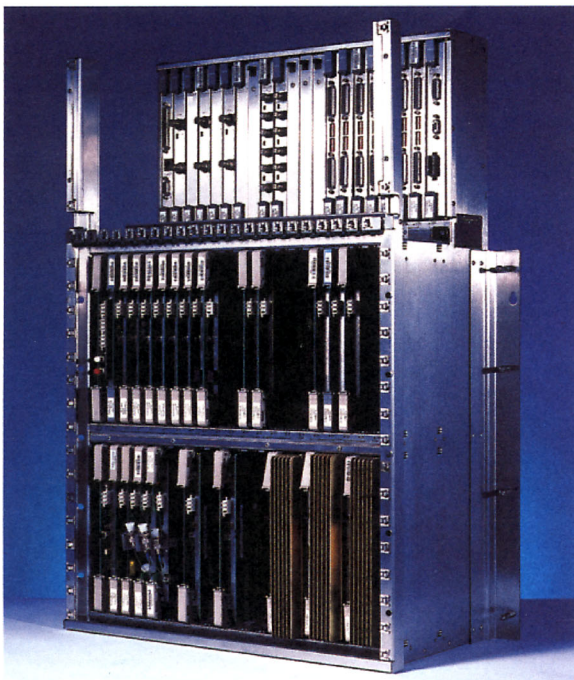# FBX-ACCESS
Consolidation Unit

The Consolidation Unit (CU) forms the core of the FBX-Access Multi-Service SDH Solution.

Connectivity

Incorporating many advanced features, the CU can be connected to a broad range of Network Terminating Equipment (NTE). Alternatively it can be installed directly into the customer's premises where there is a high bandwidth or large multiple service requirement.

Upgradeability

Based on a high capacity SDH Multiplexer, one of the CU's many advantages is its ability to upgrade services from circuit-based products - such as 2Mbit/s E1 leased lines - to ATM cell-based services. This provides the Network Operator with a future-proof guarantee, enabling the easy incorporation of future services onto the same platform. As a result, Fujitsu's FBX-Access system helps to manage the uncertainty of when and where large bandwidth and cell-based services will be required.

The CU is based on a highly reliable STM-1/4/16 SDH cross-connect multiplexer. The system shelf design allows straightforward expansion and upgrading, enabling multiple services to be provided by the same access node.

Comprehensive Functionality

Incorporating state of the art technology from Fujitsu's established FLX series of SDH & SONET equipment, the CU provides a comprehensive delivery system for a wide range of data rates.

The tributaries supported directly by the CU are:

- 2Mbit/s
- 34Mbit/s
- 45Mbit/s
- 140Mbit/s
- STM-1e
- STM-1 Optical

If installed directly into the customer's premises it can offer aggregate services of STM-1, 4 & 16.

Ease of Installation

Utilising LSI and surface-mount technology, the CU is a compact sub-rack measuring 750mm high. Two FBX-Access CUs can be installed within an ETSI 2200mm rack. The sub-rack's design features dedicated cable and fibre management facilities, ensuring ease of installation and maximising long-term reliability by preventing fibre damage caused by excessive bending and stretching.

True Multi-Service Access Node Performance

A software-download capability enables the FBX-Access system to be upgraded remotely, while the CU's modular structure enables the line interfaces to be easily expanded from STM-1 to STM-4, and to STM-16. Card upgrades also allow the hardware to support a mix of both circuit and cell-based services, with the latter consolidated using an ATM switch fabric card. As a result, FBX-Access can claim to be a true multi-service access node, providing wideband and broadband (ATM) services from the same node.

Application Focus

With configuration options for NTE delivery or circuit breakout, the CU is highly suitable for both exchange and large customer applications. Flexible protection options of units and line cards are available, enabling customers to be offered a wide range of Service Level Agreements to meet specific requirements.

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FBX-ACCESS Network Terminating Equipment (NTE)
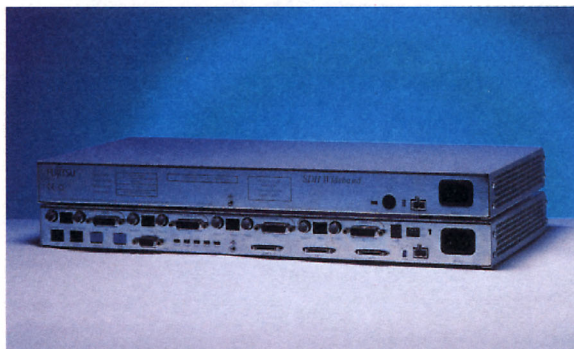
With FBX-Access, fully managed SDH reliability can be delivered to all types of customer. The NTE can be connected to the CU over a fibre, copper or radio link, allowing true multi-service, multi-technology SDH delivery.

