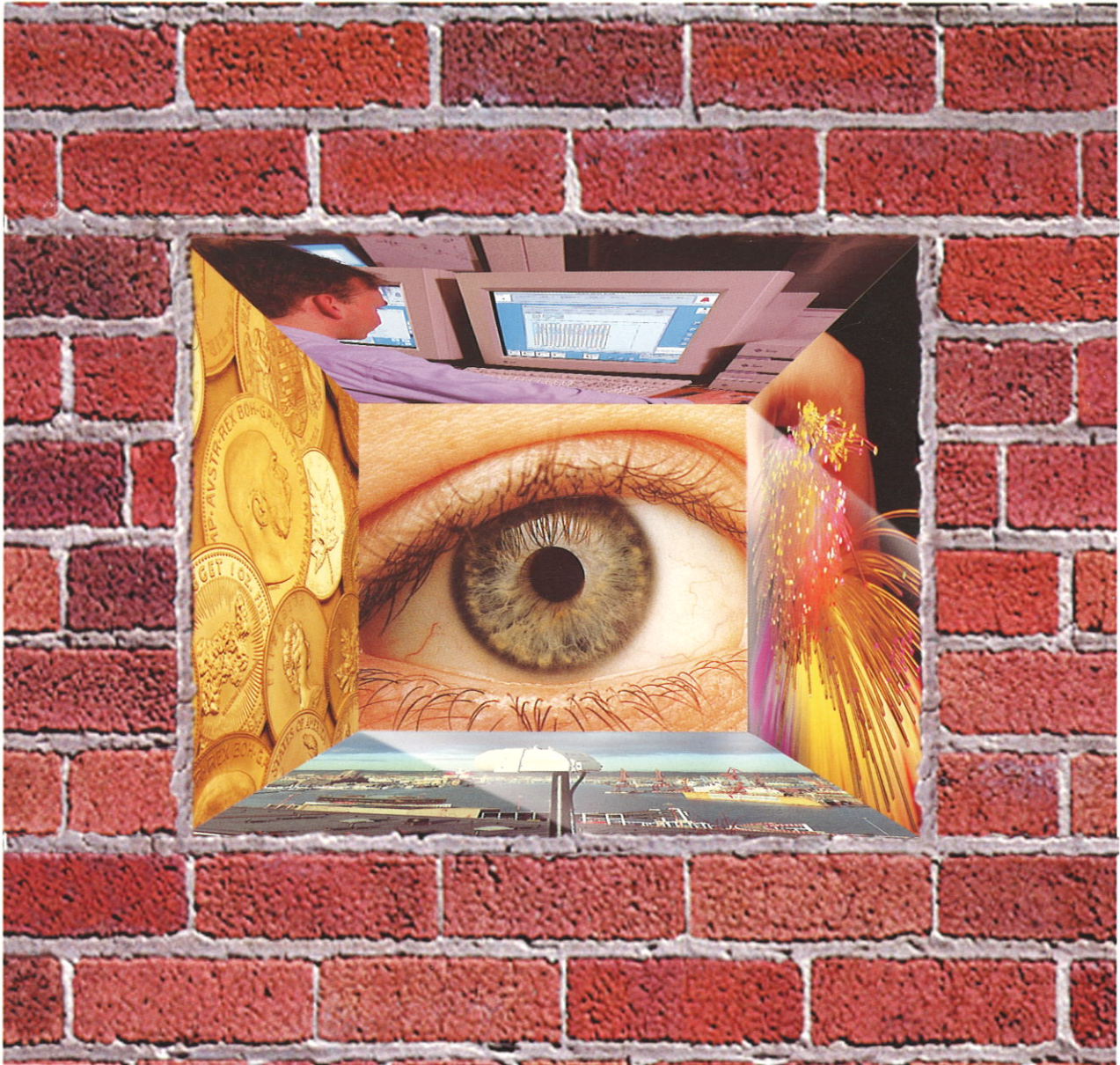


# A new dimension in transmission

PDH networking systems that meet today's needs ...  
and tomorrow's





## A GOLDEN FUTURE

Transmission systems have always been the backbone of any telecommunications network.

But today's transmission systems can be much more. They can help you meet new demands from the marketplace. Reduce your operational costs. And equip you for new revenue-earning opportunities far into the future.

With Ericsson, your transmission systems have a golden future.

# Contents

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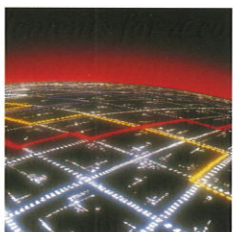


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## *Discover a new world of transmission possibilities*

Ericsson's PDH transmission systems help you meet the demands of a new era, with strong centralized management and a migration path to the new SDH transport network standards.

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## *All the elements for a complete PDH networking solution*

Ericsson has advanced PDH transmission systems for all applications, providing bandwidth from 2 Mbit/s to 4 x 140 Mbit/s, using electrical, optical or radio transmission.

3



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## *More quality, more flexibility, more revenue-earning opportunities*

With Ericsson's cross-connect and protection switching systems, you can increase the flexibility and quality of transmission services ... and generate more revenue from your network.

4

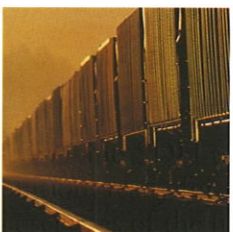


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## *Automate your transmission network management, and watch efficiency grow*

Ericsson's centralized management systems, ETMS and FMAS-NM, transform your transmission systems from a collection of boxes into an integrated network.

5



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## *ETNA: the complete transport network solution*

The Ericsson Transport Network Architecture combines PDH and SDH to form a total network solution, ready for the broadband and multimedia services of the future.



*Transmission and transport networks are today the focus of new demands and challenges. End-users require new, flexible and high-quality services; and your internal operations require continuous improvements in efficiency.*



## Discover a new world of transmission possibilities

*Most transmission equipment wasn't designed for this new environment. With transmission seen as a relatively static, unchanging part of the network, the equipment was designed to be installed and left unchanged for much of its service life. Making changes in these transmission networks is expensive and time-consuming.*

*With Ericsson, you can upgrade your PDH transmission resources. Creating a network that can easily be expanded and extended to meet new end-user needs. A network with new levels of performance, security and reliability. A network with centralized management tools that boost overall productivity.*

*And most important, a network that's ready for future opportunities and enhancements, such as SDH, ATM and the 'information superhighway'.*



PDH (plesiochronous digital hierarchy) is today the world's dominant technology for transmission in public telecommunications networks. Proven in the field, easy to install and operate, PDH transmission systems serve the traditional requirements of these networks very well.

But today, network operators are facing new challenges, which have a corresponding impact on their transmission networks. End-users are demanding flexible, high-quality leased-line services in order to build their own private networks. New network services such as high-speed data communication, and mobile networks, create new requirements for transmission resources.

For many operators, competition increases the urgency of improved network performance. In a competitive environment, it is more important than ever to offer end-users the services they want, at the times they want, and at the prices they want.

