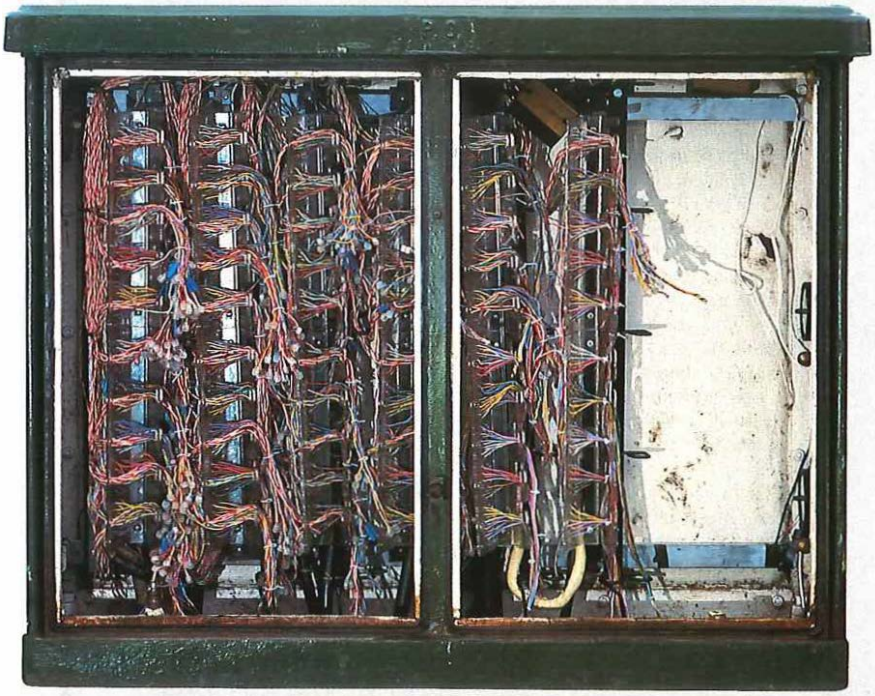
OMC for Hull

Britain's most advanced telephone service centre has been handed over by British Telecom to the independent Hull Telephone Department, who will use it to control their three System X exchange units.

The equipment, an Operations and Maintenance Centre (OMC), was designed and installed by British Telecom, and is one of the first to be commissioned. It provides centralised maintenance and administrative control for up to 300,000 telephone lines.

British Telecom won the Hull contract in competition with industry and the same British Telecom-made OMCs are currently being introduced in System X ▷

3M and MS² are trade marks.



Spaghetti Junction.

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

Urban Clearway.

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

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

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

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

Now fits all approved cabinets.

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

MS²® Cross Connect System.

3M Telcomm Products
QUALITY THAT GOES BEYOND TOMORROW

3M

exchanges elsewhere in Britain as part of a national programme.

The OMC adds remote control and centralised maintenance facilities to the computerised System X exchanges and action, such as bringing into service a new line or clearing a fault, can be taken from a distance by local technical staff using a keyboard and VDU screen.

The OMCs were designed by British Telecom's Technology Executive at Ipswich in Suffolk.

Controlling data

A new addition to the range of data communications products from British Telecom is Datel Control 1000 which provides central site control over a data network.

A modular system of technical control facilities, it can handle patching, switching, testing and monitoring and it is compatible with all equipment operating over CCITT V24 interface: later versions will provide V35 interfaces.

The system is designed to be installed between computers and data communications equipment. In normal operation, it is transparent to data flow but when problems arise, the network manager can rapidly overcome them by patching or switching to alternative channels or equipment.

The system provides flexibility in the features offered, so that users can choose a suitable combination to meet their specific needs. Each basic module will handle up to 16 data channels and prices for the patching option start at less than £80 per channel.

Gold choice

Telecom Gold has been selected by The Law Society to host a new electronic mail user group called 'Network for Law'. This decision – endorsed by The Law Society's technical consultants – to accept recommendations made by British Telecom is the first stage in The Law Society's long term aim to introduce a legal electronic network.

Network for Law provides all the standard features of Telecom Gold to solicitors, in addition to having the capability to develop specific applications designed especially for the legal community.

Tape for the blind

A cassette tape to help blind people use new-style public phones has been produced by British Telecom.

The 20 minute tape describes the layout and operation of the 'blue' payphone and the phonecard phone. It is being sent to blind organisations around the country and will be sent free-of-charge to any blind person on request.

Copies are available from British Telecom's Action for Disabled Customers (BTADC), by ringing 01-356 4917, or by writing to BTADC, Room B5049, British Telecom Centre, 81 Newgate Street, London EC1A 7AJ.

New appointments

Mr David Scholey has been appointed a non-executive Director of British Telecom.

A man of considerable banking and City experience, Mr Scholey, 50, has been joint chairman of the banking firm S G Warburg & Co. Ltd., since 1980. He is also chairman of Warburg's parent companies Mercury Securities plc and Mercury International Group plc. He has been a director of the Bank of England since 1981; a member of the NEDO Committee on Finance for Industry since 1980; Honorary Treasurer of the International Institute of Strategic Studies since 1984, and a Governor of the National Institute of Economics and Social Research since 1984. Married with two children, Mr Scholey lives in Hampstead.

Mr Colin Tipping, 41, has been appointed head of retail in British Telecom's Mobile Phone Division. The Division's commercial manager for the last three years, Mr Tipping joined the Post Office in 1964, and worked in a wide variety of functions before spending three years on Prestel. From 1979, he was Viewdata Manager with Granada TV Rental until rejoining British Telecom in September 1982.

Pop quiz magazine

British Telecom is supporting a new quiz magazine, aimed at young people with a passion for pop music and puzzles.

Building on the already successful pop chart telephone service 'Discline', the new publication will be titled the 'British Telecom Discline Pop Quiz Magazine' and will offer features and quizzes.

By using advertising inside the magazine, British Telecom wants its wider range of Guideline services to become better known to young people. Guidelines include 'Discline', which generated 95 million calls last year; 'Starline', a daily horoscope service; and 'Telefun', which offers round-the-clock jokes.

Business abroad

Telconsult, British Telecom's overseas consultancy division, has been awarded separate contracts, worth a total of £4.5 million, for work in Nigeria and Malaysia.

The Nigerian contract, worth £3 million, is for help in creating Nitel which will become the country's new telecommunications administration.

It follows a Telconsult study in 1984 which recommended major reforms of the existing national and international telecommunications organisations.

A major part of the deal will be the drafting of a five year business plan for Nitel, pinpointing areas for future investment, ways in which external funding can be attracted, and how new technology can be most effectively introduced.

In Malaysia, contracts worth £1.5 million have been awarded for technical assistance in the development of the national telecommunications network.

The contracts, for local network planning and installation expertise, mean that British Telecom will be directly involved in the plan to double the number of telephone connections in Malaysia.

First customer

Electronic Data System (EDS), the worldwide computer company, is British Telecom International's first full-time customer for its SatStream Europe small-dish digital satellite service, with a link between London and Rotterdam.

The 64kbit/s circuit links EDS' London and Rotterdam information processing centres and uses the Satellite Multiservices (SMS) package carried on Eutelsat I-F2. BTI also plans to use the French Telecom 1 satellite for SatStream Europe services.

