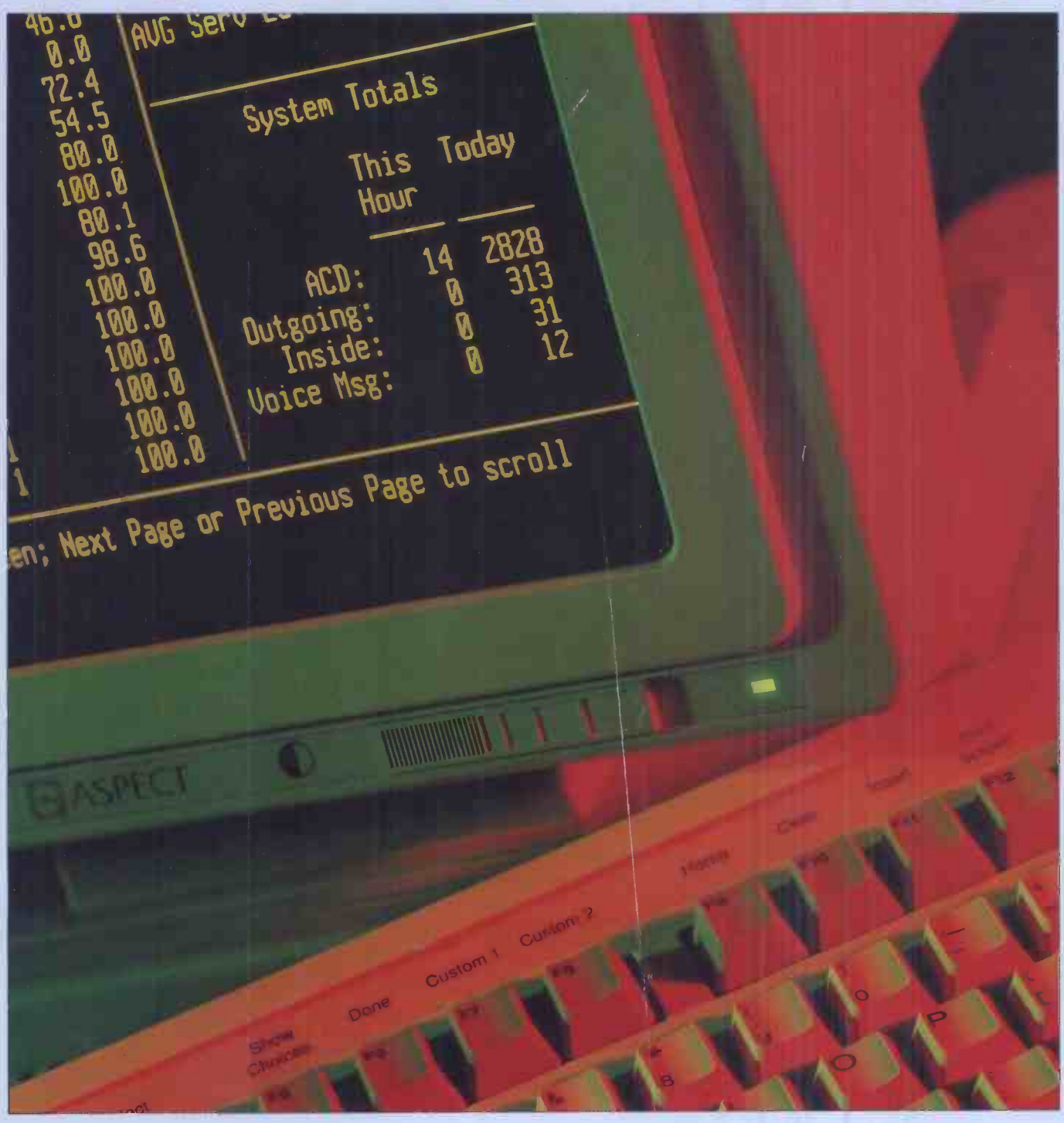
OCTOBER 1992

Communicate



ISDN: LET DOWN BY TERMINAL EQUIPMENT?

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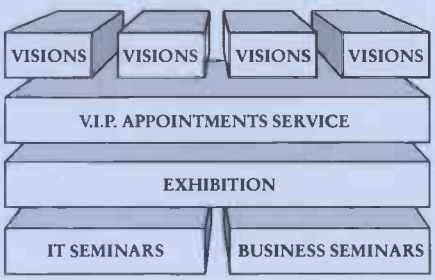

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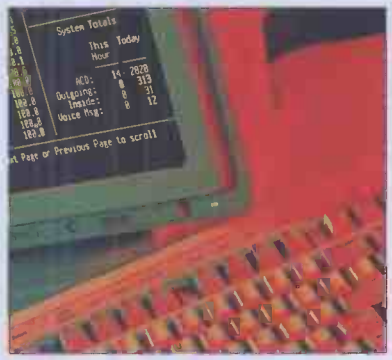

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COMMENT

As ***Communicate*** hits our readers desks, interested parties should be devouring the text of the as yet unpublished Open Nework Provision (ONP) Services Directive on European public telephony (see pan European supplement). Many observers are looking for a strong lead from the EC, hoping it will recommend the complete liberalisation of the market for voice services.

The most we are likely to get is the harmonisation of trans-border leased line charges, where an absurd situation exists; a cross-border call from Spain to France costs two thirds more than a call made in the opposite direction. This, plus the liberalisation of pan European data services, which accounts for only 10% of international telecomms traffic, is merely a sideshow to the main issue; allowing equal access to the provision of voice services.

Most of the problem lies right at the feet of the European Commission and the two Directorates shaping telecomms policy ahead of the implementation of the Common Market on January 1st 1993. The Competition Commissioner Sir Leon Britten, head of DGIV, considers telecomms to be a prime target for liberalisation and expresses his desire to push quickly for complete reform of European voice services. Unfortunately Sir Leon is retiring at the end of the year. Rumour has it that an Italian candidate will replace him. Euro watchers unkindly suggest that the liberalisation process might not proceed with the same vigour as it has with the redoubtable Britten.

The Directorate in charge of telecomms, DGXIII, is in an invidious position. On the one hand it stands accused of losing its political support from the Council of Ministers, which has moved onto other more pressing matters like monetary union. On the other hand, its standing with other Directorates is being questioned. At the recent Economist Telecommunications conference (see Eurofile, page16) a member of DGIV claimed that European PTOs saw DGXIII as "a client" representing their particular interests.

Whatever the Directorates say or do, past experience has shown that Member states have a propensity to ignore them. Spain has resisted liberalisation of its datacomms market, France continues to ignore Directives on terminal equipment and poorer nations like Greece resist mandatory infrastructure changes on the grounds that they cannot afford them.

If European nations and their PTOs continue to stymie the process of legislative reform of telecomms then the only viable response has to come from users. In the long term users have to pool their enormous purchasing power and force PTOs to stand up and take notice. The development of non-terrestrial global networks such as Motorola's Iridium (if it comes off) and others like it, will offer users choice. If users are not able to shake the PTOs out of their collective complacency by pursuing those choices, then they only have themselves to blame.

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There's more than one way to bridge a LAN

The new LANline 5220 from *Premier* combines them all for just £1485

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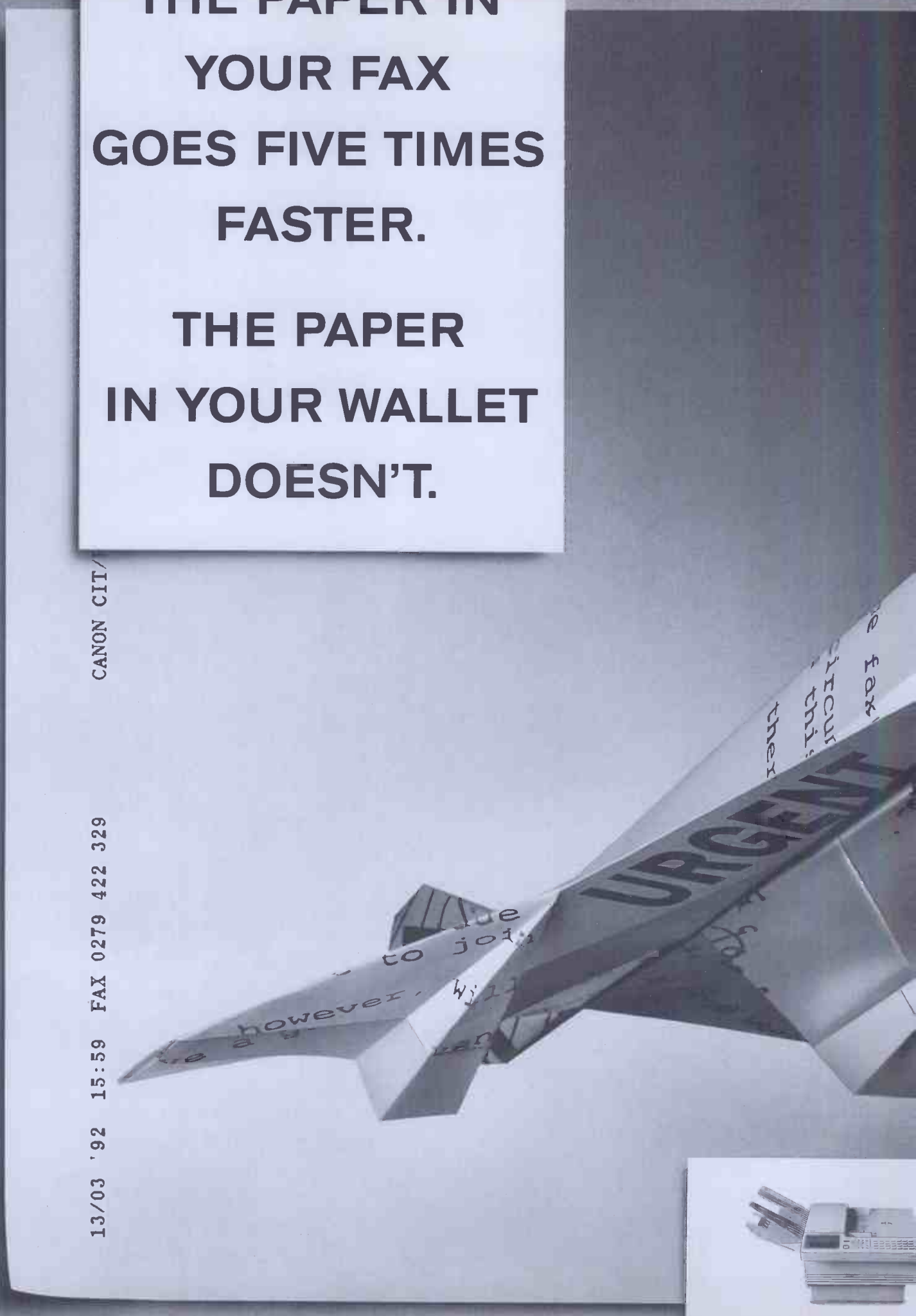

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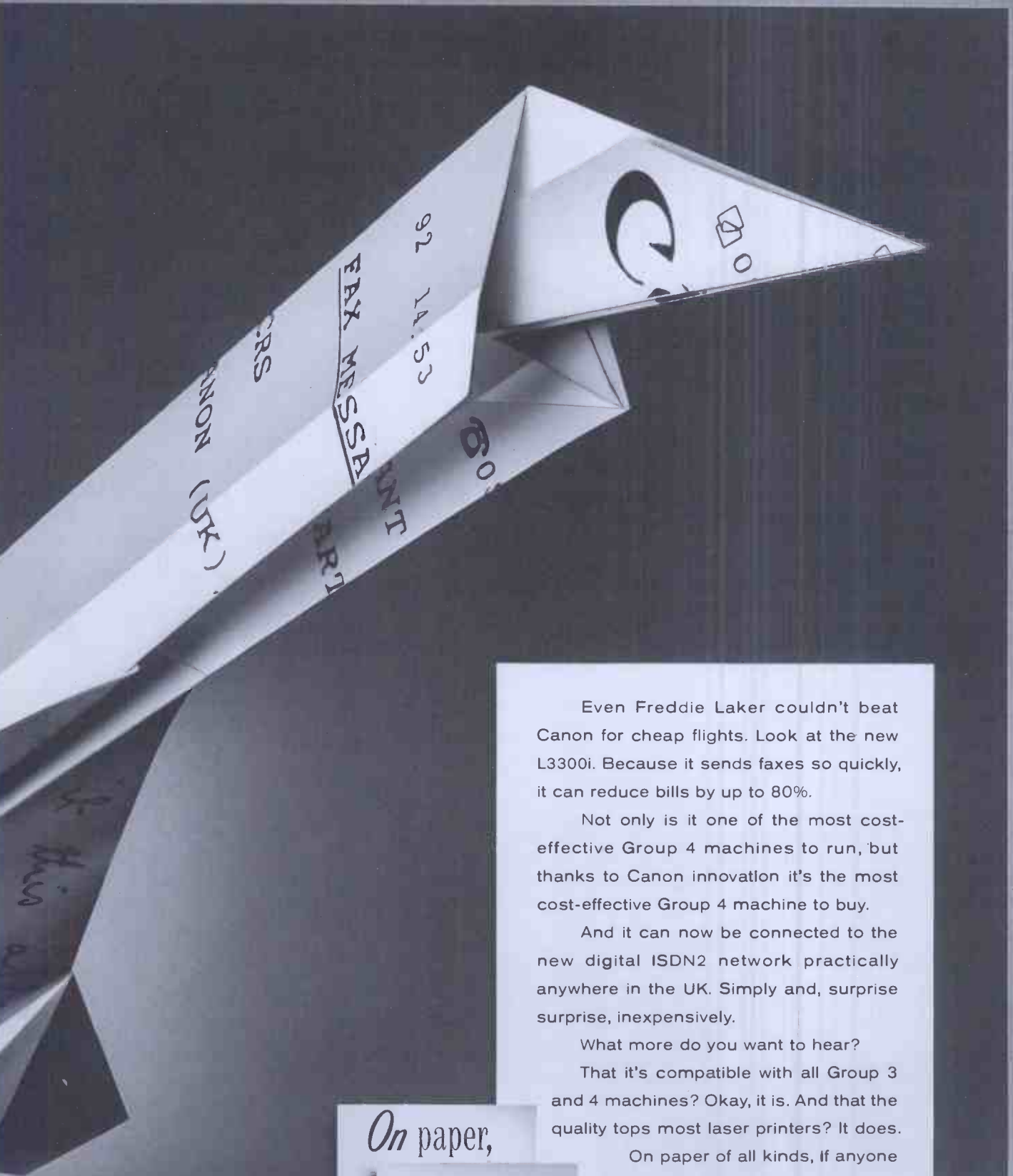

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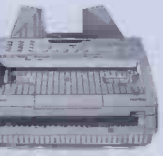

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Battle commences on the internetworking front

Banyan Systems has announced Enterprise Network Services (ENS), a new line of business which it expects to account for half of its revenue within 18 months. The first product in the range is ENS for all versions of NetWare that will give Novell users access to the same facilities that are standard on Banyan's own Vines network operating system (NOS).

James Ringrose, European marketing director says, "ENS has been designed to make major NOS environments easier to use and manage, solving the problems of incompatible corporate networks". According to Ringrose, users who have invested heavily in NetWare now want to integrate their networks into an enterprise-wide infrastructure–Banyan intends to provide them with the means to do it. Ringrose says he expects this business to be "big but incremental", and added that he expected it to account for 50% of Banyan's business within 18 months because it will open up the installed NetWare base to Banyan.

Ringrose stresses the importance of the StreetTalk global directory service claiming, "The introduction of StreetTalk and its integrated network services will greatly streamline the administrative tasks involved with traditional networks, simplifying its use independently of the operating system". To illustrate this, he claims that adding a new user to a network using ENS for NetWare will be far quicker and, should the location of the database to which the new user requires access be changed, access will be maintained without any need for reconfiguration.

Andy Baldin, business development manager for Novell UK says his company "appreciates the need to to make the administration and management of networks easier". He adds that Novell sees Banyan's announcement as "a positive move in terms of the number of users who have mixed NetWare and Vines environments that need to be integrated". Novell intends to address the issue of integrating lans into enterprise-wide networks with the launch of NetWare 4.0 which is due "around the turn of the year". While Ringrose was keen to stress the advantages its StreetTalk directory service would bring to NetWare environments, Baldin points out that StreetTalk does not conform to X.500, while NetWare 4.0 will offer an X.500 compliant directory service. He describes Banyan's ENS for NetWare as "a means to an end until true open systems directory services arrive". When asked about the accusations that NetWare 4.0 will not be backwardly compatible with earlier versions of the NOS, Baldin says, "4.0 is based on 3.11, 386 technology and is a 32bit operating system. Some modifications have been made to increase efficiency but NLMs [network loadable modules] will port to 4.0. The interface is the same for server-based systems...there may be problems where developers have bypassed the interface and gone straight into the operating system". He explains that 4.0 has a binary emulation function so that it can be implemented in large (say 20 to 30 servers) networks gradually, and in the meantime can still "look like" a 3.11 server, so users can migrate to 4.0 at leisure.

Microsoft is also determined to become a player in the enterprise-wide integration game through various permutations of Windows. Baldin says the difference between Novell's approach and Microsoft's is that the latter wants every desktop to run on Windows whereas Novell's line is to be able to accommodate whatever desktop systems and applications users want. "We are not telling everyone 'this is the operating system you must use'", he says, rather Novell is addressing the issue of DOS, Windows, Unix and Macintosh environment integration. He says Novell wants to "provide a network service that will maintain an equality between all desktop environments"–a sentiment close to Banyan's stated aim. ENS for NetWare is the first of the proposed range and other NOSs that Banyan intends to provide ENS for include Lan Manager, All-in-One and Pathworks.

IBM adheres to Blueprint but strives to slash costs

IBM has launched 48 comms products underlining its commitment to the Blueprint for Networking. The products fall in four broad categories:

- The 8250 is IBM's multiprotocol hub designed to connect different types of lans into enterprise networks. It is the result of a development, marketing and manufacturing alliance between IBM and Chipcom Corporation announced in July. It can accommodate Token Ring, Ethernet and FDDI. IBM will sell the Chipcom hub with its own management module, the AIX NetView Hub Management Program/6000. It will also supply its own routing within the hub. When asked why SynOptics, the market leader with 28% share of the world market was not chosen John Gallop, networking solutions centre manager in Europe said that Chipcom was chosen for reasons of "quality, performance, reputation and compatibility with IBM".
- Six adaptors for connecting PCs to networks. Three of these support the PCMCIA standard for laptops and notebooks and will support Token Ring and Ethernet as well as 3270 emulation for direct access to mainframes. The new Ethernet adaptor supports 10Base2, 5 and T. The Token Ring adaptor for ISA (that is non MicroChannel computers) is said to double existing performance.
- Enhancements to the 3745 comms controller have advanced peer to peer networking which is designed to transform hierarchical SNA environments into distributed computing, apparently making the 3745 more suitable for client/server applications. Improved Token Ring support has doubled the throughput of the 3745, helping to exploit bandwidth and reduce transmission costs. IBM has stated its intention to add Ethernet support to the 3174 establishment controller, to make it into a multiprotocol terminal server.
- CallPath's voice/data information has extended to cover RISC System/6000 users bringing CallPath into the Unix arena. In this situation, the RISC System/6000 acts as a server to integrate voice and data traffic. Until now CallPath has run on PS/2, AS/400 and ES/9000 platforms. IBM has added Message Queuing Interface (MQI) in response to its Blueprint promises, which simplifies the task of developing applications that run across a variety of hardware and software. This is particularly aimed at businesses that use large amounts of transaction processing, such as banking.

IBM has announced further plans to cut its operating costs. (See Cisco news story and page 9 and feature on page 18)

It is to take post-tax charges of $2.8bn in the current third quarter which will result in a net loss for the quarter. This action is being taken to cover the costs of rationalising its worldwide manufacturing operations and a further reduction to its staff.of 40,000 this year. The charges will be partly offset by a change in accounting methods which will allow the firm to recognise about £1.9bn in deferred tax assets. By the end of 1992, IBM will have reduced its workforce by about 25% since 1985 and its manufacturing facilities by approximately 40%. IBM says its costs and expense structure will be reduced by around $4bn annually from 1993.

Cisco extends its attack on the peer to peer SNA

Cisco Systems has announced the completion of Phase IV and its plans for Phase V of its IBM internetworking strategy for peer to peer networking in SNA environments. (See feature on page 18)

Phase IV developments include support for SNA physical unit (PU) type properties to its router software including class of service, transmission groups and SDLC local termination. Class of service means that its router can now recognise priorities between IBM front end processosrs. Cisco has extended this so its routers can allocate priority to traffic; for example, in retail situations credit card verification could take precedence.

SDLC local termination means the routers can maintain SDLC sessions with the end SNA devices while carrying only data packets over the routed network using TCP/IP. No polling or acknowledgements cross the backbone and session integrity is protected even in the face of long delays. Other Phase IV features include NetBIOS name caching to improve wan efficiency; media conversion support from SDLC to Ethernet; improved performance in IP routing and remote source-route bridging; SNMP MIB support for Token Ring and source-route bridging.

Phase V comprises a two pronged approach: Cisco intends to license advanced peer to peer networking (APPN) network node (NN) source code from IBM, and base products on it, while simultaneously developing its own strategy–APPI (advanced peer to peer internetworking). This will be IP-orientated and so includes internetworking features native to TCP/IP internetworking, such as dynamic adaptive routing, multimedia and multiprotocol support, with SNA comms. APPI specifications will be open and available to vendors and users free of charge. Cisco hopes to attract partners to form a consortium to aid APPI's development.

There are a number of factors that have motivated Cisco to take action, but a potential one not cited by the company may be the hefty licensing fee being charged by IBM for access to its NN source code. It is believed to be £200,000, plus royalties due to IBM for all other vendors' products based on the code. IBM will maintain control of APPN, so any changes will have to be sanctioned by Big Blue. Cisco argues that SNA has such an enormous installed base (50,000 worldwide) that it is wrong for one organisation to control its destiny. Cisco also claims:

- Although APPN sets up the initial routing path dynamically, it is not able to reroute if the initial path is congested and if the path fails, the session is lost.
- APPN has limited media use: it supports SDLC, Token Ring and X.25; Ethernet is partially supported; no support is available for frame relay or FDDI
- APPN means adding yet another protocol (Logical Unit 6.2) to be carried over the user's wan backbone at a time when users are trying to reduce the number of wan protocols in the interests of better management, increased speed and improved use of bandwidth. Cisco maintains users would prefer to use existing internetworks and services.
- TCP/IP networks can already route tens of thousands of packet/s in advance of current APPN applications. An IP alternative would mean IP-level performance on SNA peer to peer networks.

It is worth noting the timescales Cisco is working to and that in the meantime IBM is devoting a great deal of effort to addressing these issues itself (see news story on page 8).

Cisco says APPI will minimise the impact on existing networks because it resides initially on the periphery of the backbone, so isolating peer to peer applications to the access points. Users can use their current IP or source-route bridge networks which can evolve to perform dynamic adaptive routing without adding a new backbone protocol. The first stage of APPI products are scheduled for the third quarter of 1993, based on the Open Network Node (ONN), a peer to peer router based on IP.

Stage 2 is scheduled for the first quarter of 1994 and will upgrade the ONN to include SNA intermediate routing so the ONN will recognise and understand particular SNA sessions instead of just passing them via the backbone over IP.

Cisco intends to complete its implementation of IBM native APPN NN in the third quarter of 1994.

Spectrum leaves the Galaxy

Rockwell International has introduced a worldwide configurable call management system, improving on its Galaxy product–in both target market and features. Its aim is to meet emerging call centre needs within large organisations who are constantly dealing with customers over the phone.

The system incorporates automatic call distribution, voice processing, automatic outbound call management and PBX functions. Rockwell believes there is practically no competition for Spectrum in the call management market as Robert Cattoi, Rockwell's senior vice president for research, engineering and manufacturing processes commented: "no other system offers this degree of service integration". Spectrum is claimed to be an industry first in that it is designed around ISDN, with Primary Rate and Basic Rate interfaces on the network and customer sides respectively, poising it to exploit future ISDN opportunities as they evolve.

BACS benefits from ISDN links

A ten-fold increase in transmission speeds for sending electronic funds transfer (EFT) to the banks automated clearing service (BACS) should be possible using Telesmart's Multilink device. The unit transmits data over an ISDN line and can send 250,000 records/hour compared with current available access speeds for BACS which vary from 25 to 30,000 records/hour.

Multilink acts as an intermediary device, handling the comms process so that mainframes, Unix and MSDOS platforms can be linked to BACSTEL, BACS telecomms service. The Multilink system is based on a 20MHZ, 68020 processor. It logs onto the host computer though the security procedures, and accesses the files needed for transmission which are checked to ensure they comply with the chosen transmission standard. Multilink then sends the files to BACSTEL, performing any necessary protocol conversions.

Survey shows global cost cuts

PA Consulting's Survey of Employment Trends in Telecommunications 1992/93 indicated that cost control is the key issue facing telecomms managers today:

- Over 50% of participants reported an increase in training budgets as the need for internal training has risen
- Tiers of management are disappearing; staff are being expected to fulfil a much wider range of roles.
- Recruitment has halved since last year. Some companies are using fixed term contract staff. There has also been a marked decline in the use of recruitment agencies, almost half of all vacancies are being filled by internal candidates
- Respondents anticipate average salary increases of 4.7 to 6.6% in 1992 with minimal differentiation in job levels.

Optimising net management

SynOptics, the leading hub manufacturer according to The Yankee Group, is keeping the pressure on. It has announced several new products and enhancements.The company has launched a new version of its top end, Unix based network management system, Optivity, that it claims allows manager to monitor, manager and diagnose problems in the key components of a network: intelligent hubs, routers, bridges and end station network interfaces from one screen, so long as they are SynOptics own products or products manufactured by companies that have joint programme with SynOptics. The company insists on describing such elements as network fabric.

Optivity can now trace the path of a data packet from one end station to another, viewing the network interface connections, cabling types, hubs, bridges and routers involved. Optivity was the result of the alliance between SynOptics and SunConnect, a Sun Microsystems company, and Cisco Systems. It is based on SunNet Manager 2.0 from SunConnect and products were tested in conjunction with Cisco to ensure compatibility with Cisco's SunNet Manager applications which will be released soon.

These enhancements to Optivity mean that layers one to three of the Open Systems Interconnection (OSI) model are now covered, allowing it to manage: all SynOptics Ethernet, Token Ring and FDDI intelligent hubs; Cisco or other SNMP MIB II compliant routers; SynOptics and Retix bridges. LattisNet Manager for Unix 2.2 has been added including Autotopology Plus and Nodal Views which between them provide the graphical presentation of the network and its "fabric". The retail price for the Optivity network management system is £3,825. An upgrade program for current SynOptics LattisNet Manager for Unix customers is promised for the end of this month. LattisWare Solutions are software packages that can be added into SynOptics hubs to provide extra management capabilities on the SunNet 2.0 platform. The first set was issued in July and the company has added three more; RouterMan, PathMan and BridgeMan. These are to provide diagnostic capabilities for network managers.

RouterMan allows users to check the status, configuration and welfare of data on all the routers in the network by automatically identifying the interfaces and protocols supported including SNMP and X Windows systems. It was designed to exploit Cisco private SNMP MIB extensions.

PathMan allows users to trace packets on their progress through a network as outlined above.

BridgeMan identifies and provides status information on all SynOptics and Retix bridges and can use information supplied by other bridge management packages running on the network so long as they are designed on the SunNet Manager 2.0 platform. BridgeMan allows the control of bridges' address filter data and other tables.

Retail prices for RouterMan, BridgeMan and PathMan are £2,675, £1,910 and £3,060 respectively.

When asked about the lack of products for IBM's SNA because all the new developments are based on SunConnect's Unix platform, Brian Williams, general manager UK operations, said that SynOptics existing NetMap and NetView products provide SNA connecitivity. Jos de Klein, senior systems engineer based in the Netherlands added that SynOptics hubs will accommodate all the software that Cisco is developing under its five phase internetworking strategy for distributed computing under SNA. (See Cisco lead story on page 9)

SynOptics has also announced:

- the LattisHub system of expandable hubs which can be extended incrementally to provide 80 hubs 10BaseT ports. Prices start at £1,115.
- the LattisLink workgroup hub, an unmanaged, 16 port, 10BaseT hub which costs £855.
- Support for SNMP over IPX in the next release of its Lattis-EZ-View 2.0 so that LattisHub systems can be used in Novell NetWare environments without needing to learn and administer IP addressing. (see also NetWorth news story below).

Novell supports new hub vendor in Europe

Although the hub market is already brutally competitive, NetWorth, a specialist in 10BaseT NetWare products has just opened offices in Europe. The company is embarking on a joint marketing programme with Novell aimed at users and resellers. NetWorth claims it is the only hub/concentrator manufacturer to such products specifically for NetWare (See also bottom of Cisco news story on page 9).