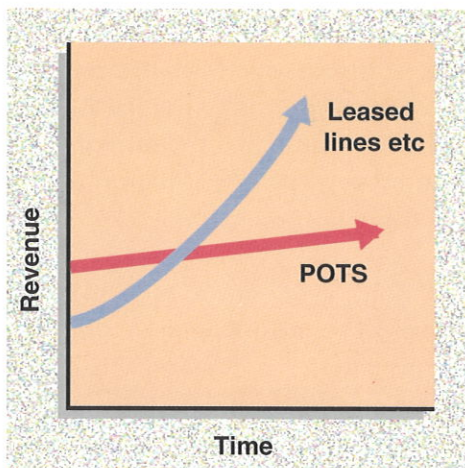
These developments are putting new demands on PDH transmission networks. Demands which were in many cases not foreseen when these networks were originally planned and built.

These new demands can be seen in three areas.

**Greater flexibility in service provision** Providing new services in PDH networks – to give a business customer a leased line, or to set up infrastructure for a new network service – is a time-consuming, labour-intensive task. In order to respond to the new market conditions, service provision must become more flexible, and more responsive to changing patterns of demand.

**Higher quality in service performance** Many customers are today demanding guarantees of high-quality service, with penalties if pre-set levels of service quality and reliability are not met. Networks must be able to meet these quality and reliability standards, and quality and reliability measurements must be made available to prove this.

**Greater efficiency in network operation** The operational efficiency of the transmission network must be improved, by reducing engineering commitments and centralizing operation and maintenance.



*In developed countries, revenues from leased lines and other broadband business services are set to outstrip revenues from traditional telephony services before the year 2000.*



*With systems like Ericsson's cross-connects, you can bring configuration flexibility to PDH transmission networks.*

#### TAKE CONTROL OF YOUR TRANSMISSION NETWORK

Ericsson has a complete range of PDH networking equipment, including multiplexers for all levels of the PDH hierarchy; flexible multiplexers; electrical, optical and radio transmission systems; and cross-connect and protection switching systems. Together, they address all transmission requirements in local, inter-exchange and national networks, as well as cellular networks.

With Ericsson's PDH systems, the emphasis is on flexibility. We've designed our systems to make it easy for you to meet new service demands. For instance, you can use our flexible multiplexers to provide business customers with a wide mix of services according to their needs. And you can use our MiniLink radio transmission systems to bring new customers on-line quickly, even when there isn't a wired connection to the network.

Further up the network hierarchy, you can use Ericsson's cross-connect systems to add flexibility to your backbone network, routing PDH signals according to demand, and delivering new levels of performance on services such as leased lines.

To these well-proven systems, we have added a new feature. A feature that will change the way you view your PDH network resources.

That feature is manageability. It remedies the most important single weakness that PDH systems have always had: their lack of central management resources. With Ericsson's PDH networking systems, combined with our centralized O&M and service provisioning solutions, you can meet today's stringent demands on performance, reliability, cost-efficiency and flexibility – without needing to replace your entire transmission network.

#### A NETWORK THAT'S READY FOR THE FUTURE

The ability to manage your PDH transmission equipment means you are well-placed to take advantage of new opportunities in today's market for telecommunications services.

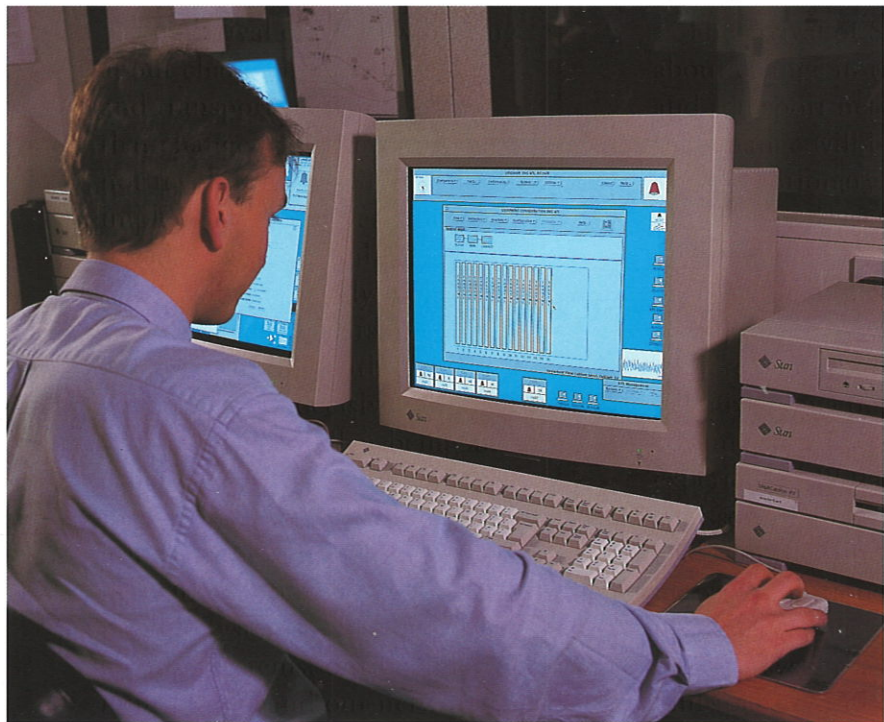
But the benefits don't stop there. In the future, your PDH systems will have to co-exist and interwork with the new synchronous digital hierarchy (SDH) transport network standards.

The arrival of SDH will bring about change in transmission and transport networks. But that change will be evolutionary, not revolutionary. SDH will be implemented over years or decades; and it is unlikely that SDH will completely replace PDH, for many years to come.

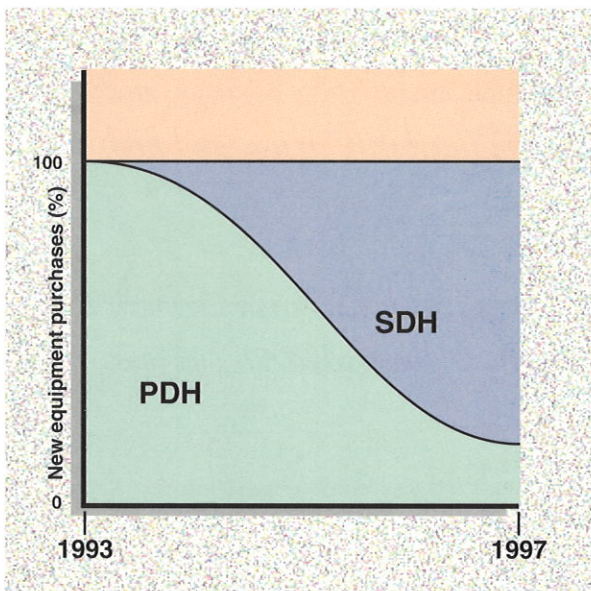
Here, working with Ericsson will give you a decisive advantage. As well as being an experienced PDH supplier, Ericsson is also a world market leader in the supply of SDH network solutions. We can provide systems – like our cross-connect systems, our flexible multiplexers and our network management platforms – that give you a ‘bridge’ from PDH to SDH, ensuring the maximum possible productive life from your PDH investment.