'Servicelink' launch

Cellnet, the leading cellular radio operator in the UK and its counterparts in the USA and Hong Kong are to work together to develop 'Servicelink', a reciprocal service which will enable customers to keep in touch even when overseas.

Under the scheme, participating cellular operators will provide incoming customers of the overseas partners with priority rental service of a portable cellphone.

When abroad, customers of the associated operators will retain cellular service and avoid difficulties with such things as hotel phone systems and unfamiliar public payphones.

Discussions are already underway with other cellular operators throughout the world and further developments are expected.

Proposals welcomed

The Department of Trade and Industry's further proposals for licensing value added and data services have been welcomed by British Telecom. Further phased liberalisation is expected to help customers benefit significantly from the latest information technology developments.

The proposals represent a challenge to the telecommunications industry generally and should help to maintain the United Kingdom's position at the forefront of information technology development and applications.

The principles set out in the proposals are broadly within the spirit of Government statements, as reflected in British Telecom's prospectus and take account of technological developments.

It is important, however, that the principles are properly and fully embodied in due course in the proposed licence.

New telex link-up

Customers of the American telecommunications carrier Graphnet Inc can now send telex messages direct to the United Kingdom, British Telecom International has announced.

An agreement with British Telecom International also means that Graphnet will be able to use the UK as a transit point for messages to Europe and beyond.

Graphnet will become the seventh US carrier to have direct telex links with British Telecom and BTI currently offers automatic telex links to 190 countries throughout the world.

Under licence

Rights to make and sell two British Telecom-designed data circuit testers have been granted to Seaward Electronics based in Peterlee, Co Durham.

Under the agreement, British Telecom is granting Seaward a non-exclusive licence to manufacture two types of data circuit tester in the UK and to market them worldwide.

The testers, developed in British Telecom's Test Equipment Design Centre, Eastbourne, can be used separately or in combination for checking audio frequency equipment and data circuits.

The licensee already makes a contact locator under licence from British Telecom. The product detects faults in telecommunications and power cables and was designed by Ernie Huggins, a recent winner in the British Telecom 'New Ideas' competition.

Cable TV contract

British Telecom International has won the contract for distribution via satellite of two new cable television channels, Lifestyle and The Arts Channel. The contract is with W H Smith, a major shareholder in both channels.

They will use the same satellite transponder as ScreenSport, an all-sports channel in which W H Smith also has a significant shareholding. Reception will be limited to the United Kingdom at first but distribution will be extended to Scandinavia and other European countries, as soon as possible.

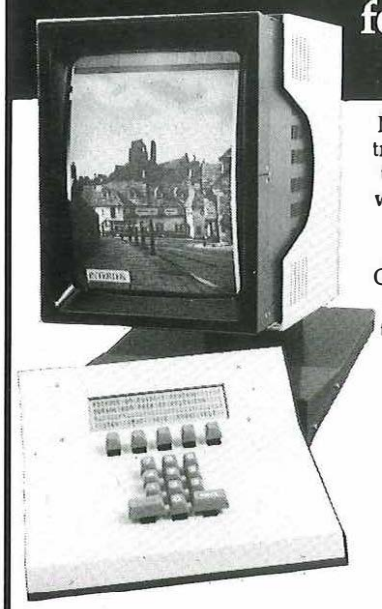
'Ships of the Line'

The development and work of British Telecom's cableships is the theme of the latest in a series of temporary exhibitions at Telecom Technology Showcase, 135 Queen Victoria Street, London EC4.

The exhibition, which features graphics, audio-visuals and scale models, traces the story of cableships from the first frail paddle-steamers and cumbersome frigates to the highly sophisticated modern fleet.

Called 'Ships of the Line', the exhibition closes on 30 May and admission is free.

You can picture what's in store for tomorrow's headline



Now view, select and store transmitted pictures without the need for paper copies, with the new PS156 Digital Picture Storage System from Intertec.

Compatible with all existing picture facsimile networks, this phototelegraphy system offers:

- *High resolution full size display on 625 line monitor. Monitor rotates for landscape portrait formats.*
- *Stores up to 16 pictures (minimum system) plus a test picture – indefinitely.*
- *Individual pictures can be called up in any order from memory store.*

A reliable system ideal for newsrooms, publishing houses, picture libraries, and other similar businesses. At last, the technology for pictures is available to complement existing on-screen text editing and page layout. With Intertec PS156, the choice is at your fingertips.

If you would like a glimpse into the future – call us for a demonstration. We'll put you in the picture.

The perfect model of a Modern Modem General.

The new Intertec Series 76 range of Modulators and Demodulators is offered in a selection of manufactured units.

- *For Transmission and Reception of Radio Telegraphy and Data*
- *Full programmable Frequencies and Bandwidth*
- *OOK, AFSK/FEK, DFSK facilities*
- *Optional Diversity and Remote Control*
- *Clock Recovery available*

Available: 19 inch (48.3cm) rack mounted (1U), or, in Eurocard racking (3U). Also obtainable in module form for incorporation into original equipment.

Programmable Transmit and Receive frequencies and filter bandwidth (Baud Rate). Operation up to 1200 Bauds. An optional Clock Recovery Module available.

A high level Module converts low level output to either Polar or Neutral (80-0-80 or 80v) conditions – the loop supply being current limited, and protected for operation up to 100mA.

Why not send us a signal to byte on? – details from,

Sole UK Distributors for: PLANTRONICS Wilcom Telecommunications Test Equipment

INTERTEC (ELECTRONICS) LTD.

3 Brook Road, Wimborne, Dorset BH21 2BH. Telephone 0202 881707 Telex 418122

TRADITIONAL B.T. PRODUCTS (for export)

We distribute for export and/or refurbish the complete range of traditional British Telecom equipment, for example:

TELEPHONES: (for hard wiring, UK spec or American plug ended): 746, 740 (dial), 741, 755 (dial and PB wallphones), 756 (LD tablephone), 766 (PB Trimphone), 772 (Xpress callmaker), 782R (standard MF tele), Statesman, Ambassador, Viscount, Sceptre, Kirk, Easicom, Dawn, Jeanie . . . Available also with Arabic Numerals.

SWITCHBOARDS: 2/2A, 2/3A, 2/4A, 10+50, PMBX4, PMBX II.

SYSTEMS: PABX1, 3 & 5, key & lamp units, 2A & 10A, Viceroy, Kinsman, Regent, Monarch, Ambassador, Senator, Ensign, Herald.

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

EXCHANGE EQUIPMENT: Main exchanges, equipment racks, mobile exchanges, UAX, relay sets, spares, etc., etc.

So for B.T. Products, no matter how obscure, we should be able to help.

Perhaps we should be talking ?

Supplies to UK only of open issue products liberalised for private supply.

TS SYSTEMS TELEPHONE SIGNALLINGS (Factories)

Telephone Signallings Ltd., PO Box 1, Wokingham, Berkshire RG11 2EU
Tel (0734) 782537 and 01 486 0994 Telex 846614

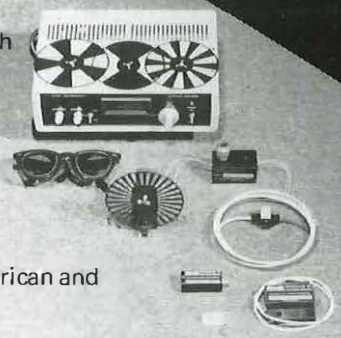
COMPONENTS

Attenuators, switches, couplers, wavelength multiplexers, lasers, eyeware, acousto-optics, scientific products.