Its flagship product is the NetWare Application Engine (NAE) which integrates NetWare functions into its Series 4000 hubs. The NAE uses NetWare Runtime as it operating system due to an oem agreement between Novell and NetWorth; Runtime is a version of NetWare running independently of the NetWare file server, meaning that applications can be run from the NetWorth's hub as NetWare Loadable Modules (NLMs). This integration of NetWare file servers and the hub is claimed to offer "a unified and homogeneous NetWare solution for enterprises".

NetWorth is also selling HubView, a Windows based hub management application. According to Clive Taylor, European general manager, NetWorth in Europe intends to achieve revenues of $8m within 12 months.

NetWorth can be contacted on 0276 685071

More comment, less cost

The Financial Times' FT Profile online database service has launched FT Profile Freeway to simplify access and control access costs. Users access the service from their own PCs which contains a library of newspapers and journals, market research and company information from the last five years.

Freeway sits on the user's PC and can be tailored to suit each user or group of users needs. It is graphical, based on Windows 3. Managers can build in cost limits for certain user's access and all access is automatically recorded. In addition, the user can see the cost of the current session on screen. Users are only charged for information they download to hard copy rather than every record they peruse.

FT Profile is keen to develop a version for the Apple Mac, particularly if a partner can be found to help fund the project. Freeway costs £100 and registration fee onto the FT Profile service costs £250. Minimum billing per month is £50.

Customising EC trading

The UK's leading electronic data interchange (EDI) service provider, INS, has announced a series of enhancements to its services. Customslink is to help users comply with the trading regulations that will come into force in January next year whereby they must return VAT EC Sales Lists. Also, UK companies exporting or importing more than £120,000pa worth of EC goods will have to make detailed monthly declarations on goods movements to HM Customs & Excise.

Customslink costs £950 which includes the software, network joining fee, one year's subscription and volume related charges which INS claims should be sufficient for the average trader making Customs returns.

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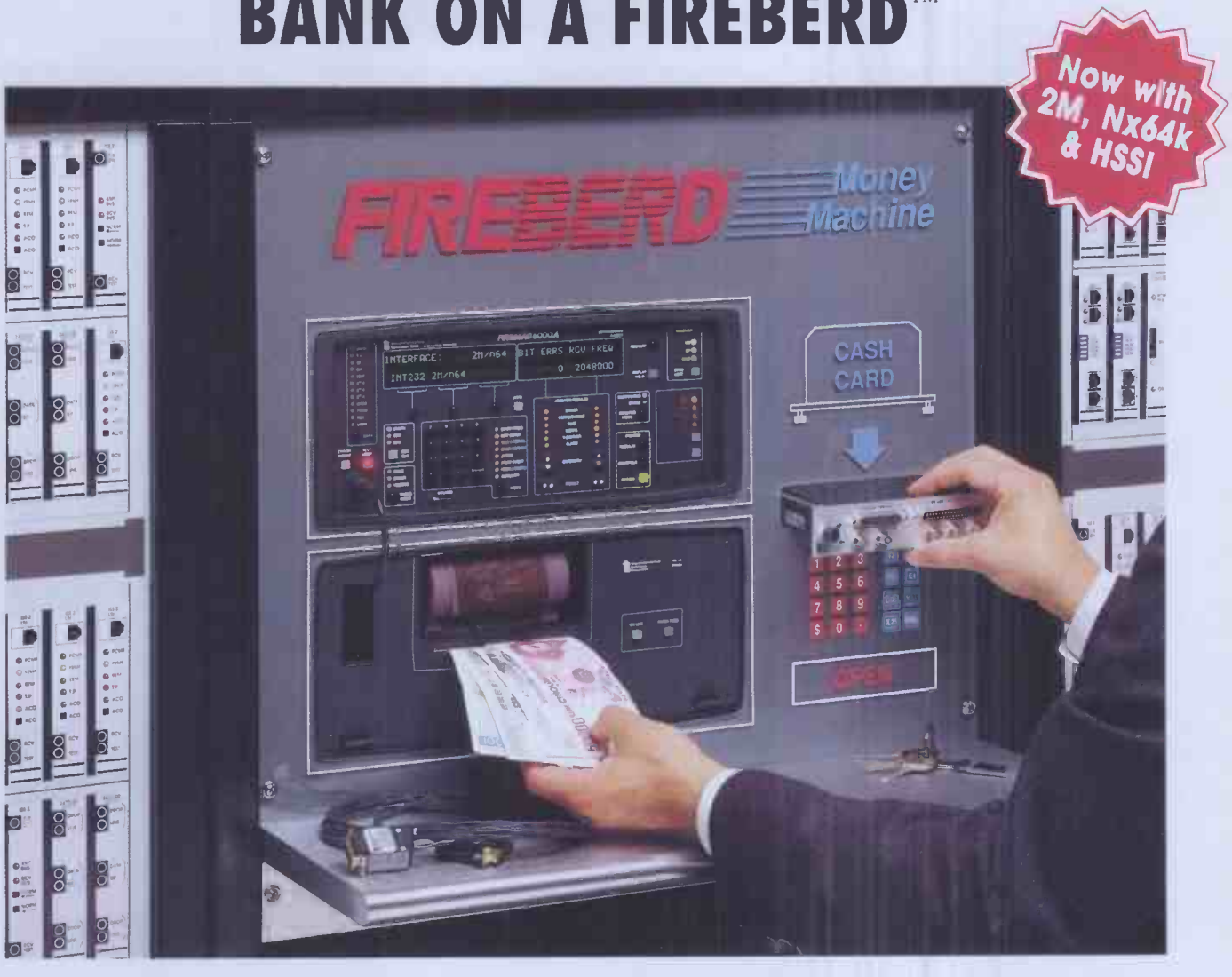

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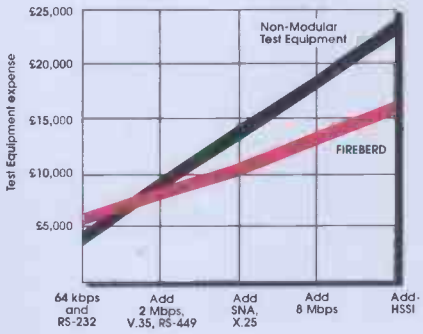

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British Rail Telecommunications (BRT) is going green with the world's first wind powered Cellnet phone which is currently on trial in Shropshire. The system uses a modified GPT 500 series intelligent card phone, and could provide an efficient service to remote areas with no mains power. The batteries are charged by wind moving the sails. The payphone is monitored on a daily basis, communicating with GPT's Payphone Management System which logs its status.

The Society for World Interbank Financial Telecommunication (SWIFT) has formally accepted a global telecomms network based on Northern Telecom's DPN-100 family of packet switching systems. The network will serve 3,700 institutions in 83 countries exchanging over 1,500,000 messages daily.

The Radiocommunication Agency (RA), part of the DTI has installed a PC based Geographic Information System (GIS). The ActionPlan system is being used at the RA's headquarters in London by its Fixed Services Section which is responsible for licensing and assigning frequencies on a national basis. The system provides a PC based electronic atlas to help staff select, record and display records of the locations and frequencies of over 8,000 links, updating its "coloured pins stuck on maps" method.

Meanwhile, Peacock Telecom has signed an agreement with Motorola to work on the development of two Cordless Office Systems for next year. Peacock Telecom will supply the switching and call management elements of the systems, while Motorola will supply the radio technology. The RTS2-10 Microcordless System and the RTS8-100 Cordless System will both operate with any CT2 CAI handset.

BT has begun building a huge corporate internetworking system using router technology from Cisco Systems. The system is designed to integrate its entire corporate management information and business systems and to provide access to the network administration computers, saving money and improving efficiency.

SMC Standard Microsystems is to manufacture a new range of Ethernet concentrators adhering to Novell's Hub Management Interface (HMI) specification. With this backing, SMC believes HMI will become a major lan standard (See NetWorth news story on page 10).

Gupta Europe has announced that its SQLBase database server will be ported to Solaris for Sun SPARCstations. Gupta's main strategy has two directions: to make SQLBase available on all leading desktop platforms; and to forge strategic partnerships with industry leaders, like the joint marketing agreement it has with Novell.

Another joint venture has been agreed between RAM Mobile Data and Computing Services for Industry (CSI) to work in the promotion of each other's products. They will also provide additional services to existing and new customers. According to Karim Khoja, general manager of RAM: "This partnership... enables us to offer existing and new users of the RAM Network connectivity to an even wider range of applications".

BRT and GPT together interpret the wind of change

Corporate successes

Vodafone has connected its 750,000th subscriber to its mobile phone network, maintaining its position as Europe's largest cellular operator. Vodafone has to date invested over £550m in building its network.

More mobile news comes from Hutchison Telecom who estimates that as many as 20% of the UK population could be using mobile phones by the end of the decade. MORI research shows that the number one irritation cited by customers was that contracts were unfair and they couldn't be changed without penalty. Hutchison has therefore introduced a "no ties" contract whereby customers can terminate their contracts with no extended notice period.

Novell has happily reported net revenue of $243m for its third fiscal quarter (ending August 1), up 45% for the same period 1991. Net income also increased 53% to $66m. Revenue growth for the first nine months of fiscal 1992 reflects 37% growth in sales of network computing software products and related services over last year, and sales of DR DOS and other products acquired through the merger with Digital Research accounted for an additional 12%.

Contracts

Unisys has won an $11m contract to provide computer facilities and telecomms services support to the US Department of Energy's Bonneville Power Administration in Portland, Oregon. The contract states that Unisys will also provide office automation support which includes PC software, a help desk service, production support and hardware maintenance.

Mercury Communications has been awarded an £11m Digital Centrex contract from The Chase Manhattan Bank NA. According to the contract, Mercury will provide managed voice comms for the bank in the UK. Initially Mercury's Digital Centrex will provide 3,100 voice links: 1,500 to its London offices and 1,600 to Bournemouth.

European issues

Computer & Communications Co (C3) has announced what is believed to be Europe's first PC based E1 compatible voice processing system using industry standard hardware. It can be used throughout Europe wherever E1 network interfaces can be supported. It has received type approval in Denmark, Belgium and Turkey with Spain, UK and Ireland expected soon.

The International Chamber of Commerce (ICC) has published the *Business Guide to Telecommunications Liberalisation in the European Community*, providing business users with a practical understanding of those EC Directives aiming to liberalise telecomms. While the guide is not a legal interpretation of the directives, it provides a business assessment which ICC considers to be fair and reasonable.

Hutchison Paging has relaunched Euromessage, currently the only mobile comms using just one device which can operate in more than one European country. In fact, it works in the UK, France, Germany, Italy and Switzerland. Information is transmitted instantly and directly in English.

Frame relay

In a £240,000 contract, Gandalf Digital Communications are supplying a frame relay network to United Carriers to support their image processing system. It will also carry X.25 traffic from their AS/400 based data system. It is based on Gandalf's Infotron 2000 WAN series, linking United Carriers' 20 depots to their head office.

NTT PC Communications, a subsidiary of NTT, has selected the IPX FastPacket networking switch from StrataCom of the US for its new public frame relay service in Japan. The service will launch next summer in Tokyo and Osaka initially. The number of high speed public frame relay services using the IPX is now eight worldwide.

Finally, Telematics International has successfully completed a frame relay beta trial for the GE Information Services (GEIS) network.

Dear Editor,
I was disappointed to see that Mitel Telecom was not mentioned in your recent article (A New Lease of Life, July 1992).
There are several facts that make Mitel Telecom one of the leading players in the PBX market.

- We have around a 20% share of the UK PBX market
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- Mitel digital featurephones regularly come top in surveys
- The recent independent Schema report on CSTA identifies Mitel Telecom as one of the key drivers in this market
- The 1992 What to Buy for Business PBX survey places Mitel Telecom joint first in its User Poll assessing equipment reliability, quality of installation, after sales service and training.

Yours sincerely,
Tim Redpath
Mitel Telecom Ltd
Portskewett
Gwent NP6 4YR

Dear Editor,
It was with regret that I read a quotation attributed to me in the July issue of Communicate, where I am supposed to have said that SNMP is "impossible as a comms protocol".
The point which I was making was that SNMP is a management protocol, not a comms protocol; it therefore requires a transport protocol, such as UDP/IP, PPP or X.25, in order to pass information between a management platform and the device which it is controlling.
I am sorry that I did not express this view sufficiently clearly, as the result is that the quotation, as published, does not make sense and the effect which you imply is that I do not believe in the usefulness of SNMP. Nothing could be further from the truth. As a tool for use with management applications, SNMP is one of the most exciting and useful developments to come from the industry for many years.
Yours sincerely,
Michael Emanuel
Director of Marketing
Network Managers
Stirling House
Stirling Road
The Surrey Research Park
Guildford
Surrey, GU2 5RF

Dear Editor,
Your news article "Sonix joins datacomms fray" which appeared in the August edition of Communicate misquoted me somewhat. "We don't expect to build leading edge modems" is far from the truth: our first product will be a V.32bis modem which we expect to outperform every other product on the market. It will use the highest specification data pump and 16bit processor currently available. Our design philosophy is that the modem should never be a bottleneck. To that end our product will have a 115Kbit/s digital interface designed for compatibility with systems running ISDN-type speeds.
However, I did say that Sonix is not involved in leading edge technologies. We will focus on modems, ISDN devices and lan interconnectivity: all of which have mass market appeal and are based on well established technologies. We are happy to leave leading edge technologies to other companies.
Yours sincerely,
Bob Jones
Managing Director
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DOING AWAY WITH DISKETTES

The benefits of electronic software distribution apply to vendor and user alike

Richard Milton

Predicting trends in the computer industry is often a matter of interpreting the faintest circumstantial evidence. Although as Henry Thoreau observed, some circumstantial evidence is very strong, as when you find a trout in the milk.

When you find that software developers like Microsoft, Novell and Systems Center have all set up operations or subsidiaries specifically to develop ways of distributing their software to users electronically, you know something is afoot.

The idea is beautifully simple: distributing software physically on diskettes is wasteful and expensive. Diskettes can be faulty and need replacing, and their total cost to the distributor is a substantial eroder of potential profits. More importantly, the physical distribution of software means that users can never be sure they have the latest version of a program or the latest price list or parts numbers. This can mean a headache for the IT department of corporate users, especially users of distributed PC lans, in making sure that all users are singing from the same hymn sheet.

Lindsay Kennedy, UK MD of Telepartner, promoting ESD in the face of user concern

Would it not be a lot simpler, cheaper and more efficient for the likes of Microsoft to send us our software via public or private comms links? The vendor would maintain up to date records of what release number or version each user has, and would make sure they were harmonised by periodical updates, probably at night using cheap line tariffs.

It all sounds splendidly efficient, but what are the chances of a national software distribution network being developed and of user organisations taking the electronic distribution route? There is little doubt that users are concerned about managing changes to their software. The widespread move to client/server architecture and the equally widespread introduction of distributed PC lans inside the organisation, means that keeping track of changes can be a complicated task.

A research study of 200 of the largest US user corporations in May this year by Specifics Inc found that over the past two years there has been an increase of 10% or more in the use of generic shrink-wrapped software packages, in-house applications and client/server applications. The respondents also forecast even more dramatic growth in these areas over the next two years. For instance, use of client/server architecture grew from 8% to 24% between 1990 and 1992 and is expected to grow to 54% by 1994.

Consultants Gartner Group estimates that software distribution and installation together represent 17% of the total cost of PC software over a five year period. An enterprise with 2,000 PCs can spend $1m each year performing distribution and installation alone, so plainly there is a substantial market here; assuming the vendors can supply a convincing service, and the users can be persuaded that investing in it is worthwhile.

Lindsay Kennedy of Telepartner, a company set up to promote electronic software distribution (ESD) says that some management information services and also datacentre managers have been wary of ESD, fearing it is too expensive or inflexible. Others believe that in-house home grown solutions are the way to tackle the problem.

The study by Specifics indicated that some managers think using a proprietary ESD system is more expensive than the traditional "sneakernet" methods of manual distribution, while a further proportion do not believe that reliable ESD products exist.

Gartner Group has given some concrete examples of the kind of savings there are to be made. Analysts compared the cost of performing sixteen updates by professional distribution, diskette distribution and using ESD for the first two years. They found that the professional distribution model cost $1.1m in year one and the same in year two. Diskette distribution cost $637,000 in year one and $673,000 in year two. ESD cost $781,000 in year one but only $193,000 in year two. On this analysis ESD clearly has the edge simply because the majority of the cost is consumed in buying and installing the initial software to control the distribution process. After that, the cost of end user support is minimal and technical labour support is very much reduced.

Perhaps another dimension in the software equation will be the factor that convinces users to look at ESD: the fact that the service provided by networked programs–and data on the network–can be delivered by the user direct to their own customers. Travel agents, department stores, insurance agents, book shops and dozens of other businesses are now built around delivering information to the customer on the spot via wans. The uniform updating of price data, quotations etc is of crucial importance to high street users like these.

The vendors themselves are keen on ESD, not only because it will save them money, but also because it gives them a direct line into their customer base (a new form of electronic publishing?) and shortens the cycle time from upgrading software to implementing the changes and collecting the revenue for upgrading as a virtually automatic process.

Doubtless network operators, too, will be puffing happily on their extra large cigars as they contemplate the emergence of yet another completely new source of regular revenue from users who will come to depend on them.

Richard Milton writes on a range of sciences and has just launched a book entitled *The Facts of Life–Shattering the myth of Darwinism*, published by Fourth Estate in Tonbridge.

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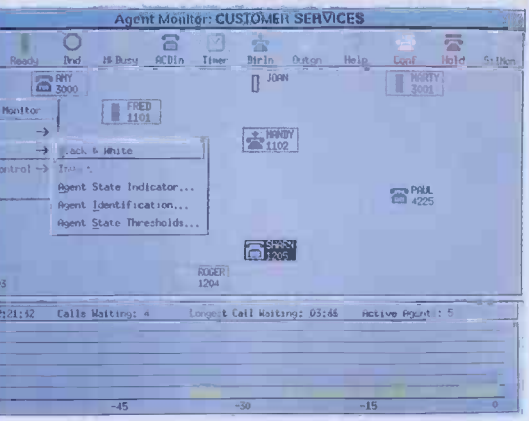

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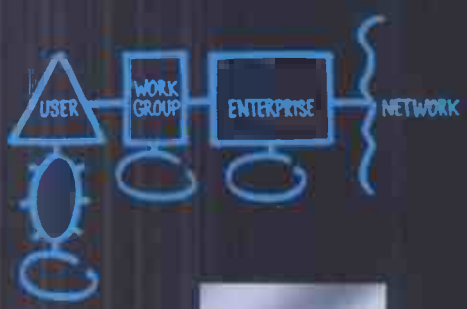

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ANYONE LISTENING?

The Fourth Economist Telecommunications Conference was held in Berlin on September 15 and 16 sponsored by Northern Telecom. The theme was Developing Cross-border European Telecommunications and Europe's PTOs were well represented among the delegates. Various speakers drew attention to the problems of prevailing telco attitudes.

The creation of trans-European networks is an important goal for the European Commission, as stated in the Maastricht Treaty, but may yet be obstructed by governments and national regulators, backed by existing public operators.

It is clear that in many EC countries the idea of competition is simply rejected outright. In other countries, competition is seen as inevitable but will receive absolutely no encouragement from existing players.

The assault on monopoly mentalities in Europe was led by Gareth Locksley of the Commission's competition directorate DGIV. Locksley said he was suffering from "cognitive dissonance", which he defined as "an inability to find a match between what you are told and what you actually see." He was referring to claims that competition is abundant in EC telecomms. He said of the telecomms sector that "it needs a shake up", adding that "some PTOs are more bureaucratic than the Commission–this is astonishing." He accused the operators of regarding DGXIII, the telecomms directorate, as "a client" working on behalf of their interests.

In the context of the Review of the Services Directive, which was due to be published on September 30th, he urged telcos to respond and take full part in the consultation process. He warned that the basic services monopoly had been implemented as a temporary measure–and that "temporary" could mean "a very short time".

Locksley also issued a strong warning on the scope of DGIV's activities and powers in the area of competition: "We are the prosecutor, the judge, the jury and we issue the fines–it's "one-stop shopping really."

Earlier at the conference, Professor Henry Ergas, Counsellor for Structural Policy at the Organisation for Economic Cooperation and Development (OECD), pointed out that among the members of "the capitalists club" only continental Europe (with the exception of Sweden) remains committed to voice monopolies. He highlighted three key benefits of full competition: increased technical efficiency; the rebalancing of prices in line with costs and demand; and the promotion of more dynamic innovation.

There is still a serious discrepancy between the EC's stated policy on telecomms and the protection of vested interest by some member states

Supplied by Public Network Europe

New players were scathing about the resistance encountered from regulators and existing operators. Claude Lalanne of SITA, the airline industry's telecomms company, said "the valiant efforts of the EC to introduce a climate in which competition can flourish has benefitted the former monopolies more than the new entrants in pan European services".

Otto Benz of Hit Rail, the group formed by Europe's railway companies to build a pan European backbone network, attacked the protection given to existing operators: "I may be able to build a network but I am not allowed to have any customers".

Maeve Sullivan, who handles legal and regulatory affairs for Mercury Communications, catalogued the difficulties Mercury is encountering in getting a fair deal with BT. She recommended the splitting up of traditional operators "as there can be no fair competition for integrated monopolies".

SITA's Claude Lalanne had earlier addressed the problems of regulating competition, especially on a pan European level: "I am not a fan of subsidiarity", he declared, urging "a more federalised European regulatory structure" and even "a European FCC". He claimed that uneven national regulations amounted to "an almost insurmountable barrier to the possibility of establishing pan European services".

Talk of competition and reform always seems to include the privatisation issue these days. Here again there was little encouragement for diehard state monopolies. Dr Herbert Ungerer of DGXIII said: "I think the debate on privatisation is going to intensify over the next year, perhaps becoming the dominant topic of the next few years".

Keynote speaker Frerich Görts, State Secretary in the German Posts and Telecomms Ministry, did warn that: "everyone is speaking about the changing of Telekom to a stock company; no one is speaking about policy and regulation".

In fact, during the Berlin conference everyone was talking about all the strands of policy and strategy which will shape the future of European telecomms operating. Tariffs and technology, competition and obligations, ownership and regulation, domestic and European: all these elements intertwine to create the parameters of the current debate on reform.

In Berlin, voices critical of the status quo in public operating such as those listed above brought forth arguments which, while increasingly familiar to us all, are still ignored by many. For how long can this situation continue?

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HOSTING A REVIVAL

The migration to distributed computing is inevitable and sensible: micro-mainframe links can and should reap the benefits

Sally Nash/Annie Turner

Some companies are downsizing, their mainframes no longer cost effective with the huge processing power of some PCs (most are resorting to distributed systems). Others find a central site of information invaluable, and it is accessing, manipulating and sharing information resident on a mainframe which has always posed the most problems for users.

IBM connectivity

The main reason for the problems PC users experience when accessing a mainframe's resources is that the dominant environment is based on IBM's systems network architecture (SNA) which was developed in 1974 and is hierarchical, with a huge installed base of more than 50,000 systems worldwide. On the other hand, all types of networks and comms that have emanated from PCs rely on distributed computing and its inherent multiprotocols. Consequently networks now need to be able to handle SNA and distributed computing. The transition has been slow and painful and is still evolving, although Ray Northcott of consultants CMG says: "IBM have recently moved a long way quite quickly".

IBM devised advanced peer to peer networking (APPN) as its strategy to make SNA a more open and distributed system; it has been criticised for technical and political reasons. The theory behind APPN is that it should minimise the need for coordinated systems definition: that is, network components such as workstations and applications need only be defined at their location so APPN can distribute information to its correct destination on demand without having to involve the network as a whole. This is because the network's topology is known throughout the network.

The ultimate aim is to move APPN onto the backbone, so that it will be host independent. This means APPN will be able to handle very large networks. At this point, the 3745 comms controller and the family of network processors, including the 6611, will be the key components. This scenario is probably several years away.

The first APPN functions were introduced on the S36 in 1986 and on the AS400 in 1988. Since last March, APPN has been part of the systems application architecture (SAA); IBM's set of standard interfaces for applications programming, users and comms. SAA enables software to be developed to run on most IBM hardware, under a range of operating systems.

IBM's Blueprint

The Blueprint (see diagram on page 22) outlines IBM's networking architecture which embraces multivendor products and interfaces for distributed lans and peer to peer networking. In particular, it is an affirmation of IBM's willingness to support Open Systems Interconnection (OSI) and TCP/IP. It is intended to allow IBM's existing and potential customers to plan their own networking strategy, knowing what products will be available from IBM over the next eight years or so. In many ways, this is a seachange in IBM's traditionally closed attitude and a most significant action followed close on the Blueprint announcement: the corporation made available licences for the source code of APPN network nodes (NN), so making it viable for third parties to develop products to work within APPN.

So far 29 companies have already bought licences for the 1.2 million lines of C code, including Novell, Apple, Network Equipment Technologies (NET), Siemens Systems Strategy Inc and 3Com. However, Cisco Systems, the largest router manufacturer in the world with 51% of the market, forsees problems. To address these and provide solutions for the "gaps" in APPN, Cisco and yet to be announced partners, have decided on a two pronged attack in the fight to make SNA more open. It will work with the licensed code from IBM, once it has secured that licence, but will also develop an open alternative to APPN based on the Internet Protocol (IP). This second strategy will be known as advanced peer to peer internetworking (APPI) (See Cisco news story on page 22). According to Mark Lillycrop of IBM specialist consultancy Xephon, the politics surrounding APPI and future control of APPN has much to do with the amount IBM is charging for vendors to licence APPN NN source code. Lillycrop says he believes this is in the region of £400,000 plus the royalties vendors will have to pay on all products that are based on the code.

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The APPI specification will be open and free of charge to vendors and users, and will include an open simple network management protocol (SNMP) management information base (MIB) for network management. Cisco is currently organising a consortium to oversee APPI's open specification and development.

Cisco is committed to licensing the APPN NN code, but because IBM will always maintain control of the code, all licensees will be dependent on Big Blue and any changes its makes or sanctions, meaning that APPN remains a proprietary solution. Cisco claims: "The industry recognises that control of a software solution this vital to the industry at large should rest not with one vendor, but rather with a group appointed by–and responsible to–the industry".

Logical Unit problems

Political wranglings about who should control the future of APPN are far from the only reason for concern about SNA's evolution to a truly distributed system. IBM's APPN products are only supported through the Logical Unit 6.2 (LU6.2) protocol which has proved to be a vexed issue. It was announced in 1982 and was supposedly first operational in 1983, although it was really implemented in 1988 on the AS/400 after a number of false starts, through advance peer to peer comms (APPC)–the interface that facilitated the implementation of the LU6.2 protocol.

The biggest dilemma faces corporate users who want to link lans and a number of dumb terminals through a cluster controller. The only way to do that now is through two separate lines into the host; an inelegant and expensive solution. Lillycrop says this is because the routing capabilities of lans are sophisticated whereas SNA cannot accommodate them. Cisco claims the need to support session integrity at all times is one of the biggest problems of working within SNA.

IBM's networking protocol, NetBIOS (a PC based networking interface) and SDLC (the bit orientated protocol used in SNA environments) cannot cope with a time lapse of more than one or two seconds. This means that Token Ring and 3274 cluster controllers cannot be mixed but rather have to reside on different backbones. Lillycrop adds that the main problem of everything having to operate under the LU6.2 protocol is finding the skills needed to write the necessary programs.

The licensing of the APPN NN source code should now allow other vendors to add features lacking in SNA, particularly dynamic registration of additions to the APPN network and the ability to keep track of them in a useful way through an intelligent directory system.

This and other technical difficulties are also motives behind Cisco's "five phase" approach to IBM integration. Although IBM has grasped the importance of routing technology within large networks, enhancements to SNA to accommodate APPN routing will not be available until an unspecified time in the future. In the meantime, the latest release of VTAM (release 4) means that it can participate in an APPN network as a low end networking node (LEN) to give

Ernie Pope at Boldon James: "VTP has taken a back seat"

some intermediate routing capabilities. It also permits the use of the subarea backbone as the transport between two APPN subnetworks. IBM has also provided application program interfaces (APIs) for VTAM and NCP.

IBM has made other moves to help distributed computing within a mainframe environment, including downsizing the customer information control system (CICS) so that it is no longer just a mainframe to mainframe package, but can now run on platforms down to a PS/2. (See IBM news story on page 8) Big Blue is at pains to stress that as it has moved to allow new terminal types to be integrated into SNA, the changes have been made in SNA itself and not the applications running on it; underlining Cisco's concern about control of distributed SNA via APPN staying with IBM. Other companies are taking a less broad-based approach than Cisco and have had successful products on the market for some time. For example, Spectrum Concepts, now part of Legent Corporation, of US origin with UK operations is one such company. It implements a LU6.2 based file transfer product. According to Stephen Burke, technical manager for Europe at Legent, "70% of major corporations have IBM SNA networks". Its Xcom 6.2 product has been developed over four years supporting VM, VMS, OS/2 and Macintosh boasts customers such as American Express and Chase Manhattan in the UK. Xcom is claimed to simultaneously transfer up to 1,000 files from a mainframe because of the inherently fast speeds LU6.2 based applications can generally achieve.