Together, Ericsson’s PDH and SDH networking solutions form the Ericsson Transport Network Architecture (ETNA): an all-embracing concept for transmission and transport networks that combines today’s proven PDH technology with complete SDH network solutions, and provides a secure

backbone infrastructure for future-oriented technologies such as ATM, and the broadband and multimedia services they will provide.

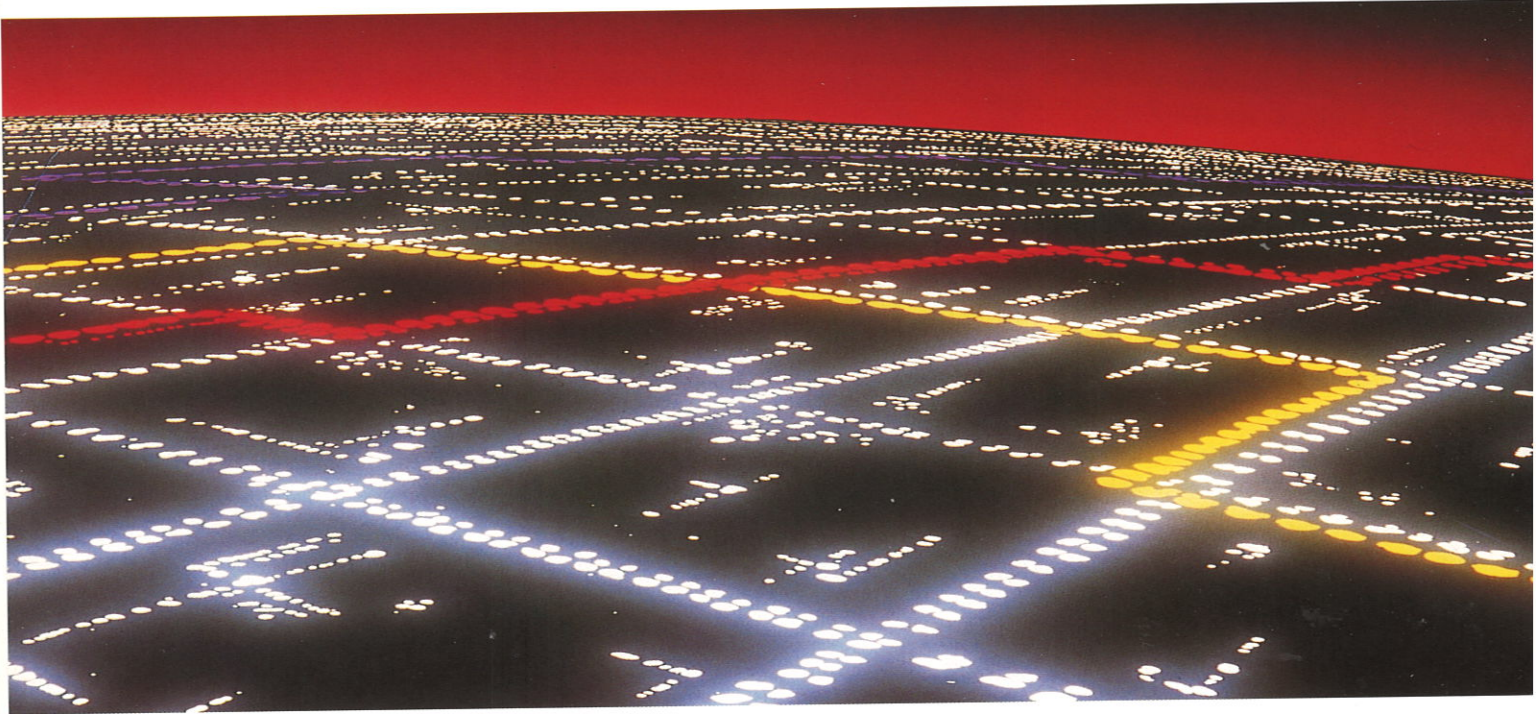


*Centralized management will enable rapid service provision, and produce huge gains in quality and productivity throughout your transmission operation.*



*It will take years, or even decades, to establish a ‘pure’ SDH network. In the meantime, you have to cope with different technologies operating in parallel.*

*Ericsson's PDH networking systems include equipment for a wide variety of applications in local, inter-exchange and national networks, as well as cellular networks. The systems provide bandwidths from 2 Mbit/s to  $4 \times 140$  Mbit/s, using electrical, optical or radio transmission.*



## All the elements for a complete PDH networking S

*They all make extensive use of VLSI (very large scale integration) technology and microprocessor control. This means space savings, modular design and software control for maximum flexibility in use, and high reliability in service.*

*And they all benefit from Ericsson's centralized network management and service provisioning systems, which maximize the productivity of your transmission network.*



## SERIES 7000 PLUS: PRIMARY MULTIPLEXERS

Ericsson's PDH range includes two primary multiplexers. The **ZAK 30-5** is a 30-channel PCM trunk multiplexer with a modular design, which can be equipped with a variety of different channel units for 64 kbit/s digital and analogue connections, and a number of signalling formats. All control, supervisory and signalling processing functions are located on a single-card control unit, which also contains the multiplexer's 2 Mbit/s interface.

The main applications of the ZAK 30-5 multiplexer are in connecting analogue exchanges via digital trunks, or connecting an analogue exchange to a digital exchange. ZAK 30-5 can also be used to drop and insert speech or data channels from a 2 Mbit/s line, for instance to link radio base stations to switches in a mobile telephone network.

The **ZAE 103 01** subscriber multiplexer converts 30 subscriber channels into a 2 Mbit/s digital signal, and vice versa. It can be used as a remote subscriber multiplexer, in conjunction with a digital exchange; or as a central subscriber multiplexer for an analogue exchange, demultiplexing the 2 Mbit/s signal into 30 analogue channels. The unit can also drop and insert up to 29 channels from a 2 Mbit/s line.

The unit has the same modular design and central control functions as the ZAK 30-5 multiplexer. In addition, it includes facilities for remote testing of subscriber lines, and programmable signalling conversion. Subscribers can be connected using analogue or 64 kbit/s digital interfaces.

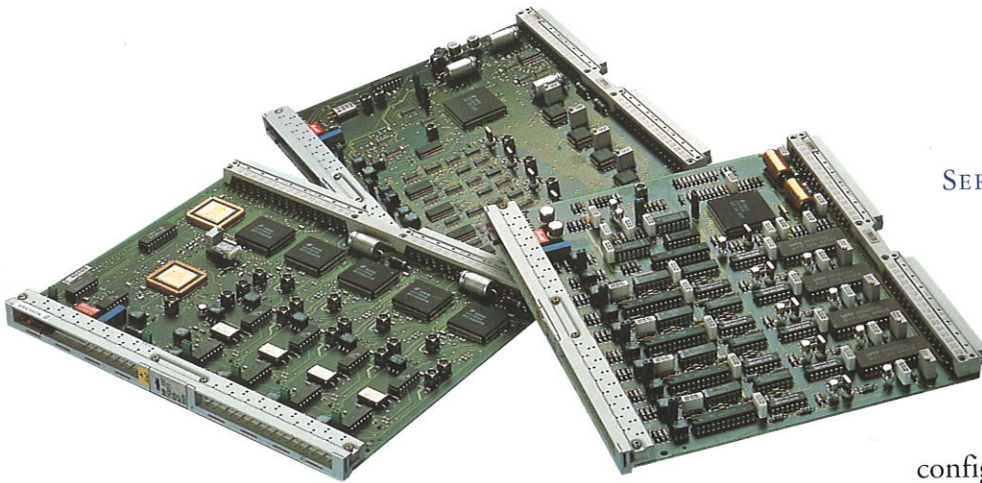
Indoor or outdoor housings are available. A single outdoor cabinet can hold up to four multiplexers, serving 120 subscribers.