TEST EQUIPMENT

Fusion splicers, chromatic dispersion set, bit error rate, laser wavefront analyser, optics tester.

– A complete range of British, North American and European Equipment.



Fibre-Optic Devices?

Call Us!
08293 3305
/3678

AG ELECTRO-OPTICS LTD. Tarporley, Cheshire CW6 0HX. Tel: (08293) 3305/3678, Telex: 61556

INDEX TO VOLUME 6 — Spring 1985 to Winter 1985/86

ARTICLE INDEX

Title	Author	Issue	Page
Advance and be recognised	Chris Bourne	Winter	26
At the Centre	Bert Hill & Margaret Flanders	Spring	10
At your service	David Brunnen	Spring	34
Better service for all at sea	Serinda Hundal	Winter	21
Business of quality, The	Phil Gillam	Summer	2
Building an image – by design	Vanessa Gilby	Autumn	23
Breaking down the barrier	Geoff Knight	Summer	21
Call of the wild!	Adrian Hosford	Winter	16
Cellnet breaks new ground	Brian McPhee	Spring	20
Changes at the top	–	Autumn	37
Changes in store	Raymond Sandford	Winter	11
City information service	–	Spring	31
Commanding voice, A	Iain Bruce	Summer	5
Cutting customers' costs ... at home ...	Bryan Friend		
... and abroad	Meena Ratti	Autumn	20
Digital advance leads the world	Roger Pine, Howard Brown & Colin Haworth	Autumn	5
Exchange fault-finder boosts efficiency	David Salmon & John Horspool	Winter	19
Firebird takes off	Herbert Wright	Autumn	10
Good deal easier, A	–	Spring	31
High speed links for PAYE network	Brian Winkler	Spring	14
Homes for computers	David Wilson	Summer	14
Information on the line	Roger Farrow	Summer	10
Interest grows in Voicebank	David Thomas	Winter	33
In the right mould	Tony Franklin & Ronan Doorly	Autumn	32
it's a fact	–	Autumn	15
Keeping in touch	Editorial	Autumn	1
Keeping up the pressure – by computer	Tim Cowell	Winter	4
Keeping up with change	Nigel Davis & Will Barton	Spring	32
Managing to cut the cost of fuel	Ron Smith	Spring	23
Mobius passes the test	Colin Dore	Autumn	27
Modern aids give training boost	Stewart Berry	Spring	5
Museum of the future?	Neil Johannessen	Summer	24
New era of 'high tech' supply	Dave Procter & Terry Scown-Geary	Summer	8
New look for London	–	Winter	25
No short cuts	Editorial	Winter	1
Oftel – the watchdog with teeth	Larry Stone	Winter	7
On the right road	Justin Quillinan	Spring	18
Pagers provide a link for life	–	Spring	36
Pay-off for bright ideas	–	Autumn	30
Payphone power	–	Spring	28
Playing host to Faraday	–	Summer	29
Prestel boost for business	Jan Shearer	Summer	30
Providing a solution	Brian Oxenbridge & Ray Cheung	Spring	8
Put to the test			
Interference – the unseen menace	Brian Jones	Winter	28
Apparatus of approval, The	Alistair Cockburn & Catherine Davies	Winter	30
Rewards for top young workers		Winter	37
Ringing the changes!	Dave Prescott	Autumn	9
SatStream makes the headlines	Peter Allen	Winter	2
Safety matters	Eve Sharp	Autumn	12
Schools get the message	Peter Thompson	Summer	32
Sites set on progress	Malcolm Drage	Winter	14
Space age link for Eurovision	Michael Astbury	Spring	2
Space age spectacular	Bob Bowden	Summer	26
Spreading the message	–	Spring	13
Successful AGM	–	Autumn	35
Telephone lines around the world	–	Spring	27
Ten years at sea	Chris Knight	Spring	16
University challenge	Justin Quillinan	Autumn	18
Very good year, A	Editorial	Summer	1
Video discs on the map	Iain Langdon & Mike Gray	Summer	18
Vietnam in view	Ron Calfe & Ian Shane	Summer	16
What's in a name?	Kevin Purell & Philippa Spragg	Autumn	2
Whistle stop tour for Telecom train	–	Summer	13
Women at work	–	Autumn	16
'X' v 'Y' – no contest	Editorial	Spring	1

SUBJECT INDEX

Title	Issue	Page
Annual General Meeting	Autumn	35
Apparatus approval – recent changes	Winter	30
Apprentice awards	Winter	37
Architecture in BT	Autumn	23
British Telecom Centre	Spring	10
BT facts and figures	Autumn	15
BT Fulcrum – launch	Summer	8
Cableships – 10th anniversary	Spring	17
Cable joints – injection moulding	Autumn	32
Cambridge University – new network	Autumn	18
Cellular radio – developments	Spring	20
City information service	Spring	31
Coiortrain – in service	Spring	13
Computers – the right environment	Summer	14
Computers – voice response to	Summer	5
Consultancy – Tallis at work	Spring	8
Deaf customers – special exchange	Summer	21
Design Unit – role in BT	Winter	26
Digital network – BT leads world	Autumn	5
Digital network – Thorn Ericsson contract	Spring	1
Directories – updating by computer	Spring	32
Education service	Summer	32
Energy – cutting fuel costs	Spring	23
Eurovision – space age link	Spring	2
Exchanges – new acceptance tester	Autumn	27
Exchanges – Strowger fault finder	Winter	19
Faraday lecture	Summer	29
Firebird	Autumn	10
Guideline services	Summer	10
Goonhilly earth station – 20th anniversary	Summer	26
HM Government – easier dealings	Spring	31
Interference – hidden menace	Winter	28
LinkLine – cutting customers' costs	Autumn	20
London's reorganisation	Winter	25
Management changes	Autumn	37
Materials management	Winter	11
Maritime connections – better services	Winter	21
Network Nine – 'office' facilities	Spring	34
New ideas – competition winners	Autumn	30
On-site services – developments	Winter	13
Oftel – watchdog with teeth	Winter	7
Palace of Westminster – new exchange	Autumn	9
PAYE network – high speed links	Spring	14
Payphones – plans for facelift	Spring	28
Prestel – boost for business	Summer	30
Prospects – the year ahead	Winter	1
Quality – need to maintain	Summer	2
Radiopaging – link for life	Spring	36
Report and accounts – full year figures	Summer	1
Safety – the BT record	Autumn	12
SatStream – FT make use of	Winter	2
Technology – keeping in touch with	Autumn	1
Technology Showcase – museum of the future?	Summer	24
Telecom train	Summer	13
Telephone lines around the world	Spring	27
Telephone links – Vietnam anniversary	Summer	16
Training – use of modern aids	Spring	5
Transport – BT vehicles of the past	Spring	18
Trade marks in BT	Autumn	2
TV advertising	Winter	16
Underground cable pressure – maintenance	Winter	4
Video discs – developments	Summer	18
Voice bank – developments	Winter	33
Women at work	Autumn	16

British Telecom Journal

Get your copy regularly

I wish to subscribe to British Telecom Journal and authorise deduction of the subscription (42p per issue) from my salary or wages.