Cost-Effective SDH Delivery

Traditionally, the delivery of services using SDH has only been available to large corporate customers, involving costly SDH nodes designed for Core applications. Using FBX-Access, a variety of PDH and SDH interfaces can be delivered, using customer-located NTE. As a result, small and medium-sized customers can finally benefit from SDH delivery cost-effectively. Even when the customer interface is a PDH service, it is delivered using SDH reliability all the way to the NTE. Service delivery using SDH over fibre, copper and radio technologies has many benefits. These include the ability to manage performance, maintain service and provide remote provisioning to agreed SLAs from a selected Network Interface.

Flexibility, Modular Design

The FBX-Access NTE has been designed to give the maximum flexibility for the installation, protection and expansion of both circuit and cell-based services. The modular approach allows installation on desks, walls and in 19" cabinets. Power is provided by 240V AC or 48V DC. Battery Back-Up Units are available to provide added protection against power failure at the customers' premises. Most importantly, delivery using an NTE removes the need for a separate equipment room, in the majority of cases.

Wide-Ranging Service Support

The extensive choice of FBX-Access NTE options supports a wide range of services - from nx64Kbit/s to STM-1. The system's modular architecture enables further circuit and cell-based NTE units to be developed, as new services or data rates are required.

Fujitsu's FBX-ACCESS NTE Range

The NTE range consists of the following, with flexible options for expansion and protection available:

- 1x2Mbit/s HDSL
- 4x2Mbit/s
- 16x2Mbit/s
- 34&45Mbit/s
- 140Mbit/s&STM-1e
- STM-1 Optical Add Drop Mux

The NTE offers flexible interface presentations to the customer to meet a variety of circuit requirements. For example, the 4x2Mbit/s NTE (FNTE-D12) offers four 2 Mbit/s circuits for use with the following presentations

- G703 ($75\Omega/120\Omega$) & G704, I.421, V11/X21, nx64Kbit/s (n=1 to 31)

Inbuilt expansion ports cater for bandwidth increases required beyond the initial deployment. In the case of the 4x2Mbit/s NTE, this allows the customer installation to be expanded up to a maximum of 12x2Mbit/s, using two expansion units. The key benefit is that no additional line plant is required to achieve the increase in customer bandwidth. This flexibility ensures that costs are only incurred when revenues increase. The provision of ATM cell-based services is also achieved using the NTE expansion ports.
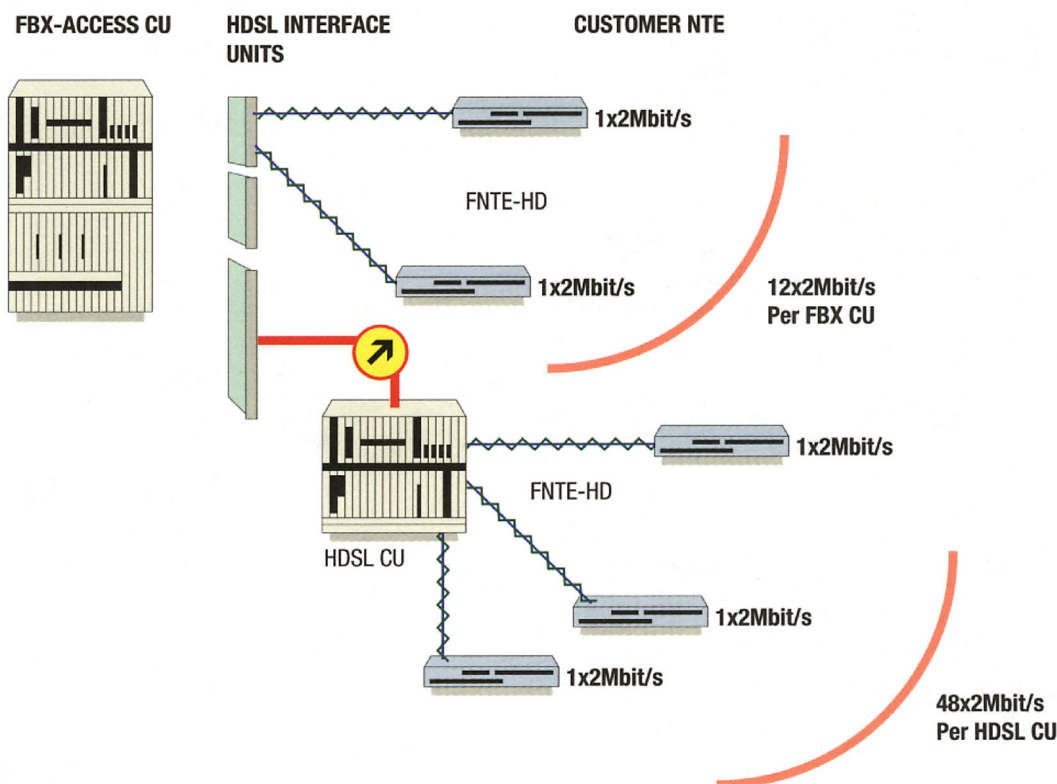
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FBX-ACCESS - Multi-Technology Delivery: Copper