*The ZAE 103 01 subscriber multiplexer, complete with programming unit. It can be used as a remote or central subscriber multiplexer.*



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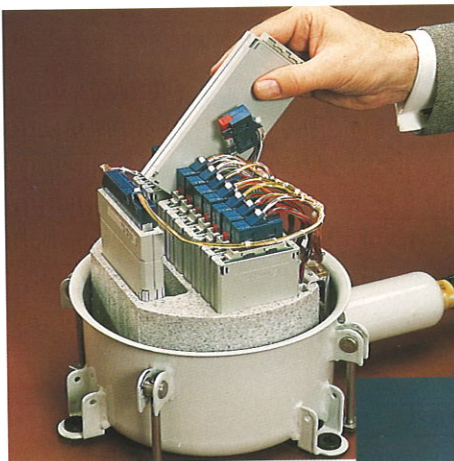
*The ZAH Z140-1 uses just three interchangeable cards to handle all levels of the PDH hierarchy from 2 to 140 Mbit/s.*

#### SERIES 7000 PLUS: HIGHER-ORDER MULTIPLEXERS

The ZAH 2140-1 multiplexing system handles all levels of the PDH transmission hierarchy, using just three interchangeable multiplexer cards. The

configuration of a multiplexer can be changed without interrupting traffic, simply by adding or removing cards. The system's modular architecture also means that spare parts holdings, and personnel training requirements, are cut to a minimum.

The three multiplex cards — each carrying a complete 2/8 Mbit/s, 8/34 Mbit/s or 34/140 Mbit/s multiplexer — can be combined in a number of ways within a single card-cage, to provide a great variety of configurations. Lower- and higher-order drop/insert configurations are possible, as are 'skip multiplexers', allowing, for instance, direct 2 Mbit/s to 34 Mbit/s, or 8 Mbit/s to 140 Mbit/s, multiplexing in one unit.



*The ZAD 2-8 repeater station for ten systems.*

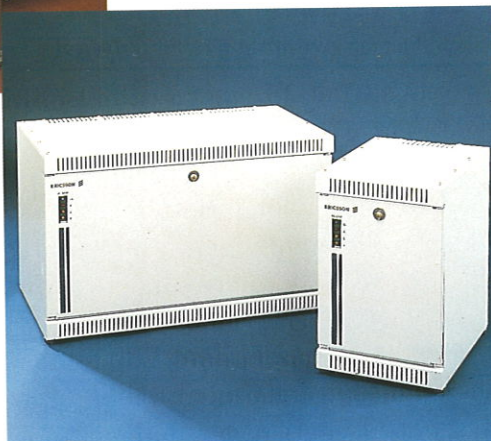
#### SERIES 7000 PLUS: 2 MBIT/S PAIR CABLE SYSTEM

ZAD 2-8 is a 2 Mbit/s line system for transmission over two unloaded symmetric pair cables. Its main application is to increase the capacity of rural networks by upgrading transmission to digital, using existing cables. The system includes line terminating and repeating equipment, all designed for years of unattended operation, and with comprehensive self-diagnostic, fault-locating and performance monitoring facilities.

#### RADIO TRANSMISSION SYSTEMS

Mini-Link is a range of short-haul microwave radio transmission systems, which form a highly cost-efficient alternative to laying fibre or cable in local transmission systems — for instance in mobile telephone networks; to interconnect private and public networks; or to connect remote subscribers via a subscriber multiplexer.

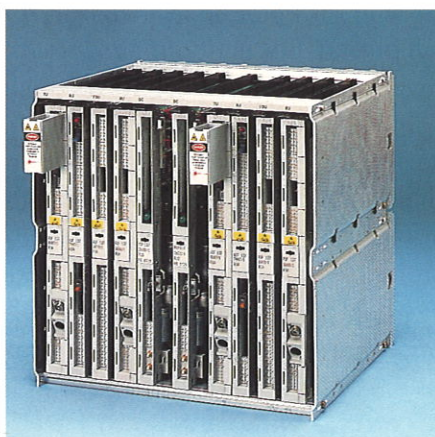
Easy and fast to install, Mini-Link is also ideal in situations where transmission capacity



*The ZAD 2-8 live terminal cabinets for 4 and 20 2 Mbit/s connections.*



*Mini-Link microwave transmission systems can be installed quickly and easily, as an alternative to running cable or fibre.*



*The ZAM 140 05 transmits 34 or 140 Mbit/s signals down short- or long-haul optical fibre links. Protection switching can be included as an option.*

has to be provided urgently, for special events or to restore services quickly after natural disasters.

Mini-Link systems have a modular design, allowing them to handle from a single 2 Mbit/s connection to 8 x 2 Mbit/s (or 2 x 8 Mbit/s), with optional 1+1 protection switching. Systems are available operating at a variety of radio frequencies from 15 to 38 GHz.

Higher-order PDH radio transmission systems are also available.

#### SERIES 7000 PLUS: FIBRE OPTIC LINE SYSTEMS

Ericsson's PDH optical line systems cover bandwidths from 4 x 2 Mbit/s up to 4 x 140 Mbit/s.

In local networks, systems such as the ZAM 40201 4 x 2 Mbit/s optical line system can be used in ring or linear networks, connecting equipment such as subscriber multiplexers or radio base-stations to central switching systems. The system includes a cross-connect for drop/insert and 1+1 protection of the 2 Mbit/s signals.

The ZAM 8-1 system carries an 8 Mbit/s signal in rural or urban low-capacity trunk networks. It is also well-suited to serve Mini-Link radio transmission systems.

For inter-exchange and long-distance applications, the ZAM 140 05 system is a modular line terminal/repeater system which can easily be upgraded from 34 to 140 Mbit/s, as capacity requirements increase. Optional 1+1 line protection is available. For higher capacities, ZAM 565-4 multiplexes 4 x 140 Mbit/s PDH channels within a 565 Mbit/s signal.

Both of these systems can carry professional-quality video signals alongside PSTN traffic: an optional video transmission system is available for this application. Wavelength division multiplexing (sending both 1300 and 1550 nm signals down a single fibre) is a further option which can boost capacity up to 1.2 Gbit/s.