Name _____

Signature _____

Duty reference _____

Grade _____

Date _____

Pay group _____

Full office address and phone number

_____

_____

British Telecom Journal is published in February, May, August and November.

Complete the form or photocopy and send to:

BRITISH TELECOM JOURNAL
Corporate Relations Department,
2nd Floor, Block A,
British Telecom Centre,
81 Newgate Street, London EC1A 7AJ.
Editorial: 01-356 5306/7. Sales and subscriptions: 01-356 6538/9.

(If you do not work for British Telecom just fill in your name and address and forward with your subscription).

Editor:
Mike Margetts

Deputy Editor:
Justin Quillinan

Business Manager:
John Klee

Assistant Business Manager:
Margaret Coutinho

Editorial Board:
D Wray, Chairman
R E Stroud, British Telecom London
A Taylor, Local Communications Services
D Mildenhall, Thameswey District
Mrs J Bogart, Local Communications Services
R Hinde, British Telecom International
D J Cattigan, British Telecom Enterprises
W A M Jones, South Wales District

Contributions:
The Editorial Board will be glad to consider articles but no guarantee of publication can be given.
The ideal length of such articles is around 1,200 words. Views of contributors are not necessarily those of the Board.

Advertisements:
Communications should be addressed to: Mrs Sheila Underwood, Litharne Ltd, Pentre House, Nannerch, Mold, Clwyd CH7 5RD. Telephone: Hendre (035 283) 808/864.
Advertising copy should be addressed to Cécile Passmore, Passmore Print Group, Tovil Printing Works, Maidstone, Kent ME15 6XA.
British Telecom Journal reserves the right to refuse, amend, withdraw or otherwise deal with all advertisements submitted at its absolute discretion and without explanation.

Advertising rates:
Black and white full page £800; half-page (horizontal) £468, quarter-page (horizontal) £272.
Extra charges for full colour, prominent position, and bleed advertisements.
There is a discount for series bookings.

Copyright:
Reserved by British Telecommunications plc.
Requests for permission to reprint articles should be addressed to the Editor.

Registered International Standard Serial Number: ISSN 0260-1532.

Subscriptions and back numbers:
Price to staff at their point of work is 42p a copy. Subscription for retired staff is £15 for four years.
For non-British Telecom readers, the two-yearly postal subscription is:
UK, £15; Overseas (excluding India) £20;
Air Mail, £30; India £36 by a combination of air mail and registered post.

Due to our low rates refunds are not payable on cancelled subscriptions.
Back numbers are available from 1971.

Remittances:
Please make Cheques/Postal Orders payable to 'British Telecom'. For Giro transfers, our account number is 513 8418.

Binders:
Binders which can hold eight issues of British Telecom Journal are available at £14 each from Bookbinders of London Ltd, 11 Ronalds Road, London N5 1XJ. Telephone: 01-607 3361. Cheques/Postal Orders should be made payable to the company.

If you are already a subscriber but change your duty reference or office address make sure you continue to receive British Telecom Journal by ringing 01-356 6538/9. You will then be put in touch with your local sales agent.

INTERFACE PROBLEMS?

The Datacheck line of breakout boxes lets you identify problems on all the interface disciplines.

Datacheck I £125
RS-232/**V.24**

Datacheck II £218
The ultimate breakout box

Datacheck III £218
RS-422/423 **X.21** (15 Pin)

Datacheck IV £315
RS-449/**V.36** (37 Pin)

NEW

Datacheck V £541
V.35

NEW

Datacheck VI £315
Centronics parallel interface printer tester

Prices subject to current Pound/Dollar rates

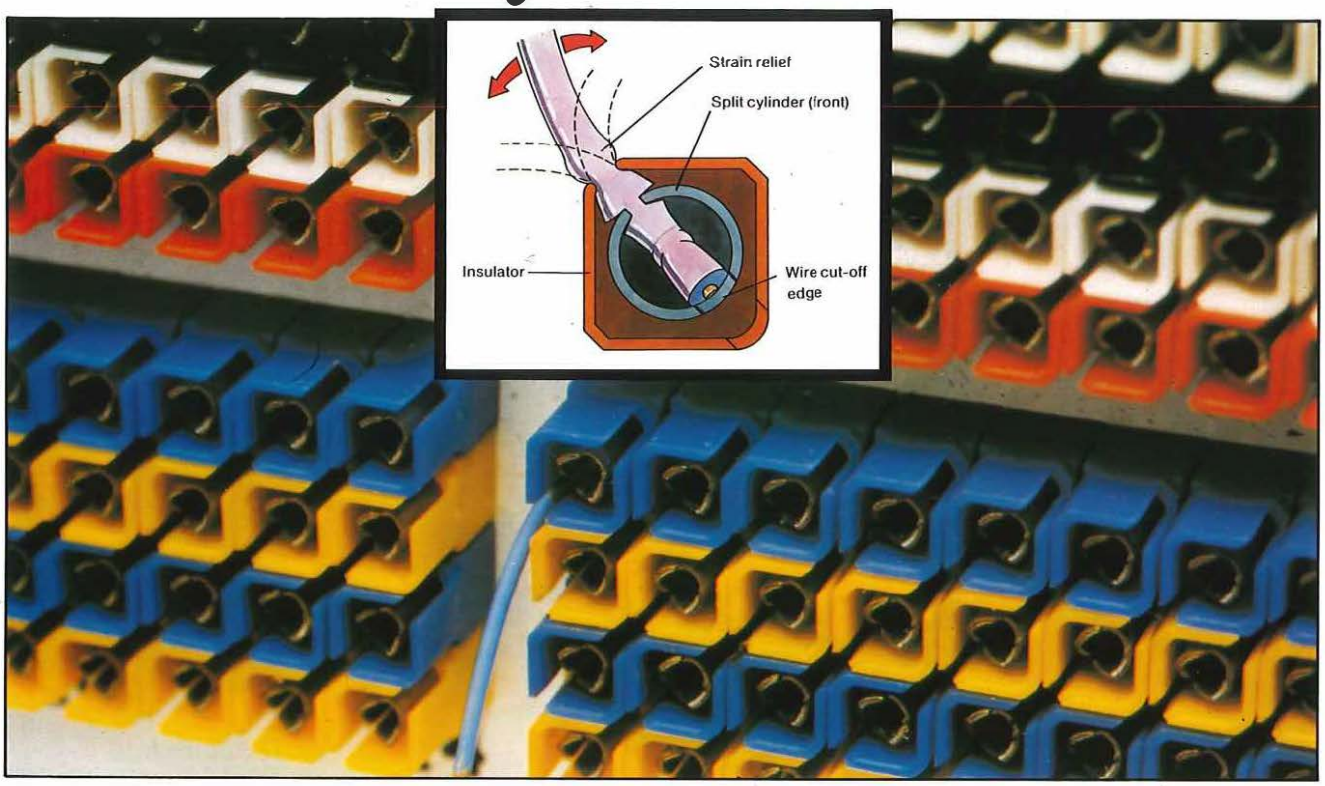
2400, 4800, 9600		
BAUD RATE COUNTER ● Measures data rate accurately **£173** (Not applicable for DC VI)	**VOICE FREQUENCY MONITOR** ● Tap into the analogue side of the signal **£89** (Not applicable for DC VI)	**V.24 MONITOR/CONVERTOR** ● Allows monitoring by V.24 devices ● For interactive working between standards **£214**

CAE GROUP

General Audio and Data Communications Ltd.
64-82 Akeman Street, Tring, Herts. HP23 6AJ. Telephone: Tring (0442 82) 4011/5551
Telex: 82362 BATECO G Cables: RAHNO TRING.
Regional Sales and Service: Manchester, Unit 5, Fivefold Industrial Park, Manchester Street, Oldham, OL9 6TP. Manchester (061) 626 3371.