One of the key features of Fujitsu's FBX-Access Multi-Service SDH Solution is its inherent flexibility - the Network Terminating Equipment (NTE) can be connected to the CU over a fibre, copper or radio link. This allows true multi-service, multi-technology SDH delivery - catering for the present and future requirements of both new and traditional operators alike. All technologies are managed by a single Integrated NMS minimising management platform and enable common work processes to be developed.

Copper Delivery

For networks that require services to be provided through an existing copper network, delivery to a single channel 2 Mbit/s HDSL NTE is available. Utilising two metallic pairs, SDH is delivered, using 2B1Q, on the line-powered NTE where conversion back to the PDH signal is achieved. For smaller scale applications, the NTE is terminated on an integrated dual line card, situated in the FBX-Access CU. Larger requirements can be catered for through a separate HDSL CU, offering 48 lines from a single shelf. A choice of STM-1 optical or electrical connection is provided between the FBX-Access and HDSL CUs. Stand-alone configurations are available that do not require the use of an FBX-Access CU.

Copper Delivery to NTE

FBX-ACCESS CU   HDSL INTERFACE UNITS   CUSTOMER NTE

1x2Mbit/s

FNTE-HD

1x2Mbit/s

12x2Mbit/s Per FBX CU

1x2Mbit/s

FNTE-HD

HDSL CU

1x2Mbit/s

1x2Mbit/s

48x2Mbit/s Per HDSL CU

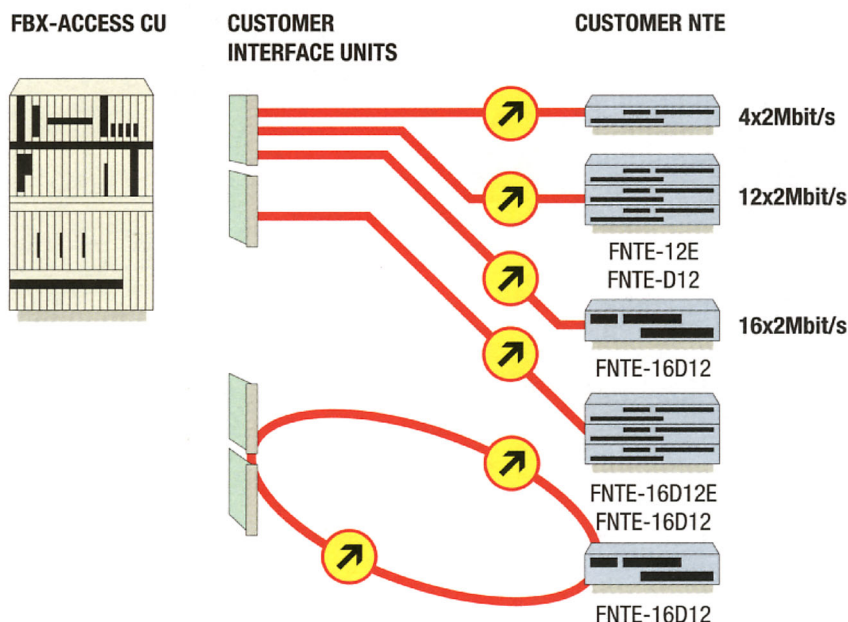| For further information please contact:			
Sales & Marketing	**Tel:**	0121 717 6444	**email:** mktg@ftel.co.uk
Fujitsu Telecommunications Europe Limited	**Fax:**	0121 717 6161	**web:** www.ftel.co.uk

FBX-ACCESS - Multi-Technology Delivery: Fibre

One of the key features of Fujitsu's FBX-Access Multi-Service SDH Solution is its inherent flexibility - the Network Terminating Equipment (NTE) can be connected to the CU over a fibre, copper or radio link. This allows true multi-service, multi-technology SDH delivery - catering for the present and future requirements of both new and traditional operators alike. All technologies are managed by a single Integrated NMS minimising management platform and enable common work processes to be developed.