*How can a PDH transmission network keep pace with today's fast-changing market demands? At Ericsson, we've solved these problems. You can upgrade your transmission network to offer enhanced flexibility, together with the high grades of service that demanding business users need.*



## More quality, more flexibility, more revenue-earning

No matter how high the quality of the systems you use, a PDH network, composed of multiplexers and digital line systems, is still basically a static network. It's not designed to cope with fast-changing demands for traffic capacity; nor can it provide the service guarantees that are necessary when you will be carrying your customers' mission-critical communications traffic.

But all these limitations can be removed by Ericsson's latest generation of cross-connect systems, multiplexers and performance management equipment. With these systems, you can transform your PDH transmission resources to give enhanced protection and re-routing capacities in the backbone network, and reach new heights of flexibility and quality in the provision of end-user services.

These systems also allow you to build a bridge to the future. Ericsson's digital cross-connect systems can carry traffic between PDH and SDH systems: allowing you to plan a smooth migration path between PDH and SDH at all levels of your transmission network, with total freedom in routing traffic from one place to another.

## AXD 1/0 DIGITAL CROSS-CONNECT SYSTEM

Ericsson's AXD 1/0 system switches and cross-connects T1/E1 (1.5/2 Mbit/s) signals, and individual 64 kbit/s signals within 1.5/2 Mbit/s bearers, without the need for demultiplexing. It is a modular, non-blocking system which can be expanded in stages from 30 to 512 2 Mbit/s ports. Ports can be configured for 2 Mbit/s or 64 kbit/s access.

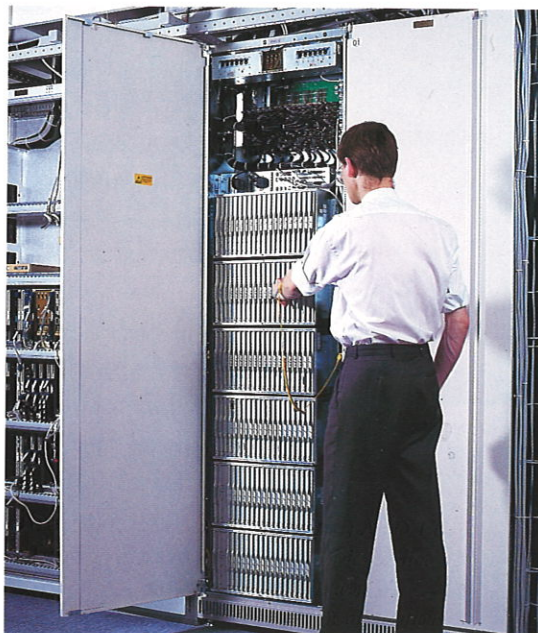
Installing AXD 1/0 systems in a PDH network greatly increases its flexibility, and reduces day-to-day engineering requirements. Digital leased lines, for instance, can be set up and routed by remote control, without the need to hard-wire connections throughout your network. The ability to provide leased-line capacity more or less on demand, creates a wealth of new business opportunities.

Because AXD 1/0 can terminate and cross-connect both T1 and E1 trunks, it can act as an international gateway node, filtering out leased-line from PSTN traffic. This reduces the need for expensive 'nailed up' connections within international switches, and increases the switching capacity available for international PSTN traffic.

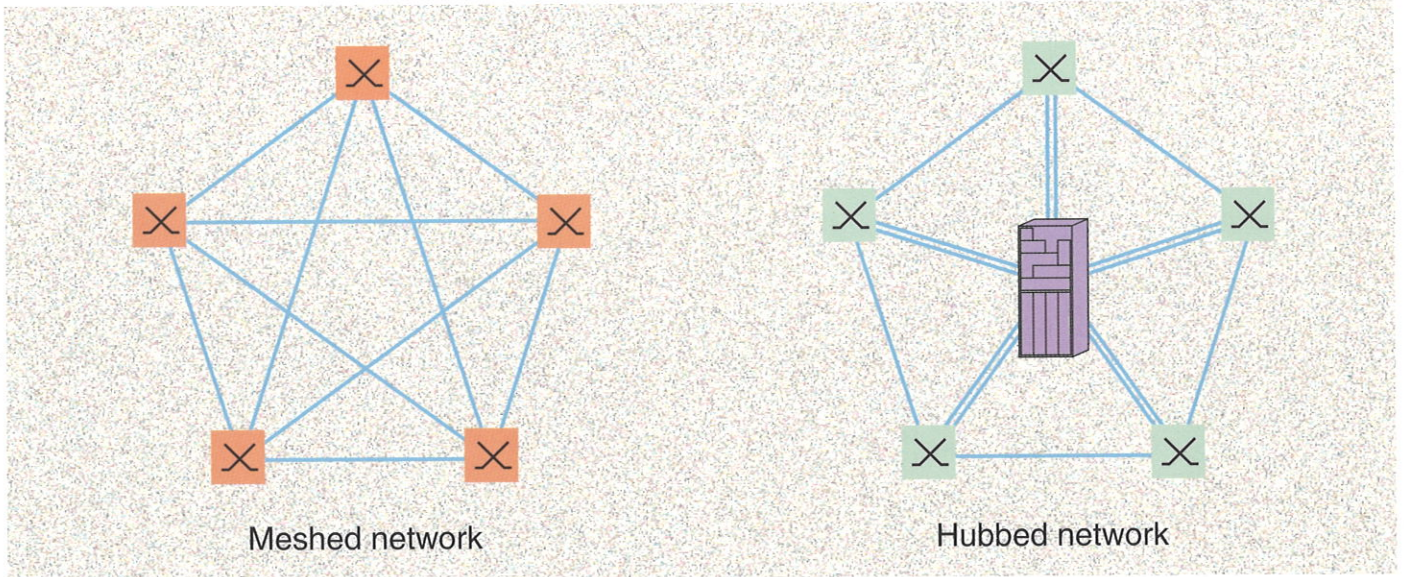
A further benefit of AXD 1/0 is the ability to utilize transmission resources far more effectively, through 'grooming' and 'hubbing'. Grooming allows 64 kbit/s channels to be allocated rationally into 2 Mbit/s bearers, increasing their load-factor and, thereby, increasing the capacity of the network as a whole.

Hubbing enables 'all-to-all' connections in meshed transmission networks to be rationalised, instead routing traffic through a central

cross-connect node (a 'hub'). Traffic is concentrated through the hub, providing increased flexibility in allocating transmission capacity between exchanges. Non-hubbed connections remain as low-priority back-up routes. Services routed via the hub can be protected, and switched immediately to alternative routes in the event of a disturbance.



*A large (512-port) AXD 1/0 cross-connect system, for leased-line provision and network grooming/hubbing applications.*



*'Hubbing' with AXD 1/0 provides increased flexibility and reliability on transmission routes between exchanges, compared with a meshed network.*

All AXD 1/0 functions are software-controlled, and can be centrally managed from a single point using Ericsson's FMAS-NM system, greatly reducing your field engineering commitments.

**THE UMUX FLEXIBLE MULTIPLEXER**

Ericsson's UMUX is a versatile access system that combines multiplexing and cross-connection functions in a single node. Its primary role is as an access multiplexer, combining analogue and digital signals from subscriber equipment into 2 Mbit/s signals. Additional functions allow individual 64 kbit/s channels within these groups to be switched separately, and transferred from one 2 Mbit/s signal to another. And drop/insert functions allow individual channels to be extracted and re-used anywhere in the network.