Associated Companies Teleprinter Equipment Ltd. Communication Accessories and Equipment Ltd.
Morse Equipment Ltd. Teleprinter Rentals Ltd. Datacare – a division of Teleprinter Equipment Ltd. Parent Company: William Batey & Co (Exports) Ltd. (Founded 1946).

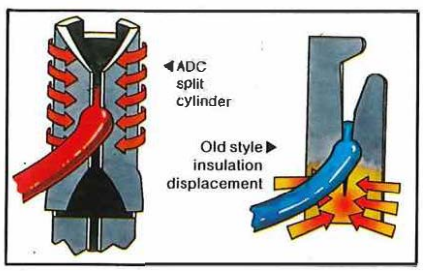
Wire termination as easy as ADC



Revolutionary new split cylinder contact means ADC's family of wire termination systems saves time and money.

ADC bring you a high-durability solution to your interconnection problems, which is 50% faster than soldering or wire wrapping – and just as reliable.

The ADC interconnection system is based on our unique split cylinder contact design, which is a positive 'punchdown' or insulation displacement method of terminating circuits for telecommunications, computer and audio applications. A major design breakthrough, it minimises intermittent faults sometimes found with other connection methods.



Connection is established by one insertion of our wire termination tool. Wire insulation is displaced and excess wire is cut off – all in one simple snap operation.

The result is a connection which is so tough it is virtually impossible for a wire to be removed inadvertently. Triple strain reliefing is a feature of Ultra-Patch interconnection panels, and Pro-Patch jackfields specifically designed by ADC for the broadcast industry. Contact pins are recessed, reducing the risk of short circuits.

What's more, our super-clear colour-coding system enables quick and accurate identification of termination points. So wiring errors are greatly reduced.

You also get versatility. Solid or stranded wire can be used, and our split cylinder contact can accept two wires on each side.

ADC – the new generation of wire termination.

ADC Europe Ltd., 126–128 Crockhamwell Road, Woodley, Berkshire. RG5 3JY. Tel: 0734 695998. Telex: 849103 ADCEUR G.

ADC Europe Ltd.

SEE THE NEW QDF FAMILY ON STAND No 5E14 AT COMMS '86.

The Cable Company

NEK Cables Ltd. Your cable specialists

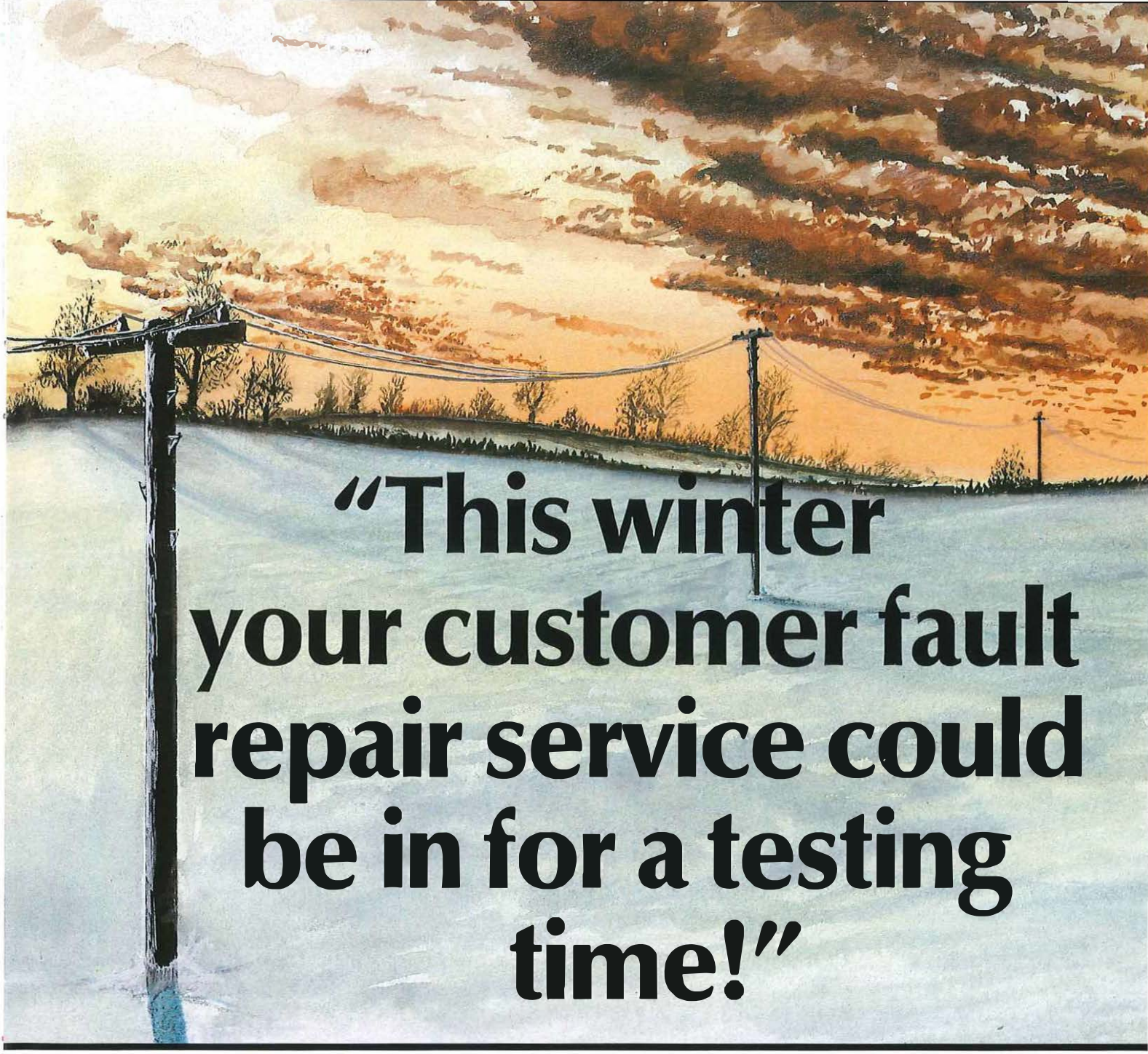
- Telephone Cables
- Digital Cables
- Multicore Cables
- Computer Cables
- LAN Cables
- Coaxial Cables
- Triaxial Cables
- C.A.T.V. Cables
- Broadcast Studio Cables
- Microphone Cables
- Audio Cables

NEK CABLES Limited.,
Chepping House, Temple End, High Wycombe, Bucks. HP13 5DR.
Tel: (0494) 450371/2/3
Telex : 83142 NEK UK

The CL680 line test system from Vanderhoff is just the kind of state-of-the-art product you would expect from one of the leaders in the industry. Consisting of one or more master stations and exchange located remote test units, the modular CL680 provides a cost effective means for centralised routine and automated fault testing of customer lines.