Fibre Delivery

Delivery to the NTE is achieved by connection over a single fibre back to a single or triple customer interface unit in the CU. The choice of interface will depend on the customer bandwidth requirements at time of installation with considerations to likely future growth. Two interfaces can be used for protection hereby offering greater network resilience if required. Future options will allow the dual-parenting of NTE from two different FBX-Access CUs.

Fibre Delivery to NTE

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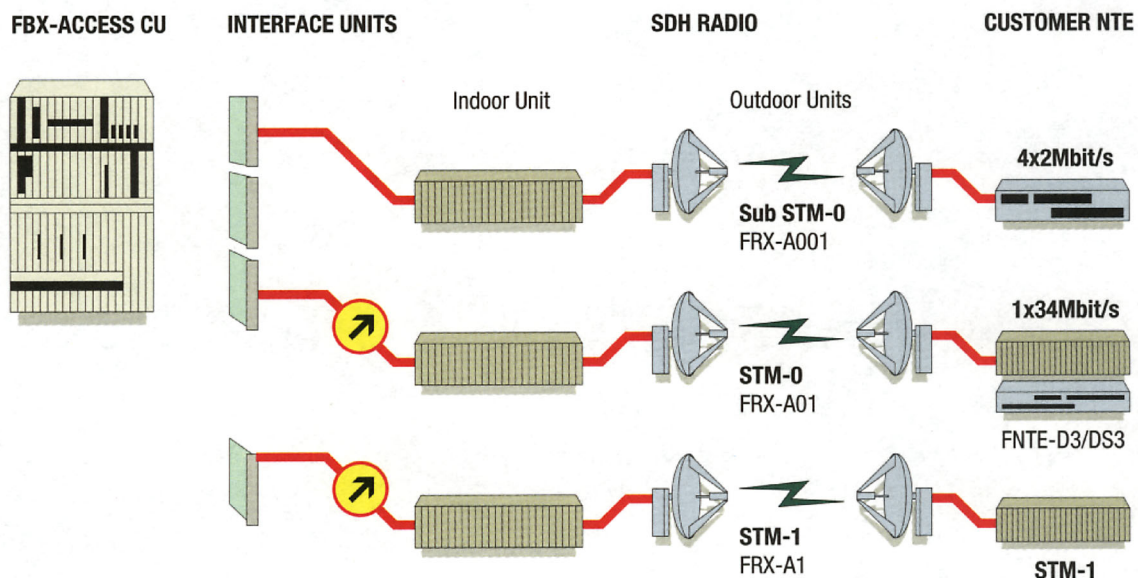web: www.ftel.co.uk

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FBX-ACCESS - Multi-Technology Delivery: Radio

One of the key features of Fujitsu's FBX-Access Multi-Service SDH Solution is its inherent flexibility - the Network Terminating Equipment (NTE) can be connected to the CU over a fibre, copper or radio link. This allows true multi-service, multi-technology SDH delivery - catering for the present and future requirements of both new and traditional operators alike. All technologies are managed by a single Integrated NMS minimising management platform and enable common work processes to be developed.

Radio Delivery

Whether for rapid deployment or for backhaul protection in areas where no fibre or copper exists, the FBX-Access platform offers a flexible and cost-effective range of SDH solutions - delivering services that meet different customer bandwidth requirements. Utilising STM-1, STM-0 and Sub STM-0 radio technology, delivery to standard NTE is available, offering 4x2Mbit/s up to STM-1 services. For 4x2Mbit/s delivery, spectrum-efficient radio technology allows multiple system deployment within small geographical areas. Stand-alone configurations are available that do not require the use of an FBX-Access CU.