They gain this speed because programs talk directly to programs and because error recovery is handled within the network rather than the application, saving application processing time.

Terminal emulation

In the beginning of micro-mainframe comms, manufacturers such as IBM, ICL and DEC linked their own dumb terminals to their hosts, thereby locking customers in. With the advent of PCs, terminal emulation packages were developed to enable the PC to act as a dumb terminal and access the mainframe using file transfer. It is the emergence of lans made up of multivendor systems that has necessitated this and software manufacturers in particular are now working toward open systems so that all PCs, no matter what applications they run, can access the same host while looking at familiar graphical user interfaces (GUIs).

Currently terminal emulation is proprietary to each mainframe manu-

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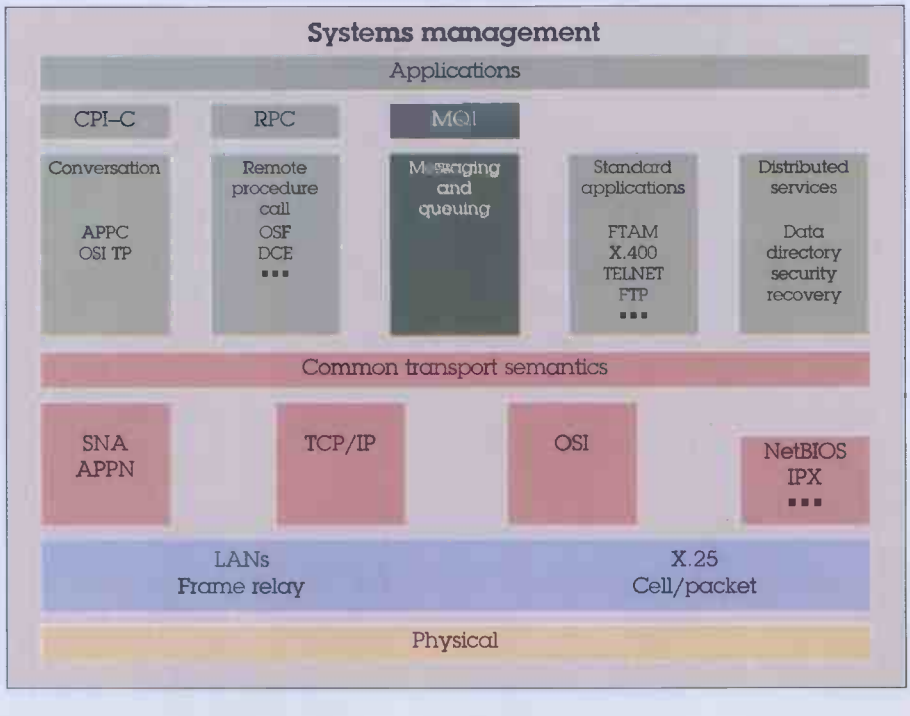
facturer, meaning a separate card has to be fitted into each PC to allow it to access the different applications on each mainframe. The solution to this costly and unwieldy problem could be found in the Virtual Terminal Protocol (VTP), the OSI standard for connecting terminals from one system to another. However, according to Ernie Pope, projects director at Boldon James, "VTP has taken a back seat because proprietary solutions have better facilities and performance at present".

Several manufacturers have implemented the standard but few customers are using it, as the technology has to be implemented in both sides of the equation. One company to implement the standard is DEC with its DECnet/OSI for VMS V5.5. DECnet/OSI implements both OSI and DECnet protocols for VMS systems and supersedes DECnet-VAX. It gives support for multivendor connectivity, larger networks and enterprise management architecture (EMA) based network management products. The release features Government Open Systems Interconnect Profile (GOSIP) compliant OSI components.

Les Ferrington of Systems Marketing is also sceptical about the timing of VTP: "I think VTP is very late in the day, with so many superb emulation and communication products around that basically do the job of VTP". Ferrington also commented with regard to DEC's implementation: "The DEC marketplace is becoming more and more closed–the question that everybody poses is regarding compatibility...it seems that the DEC world is self-sufficient and is rapidly becoming a non-part of the open systems world, as much as they have tried to be part of it".

As Ferrington says, many third party software houses have stepped into the terminal emulation breach. Wall Data sees terminal emulation simply as an enabling technology which it supplies through its Rumba product range. Although John Wall, executive vice president and founder of the company considers the competition for its Rumba product to be IBM's own terminal emulation software, Rumba products take emulation one step further. The products were developed to provide users of Microsoft Windows and OS/2 Presentation Manager with the ability to access and use existing IBM host applications using the GUI to which they are accustomed.

Action Computer Supplies offers emulation for 3270 and AS/400 from IBM and Wall Data, among others. For 3270 emulation, the DCA/IRMA 3 convertible board is compatible with both ICA and MCA bus architectures and allows a direct link to an IBM controller. IBM and Wall Data AS/400 emulation products include IBM local emulation boards for 16bit ISA and MSA, and Wall Data's Rumba for AS/400, a multisession connectivity package based on Windows.



Windows or DOS

Windows is fast becoming the most popular operating system, the multitasking ability of DOS being limited, and as such, manufacturers are producing more products built around it.

Metascybe, developer of the Connect OSI range of comms software has made a commitment to OSI based PC to mainframe comms links around DOS and Windows, most recently with its OSI conforming software, Metascybe Transport, which operates at level four of the ISO seven layer model. The software operates across industry standard network driver interface specification (NDIS), developed by Microsoft, and open data link interface (ODLI) from Novell over Ethernet. It supports all modes of operation defined by ISO 8072/3, on both DOS and Windows platforms. Tom Hooke, sales and marketing director comments that by developing its own Transport Class 4 product, it can guarantee a fast response to OSI developments and safeguard customers' existing investments and future datacomms strategy.

There are two versions of Metascybe Transport: Transport Lite, a class 4 only version which is aimed at ICL users; and a class 0-4 version for users of systems other than ICL, wishing to avoid the communication pitfalls associated with running software over proprietary network protocols. A free standing OSLAN (what ICL calls its mainframe network) and X.25 gateway version of the software is available for the ICL arena.

Commenting on the future of OSI Hooke said, "It is growing slowly at the moment, but as far as I'm concerned there will be a large uptake within a year–standardisation is the way the market wants and needs to go".

Boldon James, systems integration specialist, has a product range called Sabre Desktop. This is a family of integrated products which provide a means of integrating applications and data on departmental and corporate systems

directly onto PC based Windows applications. One of the products, DDE Object Manager, uses the dynamic data exchange (DDE) protocol which enables the manipulation of terminal emulation screen data from within Windows applications. This is a step up from one way DDE where selected data can be transferred onto the user's PC when it is updated on the mainframe. Data can be fed directly from ICL, DEC and Unix hosts onto the desktop. Boldon James does not offer this kind of package for IBM machines, concentrating its efforts on ICL and DEC.

A partnership between Eicon Technology of the US and Ungermann-Bass has come to fruition with the launch of Access for Windows and Access for DOS, which provide emulation of IBM 3270s for PCs. These products are one of the results of a project involving Eicon's 3270 emulation software and Ungermann-Bass' Net/One 3270 Gateways and Network Interface Unit (NUI-74).

Systems Marketing is the UK distributor of US based Century Software's Term family. The range has both Windows and DOS versions and allows sophisticated programming and functions. The latest version–6.3–has native Novell NetWare support and AT386 emulation, which means it can handle file transfer across a Novell network without the need for a second stack. It also features Z-modem file transfer protocol support which most proprietary products do not have. Term products are also available for Unix machines across the board. Les Ferrington of Systems Marketing says that mid 1992 sales figures indicated a 100% rise on previous years.

Novell takes new direction

It has become obvious that one manufacturer cannot meet all customers' needs. The answer is to form partnerships, joint ventures and strategic alliances, such as Memorex Telex and Novell have done.

The two companies recently entered a Master Business Agreement which includes development by Memorex Telex of lan to mainframe comms products. The first in the new product line is the 9430 Enterprise Gateway which provides a direct link between a NetWare server and an IBM mainframe, replacing the dedicated servers and front end processors normally required. Through the gateway, users can share a link to the mainframe, reducing response time and costs. The 9430 is claimed to be the first of its kind for NetWare users, offering channel speed mainframe access for lan based PCs and workstations. It supports an IBM mainframe channel with a data gate of up to 4.5Mbyte/s, as well as the Memorex Telex Super Server interface and up to three Novell lan adaptors. Raymond J Noorda, Novell's president and chief executive officer commented: "Our customers have told us they want to improve access to host based data and

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applications from their NetWare environment, and Memorex Telex and Novell have developed a product to meet this need."

Mainframe access for the portable

To make a portable PC truly portable, a user should be able to take it anywhere and still have the same functionality they can get from a fixed location PC. Portable PC Peripherals (PPCP), UK distributor for Ositech of the US, handle adaptors and software for Compaq laptops and notebooks which gives them IBM 3270 emulation and access to IBM mainframes via one of the ports. External asynchronous modems are also available to let the user dial direct into an IBM mainframe, connected into one of the two serial channels.

The cost of implementing the adaptor and software onto a portable in this way is at present quite high, but as with everything, when more manufacturers start doing the same thing, prices will come down. PPCP's sales director, John Nolan believes that "portable PCs is the fastest growing PC sector. For networking and mainframe connectivity many users are operating in a DOS environment, and Compaq is still selling more portables than other manufacturers." Soon to come from PPCP, is an internal SDLC synchronous/asynchronous modem for Compaq notebooks enabling direct dialling into IBM or DEC mainframes.

Compaq's product marketing manager Lewis Schrock commented: "Compaq sees this as an exciting advancement which makes a new range of portable comms solutions available for Compaq laptops and notebooks".

In conclusion

At a recent press briefing, John Gallop, IBM's networking solutions centre manager, vehemently maintained that SNA sales were not in decline. Even if they were, the installed base of SNA and the growing drive towards distributed computing are so strong that the knotty saga of linking lans and other terminals to host computers looks set to run and run. Such is the strength on both sides that no doubt the politics and technical one-up-manship should make exciting viewing for all involved in the industry.

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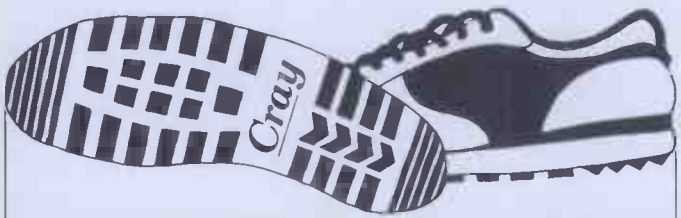

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TYING UP LOOSE ENDS

While ISDN services fight for credibility, manufacturers of equipment are having their own battles

Ken Young

Imagine roads without cars, or railways without trains. Until recently this was how ISDN was seen by its critics–a transport service without devices to make the best use of it. But times are changing: "That's a thing of the past" says Andrew Kenyon, BT's ISDN 2 marketing manager, who points out that BT now publishes a list of over 30 approved ISDN products. A comprehensive list of all products including those close to approval is perhaps double that figure.

Does this mean that ISDN has now reached the critical point of market readiness in terms of provision of service and availability of kit? Suppliers are cagey about giving actual sales figures and with top selling products selling hundreds of units as opposed to thousands it is still early days. Understandably unit costs are still high and most potential buyers are playing a waiting game to see whether ISDN will stand the test of time against newer emerging technologies and older established options.

The problem for potential users is pinning down exactly what ISDN is good for and then evaluating products to meet that need. A useful classification has been made by Yankee Group Europe who have broken applications into voice, data and video (see table). Because many products actually span a number of these classifications (such as the PC card that offers high speed data transfer, videoconferencing and Group IV fax) the classification given here takes the simpler approach of listing by product type.

This is not exclusive but gives an indication of the kind of products currently available.

The ISDN phone/PBX

There is little evidence that a large market for ISDN phones exists and this is likely to remain the case until a sizeable number of PBX companies have ISDN compatible PBXs offering the Basic Rate Interface (BRI). It is also a fact that many of the features of an ISDN phone are already available to those connected to a modern PBX or even through BT's Star services. Steven Timms of consultants Ovum, believes that customers are currently locked into proprietary arrangements: "Most PBX manufacturers are continuing to lock customers in; only when the standard interface is used will the market be open to competition, costs will drop and ISDN phones will be reasonably priced".

But it is not all gloom and doom. Alcatel, Philips, Siemens, Matra Communications and Ascom AG all offer BRI in their range.

ISDN phones are also thin on the ground. GPT's Connect ISDN terminal is the UK's first such device, also known as the "blue phone". It offers the facilities you would expect of an ISDN phone such as calling line identification, conferencing and plug in options known as PODs. POD1 is an ISDN modem controlled by the AT command set allowing existing comms software to use ISDN lines. POD2 is an X.21 port.

Multimedia

ISDN is in many ways the definitive technology for multimedia traffic. Some suppliers have attempted to seize this promise with products aimed at multimedia working practices. ICL (now owned by Fujitsu) has developed its Desktop Conferencing system which is being marketed jointly with BT. The system is designed for communication with another unit offering realtime interaction transmitting voice, data, text and graphics over ISDN 2. A Windows version was introduced in the UK in January this year allowing two users to display simultaneously and edit the same information on their PCs, while discussing what is seen. Desktop conferencing is available for IBM PC-ATs or compatibles and comes in two forms: voice and data consisting of an ISDN card, phone and software; and data consisting of an ISDN card and software. Current prices are £1,999 and £1,677 respectively. The software contains features such as:

- file transfer, screen transfer
- flipchart (enabling freeze frame and highlighting)
- phonebook
- keyboard control transfer

Adapt that terminal

Terminal adaptors are the most plentiful of all ISDN products available with kit from BT, IBM, Gandalf, Newbridge Networks, Gravatom, Fivemere, Dataflex Design and Octocom competing for attention. Newbridge TAs (BABT approved) include dual V.24 (product 1601), dual X.21 (1602), dual V.35 (1603) and a leased line backup unit (1621). One

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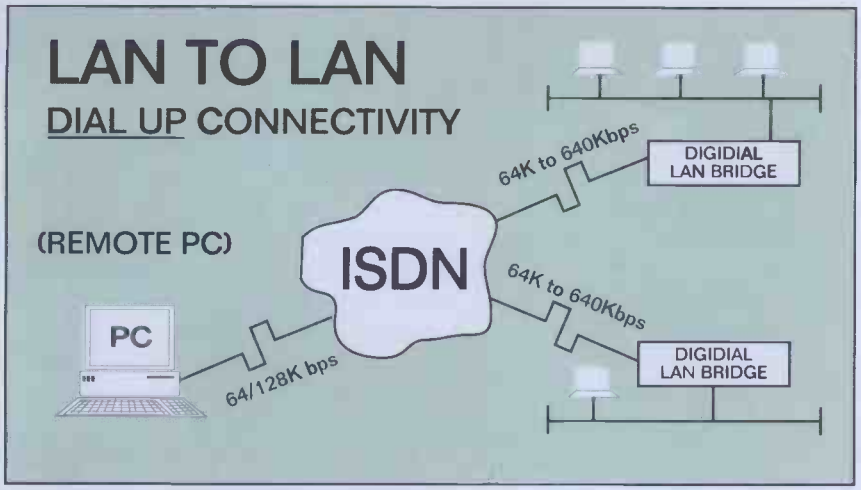

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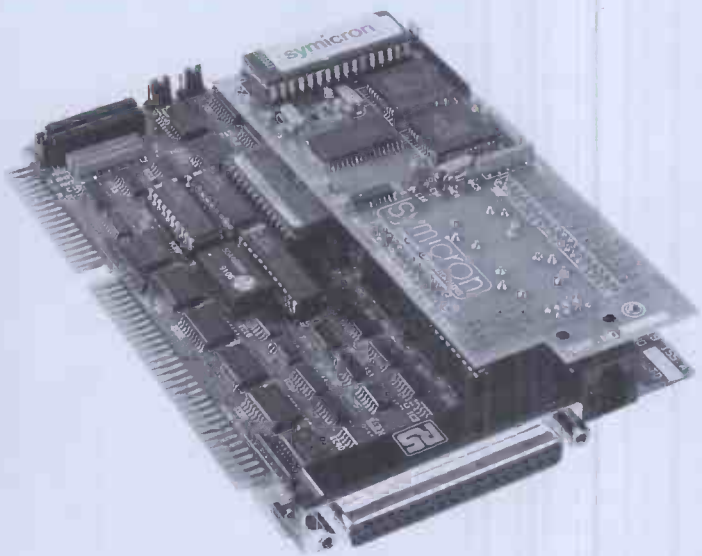

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of Newbridge's best selling points is a separate handheld keypad for easy programming and dialling.

BT's TA X.21 DS (Digital Standby) is aimed at reducing network downtime by providing a backup into ISDN for any X.21 digital circuit. This product like many of its kind, detects a fault occurring and using a programmed number automatically dials into an ISDN 2 circuit within 15 seconds. BT has also launched TA V.24, TA V.35 and TA X.21 for increased ISDN availability. All TAs include an analogue port which enables analogue equipment such as modems, Group III fax machines, phones and small switches to use the ISDN line. Prices range from £1,395 to £1,595.

Gandalf was the first company to gain BABT approval for an ISDN 2 TA. Its TA-1 offers high speed file transfer and videoconferencing at up to 128kbit/s by combining the two B channels on the ISDN circuit. The TA-1A offers full CCITT V.110 compliant range adaption to support synchronous and asynchronous devices from 1200bit/s to 64kbit/s through V.24/V.28 (X.21bis) interfaces.

As well as offering access to both 64kbit/s and B channels, Cray Communications' 9164 terminal adaptor offers network backup for 64kbit/s circuits and access security to control ISDN entry. In the case of failure the 9164 can ensure that traffic bypasses the unit and continues on to the user. A timed window facility gives users access at specified times.

Videoconferencing

Perhaps the most impressive application of ISDN to the layman is its use for face to face communication referred to as videoconferencing, although perhaps a new term is needed to avoid the confusion with studio based conferencing which costs tens of thousands of pounds to use on a regular basis. The advent of ISDN services brings the facility down to realistic price levels and, being based on the desktop PC, increases ease of access. While many ISDN cards offer this facility there are few dedicated videoconferencing terminals available. The Cameo Personal Video System from US based Compression is a proprietary product costing £1,360, but the company says that IBM and Apple versions will be available later this year. Other products are available from NEC, DCE and Internet. NEC uses just one 64kbit/s circuit while the others use two, giving sharper, clearer images.

PC cards

Fareham based Gravatom was one of the first companies to offer a range of hardware and software to meet the demand for PC cards. It has exclusive rights to market products developed by France's SCii. Its flagship product, the Datavoice S0 was first launched at the Telecom show in Geneva in 1987. Like many PC cards it has a wealth of applications: video surveillance, lan bridging, image capture and transfer, desktop conferencing and fast file transfer at 128kbit/s. It is available for PC XT/AT and compatibles as well as the IBM PS/2 and MACII. Datavoice SO costs £1,400, and as with all Gravatom kit, has gained certification for use in most European countries as well as Singapore and the US.

IBM's Interface Coprocessor/2 is for use with PS/2 terminals and uses the microchannel architecture. It uses the coprocessor support program to enable the user to establish or answer ISDN calls. A card is also available for PC-AT compatibles.

For Mac users Mac Connect has launched the Planet ISDN card which is supplied with phone management software and an Apple standard comms Toolbox driver. Up to eight different comms Toolbox applications can share one Planet card with incoming calls routed to the correct location using subaddressing within ISDN 2.

As well as the obvious applications such as file transfer or leased line backup ISDN cards are increasingly being seen

ISDN Applications and Capabilities

Voice

ANI	Call Manager
Enhanced Centrex	Networkwide ring again
Call by call selection	Call re-direction and forwarding
Voice messaging	Access to packet networks
ACD replacement	Private network overflow
Audioconferencing	Call privilege screening
Station message detail recording	

Data

PC to host comms	PC to Group IV fax
PC to lan connectivity	CD ROM access
E-mail	Point of sale
Modem replacement	Line maintenance
Lan connectivity	Terminal test and configuration
Model pooling	Message desk
PC to PC comms	Electronic directory
File transfer	Network configuration
Ethernet bridge	Help desk
Coaxial cable elimination	Telemarketing gateways
Printer sharing	Switched 384
Networking	Switched T1.5
Electronic data transfer	

Video

Videoconferencing	Electronic photo database
Group IV fax	Real estate
Digital imaging	Remote medical imaging

Source: The Yankee Group, 1991

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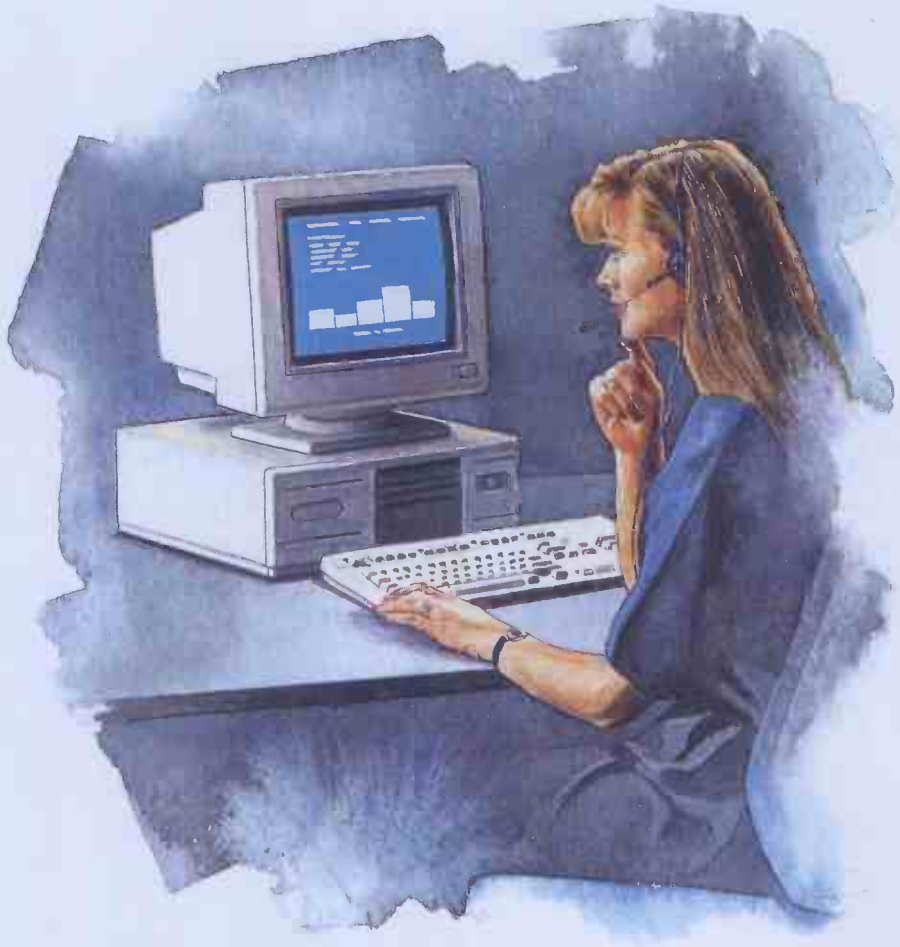

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FIGHTING FOR CONTROL

A battle royal is under way between the EC and Europe's public telephone operators (PTOs). *Duncan Ironside* reports that the EC's desire to see open competition between the PTOs is conflicting with member states' own political agendas.

European telecomms are in a state of flux. The ramifications of the Maastricht Treaty regarding European harmonisation of markets and services mirror those which face EC PTOs and the users of telecomms services.

The liberalisation of telecomms services that we have witnessed so far has been confined mainly to the UK with the break up of BT's monopoly on telephone services, and to a lesser extent in the Netherlands and Germany in liberalising terminal and switching equipment markets.

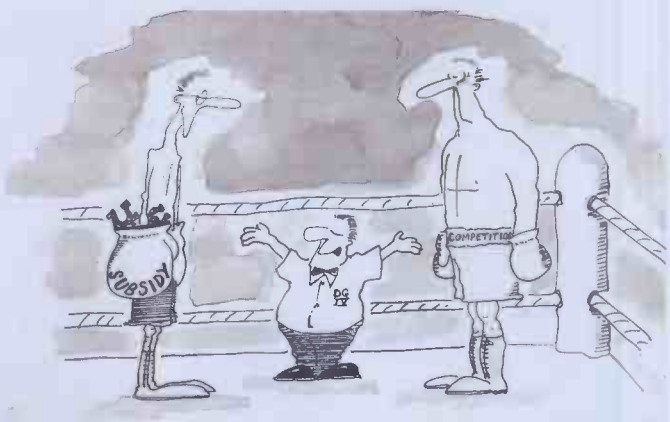
Yet the European market generally is a mass of contradictions and national tensions resulting in a two speed Europe en route to a US style, competitive industry. The tradition of state intervention and industrial policy in the telecomms industry is increasingly in conflict with the aims of an open and competitive EC.

The availability and quality of services, and of costs and tariffing of those services rely upon on the resolution of the battle between the countries that favour state intervention, notably France, Belgium, Portugal and Greece, and those like the UK and Netherlands desiring a free market in telecomms.

Conflicting ideals

Competition in European telecomms has often been trumpeted by the EC's proponents as an essential ingredient in the formation of the Single Market, due to take effect on January 1 1993. Even so, all EC nations have a tendency to protect their telecomms industries, and as a bloc they represent one of the last nationalised sectors of any strategic importance in Europe. Competitive possibilities, which might affect the quality of services and the introduction of cost oriented tariffs, are restricted as a result.

Richard Kramer, writing in an Analysys Briefing Report on the European telecomms industry entitled Serving Europe, describes the regulatory environment as being organised into segmentationists and integrationists. The segmentationists, he claims, are characterised by aggressive suppliers and multinationals looking for better functionality and lower prices in a free market. The integrationists are characterised by the old PTTs (Ministries of Posts, Telegraphs and Telecommunications) now more commonly known as PTOs, hoping to preserve virtual monopolies. One country that has rejected its



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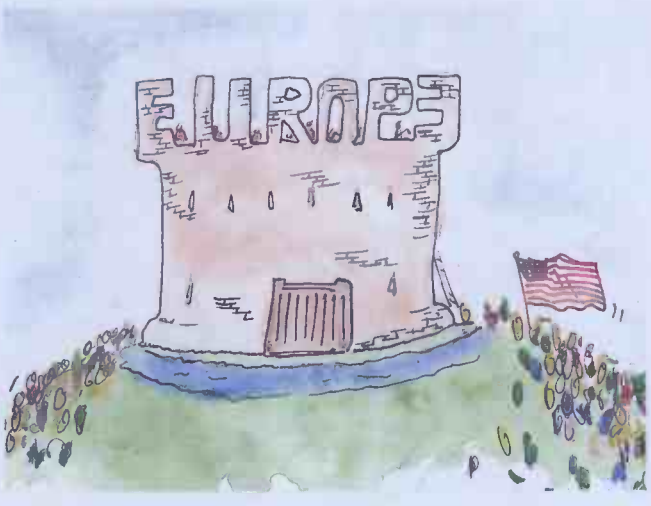
place in the integrationist camp is the UK, which has allowed basic services to be offered on a competitive basis. Countries like Italy, Spain and the Netherlands are seen as lesser segmentationists which tend to bring profitable services under monopoly control, having established their worth in the free market.

On the other side of the fence are those integrationist countries, led by France and followed closely by Germany and Belgium, which expect the public infrastructure and terminal equipment investment to be placed completely under the control of national PTOs. "EC efforts to break up the voice monopoly have met with strong resistance," says Kramer. Competition, he claims, creates tensions between new entrants to the market and state supported monopolies. The integrationist camp rejects competition on principle. With the exception of France all oppose liberalisation and support integrated monopoly without offering high service quality.



Directing policy

Opening European telecomms to increased competition falls within the full remit of the EC, and is entrusted to two Directorates in Brussels, DGXIII responsible for Telecommunications, Information Industries and Innovation, and DGIV responsible for Competition. These bodies are in turn informed by other working groups and committees.

The Directorates' influence is growing particularly in the areas of policy development, mergers and acquisitions, and other rules governing market structure. The Directorates' policy on competition is stated quite clearly; only recently the Director General of DGXIII, Michel Carpentier, claimed that advanced technology was opening up new possibilities, and recognised that: "around the world, telecommunication reform is seen as a move to stronger, more competitive economies."