It's so easy to use it practically runs itself yet offers as wide a range of tests and facilities as you could possibly wish for. These include:

Automatic tests with call queuing, supported by user assigned diagnostic messages and line termination statements: Parametric single-shot or camp on repetitive tests:



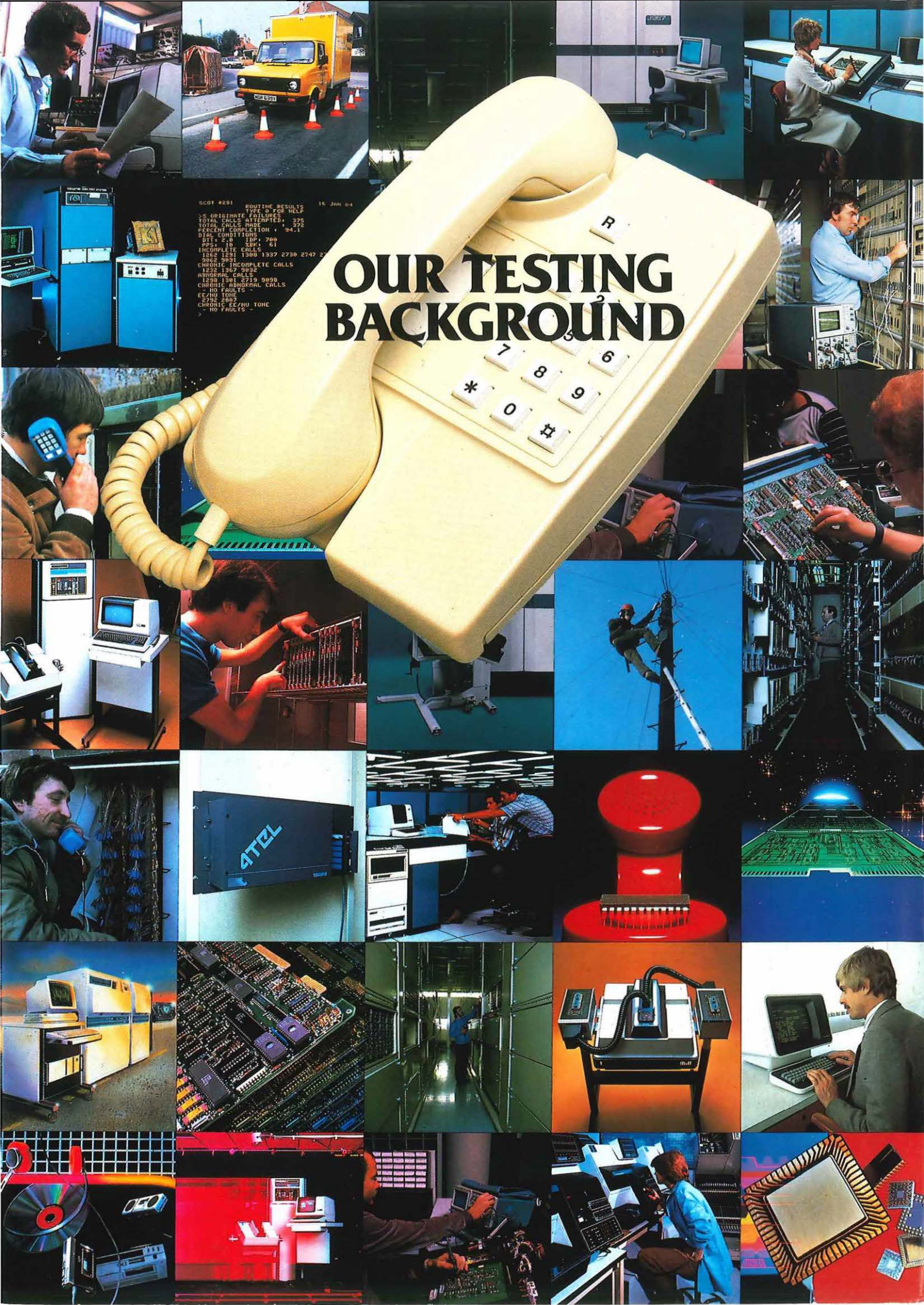
Field personnel access with synthesised speech report back:
Automatic routing programmes under full user control.

Needless to say, all this means you can identify faults accurately, reducing maintenance costs and improving the quality of service to your customers.

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

Vanderhoff plc
Vanderhoff Communications Ltd.,
Bermuda Road, NUNEATON. CV10 7QF
Telephone Nuneaton (0203) 341111
Telex: 311563 VANCOM G.

Why not get switched on to the Vanderhoff CL680


SCOT #281 ROUTINE RESULTS 16 JAN 84
TYPE 0 FOR HELP
>S ORIGINATE FAILURES
TOTAL CALLS ATTEMPTED: 375
TOTAL CALLS MADE : 372
PERCENT COMPLETION : 94.1
DIAL CONDITIONS
DT: 2.0 IDP: 700
PPS: XBK: 61
INCOMPLETE CALLS
1262 1291 1308 1337 2730 2747 2
9062 9091
CHRONIC INCOMPLETE CALLS
1232 1267 9032
ABNORMAL CALLS
1298 1301 2719 9090
CHRONIC ABNORMAL CALLS
- NO FAULTS -
EE/HV TONE
2732 2802
CHRONIC EE/HV TONE
- NO FAULTS -
OUR TESTING BACKGROUND
4TEL

PUTS US INTO THE FOREFRONT

As telephone systems become more sophisticated and customers expect more from them, it's essential that testing methods keep pace. Fortunately there is one company who has helped pioneer the technology of automated electronic testing from the outset. One company with a wealth of experience that includes computer-controlled testing of semiconductors, p.c. boards and backplanes.

The company is Teradyne. Our telephone line test systems can pinpoint faults on any line, whether they occur in the exchange, in the cable or in the customer's telephone.

Today, 4-TEL,® the system that tests every line, every night is the leading commercial line test system in America. And it's making life considerably easier for PTTs in Great Britain, Belgium and other European countries. Then there's SCOT® – the outstandingly successful tester that's brought automated testing to the exchange itself. And which is used by virtually every district of British Telecom.

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

Telecommunications Division, Teradyne Limited,
The Western Centre, Western Road, Bracknell, Berks
RG12 1RW. Tel: Bracknell (0344) 426899. Telex: 849713.

TERADYNE

We have a great range in store for you, from British Telecom.

Teletrade can offer you just about anything from a telephone to a telephone exchange, including telex terminals, answerphones, callmakers, payphones, even spare parts for maintenance.

We have brand-new solid state equipment, and good-as-new reconditioned equipment, all tried and tested by British Telecom, one of the world's largest telecommunications authorities. And the prices are very competitive.

For further information, just contact British Telecom's Teletrade Sales Office, Broad Street House, 55 Old Broad Street, London EC2M 1RX. Telephone: +441 588 5872. Telex: 887523.