UMUX is a modular system, with a very wide variety of interface options including POTS, ISDN, leased lines and various types of data access. Thanks to the modular design, upgrades, extensions and reconfigurations are simple: they simply involve adding or changing interface cards.

The UMUX Network Element Manager (UNEM) provides central control of UMUX multiplexers. Stored configurations can be uploaded from the UMUX, modified and then reloaded into the UMUX; and all UMUXs in the network can be addressed from one location via the EOC (Embedded Operation Channel).

UNEM also includes facilities for testing and fault localization, and provides a graphical overview of the network, with automatic notification of alarms. The system is equipped with the international standard TMN Q.3 interface, which can be used to integrate UNEM with higher-level network management systems.



*The UMUX Network Element Manager.*

#### CLIPS: END-TO-END SERVICE QUALITY MEASUREMENT

Quality assurance on leased lines – particularly international circuits – is a critical issue in service provision. Ericsson's CLIPS (Customer Line Performance System) provides end-to-end monitoring of 2 Mbit/s leased-line services. Compact units at the end-users premises use CRC coding to monitor service quality continuously. Measurements are fed back through the network to Ericsson's ETMS PDH management system.

#### AXD 4/1 DIGITAL CROSS-CONNECT SYSTEM

While the AXD 1/0 cross-connect handles 64 kbit/s and 2 Mbit/s signals, the AXD 4/1 cross-connect provides similar functionality in handling higher-order PDH signals. AXD 4/1 switches and cross-connects 2, 34 and 140 Mbit/s signals, and provides complete flexibility in configuring and protecting your inter-exchange and backbone transmission systems. Like AXD 1/0, all the functions of AXD 4/1 are controlled by software and can be centrally managed from a single point.

Moreover, the AXD 4/1 system can work as a bridge between PDH and SDH transport network systems. AXD 4/1 can package PDH tributaries (2, 34 or 140 Mbit/s) within 155 Mbit/s SDH bearers; and also extract them at the other end. The system therefore allows you to build up an SDH backbone network, with its superior capacity and management characteristics, while maintaining all the functionality of your existing PDH systems.



*The AXD 4/1 system switches and cross-connects 2, 34 and 140 Mbit/s PDH systems, and provides a 'bridge' from PDH to SDH transmission.*

#### SERIES 7000 PLUS PROTECTION SWITCHING SYSTEMS

The ZAN 011 and ZAN 013 protection switching systems provide maximum availability of PDH transmission services in leased-line networks, or for essential trunk routes, running at any line speed from 2 to 140 Mbit/s. The systems split each signal before transmission and send it across two paths, comparing the signals at the other end. If errors are detected, protection switching can automatically be performed in less than 10 ms. Individual digital paths can be protected, even if the paths include higher-order line systems with associated multiplexing equipment.



*The ZAN 011 protection switching system can switch a 2 or 8 Mbit/s signal to an alternative path within 10ms of detecting an alarm.*

*Ericsson's centralized management systems transform your transmission systems from a collection of boxes into an integrated network. They provide vital management information, improve transmission quality, cut O&M requirements and streamline end-user service provision.*



## Automate your transmission network management and watch efficiency grow


Quality, efficiency and flexibility are the watchwords in network operation today.

Quality is important, because end-users are becoming more and more dependent on their telecommunications links for their business — and so they are more critical of drops in network performance, or interruptions in service. Poor quality in your own transmission network will encourage business customers to look at other sources of supply.

Efficiency is important, because of the need to keep operating costs low, and maximize the productive use of highly-trained human resources.

And flexibility is important, because you need to be able to react fast — when a business customer orders a leased-line service, for instance; or when you need to optimize network traffic flows.





Ericsson's transport network management and service provision systems, ETMS and FMAS-NM, maximize the quality, efficiency and flexibility of your PDH network.

ETMS: CENTRAL MANAGEMENT  
FOR YOUR TOTAL PDH NETWORK

ETMS (Ericsson Transmission Management System) is a centralized O&M system which looks after alarm surveillance, fault localization and performance monitoring in PDH networks. This greatly increases in-service performance, and boosts your field engineers' productivity too.

ETMS doesn't just manage Ericsson's Series 7000 Plus equipment. Our previous generation PDH transmission systems (Series 7000) can also be controlled; and an optional stand-alone monitoring system permits transmission equipment from other vendors to be connected. Signalling equipment, radio links and ancillary systems such as power equipment, smoke detectors and so on can also be monitored by ETMS.

### ETMS functions at a glance

#### ALARM SURVEILLANCE

- reporting and logging of alarms from Series 7000 Plus and other systems
- generation of alarms when performance thresholds are breached
- on-demand presentation of alarm summaries

#### FAULT LOCALIZATION

- automatic, regular diagnostic checks of transmission equipment, by measuring bit error rate (BER)
- automatic or on-demand pin-pointing of faulty repeater sections in digital line systems
- 'cable test' feature to identify faulty cable sections

#### PERFORMANCE MONITORING

- performance measurement according to CCITT recommendation G.821:
  - errored seconds (ES)
  - severely errored seconds (SES)
  - unavailable seconds (UAS)
- continuous measurements are reported every 15 minutes, and archived
- permits trend analysis and planned preventive maintenance before traffic-affecting failures occur



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*The Ericsson Transmission Management System (ETMS) collects data from PDH network elements, and presents a graphic overview of network performance.*

With ETMS, up to 800 PDH network elements, and 3000 alarm detection points, can be managed from a single central point. You always have complete information on the performance of your transmission network; and your field engineering operations become much more efficient.

The operator interface to ETMS uses Windows-based PCs, or VT-100 compatible terminals. Several ETMS systems can be run from one PC or workstation, with automatic fault reporting and remote log-in procedures. Each ETMS system

can serve several operators: there are four User Categories, each with defined functions, to enhance security.

Performance data from ZAN 202 can be forwarded to a database, giving you the possibility to compile end-to-end transmission quality audits.

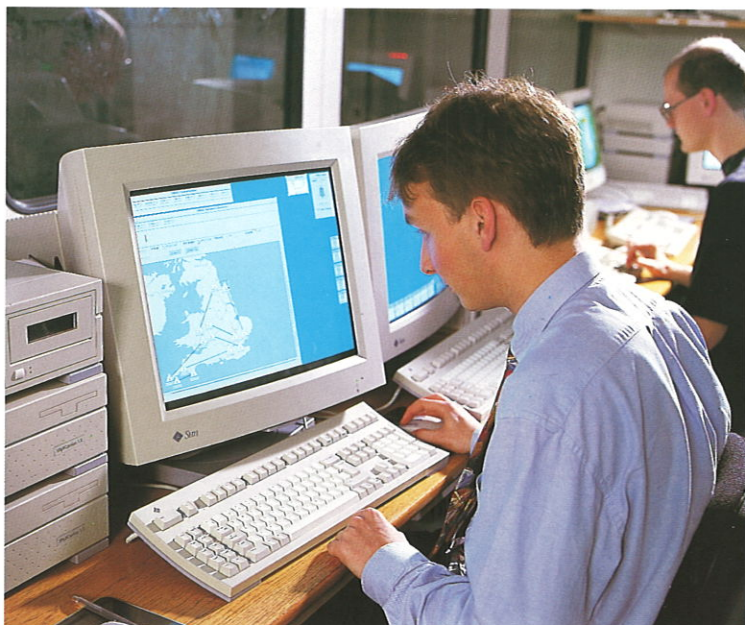
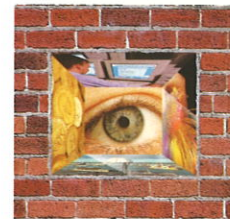
#### FMAS-NM: TAKING PDH FURTHER THAN EVER BEFORE

Ericsson's FMAS-NM (Facility Management System — Network Manager), is the management system for Ericsson's digital cross-connect systems (AXD 1/0 and AXD 4/1); and also provides centralized management for all of the ETNA SDH systems.