In accepting the challenge to reform telecomms, the EC has to come to terms with a number of realities. One of these is the balance of political power between influential nations and the wishes of smaller nations (See Fig 1). According to Kramer: "the resolution between dirigistes and free market idealogues, is the single most critical factor in determining opportunities in the European market."

Green for go

The EC as early as 1987 realised the need to create a coordinated and rational policy on the development of competition in the community. The resulting Green Paper on Telecommunications which landed on the commissioners desks in early 1988, contained a raft of objectives designed to achieve a Community-wide open market.

Political Groupings of EC Member States Fig 1

	Free Market	Centrist	Dirigiste
Influential Nations	UK—>	<—Germany	France
Second Tier Nations	Netherlands	Italy	<—Spain, Belgium
Small Nations	Luxembourg, Denmark—>	Rep. Ireland	Portugal, Greece

Source: Analysys Publications

Among the objectives were:

- the liberalisation of supply and provision of equipment
- the liberalisation of services, with the exception of voice and the operation of the basic network
- the separation of regulatory and operational functions
- the development of common supply and usage conditions of access to networks
- the introduction of Community-wide standards for interoperability
- prohibition of anticompetitive behaviour by private firms and public monopolies
- the application of full competition to the sector

The Green Paper is seen by some as incorporating contradictory positions where a competitive Europe could be strengthened to the point where market power would effectively prevent the emergence of new players in "Fortress Europe".

The underlying criticism is that a European industrial policy, although unstated, sits at the heart of telecomms industry.

Carpentier goes further, when he endorses the EC's policy hammered out in the Maastricht Treaty on Political Union. It states that the establishment of trans-European networks should happen within "the framework of a system of open and competitive markets and with the objective of reinforcing economic and social cohesion".

Subsidiarity

Carpentier claims further progress on trans-European networks will only come with the adoption of the principle of subsidiarity: measures to be dealt with at Community level should be restricted to those which are best served by that forum.

He cites the Open Network Provision Directive on the provision of leased lines in June 1992 as an example of subsidiarity and a prototype for subsequent

Directives because of its principles:

- priority is given to commercial agreements and regulatory intervention is kept to a minimum
- regulatory power should be decentralised so National Regulatory Authorities take most of the strain
- a guaranteed minimum set of common functionalities should be available across all networks in Europe coupled with flexibility to allow as much service differentiation as possible.

Other Directives including the application of Open Network Provision of ISDN and Public Switched Data Services and the pending Directive on public voice telephony networks have injected a certain amount of haste into the liberalisation process.

EC member nations are hamstrung to a certain extent in complying with EC Directives by a variety of criteria. Kramer notes that a two speed Europe consisting of lagging and advanced nations vie with each other in the process of market liberalisation and infrastructure development (see Fig 2).

Carpentier says that the advanced nations are at the forefront of open markets and network access, and have sought international trade interests through market liberalisation, with the exception of France which has rejected the policy of liberalisation.

The lagging countries have different reasons to hinder liberalisation. Some do not have the resources to carry out full network development in the open market, such as Portugal, Greece, the Republic of Ireland and parts of Spain and Italy. Another group, consisting of France, Belgium and most of Spain and Italy consider that, having achieved major infrastructure improvements in their networks, they have cause to resist EC pressure for liberalisation.

"Deutsche Bundespost? Vot do you mean, you vant to be alone?"

John Taylor, manager of regulation and tariffs at Cable and Wireless claims the simple economic logic of Europe being able to compete on the world stage makes liberalisation inevitable. "If the services Directive [on public voice telephony] was adhered to, we would immediately be able to set up a pan European service in competition with the PTTs," he says.

Describing the benefits of competition, he claims it is not necessary for Cable and Wireless to set up as a network operator to gain real benefits. "We don't need a lot of people building networks, and that includes ourselves. All that is required is one other competitor in any particular country, and that would immediately be a benefit to service providers, which in turn would filter through to the end user. As soon as there is some choice of network providers, the fact that PTTs are not guaranteed their national customer base, they will start improving their service quality no end," he adds.

Banking on telecomms

The liberalisation and competition issues are further confused by the member states' financial involvement. The EC Directives do not always take account of the members' control of their own capital and revenue budgets, and so markets. In Germany, Spain and France large financial institutions are closely linked to the telecomms authorities. In Germany, for example, the Bundesbank provides deposit facilities for Deutsche Bundespost to draw upon when it wants to expand its telecomms budget. The common theme which flows through all member states is that their telecomms institutions provide benefits for national economies.

Kramer claims it is no coincidence that countries or regions which have the most advanced financial markets like the UK and Northern Italy, can boast that they are at the forefront of network investment.

Common Market, common tariffs

The need to rebalance costs and tariffs has become a central principle in the EC's competition strategy. In the 1988 Green Paper, the section on tariffs advocated the "progressive implementation of the general principal that tariffs should follow overall cost trends". Richard Cawley, who works at the EC in the Telecommunications Policy Directorate, said in a speech to the Commed conference earlier this year that accepting the principle of cost orientation also implied a reduction in cross-subsidies. The Commission has identified a number of concerns in the area of international telephony tariffs.

At the time of writing, the Commission of European Communities (CEC) was due to report to the EC Council of

Two Europes — Fig 2

	Advanced Nations*	Lagging Nations†
Infrastructure	digital; excess capacity	analogue; peak load problems
Service quality	high; user driven, some redundancy	low; does not support data transmission
Regulatory climate	acceptance (partial or full) of competitive policy	resistance to competition bureaucratisation
State control of PTO	loosening; managerial autonomy	tight, politicised, more highly bureaucratic
Tariff structure	access high; usage low (encourage traffic)	access low, usage high (increase service universality)

Source: Analysys Publications
*UK, France, Germany, the Netherlands, Belgium, Denmark, Luxembourg
†Italy, Spain, Greece, the Republic of Ireland, Portugal

Ministers recommending further liberalisation of voice services and tariffs.

The Commission's dominant premise is that in a single market the price of cross-border phone calls should not be influenced by the existence of internal national boundaries. As Cawley points out: "an international intra-community call should be priced on a comparable basis to a similar distance national call, except to the extent that specific additional costs are involved or that demand conditions are significantly different."

The user community is eagerly awaiting the report's publication. The executive director of the International Telecommunications Users Group (INTUG), George McKendrick, says: "we would like to see the current CEC draft recommendations which ask for the introduction of competition in voice services and telecomms infrastructure on trans-border routes, accepted by the EC Council of Ministers."

"The acceptance would deliver the biggest help to European users of telecomms as it would overcome the existing problems of poor service quality and often unrealistic tariffs," he adds.

The head of DGXIII, also shares McKendrick's concerns. Carpentier claims that a prime objective facing his department and for the EC as a whole, was the removal of the bottlenecks that currently impede the realisation of the full benefits of the single market. He cites the example of what he calls the "frontier effect". A three minute call in peak time from one member state to another is on average 2.5 and 3 times the price charged for the most expensive national long distance call.

In off peak times that ratio can rise to 5 or 6 times, which as Carpentier says, hits residential users the most. As the reader can see in table 1, the price of a call in one direction within the Community varies considerably from the price in the opposite direction. For example a call from Spain to Luxembourg costs 90% more than the other way round.

Reverse the charges

There are ways to short circuit this particular form of price fixing, but they come from outside the Community. International Discount Telecommunications (IDT) based in the Bronx, New York, offers a call back service costing $250 rental per month for a US line, with calls charged at US carrier rates. European PTO's might argue they cannot afford the luxury of providing a service as cheap as IDT's because they need high tariffs to finance network investment required to satisfy long waiting lists.

David Kerr, a partner in the Communications Group at Bird and Bird, a company specialising in technology law in the EC, claims it is possible for any member nation to follow the UK's lead in liberalising its telecomms industry, and keep a tight control of its tariff charges. However, it remained to be seen how far and how fast that might happen. He points out the EC has to reconcile different political cultures, which makes the intra-community application of the Green Paper on liberalisation difficult at the moment.

Certainly the ability of the EC to curtail PTO power in the short term looks remote. France for example, is happy to flout its lack of commitment to the ideals of the Common Market programme, with its continuation of subsidies to Groupe Bull and Thomson CSF, and cash handouts to France Telecom.

Robbing Peter to pay Paul

When international tariffs are brought into the equation a truer picture is painted of the PTO's power and its reluctance to change. It is usual for PTOs to set international tariffs at far above cost. Even when pressure is exerted on the country, as was the recent case of Italy which was forced to reduce its international tariffs by 20%. The resulting revenue reductions were recovered by rises in local rates.

However, the Italian experience is not part of an overall trend in the ability of the EC to force PTOs to reduce their international tariffs. While the vast majority of international traffic consists of switched voice, which are still reserved services, the power of PTO's to confound EC Directives remains undiminished.

Kramer claims, that the only practical response for forward thinking nations, such as the UK, Netherlands

International PSTN charges

Table 1

Cost per minute in pence, at standard rate without tax

	To: country												
	Belgium	Denmark	France	Germany	Greece	Ireland	Italy	Lux	Neth	Portugal	Spain	Sweden	UK
Belgium	▪	52	37	37	52	37	52	18	30	52	52	58	37
Denmark	37	▪	37	32	42	37	42	37	37	42	42	28	37
France	39	39	▪	39	39	39	39	39	39	39	39	58	39
Germany	41	41	41	▪	41	41	41	41	41	41	41	46	41
Greece	40	40	40	40	▪	40	40	40	40	40	40	45	40
Ireland	58	58	58	58	58	▪	58	58	58	58	58	58	57
Italy	48	48	41	41	41	56	▪	41	48	56	48	56	48
Luxembourg	25	36	36	36	36	36	36	▪	25	36	36	47	36
Netherlands	35	35	35	35	46	46	46	35	▪	46	46	46	35
Portugal	69	69	69	69	69	69	69	69	69	▪	65	80	69
Spain	60	60	60	60	60	60	60	60	60	60	▪	72	60
Sweden	40	22	48	40	48	40	48	48	40	48	48	▪	40
UK (BT)	33	33	33	33	33	31	33	33	33	33	33	43	▪
UK (Mercury)	28	28	28	28	28	27	28	28	28	28	28	38	28

Source:Eurodata Foundation/Tarifica Service-Intelidata Ltd

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and Denmark is to set up telecommunication free ports between themselves.

All for one

An alternative to the fragmented two and three speed market for telecomms is the creation of a pan European operator. Organisations like INTUG are leading the call for a rationalisation of voice services and welcomes the emergence of a European operator. McKendrick says although it is highly unlikely a Euro operator will emerge in the near future, it would have the support of his organisation. Describing the rail consortium, Hermes' plan to become a de facto Euro operator, by linking the rail infrastructure with a telecomms infrastructure throughout Europe. McKendrick says he would welcome "the improved services that an organisation like Hermes would bring to our users".

The PTOs are very nervous of a move towards a single European operator, which undoubtedly would mean a diminishing responsibility for network provision and hence power to influence tariffs. If the PTOs cannot guarantee the service and tariff levels users demand, it is likely that Japanese and US companies will make Europe a target for its telecomms services; something the PTOs are anxious to avoid.

A NEW ERA DAWNS FOR MOBILE USERS

Establishing common mobile standards across Europe has been a long, slow process. *Ian Channing* writes that at last it seems users will get tangible results.

Over the next decade Europe will achieve a long sought after dream–the total uniformity of standards and specifications in mobile comms across the Continent. Since the advent of wireless comms, the European mobile scene has been a bedlam of incompatibility which has put the Tower of Babel in the shade. Nine different cellular radio standards, at least three paging protocols and innumerable proprietary private mobile radio (PMR) specifications all combined to ensure that mobile comms remained national rather than continental. This confusion also reduced the size of individual markets, putting European manufacturers at a disadvantage.

Now, driven by the need to fight back against overseas competition and under pressure from the European Commission, Europe's mobile comms industry is at last beginning to adopt a unified approach. GSM, DECT, CT2, TETRA, ERMES–the acronyms multiply, but they all have the same goal–common European mobile comms standards.

The influence of the EC has been a powerful force in reaching today's position. The Commission has long viewed comms as a key element in achieving a single homogeneous European market. By supporting and encouraging cooperation in drawing up common standards, the Commission has been able to move a step closer to achieving this.

We may yet see the ultimate dream achieved, the ability to roam from the North Cape to Sicily and from the Atlantic to the Urals using a single comms device.

The cellular scene

The key technology in creating a European wide mobile comms market is undoubtedly cellular radio. The benefits of mobile comms, particularly for the business user, are so manifest that demand seems unlimited. Although the UK cellular market is often cited as the leading example of success, other countries in Europe are experiencing similar market growth. In Germany the analogue C-Netz system is adding 25-30,000 new subscribers a month; Italy, despite a penal tax on cellphone users, is also booming, and demand is so high in the Benelux countries that congestion has become a serious problem.

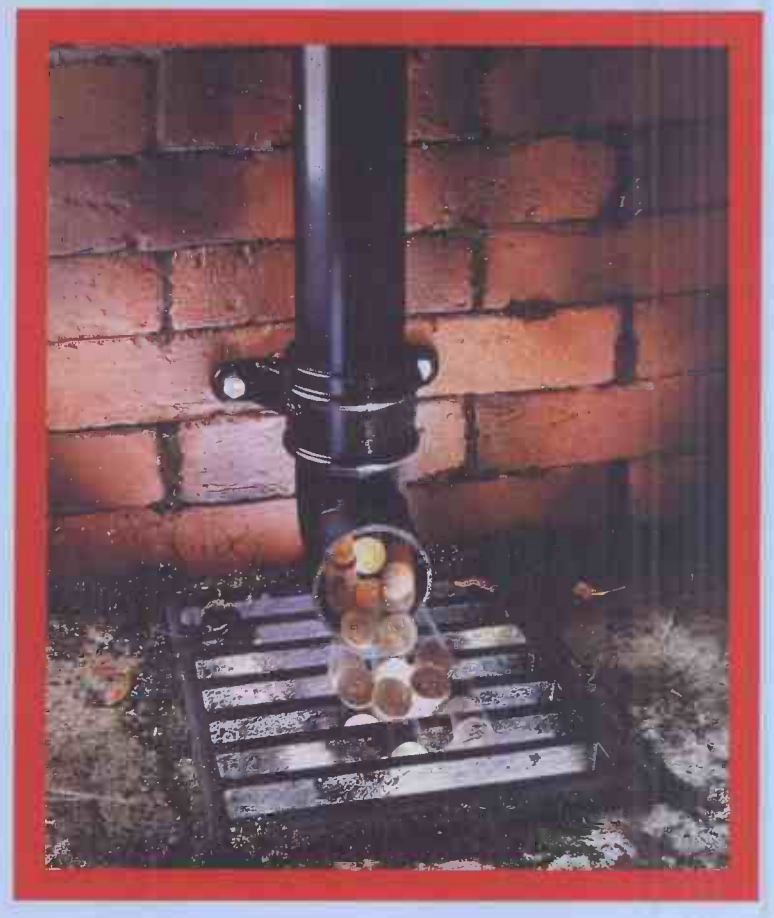
This incredible level of demand has been maintained in the throes of a deep economic recession, despite the drawbacks of analogue cellular in terms of quality and security, and the extremely high terminal prices prevailing in most European markets.

The level of demand and the problems of analogue cellular made the move to a digital standard inevitable. In a rare display of total unity the European mobile community–manufacturers, regulators and users–joined together and created Global System for Mobile Communications (GSM). One of the three stars in the EC's mobile crown, along with DECT and ERMES, GSM represents a major feat of technological cooperation.

Although officially launched on July 1st 1991, GSM was plagued by problems concerning the type approval of user terminals. In line with its European antecedents, GSM type approvals are intended to transcend national borders. The existing national approvals regimes varied widely in their scope and rigidity. These all had to be taken into account before a system of pan European approval could be created. There were also delays in developing software and test equipment, all of which effectively put back the launch of GSM by twelve months. In retrospect many industry observers believe that the original deadline was unrealistic given the size and complexity of the GSM specification.

Many also felt that the delay was beneficial in that it enabled terminal manufacturers to produce more advanced products and network operators had more time to roll out their systems. As GSM begins to come into commercial service across Europe, the

A Window



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advantages of this delay can be discerned. The German D2 network for example, has almost complete national coverage, which would not have been the case in July 1991.

Networks are now operating in Germany, Sweden, Finland and the UK. Other signatories to the Memorandum of Understanding (MoU) on GSM are likely to launch services before the end of this year. For the European traveller GSM will be a major boon. With a single cellphone users will be able to make and receive calls across the whole of Europe. In fact, with the smartcard Subscriber Identity Module (SIM) technology which is a key part of GSM, it will not be necessary to transport their terminal. A dumb terminal can be hired at his destination, then, by simply inserting the SIM card, the user can personalise the phone, make and receive calls and have the bills sent to their office or home.

The first international GSM roaming agreement has already been signed between the UK's Vodafone and Telecom Finland. This will undoubtedly be the first of many as the GSM MoU operators sign bilateral agreements to create a seamless comms web across Europe.

Nor will GSM's success be confined to Europe. Already the number of nation state signatories to the MoU has increased to 21 including Australia, New Zealand and even Cameroon in West Africa. Iran and South Africa are reportedly waiting in the wings. GSM systems are being installed or trialled throughout the Asia Pacific region as well as in Russia and other Eastern European countries. With the US and Japanese digital cellular offerings in some disarray, the opportunity exists for GSM to become a de facto world standard. This means that for GSM users the possibilities become even greater, not only pan European but world roaming!

The worldwide acceptance of GSM as the digital cellular standard will create a huge business opportunity for European manufacturers. With their long term involvement in drawing up the GSM specification, European companies such as Alcatel, Ericsson, Nokia and Siemens have a head start on their overseas rivals which should enable them to dominate the GSM market.

Satellite comms comes to the handset

UK customers eager to get to grips with this new comms system are now able to do so. Vodafone launched its GSM network in December 1991 in central London and has now rolled out the network to cover most of south east England and major motorway links. Vodafone plans to have 90% population coverage with its GSM network by spring next year.

Cellnet is also rolling out its GSM system but has announced its intention not to offer full national service until the GSM network can offer coverage almost equal to the existing analogue system. Meanwhile Cellnet will be offering local and regional GSM services from mid 1993.

The UK GSM tariffs offered by Vodafone differ only slightly from current analogue prices–a rather surprising development considering that a large premium was expected to be charged. Monthly access charges for Vodafone's GSM network are £30 compared to £25 for analogue. Call rates are also only slightly higher at 33p a minute provincial rate as against 25p, with 35p against 30p for the M25 rate.

On the terminal side most European manufacturers are now able to offer mobile and transportable GSM equipment. In line with the analogue experience, it is expected that the big market for GSM will be in hand-portables. These units are expected to come on to the market this autumn. Mobile and transportable recommended prices are around £1,200-1,500 and hand portable prices will be slightly higher. The distorted cost structure of the UK cellular market is likely to ensure that end users will pay appreciably less than this for their terminal.

Cutting the telephone cord

The other large area of wireless development likely to be of interest to the European traveller is cordless comms. The popularity of the cordless phone in the home can be judged from the enormous numbers sold each year. The EC has estimated that half of the phones in Europe will be cordless by 2000. As with cellular radio the analogue cordless phone market has been plagued by a variety of incompatible protocols and again the answer has been to move to a Europe-wide, digital standard.

There are three application areas for cordless comms; in the office, in the home and in the street. For those seeking Europe-wide, wireless comms, the latter application is the most significant. Known as Telepoint, public access cordless comms has had a chequered history. Pioneered in the UK, of the four original Telepoint licensees only one is still operating. However the lone survivor, Hutchison, remains confident and is rolling out its Rabbit service across the UK this month.

In Europe Telepoint is enjoying rather more success. France's Bi-Bop, Germany's Birdie and Holland's Greenpoint Telepoint services are all either open for commercial service or are about to launch. Further afield the Telepoint networks of Singapore and Hong Kong are experiencing explosive demand. Other networks are planned for Europe and Telepoint is being closely examined as a possible contender to provide comms services for the former Eastern Bloc countries.

For the UK customer interested in pan European comms, the most significant development is the interest among European operators in providing a roaming facility. Talks are already underway between Greenpoint and Hutchison and, if successful, these are likely to expand to cover other countries. Telepoint handsets, being much less sophisticated than their cellular equivalents,

are already retailing at reasonable prices. Although to achieve mass market penetration these prices will have to continue to fall and the £50 handset should be available soon. Call costs are usually pitched to be the equivalent of PSTN call box charges. One drawback is that Telepoint is a one way system but there are already a number of proposals under investigation which would introduce two way comms.

Even in the current atmosphere of Euro-cooperation, Telepoint continues to experience problems with standards. All the current systems utilise the UK developed CT2 Common Air Interface standard, which has not been adopted as a European standard but looks likely to achieve world recognition. However the European Commission's preferred solution is The Digital European Cordless Telephony (DECT) standard. Like GSM, the DECT standard is being developed on a cooperative basis by the European mobile industry. For many applications, DECT's time division multiple access (TDMA) based approach will be superior to the frequency division multiple access (FDMA) technology of CT2. However CT2 is a "here and now" system and few expect to see commercial DECT equipment before 1995 or 1996.

Also of importance to the travelling user is the forecast growth in cordless offices. Major PBX manufacturers such as Northern Telecom and GPT are already marketing small cordless office systems and larger systems should be available next year. For the user, the introduction of the cordless office will herald a wide range of possibilities. Not only will customers be able to use the same handset in the office, in the home and when out and about, they will be able to visit other offices, log on to the local PBX and have any charges they incur debited to their own office number. As PSTN networks become more intelligent the network will be able to keep track of the users movements, offering the possibility of genuine two way comms, regardless of location.

Paging—the forgotten technology

One of the potentially most useful pan European comms systems could be paging. Offering national and international one way comms at low cost, paging tends to be overlooked in the exciting world of digital cellular and PCN. There are already a large number of paging systems in Europe, which has over 2.5m wide area paging users. However, many of these offer only city-wide coverage and a number of proprietary standards are being used. Several attempts have been made to introduce pan European paging. The Eurosignal system for example, offers coverage in Switzerland, Germany and France, but has met with little success.

Even so, with the increasing interest in Continent wide mobile comms, the European Commission had a further initiative to investigate the possibility of a pan European paging system. The result of that initiative was the European Radio Messaging Service (ERMES). Like GSM and DECT, ERMES was developed through the joint efforts of European industry, users and regulators. A new paging protocol which offers much greater capacity than POCSAG has been developed as well as a new frequency agile pager. The ERMES specification has now been completed by ETSI and trial systems will be operating by early 1993 in Italy and Denmark. Operational systems should be coming on line in Finland, France and Sweden by mid 1993 with the remainder of the 25 MoU signatories launching their systems later in 1993. A new NEC ERMES standard pager will be available for use on the trial networks shortly.

Usage and pager costs have not yet been announced. However, one thing is certain, ERMES will offer the traveller pan European comms, albeit one way, for considerably less than GSM.

The PMR solution

In the dawn of the wireless communication era, the only form of mobile system available was private mobile radio (PMR). Long regarded as useful only to taxi firms and dispatch companies PMR has been developed to the point where it can offer the possibility of pan European comms.

Until recently PMR in Europe literally meant private networks. Proprietary protocols from individual manufacturers ensured that comms between systems was impossible. The introduction of trunked PMR networks based on the MPT1327 standard has radically changed the face of PMR. For the first time users will have a choice of terminal and infrastructure, ensuring larger markets and lower costs. The introduction of public access mobile radio (PAMR) will open up the use of these networks to the ordinary subscriber for business purposes without involvement in installing systems or obtaining licences.

There has been considerable interest in trunked PMR networks right across Europe with France, Germany, Spain and the UK all issuing regional PAMR licences. For the UK user the problem is that the current regulatory regime inhibits direct connection to the PSTN but the moves toward greater competition should remove this restriction in due course. In the majority of European countries direct PSTN connection presents no problem.

Other technologies

Lack of space has prevented the discussion of other mobile technologies which could perhaps offer pan European roaming. Digital Short Range Radio (DSRR), low earth and geostationary satellite comms systems such as Motorola's Iridium and Inmarsat's Project 2000 are just two of the many technologies being discussed. Beyond these are comms possibilities that are still only concepts, such as future public land mobile telephone service (FPLMTS), a proposed marrying of satellite mobile and cellular, and Universal Mobile Telephone Service (UMTS).

Regardless of what the future may bring the reality is, that for the ordinary business user, the technologies such as GSM which are now coming on stream will enable them to communicate wherever they may be in Europe.

We will undoubtedly see the mobile comms dream realised throughout Europe, maintaining business and personal contact with a simple hand-portable communicator.

Which technologies will be used and what the cost will be to the user are questions which have yet to be answered.

LEASED LINES: A LICENCE TO MAKE A KILLING

The issue of cost based tariffing of leased lines services has recently been pushed further up the political agenda than other telecommunication services.

Historically, international leased line charges have been excessive, and because of their lack of availability they have been used sparingly. The history of high cross-border and international tariffs reflects a defensive strategy on the part of PTOs. In Belgium, for instance a 64kbit/s leased line from Brussels to New York, costs 10% more than a line from Brussels to Ghent, a distance of 50 miles.

The gradual reductions in leased line tariffs, for example, BT's recent announcement of 20% reductions for customers with capacity requirements of 256kbit/s and above, are seen by some as a stalling tactic against the eventual onslaught of cheaper private network service offerings.Also, the level of service to date, is variable to say the least.

Things are changing relatively quickly. The Open Network Provision Directive, passed on June 5, means that from January 1st 1993 there will be a minimum set of standards for leased line services.

The main principles involve harmonising services subject to market demand and would include a minimum set of leased lines for each country. That group includes an ordinary and a special quality voice bandwidth providing two or four wire analogue interconnection. One 64kbit/s line, one structured and one unstructured 2.048Mbit/s digital line.

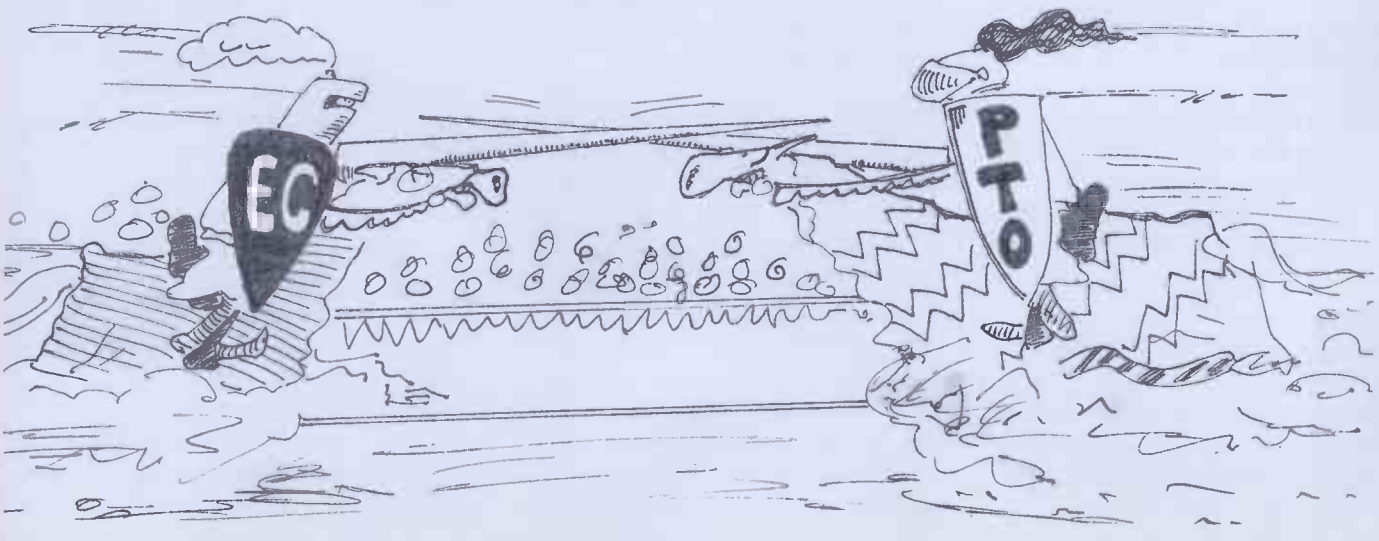
The Directive also calls for the introduction of one-stop billing and one-stop ordering designed to encourage the take up of leased lines throughout the Community. The Directive outlines the removal of restrictions on the interconnection of leased lines and the connection to PSTN.

As for tariffs, the Directive is explicit: "Tariffs for leased lines must be based on the following principles; they must be based on objective criteria and must follow the principle of cost-orientation, taking into account a reasonable time needed for rebalancing; they must be transparent and properly published; they must be sufficiently unbundled in accordance with the competition rules of the treaty."

The Directive's main purpose is to engender a climate of competition in telecom services. According to Margrit Sessions, manager of the Tarifica Service at Intelidata, the PTO's fear of competition has lead them to reduce international charges and raise local charges to compensate. Germany rebalanced its charges on 1st August by almost doubling the cost of local calls. Sessions says other countries are likely to follow suit soon.