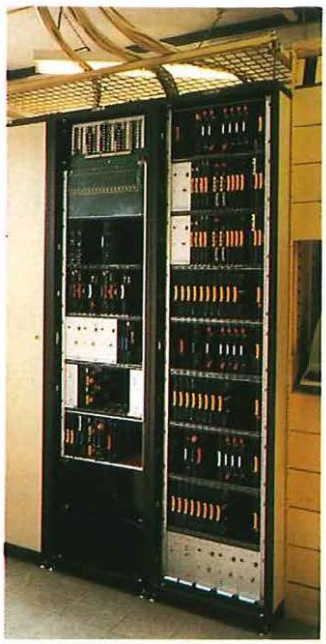
British Telecom
Teletrade

The overseas equipment marketing unit of British Telecom

CITY BUSINESS SYSTEM The revolutionary communications system for finance houses and foreign exchange dealers. Touch-controlled from the screen.

SCEPTRE 100 Electronic Telephone with call-timer, clock and number store.

700 SERIES The classic British Telecom dial phone in a range of colours.



UXD5. British Telecom's new rural digital exchange.

DIGITAL SPEAKING CLOCK The new microprocessor controlled speaking clock with a digital voice recording.

PUMA A fully electronic teleprinter using microprocessors to provide advanced facilities. It has its own memory.

LIGHTNING is no problem if you're ALERT

Fuses · Surge Arresters · Barriers · Filters · Integrated Hi-Speed Protection Modules · Discrete Primary and Secondary Line Protection Modules.

These are just some of the ALERT product range from Beswick.

The leading company infuse technology is now providing new products, new methods and new solutions in circuit protection for digital equipment and advanced electronic systems.

Whatever the requirement, be it high volume component items or specialist "limited edition" designs, a multi-discipline team of engineers and scientists is available to discuss all aspects of circuit protection to meet today's problems or tomorrow's needs and then to provide cost-effective solutions.

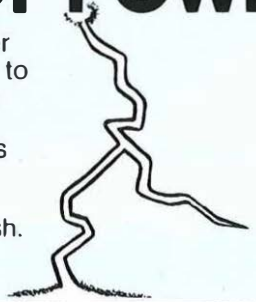
dubilier beswick

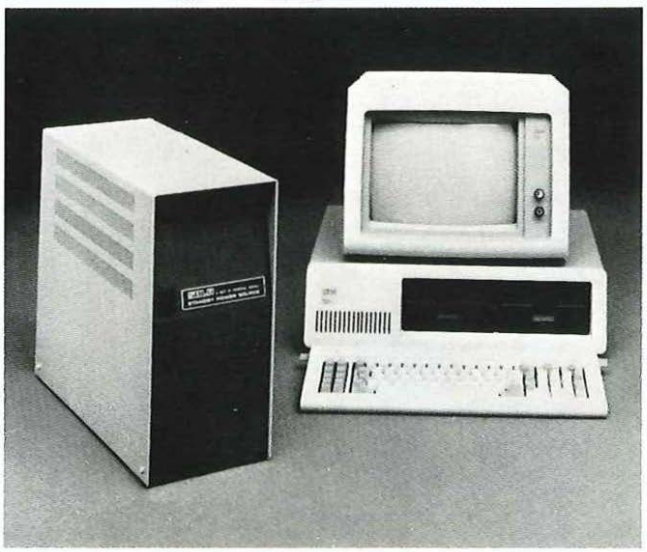
The ALERT *people in circuit protection.*

Beswick, Alert Works, Frome, Somerset BA11 1PP.
Telephone: (0373) 64311 Telex: 449196 Alert G

HOW TO CONTROL THE RISE AND FALL OF POWER.

Your small computer can give you the power to raise your productivity. But first you have to control the power you give it. Because even the slightest dip or surge of electricity can result in a shocking surprise. An instant loss of important data or misinformation. Even worse, a total power line failure can create department devastation...a total system crash. You can't afford errors, delays and other problems. After all, you've invested in a computer to increase efficiency. But now there's a solution you can afford. The Sola SPS. This economical Standby Power System is designed to protect personal, micro and mini computers from AC line disturbances





and failures. Sola SPS provides clean, regulated AC power to your computer when your power line experiences irregular voltage. Line dips or line surges are immediately converted to proper voltage. When the AC line is present, the SPS filters power to eliminate electrical noise. And when the AC line fails, the SPS goes into full action, providing precise AC power to the load from its internal battery. So the only noise you'll hear is the sound of performance. There's no maintenance. No installation. Just plug it in and turn it on. Why let your productivity rise and fall with your power? The solution is as simple as SPS. The standby system that Sola stands behind.

For more information contact:
SOLA-BANNER(EUROPE)LTD.
Sergeants Way, Bedford MK41 0EH
England
Tel: (0234) 327941 Telex: 826431

A UNIT OF GENERAL SIGNAL GS
SOLA-BANNER (EUROPE) LTD

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

PLESSEY INNOVATIONS FOR COMMUNICATIONS

With System X, Hull now has bridged the digital future.

When the Humber Bridge—the longest suspension bridge in the world, with a 1,410-metre main span — was opened in 1981, Hull reached a major communications landmark. Now Kingston-upon-Hull Telephone Department has reached another—with the switching into service of its first three System X digital exchanges.

Hull, the only independent telephone company in mainland UK, chose System X from a list of internationally available systems.

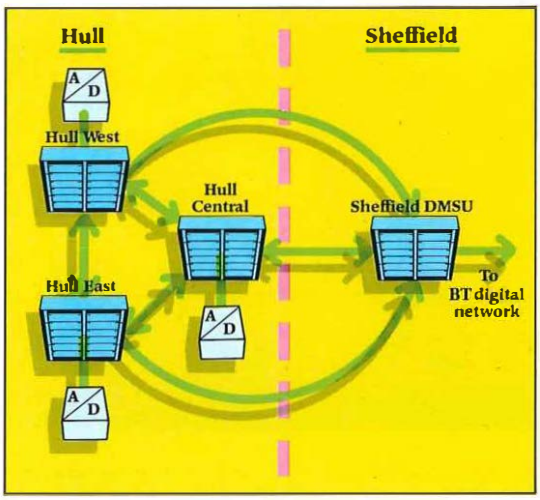
System X will give Hull the capability of extending a full range of modern communications services to over 130,000 subscribers, and will link into British Telecom's growing Integrated Services Digital Network. System X also offers facilities normally associated with electronic PBXs, such as short code dialling, push-button tone signalling, incoming calls barred, call diversion, last number repeat and three-party conversation.

Interconnection with the BT network uses common channel signalling.

The first three Hull exchanges, covering some 16,000 local lines, are now interconnected with the BT digital trunk network using common channel signalling based on CCITT No. 7 standards. Common channel signalling has many advantages to both subscribers and operating authorities.

It provides direct connections between exchange computers and thereby increases the signalling capability of the network. The consequent increase in facilities which can be offered enhances operation and maintenance of the network and provides routing flexibility and a high degree of security.

The introduction of System X digital switching together with common channel signalling between the Hull and BT networks (as illustrated in the diagram) is now providing two digitally interconnected but independent administrations with improved transmission qualities, ISDN capability and faster call set-up times, all in a new environment of computer control.



For further information, contact Peter Gordon, Plessey Major Systems Ltd, Edge Lane, Liverpool L7 9NW. Telephone: 051-228 4830. Telex: 629267.

PLESSEY

PLESSEY and the Plessey symbol are Registered Trade Marks of The Plessey Company plc.