Radio Delivery to NTE

FBX-ACCESS CU	INTERFACE UNITS	SDH RADIO		CUSTOMER NTE
		Indoor Unit	Outdoor Units	

Sub STM-0
FRX-A001

4x2Mbit/s

STM-0
FRX-A01

1x34Mbit/s

FNTE-D3/DS3

STM-1
FRX-A1

STM-1

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FBX-ACCESS
Network Management

An advanced network management system is essential if operating costs are to be kept low and rapid responses to customer demands are to be maintained. FLEXR-EM/AC is the network management system for FBX-Access, designed around a modular architecture and a standardised access management model. Providing advanced management facilities, the system provides network operators with the flexibility they need to deliver the highest levels of service to customers, combined with the tools for total responsiveness to user demands.
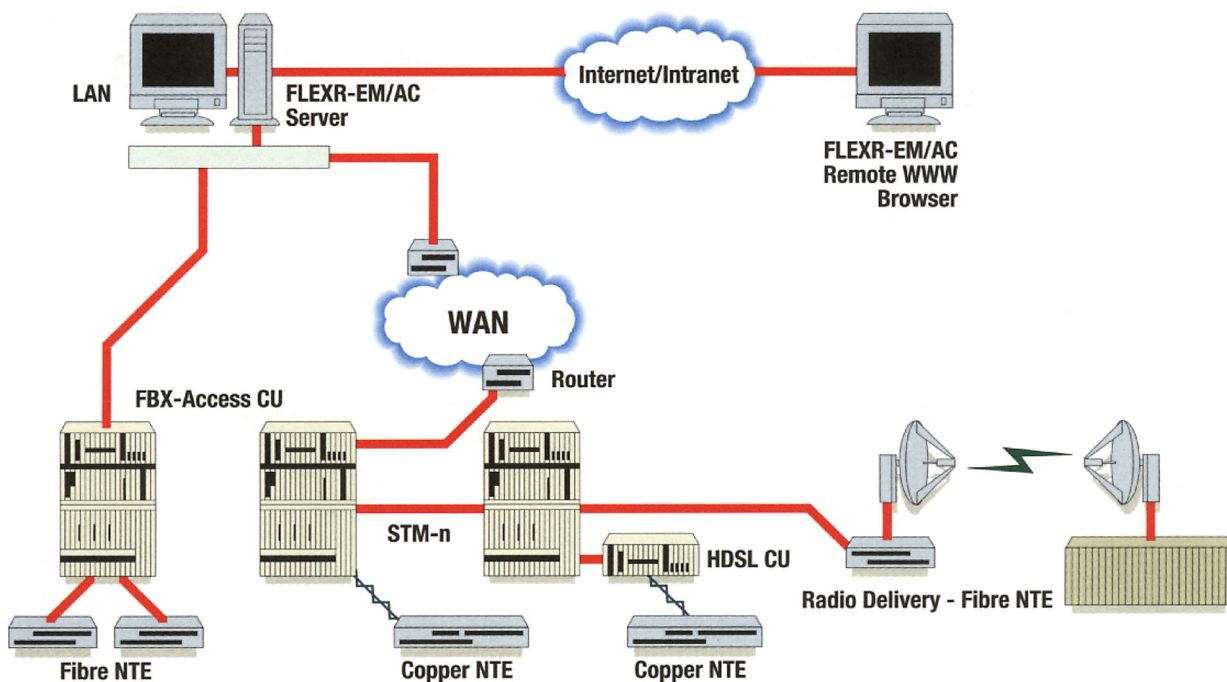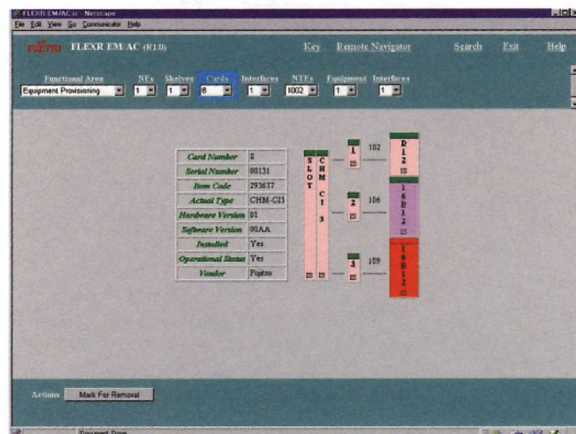
FLEXR-EM/AC supports:

• Integrated management of different access technologies and multi-vendor equipment - reducing the number of separate management systems required

• Common work practices across access technologies, reducing the chance of error and speeding up management of the network

• Pre-provisioning, fault localisation, capacity and performance management - accelerating delivery of service, providing fast identification of faults and improving network utilisation

• A Web-based interface, allowing management of the FBX-Access network from any location

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