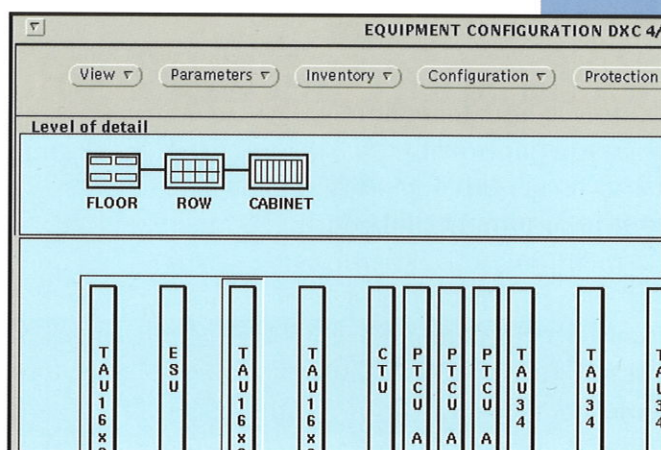
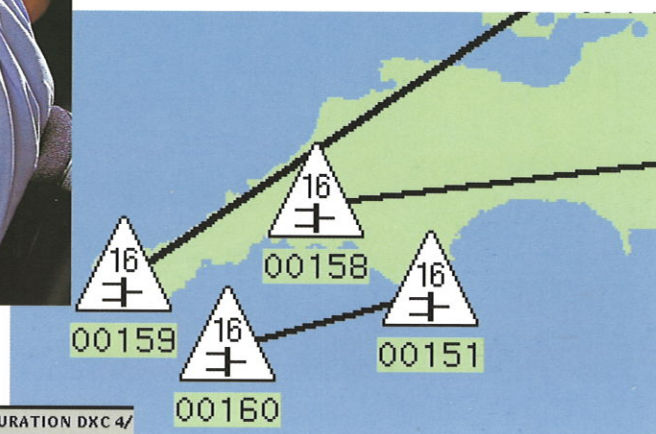
The FMAS-NM application for the AXD 1/0 cross-connect lets you take central control of your total digital leased-line network, for instance. Connections through the network can be set up and or torn down in seconds. All that is required is a few mouse-clicks and key-strokes at the FMAS workstation.

You can also use this solution to enhance efficiency throughout your PDH network: improving the utilization of 2 Mbit/s channels in the inter-exchange network, for instance.

Another FMAS-NM application manages the AXD 4/1 cross-connect, providing complete configuration, fault and performance management for your backbone transmission resources. And, as you begin to implement SDH systems within your network, you'll find that FMAS-NM can manage them too.



*Running on powerful UNIX workstations, Ericsson's FMAS-NM provide central management for cross-connect systems, and for the new generation of SDH transport network systems too.*



FMAS-NM implements the TMN international standards for network management, as specified by ITU-T. This makes it possible to interface the system to any other TMN-compliant systems or network equipment.

FMAS-NM is a member of Ericsson's TMOS (Telecommunications Management and Operations Support) family of network management systems. It

implements industry standards in computing and telecommunications, and uses modular and scalable hardware and software. As a TMOS system, FMAS can be integrated with other TMOS applications: for instance systems for the management of PSTN services, cellular networks, and in the future for broadband service management. FMAS can also provide standards-based interfaces upwards to operators' service and business management systems.

*The Ericsson Transport Network Architecture (ETNA) is Ericsson's complete concept for transmission and transport networks, bringing together PDH and SDH systems to provide a total network solution that is ready to integrate new technologies such as ATM (Asynchronous Transfer Mode) and the broadband and multimedia services they will enable.*



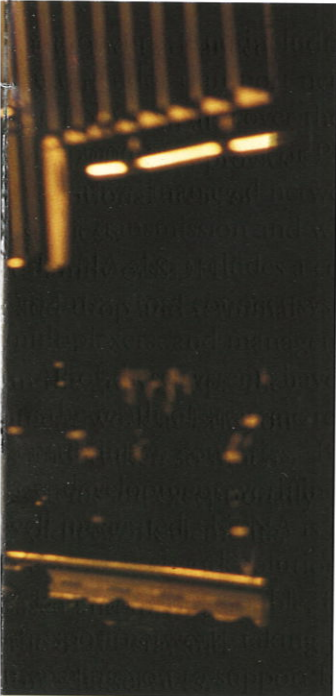
## ETNA: the complete transport network solution

For telecom network operators around the world, upgrading the transport network is a strategic imperative for long-term revenue protection.

If a network cannot offer advanced, high-quality, flexible, high-bandwidth services, then it will lose revenue. Conversely, network owners who seize the opportunity to bring new services to market ahead of their competitors, can quickly establish a market-leading position.

The transmission and transport networks are the mechanism for providing these services. For Ericsson, transport networks are a core technology. Thousands of man-years of development work have been invested in transport network research and development.

The result is the Ericsson Transport Network Architecture, ETNA. A comprehensive range of PDH and SDH systems, with a completely new design from the ground up. A modular design that simplifies hardware and software architecture, and makes for highly versatile



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components. And including FMAS, the industry's most advanced, multi-vendor transport network management system.

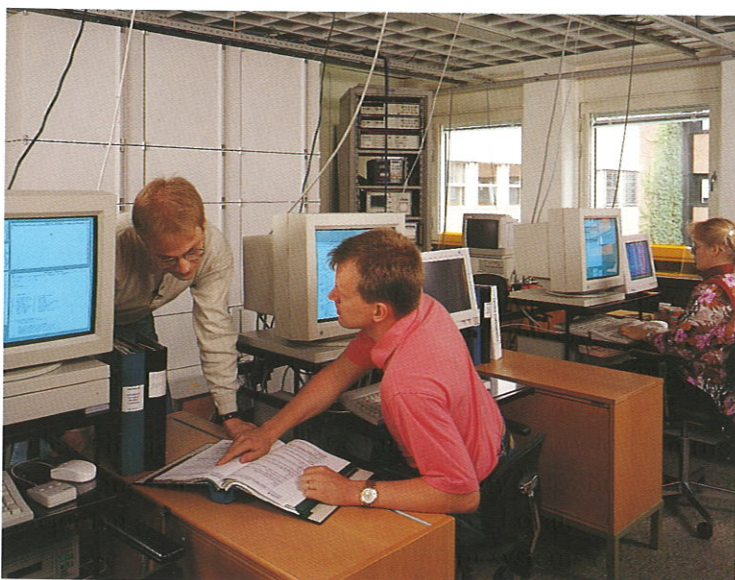
ETNA systems cover the complete needs of transmission and transport networks. For PDH networking, Series 7000 Plus provides innovative, managed network solutions in the traditional areas of PSTN transmission and wideband leased-line services.