The Finest Line Card ATE costs £200,000, and comes from Marconi

The remarkable new system 8065 line card ATE is also the most cost effective. It gives a full 110 db dynamic measurement range using sophisticated FFT software routines instead of expensive low-noise hardware sub-systems. This makes it the lowest purchase, programming and operating costed line card ATE in existence.

For high volume production testing of MODEMS, Multiplexers, and line cards, and component testing of SLICS, SLATS and CODECS, the Marconi System 8065 is the finest telecomms ATE available. It's also an invaluable asset to maintenance depots where computerised servicing has now become a necessity.

Designed specifically for the telecomms industry, System 8065 can be configured to any telecomms standard – including BELL and CCITT – to support the high production rates of line card manufacturers.

System 8065 is the only line card ATE to offer full signal and transmission testing of 4, 8, and 16 channel line cards. No other card ATE offers the total test capability of System 8065.

Test programming is quicker and easier using Marconi Instruments' unique CLIMATE (TM) test profiles. This slashes test programming costs, and shortens test program development times.

	TRANSMISSION TESTS
*	GAIN VARIATION
*	CODING
*	IDLE CHANNEL NOISE
*	DISTORTION
*	CROSSTALK
*	DISCRIMINATION
*	SPURIOUS OUTPUTS
*	RETURN LOSS
*	BALANCE
*	LONGITUDINAL PARAMETERS
*	TRANSHYBRID LOSS (ECHO)

	SIGNALLING TESTS
*	GROUND KEY
*	TEST ACCESS
*	RING TIP
*	LINE FEED CHARACTERISTICS
*	PARK AND POWER FEED
*	DISCONNECT RELAY
*	DIAL SEQUENCE
*	MANUAL HOLD
*	COIN AND FEE
*	PHANTOM SIGNALLING
*	M-WIRE AND P-WIRE SIGNALLING

With full back-up of Marconi Instruments, Europe's leading manufacturer of commercial ATE systems, this opportunity could be the best £200,000 decision you will ever take.

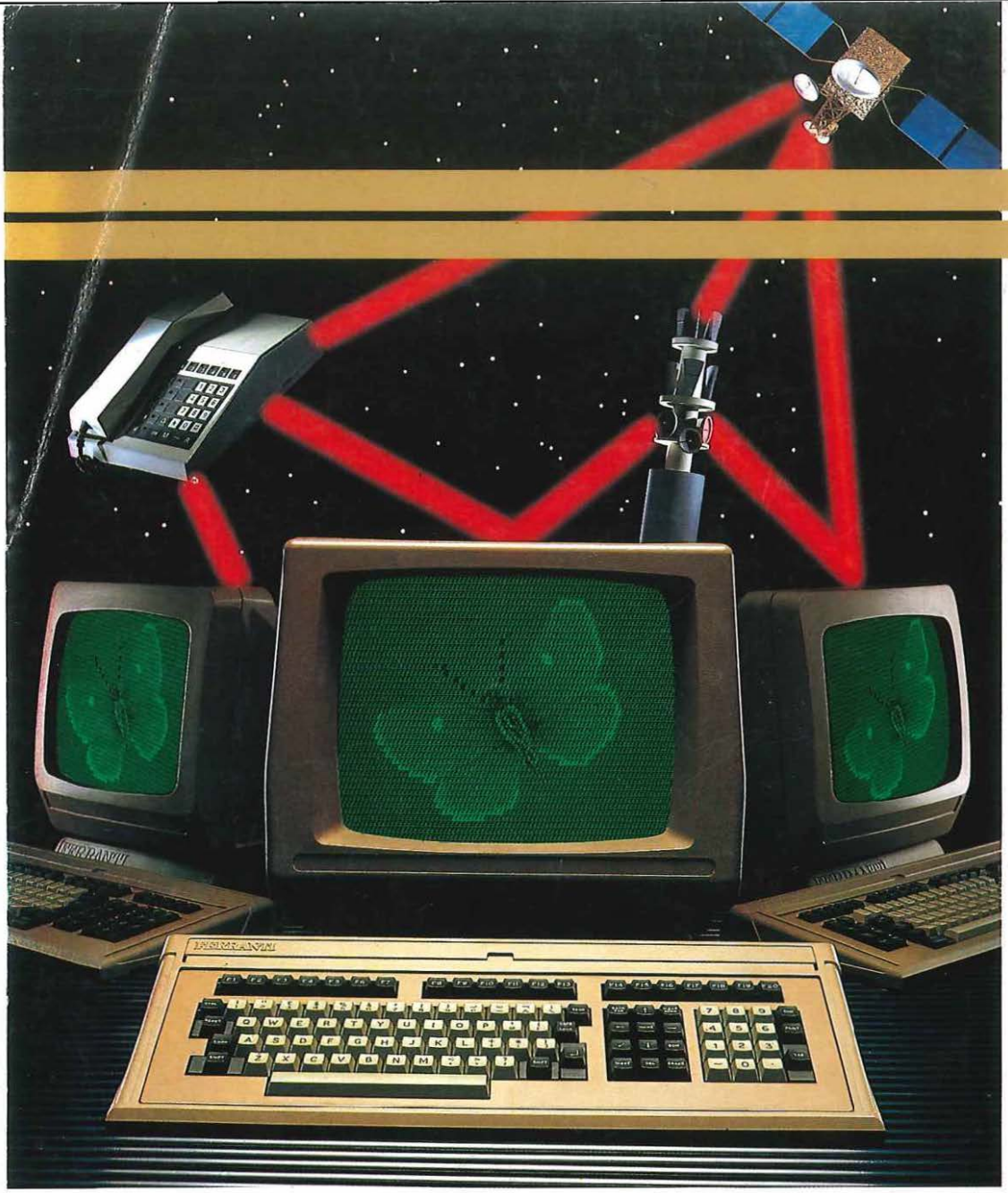
Please call us, we will prove the rest.

Marconi Instruments Limited, ATE Division, Longacres, St Albans, Herts AL4 0JN.

Telephone St Albans (0727) 59292.

Marconi
Instruments

Marconi



FERRANTI

ARGUS

ELEGANTLY EVOLVED FOR THE PRODUCTIVE OFFICE

When Ferranti office automation meets British Telecom, the result's interactive.

The equipment Ferranti is now making for the modern office gets on very well with the British Telecom network. They have a lot to say to each other.

Take information processing for a start. Our Interactive Terminal Manager offers advanced facilities with multi-windowing. It gives IBM and ICL access with common office tasks, such as spreadsheet calculations and word processing.

Then there's Telex Manager, Teletex Manager and Message Director for multi-terminal interaction, using the public networks and private lines. And don't forget the Ferranti Document Manager, which can be anything from a single word processor to a multi-terminal electronic fileroom.

Argus office products by Ferranti are providing British Telecom and others with complete solutions to their office requirements. Each product is designed for specific needs, which makes all the difference to your office productivity.

Become interactive with Ferranti, and you'll be more telecommunicative.

Ferranti Computer Systems Limited,
Simonsway, Wythenshawe,
Manchester M22 5LA UK.
Telephone: 061-499 3355
Telex: 668084

FERRANTI
Computer Systems

Please tick the box for further information on

Office roducts ☐
Telecommunication Products ☐

Name_____

Position_____

Company_____

Address_____

_____

Tel_____

Post to: 8T/16
Ferranti Computer Systems Limited,
Simonsway, Wythenshawe,
Manchester M22 5LA UK.