PTOs are being criticised because they do not want to give any more information, particularly on tariffs, than is necessary.

Organisations like Intellidata and Eurodata Foundation exist to provide up



International digital leased circuits

Table 2

Monthly rental charges and connection costs in pounds sterling

	LEASED LINE	COST OF CONNECTION	To country: Belg	Den	Fr	Ger	Greece	Ire	Italy	Lux	Neth	Port	Spain	Swe	UK
Belgium	64Kbit/s	variable	▪	1,330	1,278	1,278	1,843	1,530	1,687	1,278	1,278	1,843	1,687	1,687	1,278
	1.24Mbit/s	variable	▪	12,000	10,800	10,800	14,560	12,000	13,200	10,800	10,800	14,560	13,200	13,200	10,800
Denmark	64Kbit/s	2,950	1,702	▪	1,702	1,362	1,702	1,702	2,042	1,702	1,362	2,042	2,042	1,021	1,362
	2Mbit/s	4,960	17,023	▪	17,023	13,618	17,023	17,023	20,427	17,023	13,618	20,427	20,427	10,213	13,618
France	64Kbit/s	1,263	1,410	1,831	▪	1,410	1,831	1,831	1,410	1,410	1,831	1,831	1,410	1,831	1,831
	1.92Mbit/s	2,526	16,926	21,979	▪	16,926	21,979	21,979	16,926	16,926	21,979	21,979	16,926	21,979	21,979
Germany	64Kbit/s	358	1,778	1,778	1,778	▪	2,182	n/a	1,813	1,778	1,778	2,182	1,913	1,813	1,813
	1.92Mbit/s	358	21,086	21,086	21,086	▪	23,189	n/a	20,998	21,086	21,086	23,189	22,218	20,998	20,998
Greece	64Kbit/s	306	2,650	2,650	2,650	2,650	▪	2,650	2,086	2,086	2,086	2,086	2,086	2,086	2,086
	2Mbit/s	1,457	26,505	26,505	26,505	26,505	▪	26,505	20,865	20,865	20,865	20,865	20,865	20,865	20,865
Ireland	64Kbit/s	1,531	1,515	1,674	1,515	1,674	1,674	▪	1,674	1,515	1,515	1,674	1,674	1,674	n/a
	2Mbit/s	7,177	21,531	22,966	21,531	22,966	22,966	▪	22,966	21,531	21,531	22,966	22,966	22,966	n/a
Italy	64Kbit/s	141	3,143	3,143	2,870	2,870	2,870	3,325	▪	2,870	3,143	3,325	3,143	3,325	3,143
	2Mbit/s	282	30,326	30,326	27,597	27,597	27,597	32,151	▪	27,597	30,326	32,151	30,326	32,151	30,326
Luxembourg	64Kbit/s	521	1,172	1,537	1,172	1,172	1,902	1,537	1,537	▪	1,328	1,902	1,537	1,537	1,328
	2Mbit/s	3,434	11,721	15,370	11,721	11,721	19,026	15,370	15,370	▪	13,286	19,026	15,370	15,370	13,286
Netherlands	64Kbit/s	1,194	1,273	1,592	1,354	1,273	1,592	1,592	1,592	1,273	▪	1,592	1,592	1,592	1,354
	2Mbit/s	14,331	14,331	19,108	15,923	14,331	19,108	19,108	19,108	14,331	▪	19,108	19,108	19,108	13,286
Portugal	64Kbit/s	534	2,757	3,049	2,390	2,757	3,049	2,757	2,757	2,757	2,757	▪	1,996	3,049	2,390
	2Mbit/s	3,086	27,572	30,493	23,909	27,572	30,493	27,572	27,572	27,572	27,572	▪	19,958	30,493	23,909
Spain	64Kbit/s	2,762	3,381	3,381	3,381	3,381	3,381	3,381	3,381	3,381	3,381	3,381	▪	3,381	3,381
	1.92Mbit/s	5,524	33,812	33,812	33,812	33,812	33,812	33,812	33,812	33,812	33,812	33,812	▪	33,812	33,812
Sweden	64Kbit/s	1,822	1,487	610	1,487	1,487	2,039	1,487	2,039	1,487	1,487	2,039	2,039	▪	1,487
	2Mbit/s	n/a	14,876	6,108	14,876	14,876	20,394	14,876	20,394	14,876	14,876	20,394	20,394	▪	14,876
UK (BT)	64Kbit/s	POA	1,250	1,500	1,250	1,500	2,750	n/a	1,500	1,250	1,250	1,500	1,500	1,500	▪
	2Mbit/s	POA	22,000	27,500	22,000	27,500	30,833	n/a	27,500	22,000	22,000	27,500	27,500	27,500	▪
UK (Mercury)	64Kbit/s	POA	880	1,100	880	1,100	2,208	666	1,100	880	880	1,100	1,100	1,100	▪
	2Mbit/s	POA	17,600	22,000	17,600	22,000	24,750	6,666	22,000	17,600	17,600	22,000	22,000	22,000	▪

Source:Eurodata Foundation/Tarifica Service-Intelidata Ltd
Note:Figures are approximate costs based on exchange rates as at 10-9-92

to data information on the costs of local, national and international tariffs as well as a rounded view of the forces driving the industry. One of the reasons for tackling trans-national tariff anomalies is shown in figures 3 and 4.

Large corporations faced with decisions as to where they site their telecomms operations are unlikely to have the intimate knowledge that is required to make the right economic choices.

Table 2 shows the current most advantageous sites for the telecomms hub. In figure 3, locating the hub in Italy with 64kbit/s digital leased circuit to four other European countries costs approximately £256,500 including connection and rental charges per annum. By relocating the hub to Luxembourg, and keeping the same configuration (figure 4), connection and rental charges are cut by 25% to approximately £190,000.

Even in the UK where competition exists and leased lined traffic charges are generally the cheapest in Europe, BT has reaped substantial revenues from its KiloStream and MegaStream services.

The thrust of the Directive is to put downward pressure on charges. According to a Dataquest report on the impact of ONP Directives on telecomms, the most important question is on what criteria should a cost oriented tariff structure be based. Its author, Heidi Crompton, says that to justify their rates, PTOs have to break down costs incurred from certain elements of the public network, such as:

- Physical connection from the digital public network exchange into the CPE
- Manpower
- Potential incremental transmission costs, depending on where there is existing spare capacity on the net work
- Maintenance and monitoring
- Equipment

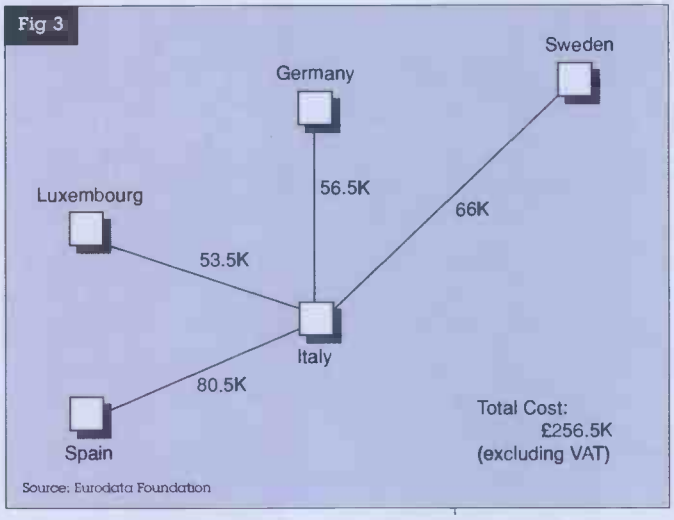
Crompton claims the two most expensive elements are the physical connection and the local cost of skilled labour. Anne Cameron, consultant with the Tarifica Service at Intelidata says that even if it were desirable, obtaining a breakdown of PTOs cost structures is going to be almost impossible.

She says: "some people might ask, why should companies provide a breakdown of costs?" and adds that if the EC commission wants fair and open competition in leased lines services, then from a purely business argument, customers have no need to see how costs are incurred.

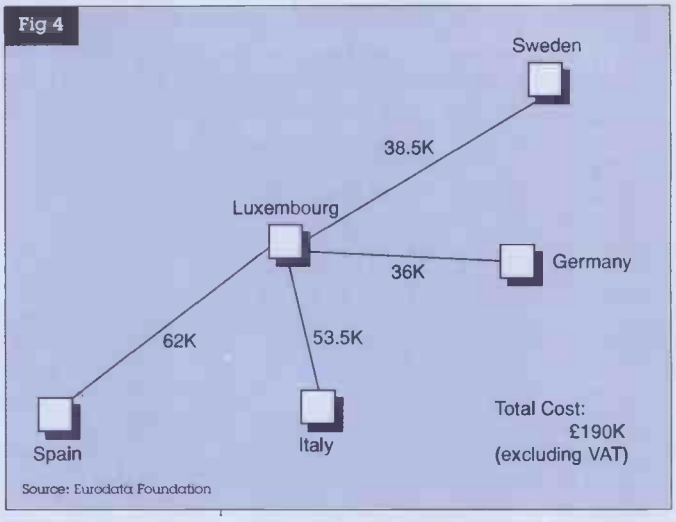
International leased line services

Belgium

Internationally, analogue circuits are



64kbit/s digital leased line connections with hub sited in Italy



Savings accrued with hub relocated to Luxembourg

available via cable or satellite. Belgium also provides all types of digital circuits from 64kbit/s to 2Mbit/s using international digital, terrestrial or satellite systems.

Denmark

The PTO has introduced high speed digital circuits at rates ranging from 64kbit/s to 140Mbit/s.

France

France Telecom offers a range of international digital leased circuits ranging from 56kbit/s to 1920kbit/s. Services are available to most countries in the world via cable or to the US and Canada via satellite. Speeds ranging from 64kbit/s to 2Mbit/s are used within Europe.

France Telecom provides one-stop shopping/billing with most EC countries including the UK. Its leased cir-

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cuits can be rented on a temporary basis.

Germany

Deutsche Bundespost offers the usual analogue and digital leased circuits for signalling rates above 200bit/s with Telekom-owned DCE for 56kbit/s to 1920kbit/s.

Greece

Although OTE offers 64kbit/s digital leased circuits to seven EC countries including the UK only two and four wire connections may terminate at a customer's premises.

Ireland

Telecom Eireann provides both analogue and digital leased circuits to most countries in the world. On the digital side it offers 64kbit/s and 2Mbit/s. The data and special services network (DASSNET) has been installed to support leased lines.

Italy

International digital leased circuits exist at 64kbit/s to Belgium, France, Germany, Netherlands, Switzerland, and the UK. 2Mbit/s satellite services are available from Rome and Milan.

Luxembourg

Both 64kbit/s and 2Mbit/s digital leased line services are offered to most European countries. However automatic availability is not on offer for connections to Scandinavian countries.

The Netherlands

The Netherlands offers a full complement of international analogue leased lines.

International digital leased lines are available to most countries. Rates range from 56kbit/s to Japan and North America to 64kbit/s, n x 64kbit/s and 2Mbit/s to all other major European nations.

Portugal

Portugal at present only offers a 64kbit/s digital leased circuit to European countries. 2Mbit/s circuits are in the pipeline.

Spain

Telefonica offers both 64kbit/s and 1920kbit/s digital leased circuits to European countries.

Sweden

Televerket offers 56kbit/s digital leased lines to other Scandinavian and Switzerland on demand.

However, other high speed lines are offered depending on the availability and the users potential traffic requirements.

UK

BT

Apart from the usual international analogue services, BT also offers digital leased lines services to all EC countries from 64kbit/s, through n x 64kbit/s to 2Mbit/s. The company also specialises in one stop shopping/billing for its clients.

UK

Mercury

Britain's second carrier provides a full range of international digital leased line services to most European countries via cable and satellite. It offers speeds from 56 and 64kbit/s up to 2Mbit/s.

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ISDN: ALL DRESSED UP AND NOWHERE TO GO

The roll out of ISDN services through Europe has been a slow and often painful undertaking. Over optimistic predictions in the 80s that ISDN would bring together voice and non-voice traffic, and hasten the end of private networks have shown themselves to be premature.

All the same, in the last two years events have moved on apace. Following the signing of a Memorandum of Understanding (MoU) in 1989, which committed the 18 signatories to bringing forward their ISDN implementation plans to 1993, a large number of countries including the UK have launched both basic and primary rate access services (BRA and PRA respectively). The need for European nations to keep up with technological advances has been driven by the need to remain competitive.

The record of implementation though has been patchy. Italy, Spain, Portugal, and Greece have been criticised for their lack of speed in launching ISDN services. It is said that they could have pursued ISDN more vigorously but consciously decided not to. In those particular countries user numbers were low and if they took up the development of ISDN it would only benefit their competitors in other countries.

Countries like Belgium and France, which have been at the forefront of ISDN, passed laws stating that competitors could enter new telecomms services markets, including ISDN, but only if they did not harm the PTO's ability to perform public service duties.

The economic cost of implementing ISDN across Europe is high. France has heavily subsidised its Numeris service and other ISDN applications, which would not be developed under normal market forces.

According to INTUG the advances in ISDN implementation have not been helped by lack of terminal connections (See feature on ISDN terminal equipment on page 26), poor intercompatibility and a limited penetration in terms of network access. Internationally, INTUG claims the situation is worse. Despite international alliances like ABK (AT&T, BTI and KDD) and the Quadripartite Group (BT, France Telecom, DBT and SIP) pushing ISDN interconnection along, it claims there is little evidence of economic interconnection with existing networks, particularly X.25 networks.

The EC has moved forward in 1992 with the publication of the Open Network Provision of harmonised ISDN access arrangements due to come into effect with the Common Market next year. The Directive calls for open and efficient access to ISDN with a minimum set of offerings to be made available by January 1, 1994.

It sets out that all members should offer BRA and PRA. Each member should offer a circuit mode 64kbit/s unrestricted bearer service, and a circuit mode 3.1kHz audio bearer service. Supplementary services should include: calling line identification presentation; calling line identification restriction; direct dialling in; multiple subscriber number; and terminal portability. Other supplementary services have been pencilled in for when the relevant international standards have been agreed for them.

Whatever timetable the EC Commission wishes to set out for the implementation of ISDN, analysts suggest that without the right applications the technology will still be grounded.

Terry Wright, senior industry analyst at Dataquest, says that a number of factors including the depressing effects of the recession have meant a poor take-up of ISDN. However, he claims that with the increasing availability of BRA, a boost will be given to the medium sized PBX market, which typically means PBXs with 24 to 100 lines. Add the potential of cordless telephony and the ingredients, he says, are there for serious growth in the ISDN market in 1993.

European ISDN services

Belgium

Belgium launched its first ISDN commercial venture in 1989. National operator Belgacom operates three digital exchanges within Brussels which provide ISDN basic and primary rate access

across the country.

The main bearer services include circuit switched connections and ISDN virtual circuits. Supplementary services include, user to user signalling, closed user grouping, call waiting, calling line identification.

International connections can be made with the telephone and packet switched networks. Since 1990, connectivity is available with Numeris of France and ISDN 2 of the UK.

Belgium offers a switched 2Mbit/s ISDN service, which it brought on line earlier this year.

As for its B-ISDN plans, Belgacom has set up a joint research venture with Belgian Broadband Association, and intends to develop an ATM experimental network to test the technical feasibility of B-ISDN.

Denmark

Denmark is in the early stages of developing ISDN–a commercial service went live earlier this year. International agreements have been forged with the UK, Germany, and France to interconnect a full ISDN service. Other countries will be connected by a switched 64kbit/s bearer service.

France

France introduced the world's first full ISDN service in 1987 on a public network, with the connection of a 144kbit/s service in Brittany.

ISDN subscribers have a S interface provided by an NT type line terminal to which they can connect, 64kbit/s data terminal, digital telephone sets or adaptors. The first version offers support for 3.1 kHz voice telephony and 64kbit/s transparent data circuits. Supplementary services include display of the caller's number, subaddress and user to user signalling transmission capability. Access to Transpac in packet mode is carried out via a D channel.

2Mbit/s switched services have been available for three years and have more than 2,700 subscribers. ISDN is also generally available through the PSTN service. France has connections with most European countries.

Germany

Digitisation of Germany's telephone network, which was started in 1985, is expected to be completed by 2020. Some exchanges in eastern Germany, including Berlin, have been digitised and can provide ISDN connection. Germany has had an ISDN service for a number of years. DBP boasts 78,000 basic rate, and 7,000 primary rate customers.

With basic access, two 64kbit/s channels are made available for user information and 16kbit/s for signalling purposes. Germany also has a switched 2Mbit/s primary rate service.

International connections can be made to most European countries.

Greece

ISDN is not available in Greece and OTE has no immediate plans to introduce a service.

Ireland

Telecom Eireann has installed two ISDN exchanges and plans to implement a service in 1993.

Italy

An extensive pilot ISDN service was launched in June this year covering eleven cities and 7,000 subscribers.

The service is based on 144kbit/s BRA. Several types of terminals and terminal adaptors have been provided including audio and video conferencing systems, Group IV fax and videophones. Packet connections are also provided in the pilot programme. A full commercial ISDN service is planned for early 1994.

Luxembourg

The P&T Administration plans to install an ISDN exchange in 1993.

Netherlands

Single channel 64kbit/s access was introduced in four main cities in 1989, and was based on the German S12 standard. International interconnection was set up immediately with Germany. A full ISDN commercial service is expected to be launched later this year.

Full coverage is envisaged to take another four years and will include 25 cities.

Portugal

No ISDN service is available at present but pilot projects have begun. A real commercial service appears to be some way off.

Spain

A BRA and PRA pilot project was started in September 1991 in Madrid, Barcelona and Seville. A full commercial service is due to be launched in 1993.

Sweden

Sweden's ISDN service is still in its early stages, but with the launch of a commercial service in 1993, Televerket intends to offer interconnection between ISDN subscribers and its public switched network, Datex. This will enable ISDN users to interconnect with all Scandinavian countries and Germany.

UK

BT has two ISDN access services, the

International ISDN charges

Table 3

Cost in US$ of 1 minute call in peak hours for 64kbit/s international switched connections

	Basic access in US$		Primary access in US$		To country							
	Connection	Rental*	Connection	Rental*	Belgium	Denmark	France	Germany	Italy	Neth	Sweden	UK
Belgium	391.26	76.62	12769.03	945.55	▪	n/a	0.98	0.98	n/a	0.82	1.53	0.98
Denmark	264.81	278.29	2648.08	2782.8	0.56	▪	0.56	0.49	n/a	0.56	0.49	0.56
France	133.32	59.25	829.55	616.24	0.97	0.97	▪	0.97	0.97	0.97	1.46	0.97
Germany	87.72	49.93	134.95	349.53	0.78	0.78	0.78	▪	n/a	0.78	n/a	0.78
Italy	319.23	39.9	319.23	550.68	▪	▪	▪	▪	▪	▪	▪	▪
Netherlands	479.33	50.93	1797.48	509.29	0.69	n/a	0.69	0.69	n/a	▪	n/a	0.69
Sweden	826.09	68.84	n/a	n/a	▪	▪	▪	▪	▪	▪	▪	▪
UK/BT	684.93	47.95	5179.79	550	1.46	1.46	1.46	1.46	1.46	1.46	1.46	▪
UK/Mercury	n/a	n/a	4726.03	488.01	▪	▪	▪	▪	▪	▪	▪	▪

Source: Tariffica Service/Intelidata Ltd

ISDN 2 which was launched in January 1991 and ISDN 30.

ISDN 2 is available nationally and is the basic rate version aimed at home workers and small to medium sized businesses.

ISDN 30, the primary rate service, provides the customer with 30 x 64kbit/s channels and two data channels for signalling and synchronisation. The service is now available nationwide.

BT claims that over 8,000 channels of basic rate and over 77,000 channels of primary rate are currently in commercial service. International ISDN connections are currently available to Belgium, Denmark, France, Germany, Italy, Netherlands, Spain and Sweden.

Mercury only offers a primary rate service to business clients with the equivalent of 90,000 basic rate channels. Basic rate access is planned for the near future.

X.25 COMING UNDER FIRE

Liberalising European voice monopolies, if it ever comes to pass, will have far reaching effects upon X.25 packet switch networking, the only technology remotely approaching pan European proportions. Include the advent of frame relay and the threat to the survival of X.25 is considerable.

Packet switching is a well trodden data traffic medium. The CCITT standards published in 1984 and 1988 established X.25 as a widely used service. European users of X.25 services can expect to find 64kbit/s transmission as standard, and 2Mbit/s between major centres becoming normal.

Packet switched networks were established in the early 1980s as industrial policy projects, but the development was irregular and the quality varied. No other European country except the UK has attempted to match France's Transpac network (which now has over 90,000 subscribers) nor its efforts to create a pan European network.

Countries like Ireland see their role more in terms of an international gateway for European X.25 networks. In 1990, Telecom Eireann introduced the Data and Special Services Network (DASSNET) to take advantage of the growth in international traffic.

Other countries, such as Italy and Greece, suffer from outdated equipment and a lack of digital lines. Portugal has these problems and more. According to a EUSIDIC survey of public data networks in Europe, 64% of international calls from Portugal failed.

If all EC nations implement the requirements laid out in the various ONP directives (see leased lines and ISDN services sections) then the quality and availability of X.25 network services could become merely academic.

John Murphy, product sales manager at Baynton Thompson Networks, a distributor of internetworking products, claims the greatest impact on X.25 networking is likely to come with the deregulation of ISDN services. "From an internetworking perspective, an X.25 network is not designed for the type of traffic that is generally found on lan to lan connections. Recently we replaced an X.25 network with an ISDN one and, although it is used in batch transfer mode, we managed to cut the customers bill from £300,000 to £100,000."

Peter Morley, BT's marketing programmes manager of Global Network Services, believes there is still a lot of life left in X.25.

He says that transmission alternatives have existed for some time through the PSTN services, although he accepts they have limitations, but does not expect the liberalisation of voice services to have a major impact on X.25.

The successful transmission of data in the 1980s depended to a large extent on the quality of the line, which until very recently was predominantly analogue. The advantage that X.25 had over any other data transporter was that it incorporated the necessary error correction and detection facilities to overcome noisy analogue lines. With the considerable improvements in transmission techniques and line qualities, wan performance has also improved since the arrival of X.25.

The growth in computer based applications has also led to users wanting to transport data more quickly and cheaply than can be obtained by using X.25. The development of access layer technologies such as frame relay is the result.

Morley says that with data transmission predicted to have grown by 700-800% by the end of the century, which is double that predicted for voice, there will be a need for both X.25 and frame relay acting as complementary services. "Suppliers are interested in moving into managed data services, and they are likely to carry both X.25 and frame relay within their portfolio of services," he says. "Frame relay will be good for high density traffic, and especially lan to lan traffic, but X.25 will still be needed for low to medium range data applications. After all there are many customers who don't need the speed and size that frame relay can offer," Morley adds.

X.25 may be feeling the icy blast of competition from competing transmission systems, but in the same way that IBM has built up a strong and stable customer base with SNA, shifting X.25 from the scene will be no easy matter.

European packet switched services

Belgium

The DCS public packet switched data network was established in 1982. DCS users can be connected directly to over 100 foreign networks including all European national networks.

Denmark

Datapak, Denmark's packet switched network provides a range of services utilising X.25 and X.28 connections. Users can be connected to all the European data networks where the corresponding services exist.

France

Transpac, the oldest and most extensive packet switched network in the world with over 90,000 direct accessing customers is connected to foreign networks via a gateway called NTI. A full range of services can be accessed with X.3, X.25, X.28 and X.29 connections, without any supplementary subscription charges. Indirect access users (ie through the PSTN), must subscribe to an accounting facility called NUI, provided by NTI.

Germany

DBP Telekom has a large number of packet switched data network users, with almost 70,000 X.25 subscribers. International connections are good to all other European countries via Datex-L (requiring X.21 access) or Datex-P (requiring X.25 access). Under certain conditions, connections from the phone service and Datex-L can be routed to Datex-P. Traffic charges are dependent on the call duration, the data volume and the country concerned.

Greece

Hellespac, Greece's packet switched network offers X.25 and X.28 connections, and is presently available to a few European countries. Direct connections are available between Hellespac and the PSDNs of Germany, Spain, Netherlands, and France.

Ireland

Eirpac is the national packet switched data network. Using X.25 and X.28, connections can be made to all European PSDNs. A dial up X.25 service has recently been introduced.

Italy

Itapac, the Italian packet switched data network can communicate with users of over 100 foreign data networks via Italcable, the international network. SIP has approximately 25,000 subscribers to its X.25 network.

Luxembourg

The international nodes of Luxpac are directly connected to the networks of Belgium, France, Germany, Netherlands and the UK. X.25 equipment has to be supplied by the national PTO.

The Netherlands

An international PAD service connects Datanet 1, (the Netherlands' packet switched network) directly with US, Canadian, Japanese and European networks. Users are not required to use the PTO's terminal equipment for X.25 connections.

Portugal

Telepac is Portugal's packet switched data network offering X.25 and X.28 connections to all European countries.

Spain

Exclusive international circuits are used to link Iberpac, the national packet switched network to foreign users. Iberpac X.25 interconnects with all European countries. Services include dedicated X.25 and X.28 connections, and dial up X.28 and X.32 connections.

Sweden

Televerket's packet switched service Datapak which was originally launched in 1979, offers X.25 and X.28 connections for foreign users. A second national carrier, Tele2, has two X.25 packet switched nodes with approximately 25 users at present.

UK

BT's packet switched network PSS, and the international IPSS gateways are incorporated into a single worldwide venture called Global Network Services. X.25 end to end connections are available to over 20 countries.

International X.25 charges

Table 4

X.25 call charges per minute on a 9.6kbit/s circuit in pence

	Connection charge	Monthly rental charge	To country: Belg	Den	Fr	Ger	Gre	Ire	Italy	Lux	Neth	Port	Spain	Swe	UK
Belgium	£ 261	£ 147	▪	0.02	0.02	0.02	0.02	0.02	0.02	0.007	0.02	0.027	0.027	0.02	0.02
Denmark	£ 465	£ 131	0.032	▪	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.02	0.03
France	na	na	0.023	0.023	▪	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
Germany	£ 197	£ 150	0.017	0.017	0.017	▪	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
Greece	£71	£ 86	0.0023	0.0023	0.0023	0.0023	▪	0.0023	0.0023	0.0023	0.0023	0.0023	0.0023	0.0023	0.0023
Ireland	£ 239	£ 175	2.4	2.4	2.4	2.4	2.4	▪	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Italy	£ 47	£ 154	0.04	0.04	0.04	0.04	0.04	0.04	▪	0.04	0.04	0.04	0.04	0.04	0.04
Luxembourg	£ 130	£ 174	0.007	0.02	0.02	0.02	0.02	0.02	0.02	▪	0.02	0.02	0.02	0.02	0.02
Netherlands	£ 159	£ 74	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	▪	0.03	0.03	0.03	0.03
Portugal	£ 217	£ 226	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	▪	0.017	0.017	0.017
Spain	£ 183	£ 296	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	▪	0.029	0.029
Sweden	£ 876	£ 229	0.04	0.025	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	▪	0.04
UK(BT)*	£150/user	£200/user	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	▪
UK(Mercury)†	£ 1,150	£ 400	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	▪

Note: approximate costs, without VAT, based on exchange rates as at 10-9-92

* BT has no time based charges, data refers to charges per decasegment †Mercury has no time based charges, data refers to charges per segment

Sources: Eurodata Foundation;ce: Tarifica Service/Intelidata Ltd

USERS SEE A BRIGHT FUTURE FOR VPNS

Virtual private networks, which have been such a hit with customers in the US are coming to Europe. Stiff competition from value added network providers has forced European public telephone operators (PTOs) to develop VPN services to stem the flow of business to companies like AT&T's Istel and GEISCO.

Whetever the rationale behind the introduction of VPNs, observers predict a rosy future for them. According to a report published by consultants Ovum Ltd, potential revenues from European VPN traffic could reach $5.8 billion by 1997.

The advantages of VPNs are in their universal applicability. Cable and Wireless which launched a global VPN last year, claims that by placing all voice and data services onto one platform, and by tapping into the digital infrastructure of the international switched public network, time and distance barriers become irrelevent. London or New York would appear no further than from one room to another.

The US and Australian experience is that VPN services cost less and they offer a greater variety than those offered with dedicated leased lines. Northern Telecom says that Telecom Australia's CustomNet VPN, for which it supplied its DMS switch, gained far more customers in its first two years of operation than the organisation ever expected.

Business customers want the same things from VPNs. In the UK, most large businesses already have extensive private networks. What they are looking for is a highly featured network which saves them money over leased lines. The VPN provides a way of maximising the use of lines between sites, so that they exactly match the users traffic requirements.

VPNs offer functions that are very similar to private networks including private numbering , preferred routing, use of authorisation codes, and abbreviated dialling.