ETNA also includes a completely integrated family of SDH systems: cross-connect systems, synchronous add-drop and terminal multiplexers, and management systems.

All of these systems have been designed from the ground up: they are the result of strategic research and development work at Ericsson centres in ten countries. Because Ericsson has undertaken so much core development work in-house, the ETNA systems are exceptionally well integrated. ETNA is not just a collection of network elements, but a true network solution.

ETNA creates a stable, flexible, standards-based and intelligent transport network, taking you smoothly into the SDH era, and preparing you to support broadband and multimedia services. Indeed, much of Ericsson's development of ATM-based broadband systems has taken place in parallel with SDH systems, to ensure that ETNA will provide the best possible transport infrastructure for broadband services based on ATM.

And just as important, ETNA systems fit seamlessly into the existing transmission environment, increasing its capabilities and maximising your returns on investment.



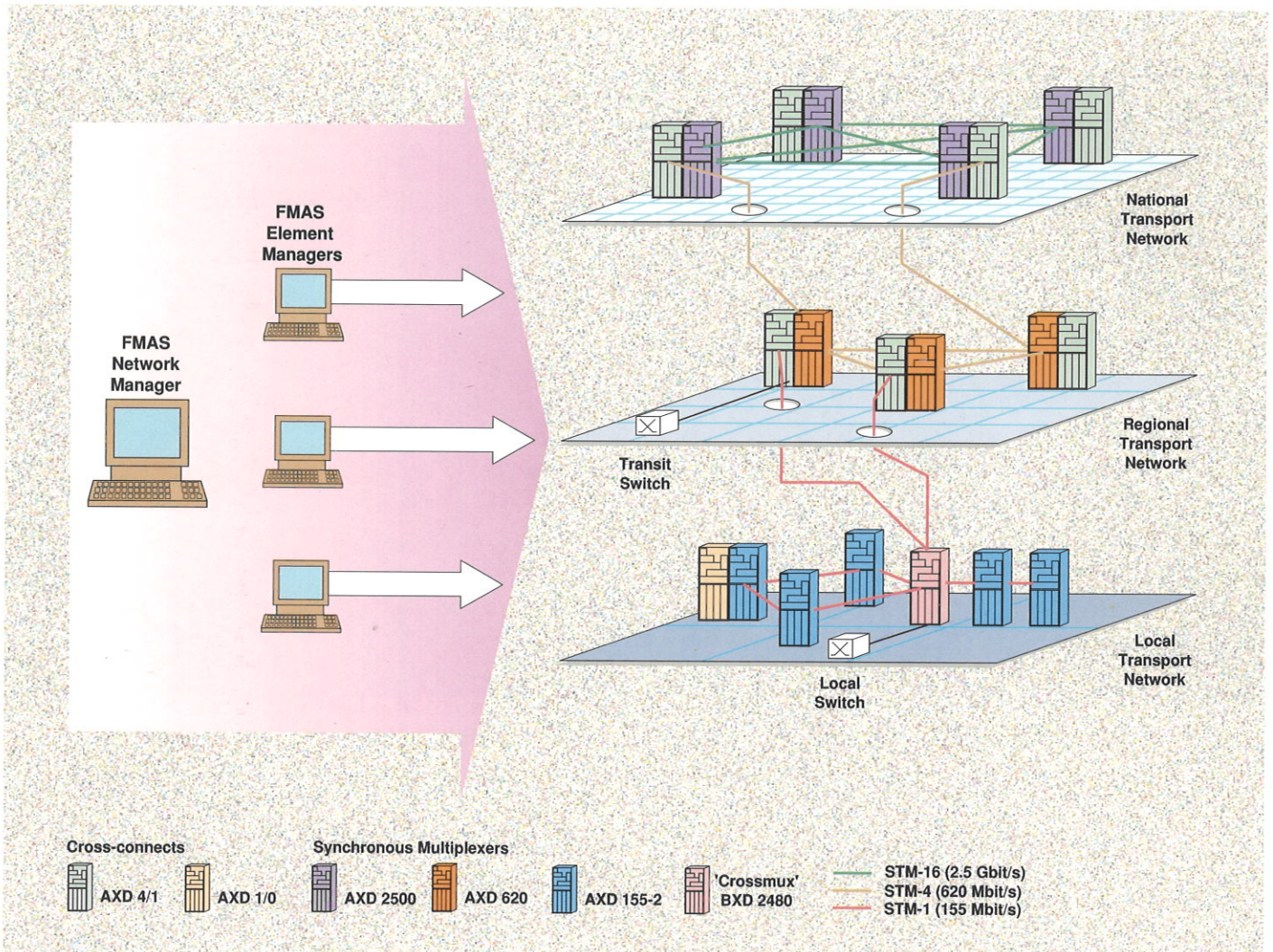
#### A HIERARCHY FOR ALL LEVELS OF THE TRANSPORT NETWORK

ETNA systems cover all applications, at all levels of the transport network hierarchy. High-capacity cross-connect and multiplexing systems handle high-speed trunks at up to 2.5 Gbit/s at the national and regional levels; at the local level, add-drop multiplexers, narrowband and wideband cross-connects and a wide variety of other access systems provide end-user connection to services.

All this equipment, at every level in the network, is managed by Ericsson's range of management systems. Local, regional and national management systems can be




## THE ERICSSON TRANSPORT NETWORK ARCHITECTURE – SDH SYSTEMS



installed, each communicating with each other, and each able to take over the functions of subordinate systems whenever necessary.

At the top of the management hierarchy is FMAS-NM: the command centre for the whole of the network. FMAS-NM manages ETNA network elements; and thanks to standardized interfaces it can manage network elements and element managers supplied by other vendors too. FMAS-NM also provides open interfaces upwards towards service and business management systems, providing the opportunity to create powerful solutions that automate all aspects of the operator's business processes.



### TAKE A GLOBAL VIEW

With Ericsson's systems, you could build a complete, managed transmission network to handle your most important customers' national, or even global, networking needs.

Sounds a bit futuristic? Well, one of our customers opened just such a global network, using Ericsson's cross-connect and network management systems, in the summer of 1994.

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Uhura(7)

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Ericsson's 75,000 employees are active in more than 100 countries. Their combined expertise in switching, radio and networking makes Ericsson a world leader in telecommunications.

Business Area Public Telecommunications creates, markets and supplies advanced systems and products for public telecommunications networks.

The successful AXE system for switching and intelligent network applications has been installed in more than 100 countries. Other important product areas are transport network systems and network management and operations systems.