The UK is leading other European markets in the implementation of VPNs. UK companies are moving rapidly away from the idea of wanting to be their own phone companies. Increasingly they want to leave telecomms to specialists

Costs also play a large part in companies' decisions to buy into VPN services. Leased line tariffs have been historically very high throughout Europe. VPNs are seen as a force in making PTOs reduce digital circuit charges. Germany, which is notorious for having the highest leased line costs in Europe, recently announced its intentions to reduce the cost of 64kbit/s services by 25% immediately. This is an attempt to attract customers away from analogue traffic in order to regain some of the market share lost to rival VPNs.

With the recession exerting heavy pressures on companies' telecomms budgets, cost is likely to be the overriding factor in the choice of VPNs for the rest of this century.

European Virtual Private Networks

Belgium

Belgacom installed an Alcatel System 12 platform for its national VPN in September 1991. International connections to Netherlands, UK and US were added in November last year. Its Centrex platform also uses Alcatel equipment.

France

France Telecom led the world in developing the first VPN in 1975 with a service called Colisee. The international platform, which was launched in early 1991, is linked to Hong Kong, Netherlands, UK, and US. The Northern Telcom SL-1 switch is common to both the Centrex and International platform.

Italy

At present Italcable is the only national Italian carrier that has international VPN links with the US. SIP operates a domestic VPN using AT&T 5ESS switches.

Netherlands

PTT Netherlands only recently launched a national VPN service. An international service called WVPN links Belgium, Hong Kong, France, UK and the US using Northern Telecom DMS-100 switches.

Sweden

Televerket offers an international VPN service to the UK and the US using Ericsson switches.

UK and BT

BT launched a national VPN service FeatureNet 1000 this summer, but has offered an international service connecting Australia, Belgium, Canada, France, Japan, the Netherlands, Norway and the US since 1990. Northern Telecom provide DMS-100 switches for national and international, and Centrex platforms.

UK and Mercury

Mercury's international VPN service links Australia, Hong Kong, the Netherlands and the US.

The company is also at the forefront of a multilateral virtual network service. Along with Hong Kong Telecom, Sprint, Teleglobe Canada, Unitel, AOTC and Unisource the companies joined forces to create GVPN.

Rest of Europe

A number of other of European countries are jumping into the VPN market, including Denmark, Norway and Switzerland. Spain has an older VPN called Ibercom. It is an overlay network which uses different switches to those found on the public network. The disadvantages for its customers, is that PBXs are linked to the VPN via dedicated leased lines, and the high costs involved in maintaining the network, is leading Spain and others including France to look hard at the introduction of intelligent networks .

as a means of providing gateways into lans. Gravatom provides software for links into Novell and TCP/IP networks, which can be preprogrammed so that the ISDN link is automatically set up when files are transferred or servers requested.

Mux, fax and futuregazing

The idea of ISDN acting as a form of dial up replacement for KiloStream is of obvious appeal to those who cannot justify the costs of leased lines or do not use them efficiently. But even greater potential lies in the exploitation of primary rate ISDN (ISDN 30) as a form of dial up MegaStream. General DataCom has launched an ISDN multiplexer that aggregates bandwidth on 30 ISDN channels allowing one ISDN 30 link to be used for a single application. Called the Ramp ISDN Multiplexer, it supports bandwidth rates from 64kbit/s (one B channel) up to 1.92Mbit/s (30 B channels) with dynamic adding and subtracting of channels. Two RS449 ports are provided. Other multiplexer products are available from Channel Systems, Patapsco, SD-Scicon and STC.

For lovers of the fast fax, ISDN is the clear winner. Ricoh's Fax 700L delivers one A4 page every 1.5 seconds which, according to Ricoh, reduces costs by up to 85%. Dual ports are provided so that simultaneous communication and reception in Group III and IV modes is available. It also boasts a 1200 page memory. The HCS Infotec 6865 fax can handle A3 pages and comes with a 30 sheet document feeder. Transfer of an A4 page takes around four seconds with broadcast and batch transmission available. BT's CF2000 clocks in at seven seconds for an A4 page and at just under £6,000 (plus VAT) is the cheapest available.

Prognosis

For someone charged with getting the ISDN bandwagon rolling Andrew Kenyon, BT's ISDN 2 marketing manager is predictably upbeat: "It's going very well; the list of approved products is growing rapidly and awareness is increasing". But Kenyon admits there is a credibility gap to be bridged and that many comms managers are quite happy to carry on the way they are. He also admits that costs are putting some potential users off, but predicts changes: "Prices will drop soon. In say six to 12 months it will be possible to get a terminal adaptor for £600, and a data only PC card for £500."

Brian Tagg, managing director of Maxim Networks admits that ISDN kit is a hard sell, but that: "it's like X.25 was ten years ago. People are just being cautious." Tagg sees his greatest sales coming from those needing remote access to lans and database servers, such as teleworkers and doctors.

Martin Gronow, senior consultant at National Computing Centre, who has recently completed a two year study of ISDN awareness in the UK says that while there was an early flurry of activity when services first became available it has "dropped off a bit lately–perhaps another pump priming drive is required". While some predict exponential growth in kit sales in a year or so, Gronow is more cautious. "Currently you pay a premium for the equipment and it's not completely open–perhaps standards should have gone further."

Meanwhile, suppliers like Gravatom are getting frustrated at the wait-and-see attitude of many potential buyers. Ron Ferguson, ISDN sales manager insists that: "Many DP professionals pooh-pooh ISDN–they just can't visualise 64kbit/s. Buyers should go for it now, do they want to reap the rewards now or wait 'til their competitors do it'?"

But perhaps potential users will start to take ISDN more seriously when it becomes a standard feature on PC kit. Hewlett-Packard has got the ball rolling with its Apollo 9000 workstation which includes an ISDN interface and BRI adaptor.

It has also announced a BRI adaptor for Industry Standard Architecture (ISA) computers and an ISDN server that allows the integration of TCP/IP software.

When Ovum surveyed user attitudes to ISDN last year they found that the overriding concerns were standards and costs.

Many respondents highlighted the lack of compatibility between different suppliers and the incompatibility between services in different countries. The predictable concerns over costs related to equipment that needs a mass market to bring cost savings and a service that has been priced, some say, to ensure that BT's existing services do not take a battering. It remains to be seen how long UK users will be prepared to flag behind France and Germany in using ISDN.

Much of the problem lies in demonstrating real cost savings with ISDN kit. It is not too difficult when considering its use as a replacement for leased lines, but for Group IV fax or viedoconferencing, it is more a matter of paying through the nose just to use state of the art equipment and services. In the current economic climate, such an approach is highly unfashionable and is going to make sales difficult to come by. And if it takes too long, newer or emerging technologies and services may take up the slack.

According to The Yankee Group the greatest growth in the short term will be among terminal adaptor vendors with the manufacturing sector providing a third of sales followed by the medical sector, government and finance. Key target areas will be communities of networkers as in the travel, airline and hotel industries. For the moment equipment vendors must prove that their own implementations of ISDN are worthy of emulation.

Contacts

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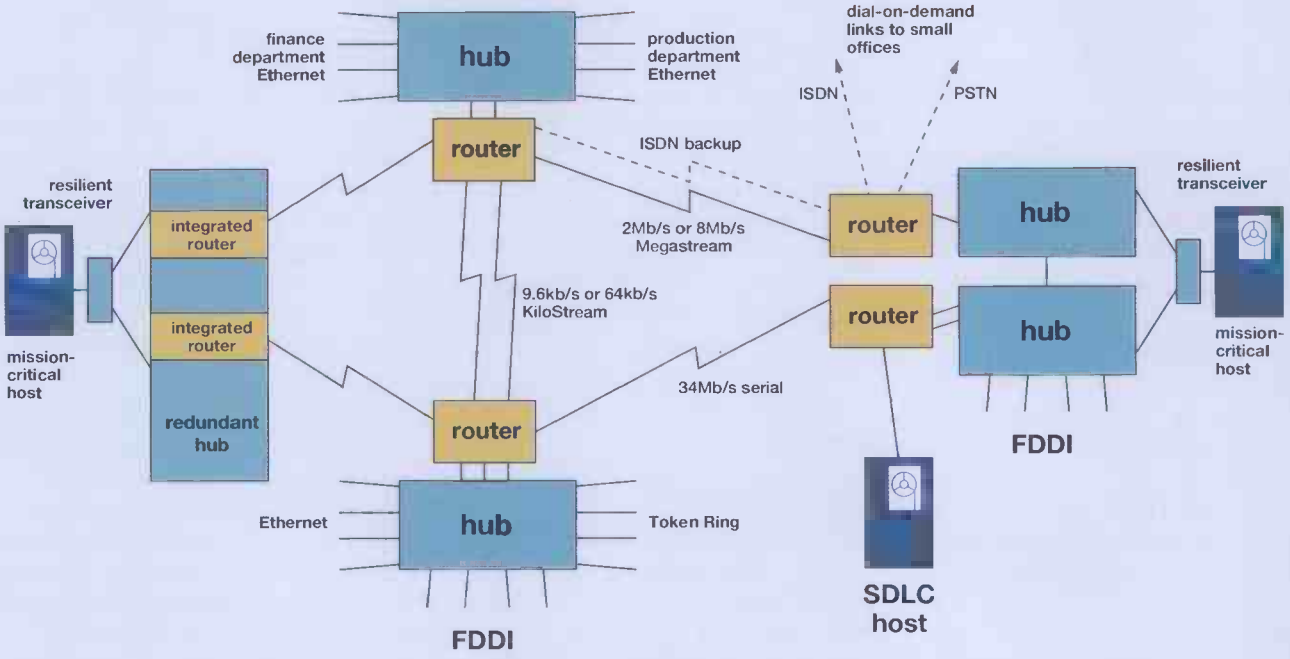
GPT	0628 772000
Gravatom	0329 825757
Hewlett-Packard	0344 362464
IBM	0962 84433
ICL	0344 711000
Mac Connect	091 230 5596
Maxim Networks	0934 520500
National Computing Centre	061 228 6333
Newbridge Networks	0633 413600
Ovum	071 255 2670
Ricoh	081 751 6611
Yankee Group	0923 246511

Are you routing to integrate your LANs into one unified network?



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Circle No. 16

STRUCTURED OR STRICTURED?

Structured wiring still has one or two kinks that need to be straightened out.

Annie Turner

Structured cabling is defined as "A planned network of cables and components which have been designed to use a minimum number of cable types to meet all comms needs. A structured wiring system enables access points to be easily relocated or added, as well as allowing for the implementation of new technology".

Charles McGregor of Fibernet says, "There is no reason why structured cabling should be a problem any more than wiring a building for power is–it [the implementation] should be a straightforward job for electricians." The most telling word in that statement is "should" and there are three areas that still cause confusion for users:

- the number of unreliable companies offering poor consultancy leading to inappropriate or low quality installations. Furthermore, many new and refurbished buildings do not provide adequate facilities for comms cables.
- the surprising improvements still being made to the performance of media, particularly unshielded twisted pair (UTP) and the various standards debates that are underway
- the number of structured systems available. There is a growing number of players in the market; for example, IBM has now entered the UTP arena through an alliance with Nevada Western.

The unscrupulous leading the blind

Grant & Taylor (into which Case Cabling has recently been absorbed and which itself is part of the Cray Electronics Group) installs many systems in the City, including some to carry image traffic over lans into dealing rooms. Hugh Doyle, its managing director, says it is not uncommon for his customers to have to undertake work such as putting in false floors or ceilings because no provision has been made for cabling in brand new or just refurbished buildings. It seems that some architects are more interested in "aesthetics" rather than practicalities, taking the view that the client will bear the cost of amendments. This is at odds with a definition of structured cabling as: "A term applied to a cabling system implemented within a building as a preplanned utility".

Steve Hampson, sales and marketing manager, cable networks, at Northern Telecom suggests that some installation companies are less than honest too. He says a typical rouse is to install recognised brand name systems but to use cheaper components not the actual specified brand. Naturally savings made on cheaper elements are not necessarily passed onto the customer. Furthermore, using non-approved products, which are likely to be of less good quality, may cause problems and the customer may then find he or she has fallen foul of the terms of the system's guarantee.

One way to protect against this is to check out how closely the proprietor of the system scrutinises its third party licensed companies and whether in case of dissatisfaction with the installer, the system proprietor offers any recourse.

There will always be companies who are more interested in selling the system they have rather than recommending one that suits customers' needs. Another variation on this theme is to install a system far grander than a client needs, even bearing in mind it is sensible to put in more capacity than the user's current requirements to allow them to grow or move around painlessly.

Improvements and standards

Standards watching in cabling is difficult because of the number of committees involved and the rate of progress. In the mid 80s the idea of 10Mbit/s over UTP was the cause of mirth in some quarters; standards are now emerging to govern 100Mbit/s over copper. Peter Crouch, local area systems infrastructure technical manager with BT's Premises Cabling Services says; "as long as the standards are built round performance that will leave people free to use innovative ways of attaining that performance". Happily this seems to be the way in which the standards bodies are working and progress has been pushed by customer demand for greater facilities. The main activity is on three fronts:

- The US wiring standard, usually referred to as EIA/TIA 568, has been in issue status since December 1990. Its correct title is Commercial Building Telecommunications Standard. The International Standards Organisation (ISO) is now working on a building cabling standard which will have worldwide acceptance. Much of 568 will be included, but it looks likely a great deal

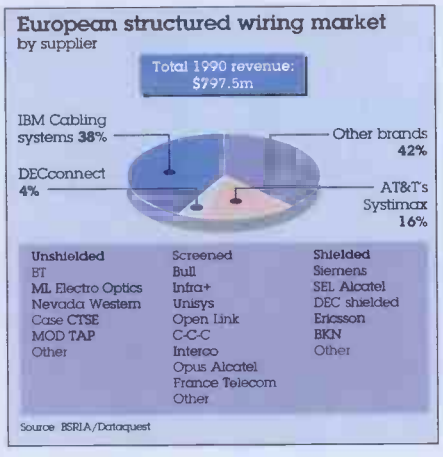
more will be added. The ISO draft standard is due at the end of 1993.

- The Electrical Industries Association (EIA) has recently started to issue draft Telecommunications Systems Bulletins (TSBs) relating to building wiring in the US. These have covered two separate issues; UTP cables and connectors covered by TSB 36 and 40 respectively.

TSB 36 is called Additional Cable Specifications For Unshielded Twisted Pair Cables. It deals with cable categories from one to five. Category five was originally designed to cope with 16Mbit/s speeds because familiar 1010 cables from AT&T and CWI cables from BT were able to cope with 16Mbit/s, but they were really only meant to handle speeds up to 10Mbit/s. It was felt that 16Mbit/s was too close to such cables total capacity. AT&T was the first to develop the 1061 cable (category 5 wire) which could run at 16Mbit/s comfortably, with a "safety factor". The 1061 hit the market at about the same time the FDDI standard was agreed, making several parties curious about copper's real upward limit and whether copper could challenge FDDI's 100Mbit/s speed.

Last autumn the Unscreened Twisted Pair Development Forum (UDF) was formed by BT, AT&T, Ungermann Bass, Hewlett-Packard, Crescendo Computing, Apple and Fibronics. It has made presentations of its prototype design for an encoding technique for the system and media performance type to ANSI. Crouch says the secret of "CDDI's" success will lie in the encoding which will allow a throughput of 100Mbit/s although the actual pulse code will be less; the chosen pulse rate will be somewhere between 40 and 60MHz. Naturally hub manufacturers are watching this issue closely as there will be fierce competition to get compliant products to market as soon as the standard is set.

The American ANSI committee decided to investigate "CDDI's" possibilities based on existing, installed cable. So far tests have been most promising using category 5 cable. In addition to high speed, the cable will also have to be able to conform to EMC standards (see below). However, Crouch says it is possible that between now and the end of 1993 when the draft standard



is expected, it is possible that ANSI will decide to try different cable standards or to "tweak" existing wire. At the moment it seem likely that IBM cable type 1 will also be a supported media type for 100Mbit/s DDI. Nevertheless Crouch states, "any supplier claiming to have conformant product is clearly misrepresenting the facts". So far not even the name for the 100Mbit/s over copper standard has been decided. Contenders include CDDI, 100BaseT and TPDDI.

TSB40 dealt with the issue of connectors. Until the advent of category five cable, connectors performance was better than that of the cable. However category five cabling suffers degradation if used over existing connectors so it has become necessary to draw up performance specifications for the connectors too. They need to have a crosstalk tolerance that is up to 12dB better than that of the cable.

- Historically the American FCC has been more interested in electromagnetic (EM) emission levels than IT equipment's susceptibility to such emissions. The European Commission is interested in both and so has developed an electromagnetic compatibility (EMC) standard for all EC countries. The EMC regulations should be completed this month and from 1996, all EC members will be obliged to have legislated for their inclusion.

All equipment generates and is susceptible to EM forces so there must be a limit imposed on what each unit emits as well as a specification for each unit's tolerance to EM emitted by other, nearby equipment. UTP systems must comply as well as STP and some doubt has been cast on the EMC features of STP and interconnect and crossover point where grounding considerations have not been sufficiently catered for.

Although cabling systems installed before January 1996 do not have to comply, any existing elements that are replaced or modified after then must comply with the EMC specification, and so must the system they belong to. However, it is as yet a moot point what degree of change will bring about the enforcement of EMC regulations on the whole wiring system.

Media bias

In April 1991 the Building Services Research and Information Associations (BSRIA) and Dataquest produced a report entitled European Market For Structured Wiring Systems. According to this, the structured wiring market was worth $797.5m in 1990. At this time: shielded twisted pair (a sector dominated by IBM) accounted for 53.8% of the market; unshielded twisted pair had 33.7%; screened twisted pair which is commonly implemented in France took up 12.5%.

The report expected that the market would increase substantially to $1368.9 by 1993 with shielded twisted pair falling to 38.9% of the market and unshielded twisted pair and screened twisted pair rising to 42.6% and 18.5% respectively. Crouch of BT says that in fact the anticipated growth in structured cabling in the UK was too optimistic and in fact the market is currently all but static; he believes there will be a boom however as soon as the recession begins to lift.

Contacts

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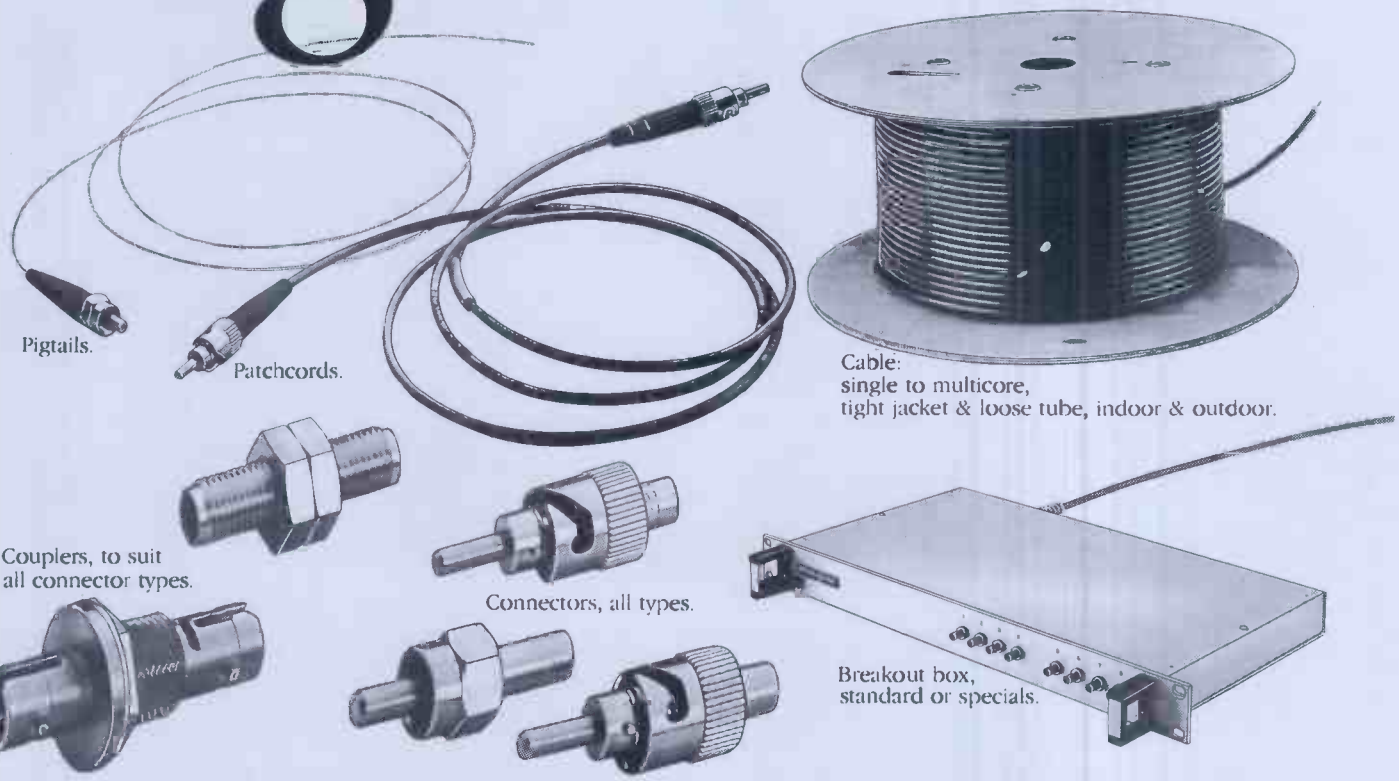
Datarange	0494 441256
Fibernet	0734 819122
Grant & Taylor	071 729 3777
ITT Datacomm's	0256 58181
Nevada Western	0582 608816
Northern Telecom	0628 795000
Pilkington Communication Systems	0745 584500
Trend Comm's	06285 24977

The Lighthouse



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SUPPLIERS' NEW DEVELOPMENTS

As can be seen from the diagram, **AT&T**'s Systimax has by far the largest share of the UTP structured cabling market. It does not sell direct. The very large installations, of more than a £1m as a rule of thumb, tend to be executed by **Honeywell, BT, Olivetti, Pilkington** or **ICL**. On top of that, AT&T licenses a 100 or so smaller companies to install its system, supplied by **Anixter**. Anixter announced in July that it had engaged an independent UK laboratory to test AT&T's Systimax for compliance with the EC's EMC Directive. The lab tested 16Mbit/s Token Ring using Systimax and found it met all regulations. AT&T and Pilkington have extended Systimax to accommodate fibre to the desk applications through Pilkington's Flexilink 6000 system.

In addition to be a licensed supplier of Systimax, **BT Premises Cabling Service** (PCS) claims to offer a cabling service to meet all needs. According to Peter Crouch, OSCA is still "a cornerstone of PCS", contrary to much speculation that it had been all but dropped. The heart of OSCA to install fibre by "blowing" it down a tube, so that the whole duct does not have to opened to the air to put the fibre in. The technique was adapted from the way in which fibre is installed in the public domain. The tubes in which the fibre resides can be taken right to the patch panel, so the fibre has an unbroken run, avoiding the much documented problems of the difficulty in the end connections of fibre. Currently fibre is blown in bundles of four fibre strands but BT is developing technology to blow two such bundles, not surprisingly called dual bundle blowing. BT's Crouch says "we're majoring in blown fibre over and above cabled fibre - it's used extensively". BT named **BICC plc** as a licensee to install blown fibre in June this year, under the product name Blolite.

Cableship has just been awarded the TIA's Telecomms Installer of the Year award for the second year running because of its ability to define its customers' needs and then satisfy them

C-C-C Group's own system is called Freenet Intelligent Cabling System, based on STP. The backbone of the system is 25 pair shielded cable which C-C-C claims can carry mixed comms signals (that is video, data and voice) at very high speeds over extended distances. Current international installations include a 4000 node project at the the Australian Stock Exchange.

IBM's changing role. According to BSRIA/Dataquest, IBM currently holds 38% of the structured cabling market through its STP system (see diagram page 32). However, IBM has recognised the surge in UTP growth and entered an alliance in May with **Nevada Western** to penetrate this market. Nevada Western is part of Thomas & Betts, the largest electrical component manufacturer in the US. IBM will sell Nevada Western's On-site Multiple Network Interface (OMNI) patch panels and OMNI wall outlets using RJ45 jacks and plugs and level 4 and 5 (EIA/TIA 568) UTP cabling. Garth Bridgwood, business development manager at Nevada Western says, "The...system was chosen because it offered a total UTP solution from host computer to the terminal and peripherals". John Somerset-How, UTP marketing manager at IBM adds that his company expected to install 50,000 nodes using NW's range by mid 1993.

As a result of **Case Cabling** being absorbed into **Grant & Taylor**, that company has acquired the ability to carry video over UTP to add to its broadbased structured cabling portfolio. The UTP's ability to carry video is due to the development of an RGB balun by Amulet. This can be integrated into recognised structured cabling systems such as the Case CSTe line and Systimax.

ITT Datacommunications: This is newcomer, launched a year ago. The company claims it has an advantage because it designs and manufactures its own components. It installs systems itself as well as selling through VARs. ITT developed a proprietary cable; a four wire, twisted pair which the company claims can provide 100Mbit/s transmission over 100m without repeaters. It is fully screened to comply with EMC requirements. The interconnection elements have also been designed so that they can supply total screening if desired.

Every installation is underwritten by a life time guarantee that the system will perform to the stated specifications throughout. ITT's clients include the Midland Bank and British Gas. VARs include Grant & Taylor, Datarange and Cableship.

JBM Communications structured system is called AXIS which it claims meets the requirements of the EMC system. It is based on UTP.

Northern Telecom: Although NT's Integrated Building Distributed Network (IBDN) started to evolve in 1985, it was launched in the UK in 1989. NT sells its system through certified system vendors (CVS); NT's definition of a VAR. ICL is NT's only VAR at the moment but NT's Steve Hampson says it is planning to recruit six to eight other CVS in the near future. He believes it is essential that NT keeps control of how its system is being installed and adds that when a system is licensed to many VARs, that control can be diminished. NT's CVSs will be obliged to use all NT or NT approved components and the company reserves the right to carry out spot checks on any installation. IBDN is based on fibre and UTP; the company says it is able to provide 100Mbit/s over copper, end to end. Steve Hampson of NT claims it is the first company to be offering this using category 5 cabling. He also stresses NT's cross connects and patch cords are designed to handle 100Mbit/s, unlike some other vendors' systems and believes this will increase NT's market share.

NT is also already complying with the EMC standards for UTP NT is closely monitoring the progress of asynchronous transfer mode (ATM) and will be able to implement it once it is established. He also emphasises the fact that IBDN is based on RJ45 sockets and plugs and claims one of the drawbacks of Systimax is that it is based on 1066 which has a big installed base but is not a recognised standard.

Trend Communications is offering companies free "health checks" in their cabling infrastructures. The company is a long established installer of structured cabling and has announced exclusive rights to distribute the COSMOS (cabling for open systems using a modular solution) which can carry voice, data and video which complies with the EC's EMC Directive.

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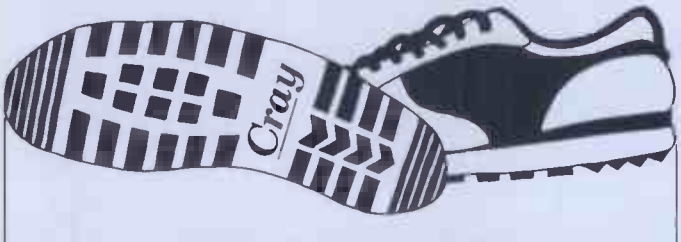

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COMPANY	Alcatel Cablenet	Anixter UK	Bailey Telecom	British Telecom	Cableship	C-C-C Group	Computer International	Drake & Scull Technical Services	ENE	Honeywell Control Systems	Installaphone	Intercept Telecom	J O Grant & Taylor
CONTACT NAME		Jo Laking	Julia Craven	Lesley Davies	Susanne Whiteman	John McDermott	Alan Williams	Mr Kimher	T Redmond	J L Baker	Alan Pool	Colin Phillips	Mr J Russell/BTEL
TEL	081 312 3131	0753 686884	0532 439921	071 380 2122	081 429 2333	0252 375775	0296 434911	0705 387626	0734 772944	0344 424555	021 766 8460	081 305 1231	071 729 3777
MANUFACTURER/ VAR/DISTRIBUTOR	Manufacturer	Distributor	VAR/Distributor	VAR		Manufacturer	VAR/Distributor		VAR/Distributor	VAR			VAR/Distributor
AT&T		✓	✓		✓					✓	✓	✓	
CABLENET					✓								
CABLE ONCE													
CABLETRON											✓		
DEC CONNECT		✓											✓
IBDN (NORTHERN TELECOM)													
IBM-STP		✓	✓					✓	✓		✓		✓
IBM/NEVADA WESTERN-UTP		✓	✓	✓	✓			✓	✓	✓	✓		✓
ITT CANNON					✓			✓					
JBM									✓				
MOD TAP									✓		✓		
TRACS													
OTHER	Alcatel system	Krone RJK series		BT Open Systems Cabling Architecture (OSCA)		Freenet Intelligent Cabling system	Install UTP, STP for 10BaseT, Token Ring & TPDDI; fibre to meet FOIRL & FDDI		Interco, Ackerman & IBCS	Krone based voice systems	Install a variety of systems from various vendors		

COMPANY	Logical Networks	Misys Communications	Network Fibres	Northern Telecom	Pilkington Communication Systems	PM Communications	Pronet	Starplan Network Services	Structured Cabling Installations	Systemhouse	Team Communication Services	Trescray Network Communications	VDU Installations
CONTACT NAME	Dr Jon Davies	Ms G Cronin	Mark Vening	Simon Streat	Jane Harrad	Andy Bridson	Lou Warner	Bob Gray	Peter Bell	Danny Hardy	Gary Brunning	Matt Flowerday	Mrs O Webster
TEL	0753 696699	0908 566013	0252 371372	0628 795311	0745 584545	061 655 3633	0635 31045	0256 24823	0705 677100	0276 691122	07844 66744	071 702 3457	0344 424900
MANUFACTURER/VAR/DISTRIBUTOR	VAR/Distributor		VAR/Distributor					VAR		VAR/Distributor	VAR/Distributor	Manufacturer	Manufacturer
AT&T	✓	✓			✓				✓				
CABLENET													
CABLE ONCE						UTP & STP level 5 conformance, fibre backbone and campus systems							
CABLETRON													
DEC CONNECT												✓	
IBDN (NORTHERN TELECOM)				✓									
IBM-STP					✓								
IBM/NEVADA WESTERN-UTP	✓				✓								✓
ITT CANNON					✓		✓ - wire management products	✓			✓		✓
JBM										✓			
MOD TAP									✓				
TRACS												✓	
OTHER	Fibre optic cabling, thick and thin Ethernet & volce cabling systems		Fibre optic cabling including FDDI, Token Ring & Ethernet				Level 3, 4 & 5 UTP & STP systems from NEK and BIC		BS 6701 Volce system	Siemon product range		Fibre Industry Association approved installer	

ASPECTS OF CALL PROCESSING

Call transaction processing involves sophisticated methods of handling phone enquiries far beyond conventional ACD.

Industry researchers such as Dataquest are adopting the term Call Transaction Processing (CTP) to describe a new way of handling customer phone requests, such as asking for specific information, placing orders and requesting services, support or help. It is a subject that Aspect Telecommunications, manufacturer of the CallCenter stand-alone Automatic Call Distribution (ACD) system, feels will soon be widely discussed and implemented in service orientated companies.

"The leaders will be marketing customer service and corporate executives rather than simply telecommunications and data processing managers. A vendor interested in forming long term relationships supported by good products and services can grow well in such an environment," explains Carol Snell, Aspect's vice president, international operations.

The nub of Aspect's argument for CTP is that a "moment of importance" occurs when a customer contacts a company to conduct a phone transaction. The first ten to 20 second interval after dialling determines the caller's perception of welcome, opportunity and satisfaction in how their call is answered. If the call is not dealt with effectively, a business may drive away a percentage of its customer base or prospects.

"When an individual builds a perception of what will happen on the next call–and when that perception is positive–a powerful customer or brand loyalty is developed."

This service orientated approach is far removed from the basic business of selling stand-alone ACDs. Aspect intends to do for CTP what Tandem has achieved for on-line transaction processing (OLTP), defining the nature of the market and its derivatives, plus the yardsticks by which they are measured.

Aspect is taking this role on the strength of its performance since 1985 when it was founded. In 1988 it entered the European market and, according to Dataquest, is the UK leader for new ACD systems of 50 agents or more and has over 50% of the Dutch market.

Focusing on application specific telecomms, the Aspect CallCenter first appeared in Europe at TMA '88 as the first device to integrate call, voice and data processing in a single, stand-alone device. These facilities involve identifying the caller or type of call and routing it accordingly, modifying the call routing dynamically depending on the current conditions within the ACD system and providing alternative ways of dealing with the call in addition to routing it to an agent.

Aspect has attracted an impressive list of Blue Chip companies. There are some 80 CallCenter installations in Europe, mostly in the UK, and over 300 worldwide. Aspect UK's turnover in 1991 of £6.5m represented an increase of 30% in a tough financial climate. The company expects similar growth this year. It bases its success on four elements:

- State of the art technology allowing cost effective growth and the ability to carry forward functionality with each upgrade
- Marketing based on the company's ability to solve user problems and meet user needs. "Aspect provides technology that allows customers to attack their business problems in ways that will differentiate them in the marketplace as well as being cost effective to implement," said European marketing director Lin Johnstone
- Effective distribution distinguished from competitors by concentrating on selling applications directly to end users
- Aspect stresses its belief in the need for effective, ongoing customer support after installation, thorough training and application support. Quarterly surveys are sent to customers for opinions on quality of service and responsiveness from Aspect employees.

"We measure our customer satisfaction in the surveys and percentage system availability to five decimal places. How often the equipment fails is, by itself, an insufficient measure of service quality," adds technical marketing consultant Neil Berry.

Aspect CallCenter hardware and software is based on de facto standards, primarily the Unix operating system and Motorola processors. As chipsets

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become more powerful, they can be incorporated into the platform. It has evolved differently from a conventional PBX or hybrid system, offering in particular a powerful processing engine–a prerequisite for a stand-alone ACD.

Typically, a PBX would need additional devices and offboard processors to be plugged in, incurring overheads and presenting an extra point of failure. Aspect has designed one massive engine that integrates the various applications.

The CallCenter is multiprocessor based. The call processor's main responsibility is handling calls; deciding to whom they will go and what announcements to play. An administration processor controls peripheral products, such as comms with computer systems via Aspect's Application Bridge and with workstations, providing realtime management information.

"These tasks are traditionally done by a single processor. Our segmentation of tasks, each carried out by a separate processor, enables us to add functionality without impairing performance," says Berry.

A switching subsystem provides a non-blocking digital architecture, supporting all public or private analogue or digital channels to all user interfaces. A card supporting trunk or agent lines can be plugged into any slot or position, while the system is "live". This enables card replacement without shutting the system down.

The CallCenter also offers an Ethernet based voice subsystem giving announcements to callers, prompting caller responses via DTMF tones, smoothing peaks and troughs throughout the day and providing voice mailboxes; functions normally provided only by a separate, additional unit.

Aspect is also highlighting what it calls the "switch to computer interface", a term chosen for its unequivocal meaning rather than CSTA, CIT and similar monikers. "It is down to the functionality of the switch and computer. The protocol, such as ECMA's CSTA protocol only defines how a piece of information travels between the two devices, not how well it is processed at either end. That remains vendor specific," explains Berry.

Aspect identifies four main applications of such an interface:

- Data directed inbound call routing, such as asking a caller to enter an account number, collecting potentially valuable data from them while on hold, then allowing a computer system to decide who would be best to answer that call
- Synchronised screen management enables the computer to present the agent with customer details in time for the agent to be prepared for the call, obviating the need to ask for an account number and other details that are held in the database instead
- Data directed outbound call routing dials out and presents agents with the

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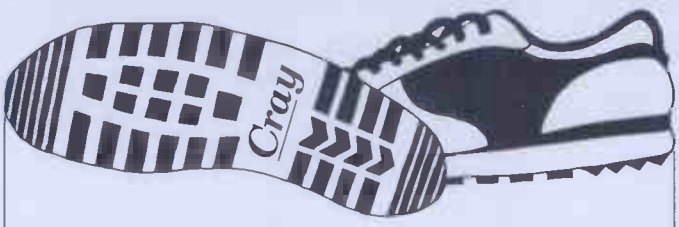

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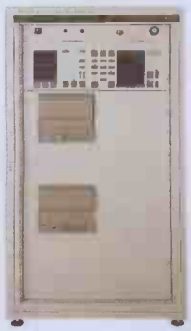

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appropriate screen details

• Database enquiries are often a forgotten application, using the voice capabilities of the CallCenter. Applications which do not generate revenue, such as balance enquiries, can be answered by the voice response system. Inputting the account number activates the data system which collates the information; CallCenter then speaks the balance.

The Application Bridge software is an option for switch-to-computer work with up to five computers simultaneously. As well as providing the comms link, Aspect works with customers to build data system software and has formed an application partnership programme with independent software vendors. The bridge will provide an interface from CallCenter to other vendors' application program interfaces (APIs). "We feel the switch and the computer should work in a peer to peer relationship to affect how calls are routed," adds Berry.

Drinking to call processing

Coca-Cola and Schweppes Beverages (CCSB) took delivery earlier this year of Aspect's 50th ACD system at its Telebusiness Centre in Peterborough. Customers placing orders are answered by the CallCenter which automatically routes and prioritises calls. The system is linked through Aspect's Application Bridge to a computer database.

The CallCenter directs calls intelligently, based on data from the computer, synchronising the arrival of calls with the appearance of appropriate customer account information on the receiving agent's screen. This automation not only ensures customers are dealt with quickly and efficiently but also allows more calls to be handled, increasing CCSB revenues.

The centre runs all day, every day, taking calls from 36,000 customers a year. CallCenter produces reports showing realtime, forecast and historical data on the calls handled, average queue time, agent status enabling staffing levels to be optimised. For instance, the system prompts callers to leave a message and phone number–charged at local rates–if an agent is not free within four seconds. Once an agent is free, the message is passed through and the customer number displayed on-screen. CCSB has set a target that each message left on the Aspect VoiceMail system will be returned within one hour.

Dataquest forecasts that by the end of 1992, Aspect Telecommunications will be equal with Northern Telecom–whose system is not a stand-alone product–rising 18.5%, while NT will fall from 20%.

"All our customers want enhanced CallCenter functionality–the answer is an integrated solution. Cost justification lies in delivery of added features, and the larger the system, the more competitive we get," concludes Carol Snell.

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SHOWROOM

ANALYSERS

Solving carrier problems with SMDS

GN Navtel is adding SMDS (switched multi-megabit data service) analysis to its 9470 Protocol Analyser. This feature essentially provides analysis of data streams according to Bellcore specifications. To resolve carrier or protocol related problems, the 9470 can now provide vital information to the user on the behaviour and performance of the carrier system, as well as the physical layer convergence procedure (PLCP), the SMDS interface protocol (SIP) Levels 2 and 3. This is achieved by the ability of the application to monitor layer one of the T1 facility concurrently, while gathering statistics for the higher layer SMDS protocols. This support allows the operator of the 9470 to identify transmission facility problems or the protocol violations affecting the proper operation of the SMDS service.
GN NAVTEL CIRCLE NO:100

Multi-lingual cable analyser

The Comtest Pair Scout from M-Trade UK is a handheld cable analyser available in eight different languages. It has technology which can test both unshielded and shielded twisted pair cabling. The USOC and ATT RJ-45 pair assignment standards are supported, and the analyser can be used to measure installed cable for compliance with the EIA/TIA 568 Commercial Building Telecommunications Wiring standard, an emerging standard which is increasingly applied to data wiring. The Scout can run passive and active link profiles, calculating signal to noise ratios, the details of which can be printed. It supports attenuation, near end crosstalk and ambient noise tests. The unit can also test the operation of MAUs by using phantom voltage to simulate the insertion of a station onto the ring.
M-TRADE UK CIRCLE NO:102

BRIDGES & ROUTERS

Routing for versatility

Azlan has announced it is to distribute the RouterXchange 7000 product from Retix. The RX7000 is based on Retix's parallel routing architecture and uses multiple Intel RISC processors. It is designed to connect any combination of Ethernet, Token Ring and FDDI lans over a variety of wan facilities. Its routing capabilities include DECnet phases IV and V, IP, OSI, IPX/SPX and Gosip. Data compression and diagnostics are provided and it also supports ISDN, X.25, ATM and frame relay. The RX7000 is now available from authorised resellers in the UK.
AZLAN CIRCLE NO:103

Compressing router from Newport

Newport Systems Solutions is claiming an industry first with the introduction of a wide area network router node with data compression for use with personal computer systems supporting IBM's Micro Channel bus standard. The MCA version of the Lan2Lan router has been designed to support data compression on point to point connections and X.25 virtual circuits, delivering on average a fourfold increase in data throughput. It combines Lan2Lan software, a comms adaptor and cabling to facilitate internetworking comms, and can also communicate with ISA versions of Lan2Lan routers, with or without data compression.
NEWPORT SYSTEMS SOLUTIONS CIRCLE NO:105

Plug in and play bridging router

Proteon has launched a bridging router which it claims can be installed in less than 15 minutes. Called the DNX300m, it is aimed at businesses with remote departments, giving them bridging and routing capability without the problems of installation and maintenance. It integrates multiprotocol remote sites and departmental lans into corporate networks through support for Token Ring, Ethernet and a range of wan interfaces. The unit will be priced from £2,950 to £4,750 and additional DNX300 products are to be announced in the coming months.
PROTEON INTERNATIONAL CIRCLE NO:106

FAX

Plain paper on a roll

NEC has developed a thermal paper which has the handling characteristics of plain paper. Thermaplain is designed to overcome the problems of other low cost alternatives. Thermal transfer requires paper and a film roll. Ink jet is slow and produces wet copies. NEC claims Thermaplain can be written on in pen, pencil, biro etc, photocopy without jamming the copier, and retain its image for at least the seven year legal requirement. It comes on rolls either 80m or 40m long.
NEC CIRCLE NO:108

Secure fax goes plain

The 650A plain paper secure fax has been launched by Trend Communications. It has been designed to combine the security features of Trend's 640A thermal fax with the use of plain paper. It has push button operation, 24 one touch keys (four of which are programmable), prompt display, transmit and command confirmation. It has a 30 page document feeder and gives received documents identification. In secure mode, data is transmitted via the RS-232 port and can be encrypted for full security and transmitted up to 14.4kbit/s. In non-secure mode, the memory upgrade option allows transmission to and from memory, or a fax can be read into memory for later transmission-for example at reduced line costs. The 650A will ship from October, with volume production from early 1993.
Pricing of the plain paper facsimile, although not confirmed is likely to be around £5,940.
TREND COMMUNICATIONS CIRCLE NO:109

20 in one fax technology

Telematics International has worked with Forward Technologies Inc (FTi) of the USA to announce an intelligent fax transport technology. FaxIT transparently sends and receives Group III faxes over a frame relay or X.25 packet switched data network in realtime. By using existing data network facilities and bypassing the public phone network costs can be reduced. Compression and multiplexing within the unit allows up to 20 simultaneous 9600bit/s transmissions on one 64kbit/s line. FTi is in the process of porting the FaxIT software to run on Telematics' PCP packet switching, and will be fully integrated into Telematics' network management system.
TELEMATICS INTERNATIONAL CIRCLE NO:110

FDDI

FDDI interface for Apple and Quadra

Cabletron has introduced the F6069 Desktop Network Interface card, claiming it is the industry's first FDDI adaptor for Apple Mac II and Quadra Nubus computers. This means that the high speed networking capabilities of FDDI are now available to the Macintosh desktop. By connecting these computers to 100Mbit/s FDDI networks, the F6069 is claimed to enhance the Mac's performance on applications requiring high bandwidth. It supports Apple Unix 3.X operating systems, and includes a Motorola FDDI chipset and 68020 processor for management. It also supports FDDI Station Management version 6.2 for compatibility with other vendors' products and is manageable through any SNMP compliant management platforms.
CABLETRON SYSTEMS CIRCLE NO:111

SHOWROOM

HUBS

FDDI hub

GADC has launched a compact FDDI hub, the FDX-100. Providing interconnection between the FDDI and other lans, the FDX-100 adopts a modular approach to the implementation of the ANSI X3T9.5 FDDI standard over fibre, co-ax and twisted pair cabling. The unit is designed to enable FDDI devices, like workstations, concentrators and bridges to be attached to the backbone network in a variety of topologies. The system supports a single 100Mbit/s ring with redundancy or double bandwidth and can accommodate up to five plug in modules.
GADC CIRCLE NO:113

An immediate recovery

Cabletron Systems features again with the addition of Automated Beacon Recovery capabilities for its Multi Media Access Centre (MMAC) intelligent hub series. Residing on Cabletron's i960 RISC based Token Ring Management Module in the MMAC, the new feature isolates and removes faulty nodes from a "beaconing" Token Ring network and restores communication. Once the problem is isolated and removed from the network, the Token Ring Management Module (TRMM) issues an alarm that alerts the network manager to the exact location of the faulty node and other information. Cabletron is offering the feature as a free upgrade to all its customers, including those who have already purchased the TRMM.
CABLETRON SYSTEMS
CIRCLE NO:114

LANS

Testing DEC interface card

DEC has announced a 32bit network interface card. The EISA TP/BNC is priced at £446 and is designed to connect personal computers that use EISA bus architecture to thin wire or twisted pair Ethernet networks. Tests carried out using Novell's Perform3 analysis utility and ODI V3.11 server drivers indicated a significant improvement of performance. All cards in the DEC EtherWorks family work with Pathworks software as well as Novell NetWare, Microsoft Lan Manager and other NDIS compliant systems. It has 128kbyte of RAM, self test firmware and 16kbyte on board ROM. It complies with V2.0, IEEE 802.3, 10BaseT and 10Base2 standards and supports both STP and UTP.
DEC CIRCLE NO:116

Cut out the jittering

BIT Communications has added a new jitter attenuator to its range of Token Ring products. Jitter is inherent in Token Ring and is a result of accumulated signal distortion. The Pacemaker jitter attenuator provides a reduction of jitter in 4 and 16Mbit/s Token Ring networks, apparently without affecting the throughput or configuration of the network. The Pacemaker comes in a 1U high 19 inch rack mounted case and connects to the network via a standard lobe port of a MAU and is available now, priced $2,950 each for quantities of two or more.
BIT COMMUNICATIONS
CIRCLE NO:117

MODEMS

International modem range

Amber Logic has developed a range of fax/data modems for international use. The Mistral FX series of Quad, V.32 and V.32bis modems will be available in desktop, pocket and internal PC card versions. They have apparently been designed to meet the approvals requirements of major countries throughout the world. The base model is the Mistral FX24s, a quad standard, dial up, desktop modem. Its fax facility allows fax messages to be sent to, and received from, Group III compatible fax machines and modems worldwide. It is supplied with Trans-send Professional software which can be used for fax and data transmission. International V.42bis and V.42 standards for data compression and error control are included. The FX24s modem is priced at £395 including the software package.
AMBER LOGIC CIRCLE NO:118

MULTIPLEXERS

Mux ready for fractional E1

Scitec has launched the first in a planned series of intelligent digital multiplexers (IDMs) that will cater for the new European fractional E1 services expected next year. The Scitec IDM200 is a compact desk top multiplexer for linking digital PBXs, high speed data devices and lans into 2Mbit/s private networks as well as the fractional E1 services. It provides a G.704 network interface and a G.732 PBX interface, both at 2Mbit/s. It has four drop and insert data ports which can be set to any Nx64kbit/s speed from 64 to 19.8kbit/s with V.35 or V.11 EIA-530 interfaces. Configuration, control and diagnostics may be performed locally using the front panel or via a VT-100 terminal. Priced at £2,995, the IDM200 measures 1 3/4" high.
SCITEC COMMUNICATION SYSTEMS CIRCLE NO:121

Mux for ISDN and KiloStream

Philips has brought out the Semanet 128 ISDN multiplexer which has been designed to operate simultaneously on BT KiloStream, 128kbit/s digital leased lines and BT ISDN 2 services. It is available in 2 or 8 data channel versions and offers sync or asynchronous data format. The ISDN 2 interface is integrated into the multiplexer and has Europe wide ISDN 2 approval. It uses dynamic bandwidth management, will automatically dial back up failed KiloStream links and has network management capabilities.
PHILIPS COMMUNICATION SYSTEMS CIRCLE NO:122

NETWORK MANAGEMENT

The missing link

3Com has announced a desktop level network management product based on SNMP, which is claimed to use only a fraction of the memory typically required by similar products. LinkWatch enables PCs and workstations using 3Com's EtherLink network adaptors to be monitored and controlled from local or remote SNMP based management stations. LinkWatch is aimed at network administrators with EtherLink networks containing 10BaseT managed wiring hubs, non-manageable hubs or bus topology networks which have no hubs. It can spot and isolate errors affecting network performance, obtain data for balancing traffic loads and get information about each network end node. LinkWatch is priced at £274 per licence which is valid for one installation and can manage up to 251 nodes.
3COM CIRCLE NO:123

PBX

Voice enhanced applications

GPT has launched Telelink which integrates with PBX systems supplied by CSL and records data for use in computer based data processing applications. Access is via normal phones or programmable feature phones for faster data entry. Optional Officelink and Worklink interface modules are available to extend Telelink to include staff status reporting and data collection into clocking and booking systems. Officelink enables access to instant information on the status and location of personnel. Worklink is a time management system. Telelink sits on a PC or Unix computer connected to the PBX. It collects, stores and updates integrated applications or can generate ASCII file data which can then be accessed by another system
GPT COMMUNICATION SYSTEMS CIRCLE NO:124

Hybrid PBX

The 4100 range of digital hybrid PBXs has been launched by Alcatel in the UK. The 4100 switches can handle between four and 120 extensions. The system can be re-programmed as requirements change locally by the customer from a handset or a PC, or remotely by Alcatel—the original

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Circle No. 33

program is copied for back up in case of error. The S, M and SL in the range will accommodate standard two wire phones as well as the handsets and add on modules available with the range. The 4100 VS, another product in the new range is a digital hybrid key system providing up to six exchange lines and 14 extensions, two of which are single line ports suitable for connection to a fax or answering machine.
ALCATEL BUSINESS SYSTEMS
CIRCLE NO:125

PRINTERS

Old for new

Océ Printing Systems has brought out the Océ 6755 laser printer to replace the Océ 6750GI. The 6755 is a 23page/min machine offering full speed duplex printing and a duty cycle of 150,000 prints/month. Dot density is 508x508dpi and it also uses Océ's CopyPress technology, which uses laser and offset printing techniques. Features include dual paper trays, finishing options, and various paper size capability. It uses a 68020, 20MHz processors with memory of 10Mbyte RAM. Floppy disk drive and 40Mbyte hard disk are optional. It is HP LaserJet (PCL level IV) compatible and offers standard interfaces and common line printer formats. The 6755 sells at an entry level price of £29,000.
OCÉ PRINTING SYSTEMS
CIRCLE NO:126

RACKING

Wall mounting

BICC VERO's new 19" wall mounting cabinet, the Imrak 400, is available ex-stock and fully assembled from Wadsworth Electronics. With the same design as the Imrak 1400, the 400 accepts standard 19" racking accessories and is made primarily for networking applications in the office. Equipment such as Ethernet multiport repeaters can be mounted in the front section, with any indicating LEDs clearly visible through the glass door. The cabinets are 600mm wide, in depths of 9U, 12U and 15U–497mm, 630mm and 764mm respectively.
WADSWORTH ELECTRONICS
CIRCLE NO:127

SECURITY

Securing MegaStream

Megacrypt Data Encryptor from Open Networks Europe is designed to provide high security for electronic data transfer over comms networks. It is a synchronous protocol independent unit operating from 16Kbit/s to 2.3Mbit/s. Apart from physical security, Megacrypt will not allow data to be transmitted if there is a hardware error. It offers a selection of master keys, each of 32768bits, down line loading of keys using DES or RSA algorithms for easy management and key module loading of keys. Point to point and broadcast operation is offered and V.11, V.35 and G.703 interfaces are supported. Applications for Megacrypt include encryption of MegaStream telecomms links, videoconferencing links via satellite and terrestrial links, and security of financial and commercial information.
OPEN NETWORKS EUROPE
CIRCLE NO:128

SOFTWARE

An end to re-keying tedium

Fisk Brett are offering a range of software and hardware products which enable desktop PC users to download information directly from local and remote mainframes or mini computers, into PC applications. An automated client/server approach is used to connect the user to the mainframe, enabling the use of data from the mainframe for inclusion in analyses and reports eliminating the need for re-keying data and giving users access to up to date information. Choice of hardware and software is dependent upon the relative locations of the PC and mainframe. For local terminal emulation, a protocol converter or Twinax emulation card would typically be installed, and for remote installations a modem would be required to enable the PC to dial up the host mainframe.
FISK BRETT CIRCLE NO:129

VIDEO

Start seeing things

Video pictures can be exchanged using analogue phone extensions, claims Olympic Communications. Using See-Phone, full composite video signals are sent over existing twisted pair cabling separate from the phone line. This allows for broadcast pictures to be displayed in the user's office, either on a TV type monitor or as a moving picture on their PC. Users can hold, transfer and make conference videocalls by using their phone in the normal manner. Multimedia PCs or PCs with a DVI board added can be used as video phone terminals. Long distance communication is via ISDN codecs interconnected into See-Phone as a shared resource.
OLYMPIC COMMUNICATIONS
CIRCLE NO:130

WANS

Ways to wan

Novell has announced new releases of some of its comms and wan products to meet demand for NetWare integration into enterprise systems. The new products include a version of NetWare MHS messaging server, to which directory synchronisation, enhanced asynchronous comms, longer user names and better administration have been added. Also on the list is v2.0 of the MultiProtocol Router which now has enhanced ease of configuration, management features, filtering and OSI routing. V2.0 of NetWare Wan Links, a NetWare Loadable Module is the third new release from the company. It enables the routing of IPX, TCP/IP, AppleTalk and OSI traffic across X.25 based public networks or private networks based on leased lines. It now supports all the above protocols over wide area links, support for PPP, support for X.25 and improved SNMP capability.
NOVELL CIRCLE NO:131

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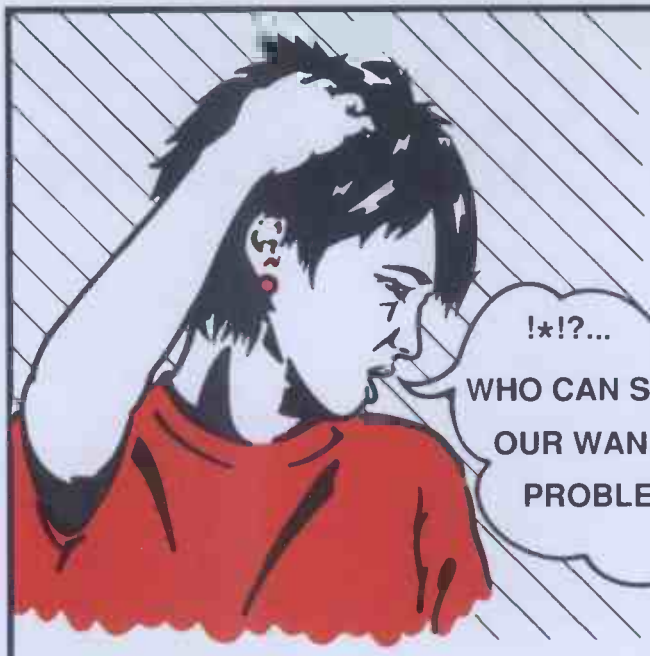

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We are keen to increase our European presence and are expanding our professional networking services activity. This has created opportunities for network engineering specialists to join us as Project Managers or Consultants in London, Paris or Brussels.

As Project Manager, you'll work on short term assignments on customer sites throughout Europe. Your role will range from producing high quality proposals to assuming principal responsibility for the integration of a customers' Network. Consultancy work will include conducting a wide variety of studies and providing support and advice for existing or planned networks. Either way, you'll enjoy exposure to a diverse and challenging workload.

To succeed you'll need 3 - 6 years' experience of network integration in either a Project Management or Consulting role with a manufacturer or service company. Your knowledge of local and wide area networking should include a sound understanding of some of the following: cabling systems; protocols; network management; packet switching; ISDN; ATM; and the methodology and tools associated with project management, analysis and design. Fluency in English and at least one other European language is essential.

Of equal importance will be your ability to work autonomously and confidently in an international business environment making full use of your first class communication and resource management skills.

In return for all this, we're offering salaries and benefits packages which will truly reflect the strategic importance of these positions.

For further details please call Sue Hampson, Director, Human Resources on 0276 685071 or write to her at Ungermann-Bass, European Headquarters, Compass House, 207 - 215 London Road, Camberley, Surrey GU15 3EY.

Ungermann-Bass

BRINGING THE BEST TOGETHER

Circle No. 54

Opportunities in Communications

COMMUNICATIONS ENGINEER - VIDEO CONFERENCING

£37,000 Holland Ref 10/123

An experienced communications Engineer with specific expertise in video conferencing is urgently required to fulfil a consultancy role in one of Europe's highly prestigious organisations. The position is permanent and calls for a November start. On offer is a generous salary and overseas allowance at £37,000, with full relocation expenses.

NETWORK CONTROL Hertfordshire

£15,000 + shift bonus Ref: 10/125

Network and Systems Support specialists with UNIX experience are required to man 24 hour NCC with nationwide RF based system network. Receiving the majority of user queries passed on by the helpdesk, you will be required to either resolve or pass on to a higher level.

NETWORK SOFTWARE DEVELOPMENT MANAGER

£30,000+bonus+car Hertfordshire Ref: 10/127

Is required to assume responsibility for all new developments of network and product software. A specific knowledge of UNIX, and VAX based systems under VMS, along with knowledge of computer based telephony switching systems with reference to the implementation of standard signalling systems, and experience in both switching and telecommunication and operational software is required.

BASE STATION ENGINEER South East

To £20,000 + car Ref: 10/124

A Base Station Engineer is required to carry out routine maintenance, deal with emergency call-outs, implement updates and modifications, and liaise with contractors/providers at base station sites where necessary. Ideally, you will be educated to HNC level (or equivalent) in electronics/communications, and have knowledge/experience in maintaining radio base stations.

ACCOUNT EXECUTIVES North London & Central London

£35,000 ote + car Ref: 10/126

Joining one of the UK's foremost communication companies, you will be the *centre of competence* within a given area for specific value added services sold through an extensive and active territory sales team. Duties will include supporting the sales team in identifying and securing orders and identifying new business opportunities in non-managed accounts; the provision of ongoing product training to the sales team and input into their business plans. A networking background, good business acumen and the ability to negotiate at senior and Board level is a must. Offered is a basic salary of £20,000 an OTE of £35,000 (no ceiling), plus car and usual large company benefits.

Please write to Richard Lloyd citing reference number and enclosing CV at

RICHARD LLOYD & Associates

A Search and Selection Consultancy

35 Carston Grove – Fords Farm – Calcot – Reading RG3 5ZN
Telephone 0734 415161 – Facsimile 0734 410888

RLA

Circle No. 55

Established in 1981, ORIC is one of the leading I.T. recruitment consultancies in the U.K. Our PC division specialises in development, support, networking, voice & datacomms, systems integration, consultants and trainers. Here are a few of our current requirements, however if you do not see anything that meets your criteria, please contact us to discuss your requirements in more detail.

ORIC

ORIC - COMPUTER PERSONNEL CONSULTANTS
188 Shoreditch High Street - London E1 6HU
Tel: 071-729 7329 (office hours) or Robin Barley 071-602 7798 (evenings and weekends)
Fax: 071-739 5049

ARE YOU AN ASSET OR A LIABILITY?

LONDON Salary to £35,000 + Benefits

In any company the employees are the number one assets and this financial systems house will be the first to tell you so. However to be a successful company you need dynamic individuals with strong technical skills and the desire to use those skills in an innovative and creative way. These are the people we are looking for. With your 5-6 years UNIX, C and Comms COSI, X25, SNA expertise we will provide you with the opportunity to work on leading edge technology in the open systems arena but, more importantly you will be working for a company that appreciates your skills and your dedication. to find out more call Carol or Andy. *AW/6551*

PROCURE YOUR COMMS

SURREY To £35,000 + Benefits

This front runner provides IT solutions/consultancy, bespoke software and training for a wide range of customers. They now wish to add to their already, enviable range of skills, your comms expertise. Ideal candidates will preferably be educated to degree standard, with 3-6 years experience at strategic level, providing project evaluation for end users and knowledge of OSI, TCP/IP LAN/WAN, X400 and X500 protocols. This post offers the opportunity to procure your own niche in this specialist field. Excellent benefits including Bonus, Non Cont Pension , BUPA etc. Call Carol or Andy. *AW/8236*

EUROPEAN NETWORK SUPPORT

WILTSHIRE c. £22,000 + Benefits

Front line support on consultancy with an international company servicing major Blue Chips and Distributors throughout W. Europe. This is an outstanding role for a fluent Italian speaker with strong Novell, Network architecture, interconnectivity and PC application experience. Knowledge of shell and server configurations would be useful as would related Datacoms knowledge. A member of a key team your prospects for progression and further training will be unrivalled. Contact Colin or Bryon. *NW/4762*

PRE SALES SUPPORT

HOME COUNTIES £30,000

This manufacturer, who are actively addressing the European Reseller and distribution market place and are keen to recruit Presales Support specialists. You will be responsible for the training, presentation, bid and tenders to resellers and distribution both here and abroad. Good interpersonal skills are essential as is experience of Hubs, Ethernet, Token Ring, Bridges, Routers, and Network Management software. For the career minded only. contact Bryon or Colin. *NW/7341*

PRINCIPLE COMMUNICATION CONSULTANT

BERKSHIRE Salary to £40K + Car + Benefits

SNA, IBM Connectivity, PTT Connectivity, Open Systems, EDI. These are the key technical skills required to fill a crucial post within an expanding international comms/system integration company. Reporting directly to the Board of Directors, you will provide a high level consultancy service to 3rd wave network companies as well as taking an active role in the development of company business strategy, plans and policies. Ideally you will have the minimum of 15 years experience in the IT arena and have proven experience of project implementation. This position offers unrivalled opportunities. Call Carol or Andy. *AW/8730*

DATACOMS SYSTEMS ENGINEER

M25 £18 - 25,000 + Car

Novell, 3Com, Synoptics, Maintain, Newports Solutions, these are just some of the product ranges you will be using to design state of the art systems for this major consultancy/distribution. This expanding organisation offers a high profile role designing, installing and supporting total network systems at major sites throughout the UK and in the latest datacoms technology. Intelligent hubs, Bridges, Routers. Structured Wiring systems etc. As a Novell CNE, or equivalent, you will receive full ongoing training and be encouraged to gain further qualifications as your experience expands. An exciting role for real achievers. Interested? Contact Colin or Bryon. *NW/6412*

NETWORK TRAINER

M4 CORRIDOR £25,000 + Benefits

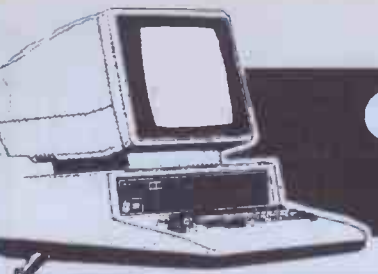
With a huge demand for their product this company are currently looking to recruit experienced trainers on LAN Technology. Ideally you will have a good understanding of TOKEN RING and associated networks products and have been trained within a highly technical environment, for at least two years, and have the drive and ambition to succeed. Give Bryon or Colin a call to hear more. *NW/7677*

EUROPEAN SYSTEMS ENGINEER

M4 CORRIDOR £28,000

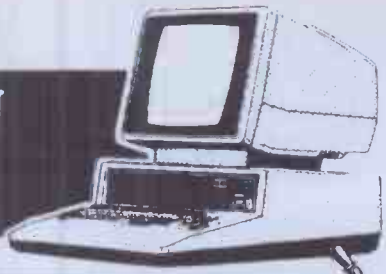
This company have their sights firmly set on Europe. Currently recognised as one of the leading network solutions providers, they are actively looking to recruit individuals fluent in German, French or Italian. With offices based both in the UK and Europe, they have established themselves with a number of resellers and distributors. As a company they are keen to recruit individuals with strong LAN experience on both Token Ring and Ethernet coupled with experience of Novell, Lan Manager, or Server and Network protocols. If you have experience of support to third level on networks and are fluent in a European Language contact Bryon or Colin. *NW/7677*

Circle No. 56



Enhance your career as a

COMMUNICATION SPECIALIST



PROJECT MANAGEMENT

Herts **To £25K**

A mature and experienced project manager within LAN/WAN industry is required. You will be familiar with CISCO and network management products and have successfully planned, controlled and managed 3rd party installers. In return an attractive salary and good promotional prospects are on offer.

Contact: William Hobson Ref: WH4201

COMMS CONSULTANT

London **To £33K + Car**

Flexibility, commercial acumen and above average technical skills are necessary to succeed in this high profile post. You will be degree qualified and have the ability to design, advise and implement communication architectures in particular experience of OSI, LANs, WANs, radio, PABX, network management.

Contact: William Hobson Ref: WH4202

TRANSMISSION SYSTEMS

South **To £28K**

Excellent opportunity to use your voice switching or transmission systems skills in a customer orientated environment. You will be planning, designing and suggesting new configurations to prospective customers. You require experience of PSTN, System X, TEX4/a, PDH or SDH. Overseas travel is a real possibility.

Contact: Gordon Short Ref: GS4202

NETWORK MANAGEMENT

N. London **To £30K**

A new telecomms operator is about to go live and can offer exciting career potential. You should have experience of network management systems in a telecommunications environment with project management expertise. Preferably a knowledge of UNIX, X-WINDOWS and Datacomms.

Contact: Gordon Short Ref: GS4201

SOFTWARE DESIGNERS

Hants/Midlands **To £30K**

This young company has a number of vacancies for software engineers who have at least 2 years commercial experience in C and Unix developing network management and communications protocols. Good opportunities to develop and progress to consultancy status.

Contact: Bill Hobson Ref: WH4203

RF SYSTEMS

North/South **To £27K**

Small, commercial companies are growing and offer excellent outlets for creative flair in radio systems and design/development. Several new projects in satellite communications, TV demodulators, mobile radio, cable TV and cordless telephones. A degree level is preferred with knowledge of telecommunications.

Contact: Gordon Short Ref: GS4203

To discuss these opportunities contact GORDON SHORT or BILL HOBSON on 0442 231691 (days) or (0442) 253300 (eves/wkends) or send your CV to them at:

Executive Recruitment Services

DATA COMMUNICATIONS DIVISION

Hempstead House, Selden Hill, Hemel Hempstead, Herts. HP2 4LT.

Circle No. 57

SENIOR NETWORK DESIGNER

Racal Data Networks Ltd is now well established as a leading provider of Managed Network Services to major corporate users, with a reputation of achieving performance levels second to none. Our range of services, to some 80000 users, encompasses Data, Voice and Value Added Services.

We are now looking for an experienced Network Designer to further strengthen our Data Design team, based at our prestigious offices in Basingstoke. A technical Graduate, with 5+ years experience of design in a Data environment, you should offer expertise in at least two of the following:-

- **X.25**
- **OSI**
- **LANs**
- **Managed Bandwidth**
- **Sizing/Modelling**
- **Network Management**

Working at a System level, you will be able to demonstrate the ability to provide creative network design solutions that meet Commercial/Operational requirements to budget and within tight timescales. Other responsibilities will include the initial specification of technical requirements, product evaluation and assessment, system/network specification and the provision of technical support to Sales & Marketing.

The Company is now entering the next phase of an ambitious growth strategy and this is an excellent opportunity to join a highly professional team and contribute to the strategic development of our future services.

We offer an excellent working environment and attractive remuneration. Write now with details of your career to date to:–

David Parry, Personnel Manager, Racal Data Networks Ltd, Oakwood, Crockford Lane, Chineham Business Park, Basingstoke RG24 0TT. Telephone: (0256) 469334.

FS 13949

RACAL DATA NETWORKS

The Complete Network Service Provider

RACAL

Circle No. 58

Your Professional I.T. Partners

With specialist divisions for Operations, Communications & PC Support

Contract

LAN SYSTEMS ENGINEER **London** **6 months+**
Specialist in interconnectivity. Retix, Cisco, Wellfleet, TCP/IP, Novell, 3Com. CTE/JH

VOICE SPECIALIST **West** **6 months+**
Support and development engineer comprehensive ISDX with ACD, + key systems CTE/JH

PC SPECIALISTS **London**
Individuals with each of the following skills are required for forthcoming projects with a major supplier. Lotus notes, MS Mail, Novell 3.11, Wellfleet Routers, OS/2 LAN Manager, MS LAN Server CTE/JH

2 x PROJECT ENGINEERS **Scotland** **6 months**
Voice Project Engineers experience with large and small PBX systems. Hands-on experience essential CTE/PR

INSTALLATION ENGINEERS **Scotland** **6 months**
Experience with Voice, Radio, Telemetry and Multiplexor networks installation CTE/PR

NOVELL SUPPORT **London** **2 months**
Experience with Novell networks up to V3.11, DOS, E-Mail and general software packages. CTE/PR

PROJECT MANAGER/ENGINEERS
London/South West
Good knowledge of Meridian PABX's. Hands on Technical Support experience preferred. Also interested in strong ISDX and ACD skills. CTE/MG

FIELD SERVICE ENGINEERS
London **Long term**
Installation technicians with experience of PC's, cabling and comms support. Must be prepared to work rotating shift. Good knowledge of Modems, LANs, DRS controllers. CTE/MG

Permanent

NETWORK SUPPORT ANALYST **£21k**
Berkshire
As part of the office system group you will be responsible for the development of WAN server policy, standards, systems support and training together with the support of LAN administrators. You should have a minimum of 2 years experience supporting Novell in a Token Ring environment with experience of Ethernet and LAN diagnostic tools eg. IBM LAN Manager. CNE qualifications are desirable, however formal training will be provided. CTE/KW1

SNR NETWORK CONTROLLER **£18-22k**
Buckinghamshire
This major American company are looking for the above as part of a major reorganisation with its European subsidiaries. This role will involve full responsibility for all WANs as well as close liaison with LAN administrators, based in Europe. You should have a minimum of 2 years experience as a Network Controller using DEC VAX, Decnet, WANs, Bridges, Routers, Ethernet. Some LAN experience in the form of Pathworks, and All-in-one would be an advantage CTE/KW2

TELECOMMS TECHNICIAN **£20k**
City
This is an excellent opportunity for a PABX Engineer looking for greater responsibility within an in-house environment. A thorough knowledge of MD110 or other digital switch is essential together preferably with a knowledge of Datacomms. Good verbal and written communications skills are essential as this post involves considerable administration work. Your responsibilities will include telephone faults, mobile phones, pagers and comms invoices. CTE/KW3

NETWORK CONSULTANTS **To £25k + car**
Hertfordshire
Our client, a large computer services company is currently looking for the above as part of its expanding consultancy services division. You should be a graduate with 5-7 years DP experience, at least 2 of which should be as a consultant. A good understanding of interconnectivity between PC's and Dec Vax hardware, eg. PCSA, Decnet, Novell, Ethernet. You should also have good implementation and installation skills at consultancy level across multivendor environments. CTE/KW4

071-383 3888
Hunterskil Limited, Project House, 110-113 Tottenham Court Road, London W1P 9HG.
Fax: 071-387 2048

HUNTERSKIL

SALES SUPPORT & MARKETING

SALES EXECUTIVE LAN PRODUCTS

£55,000 Earnings £GTE £27,000 Basic

A small and highly successful division of a £multi-million company with a $multi-billion parent (one of the largest Data Processing companies in the world) this group are focused on medium and large sized major accounts, specialising in the clients business issues and objectives.
Selling Ethernet, Token Ring and FDDI based products they have established strong links with strategic 'world class' partners and subsequently are enjoying great success.
Predominantly targeted at 'new business' your brief will be to source opportunities for major account 'business creation'.

FIELD SUPPORT ENGINEER

Scotland c£15,000+Car+Petrol

Our client seeks a young, energetic field engineer who understands Modems, MUXS, RS232, X25, DOV, etc. Any LAN knowledge would be useful as would any specific knowledge of Infotron Multiplexors.

CUSTOMER SERVICE ENGINEER

City c£18,000 Packages+Car

Our client needs two Engineers with knowledge of Modems, Muxes, RS232, X25, TDM, V24, VoiceComms plus any exposure to LAN systems.
A flexible attitude is vitally important for this role.

CUSTOMER SUPPORT ENGINEER

N.H. Counties c£16,500+Car

Our client is seeking an experienced Engineer to help install and maintain its range of LAN based products at customer sites throughout the UK. You may also be asked to undertake some project management duties. You will be enthusiastic, flexible and hard working with knowledge of Ethernet, Token Ring, Bridges, Routers and Gateways coupled with general WAN skills.

TECHNICAL SUPPORT ENGINEER

Bucks c£26,000

This company specialises in a range of hardware and software products for the PC and LAN Marketplace. The role will encompass first and second line telephone support, post sales support and analysis of problems in the test laboratory. The products supported will be Token Ring Adaptors, Intelligent Hubs, FDDI Adaptors, Bridges and Network Management Software. You will also have a good knowledge of PC's and associated operating systems and LAN operating systems (Netware, LAN Manager, etc).

MAJOR ACCOUNT MANAGER TOTAL NETWORK SOLUTIONS

£76,000 £50,000 G.T.E. £38,000 Basic+BMW

Already established globally as a provider of WAN's and backbones to some of the World's largest institutions. This £40 million manufacturer backed by a £Multi-billion parent is currently capitalising on its unique position.
Offering 'Total Network Solutions' including Data, Voice & Video Integration, Consultancy, F.M., Design and Maintenance, this team is enjoying major competitive 'Knockouts' in the Commercial and Financial arena.
A quality 'New Business' role, your brief will be to fully understand the business issues of your target account and totally satisfy their networking needs.
Your background of over target performance of networking solutions into banks, building societies or the Insurance market place will enable you to take advantage of this opportunity.

MAJOR ACCOUNTS 'NEW BUSINESS' VP - LARGE PABX - ACD

£70,000 Earnings £45,000 GTE £35,000 Basic

This is an opportunity to join a 'world beating' Telecoms Systems Supplier.
Selling large PABX Voice Processing and Automatic Call Distribution systems into major 'Strategic' targeted accounts, they are enjoying notable success and rewards.
If you are currently selling in this arena and can truly demonstrate a successful sales track record in the 'Telecoms' marketplace - then you will qualify for a place

SENIOR SALES EXECUTIVE LARGE PABX SYSTEMS

£50,000 Earnings £GTE £25,000 Basic

The company: A 4.5 Billion World Wide corporation with £300 Million UK T/O and investing £400 Million in R&D, is a highly respected organisation with operations in over 80 Countries.
The Role: Selling large PABX (500-1,000+Extension) systems, this Southern based 'New Business' Sales Team have enjoyed in excess of 300% growth and earnings exceeding £100,000.
The Candidate: This is a purely 'New Business' Sale role for a young, dynamic, aggressive and professional major account penitrator, currently frustrated with small systems and having a lack of support.
If you are looking to join a Global player and wish to continue your exceptional sales track record call now.

CUSTOMER SUPPORT SPECIALISTS

Hertfordshire c£28,000+Car

Our client is one of the most successful systems companies in the UK, who provide Networking and Communications solutions to large Blue-Chip Multinationals and to Government and Defence departments. Rapid growth has resulted in the need to recruit two Support Specialists who will use their extensive technical knowledge of the networking arena to manage Customer queries and provide solutions and support in the field. This is a Central position which will require excellent interpersonal skills and the ability to recognise and multi-task technical problems in line with each individual customers support needs.

PROJECT MANAGER

M4 Corridor c£35,000+Car

Our client needs someone to manage and oversee the installations of combined Voice/Data Systems with project values in excess of £2 million.
The role will also include Sales Support and account management. You will spend a large proportion of your time in Europe, so the ability to travel at short notice is a must.
Your technical background will encompass both Voice (ie PABX, ACD, VP, etc) and Data (ie X25, ISDN, DPNSS, etc) technologies. Knowledge of dealing with European PTT's would also be a great advantage.

EUROPEAN SUPPORT ENGINEER

Berkshire c£30,000+Car

Your brief will be to provide 2nd/3rd line support on a range of Call Processing products, to clients throughout the UK and Europe. You will ideally have a mixture of Voice and Data Communications knowledge ideally encompassing areas like: PABX's, ACD, Voice Processing, Call Management Systems, ISDN, SS#7, DASS, DPNSS, Frame Relay and X25. You will be required to spend at least 50% of your time travelling so a very flexible working attitude is required. First class Communications Skills are of parament importance.

STRATEGIC ACCOUNT MANAGER INTEGRATED NETWORKS

£70,000 Earning £G.T.E. £28,000 Basic

As a relatively new and dynamic sales team within a £Multi-Billion world player, this division is setting the standard and pace in the corporate and Government maket place.
Selling fully integrated voice & data network solutions into the 'New Business' arena, their top achievers are regularly earning in excess of £70,000.
Your successful sales track record of network solutions (bringing together access products, backbones and LAN/WAN integration) within strategic targeted accounts, is a pre-requisite for this career opportunity.

SALES MANAGER PABX

£40,000 Benefits Executive Car

Operating in nearly 50 Countries and part of one of the World's largest International Telecommunications Operators, this £multi-billion organisation are now poised for further rapid growth.
Responsible for the North, your brief will be too grow, manage and motivate the existing team and achieve an over quota performance.
Of degree standard, your sales track record within the PABX arena together with your man-management skills will enable you to take advantage of this opportunity and offer advanced voice and data solutions to the corporate market place.

MAJOR ACCOUNT SALES LAN/WAN

£60,000 O.T.E. Prestige Car c£28,000 Basic

Having achieved outstanding growth in it's chosen market place, this Global provider of backbone networks and services is enjoying rapid growth in the recently created L.A.N. division.
Due to the momentum created by this dynamic business unit, my client is looking for a key player.
Selling LAN solutions at board level you will probably come from a technical background with strong interconnectivity skills which you have been utilizing in a 'Quota Beating' sales role for the last 3 to 5 years.

SYSTEMS ENGINEER

Berkshire c£22,000+Car

This pan European company has been in existence for three years and employs over 150 people in the UK.
A vacancy has arisen for a Systems Engineer to provide technical and post sales support to their installed client base. You will also provide customer training, project manage installations and occasionally pre-sales support.
Ideally you will have knowledge of Token Ring, Ethernet, Novell, Lan Manager, Bridges, Routers and Hubs. Any knowledge of Unix and 'C' programming would be useful.

PABX FIELD ENGINEER

M4 Corridor c£15,000+Car

We need an experienced PABX Support Engineer to support this company's range of Hybrid PABX/ACD systems. You will have at least five years experience within telecoms. Any exposure to DPNSS, DASS, ISDN and PABX internetworking would prove useful.

SALES SUPPORT ENGINEER

Hampshire c£25,000

Based along the M3 corridor our client has just released a new generation of Intelligent Hubs to help spearhead this organisations attack on the internetworking marketplace.
You will be articulate, tenacious, have excellent communications skills, commercial awareness and a thorough knowledge of the Bridging/Routing market. You will be required to travel, sometimes at short notice, wherever the need arises, so your attitude will be a flexible one.
It is presumed that you will have a strong communications background covering areas such as LANs, X25, Modems, Muxs, etc.

SENIOR SUPPORT ANALYST

Berkshire c£21,000

You will be responsible for the development of LAN Server Policy, Standards, System Support and the Training/Support of LAN Administrators. You will also monitor, upgrade, plan and install new and existing servers.
You will have knowledge of supporting Novell in a Token Ring environment and experience of Ethernet and LAN diagnostics.

PC NETWORKING TRAINER

Buckinghamshire c£25,000

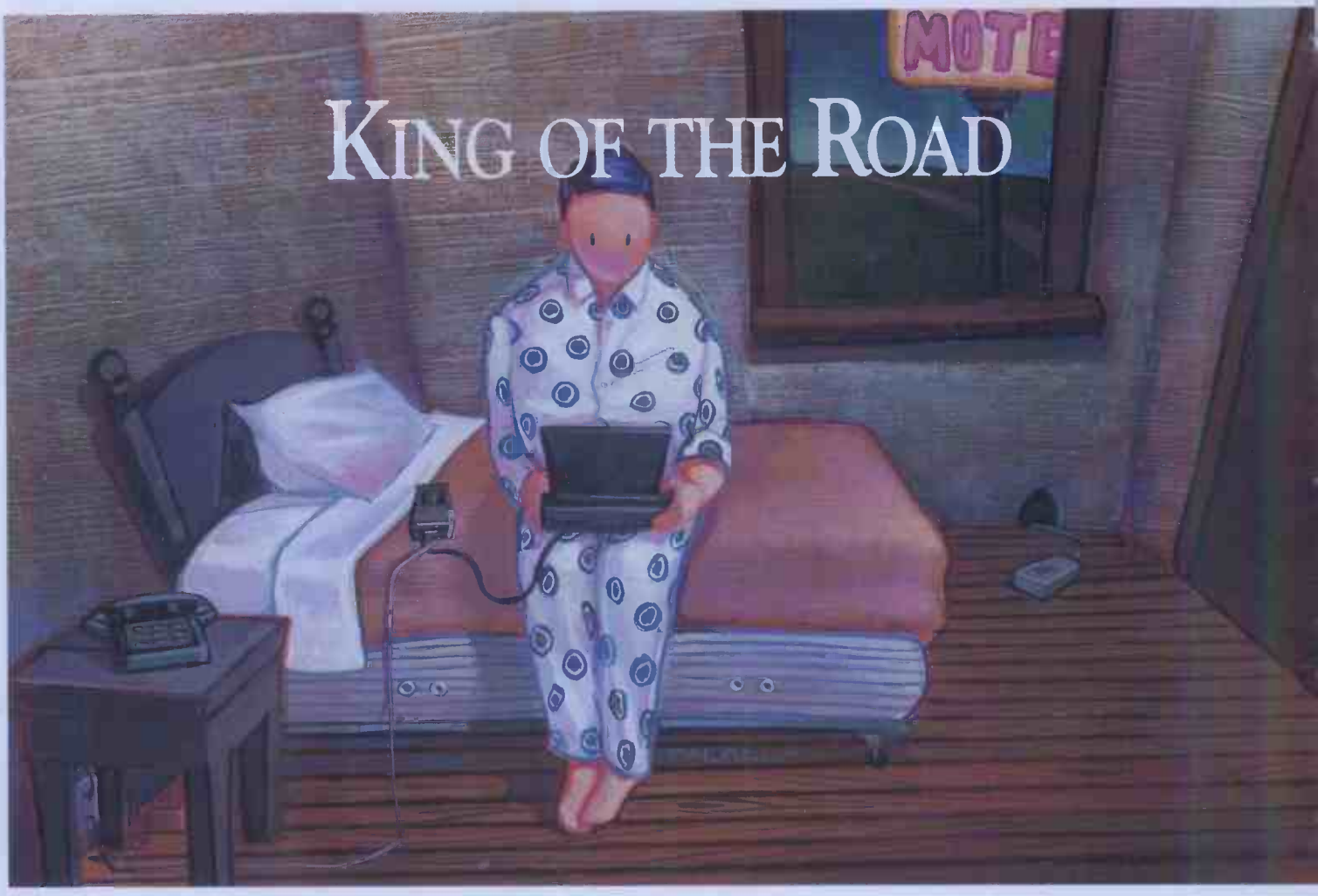
Your brief will be to provide training courses on a variety of PC Networking topics particularly concentrating in the Token Ring arena. You will be training Support and Systems Engineers and possibly Technical staff from OEMs, Distributors, Dealers and End-Users.
Because of the close contact with Technical Support staff and the level of technical expertise you will acquire, you will naturally become involved in complex technical issues, so any support experience would prove useful.

LAN PRODUCT SPECIALIST

Buckinghamshire c£25,000+Car

Educated to HND/HNC level your experience will be in the LAN market area specialising in internetworking products.
Your task will be to provide pre-sales support to Account Managers, provide third line technical support, evaluate new products, implement training courses and generally become the point of technical contact for your specific lines.
You will understand CCITT and IEEE standards and be able to analyse technical problems in depth.

Orion RESOURCING
THE COURTYARD, MERLIN CENTRE, GATEHOUSE CLOSE, AYLESBURY, BUCKS HP19 3DP
TEL: 0296 393636
EVENINGS/WEEKENDS 081 813 0971



Multi-Tech's New Data & Fax Modem for Laptop PCs

When you're in your office, you want power and performance from your modem. So why settle for less when you're on the road?

With the MultiModem^{MT}, Smaller is Better.

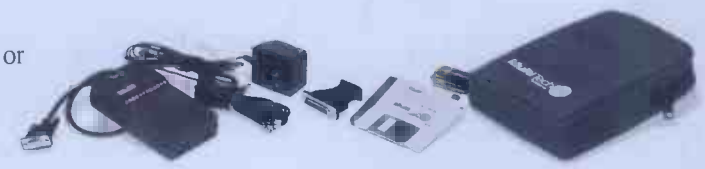
Until now, "pocket modem" usually meant small size, with small features, less LEDs and poor flexibility. But with the new MultiModem^{MT}, you get a state-of-the-art modem, with data speeds up to 14,400 bps (up to 56,000 bps compressed), and send & receive fax capability at 9600 or 4800 bps. You also get twelve LEDs and a speaker, so you'll know what's going on.

The MultiModem^{MT} runs on either AC or battery power, so you can transfer files and send or receive faxes at the office, from home, or on the road. You also get remote configuration, UNIX® support and "flash PROM" updating from our BBS.

All This, and Free Software Too!

We include everything you need to hit the road running, including our MultiExpress™ data and fax communications software. And if you're an Apple® PowerBook® user, we've got a version for you, too.

For more information, please call us at 0344-891266.



MultiTech® Systems

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