



## broadband central office

**TELINDUS OFFERS A FULL RANGE OF CENTRAL OFFICE (CO) ACCESS SOLUTIONS, FOR USE IN A TDM AND BROADBAND ACCESS ENVIRONMENT.**

This chapter describes the broadband central office solutions designed for integration into IP, ATM or Frame-Relay environments.

The Telindus 2400 mini-DSLAM (Digital Subscriber Line Access Multiplexer) series can be used for the delivery of business oriented broadband services and for installations in areas with few customers, where flexibility on the backhaul connection to the backbone is key.

All Telindus Central Office solutions can be controlled by a variety of carrier-grade maintenance and management tools, which are common for all centrally and remotely installed network elements.

# 2400 ADSL / SHDSL SERIES



**> THE TELINDUS 2400 MINI-DSLAM SERIES ENABLES ENTERPRISES AND SERVICE PROVIDERS TO DEPLOY BUSINESS SERVICES OVER ADSL AND SHDSL, WHILE MAINTAINING A MAXIMUM FLEXIBILITY FOR THE CONNECTION TO THE BACKBONE.**

Apart from a fixed 100Base-T backbone connection, the Telindus 2400 Series can accept various modular interfaces with support for PPP, Frame-Relay or ATM. These interfaces include:

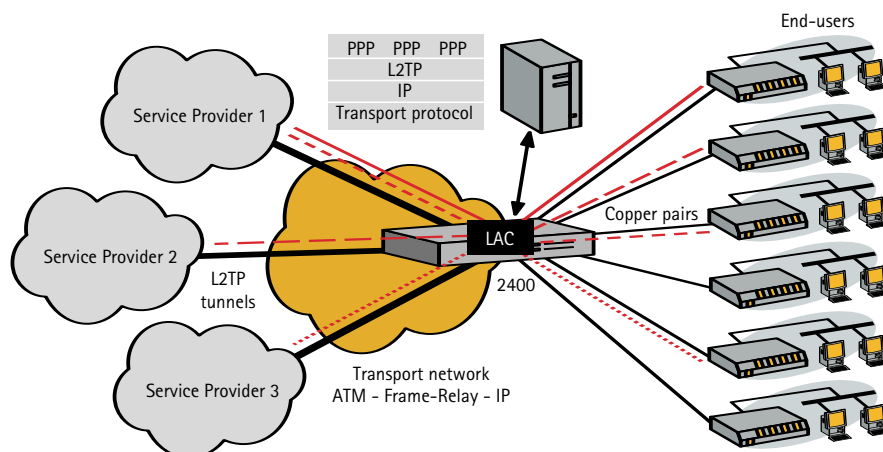
- > Multiple E1 (up to 8) with support for IMA (Inverse Multiplexing over ATM), multilink PPP or multilink Frame-Relay. The number of E1 lines and the encapsulation scheme effectively used can be selected by configuration (e.g. 4x E1 IMA)
- > E3/T3\* with support for PPP, Frame-Relay or ATM
- > STM1\* with support for ATM
- > 10/100 Ethernet interface with built-in 4 port switch\*

Fully supported by the TDRE (Telindus Dynamic Routing Engine), the 2400 Operating System supports ATM switching, full IP-routing, bridging and VLAN switching. The unit can be split into multiple bridge groups, enabling direct mappings

between DSL lines and VLANs. In addition it has an extended support for IP CoS (Class of Service) and it can initiate and terminate VPN (Virtual Private Network) circuits. Therefore, the Telindus 2400 Series can be used for supporting services like VoIP (Voice over IP) and intranet applications.

Integrated Service Selection (LAC: L2TP Access Concentrator) allows selecting the service based on the user ID and password. This allows the set-up of a complete service, without the need for installing a separate BAS (Broadband Access Server).

**✓ INTEGRATED SERVICE SELECTION FUNCTIONALITY\***



## FEATURES & BENEFITS

- > SMALL ADSL/SHDSL DSLAM FOR PROFESSIONAL BROADBAND SERVICES
- > 1 UNIT HIGH HOUSING FOR COMPACT CENTRAL-OFFICE SOLUTION
- > UP TO 24 ADSL OR SHDSL LINE PAIRS PER UNIT WITH POSSIBILITY FOR CASCADING
- > MULTIPLE PROTOCOL SUPPORT FOR FLEXIBLE MIGRATION FROM FRAME-RELAY / ATM TO IP TRANSPORT
- > MODULAR INTERFACE FOR MAXIMUM FLEXIBILITY FOR BACKBONE CONNECTIVITY

## TELINDUS ACCESS SOLUTIONS

> TELINDUS DYNAMIC ROUTING ENGINE

> ACCESS ROUTERS

> BROADBAND CENTRAL OFFICE

> BROADBAND CPE

> TDM CENTRAL OFFICE

> VOICEBAND MODEMS

> TDM DSL MODEMS

> FIBRE OPTIC MODEMS

> MULTIPLEXERS & INTERFACE CONVERTERS

> ISDN MULTIPLEXERS

> MODULAR DATA INTERFACES

> NETWORK MAINTENANCE & MANAGEMENT

> ACCESSORIES

## TELINDUS SURVEILLANCE SOLUTIONS

> TELINDUS SURVEILLANCE SOLUTIONS

## TELINDUS SERVICES PORTFOLIO

> INTEGRATED APPLICATIONS

> REMOTE MANAGEMENT SERVICES

## REFERENCE SECTION

CONTACT TELINDUS

The unit comes with an advanced built-in management agent and is supported by the complete TMA management suite for local and remote control. The existing backbone infrastructure (IP, ATM or Frame-relay) can be used to transport all management information to a central location without the need for a separate overlay network.

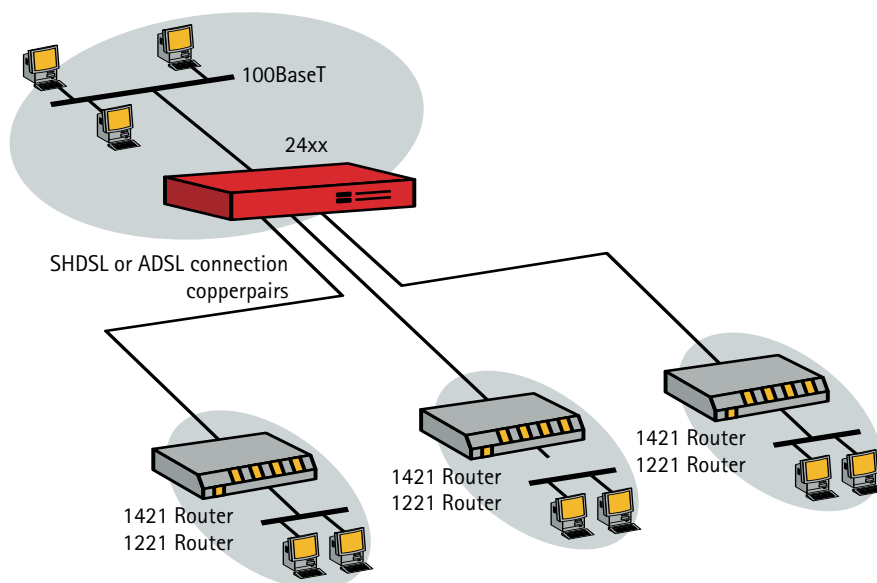
The Telindus 2400 access concentrator houses 8, 16 or 24 ADSL or SHDSL modems. Two SHDSL circuits can also be combined to increase the distance or speed towards the end-users.

The Telindus 2400 series comes in a very compact size (1 unit high) and can be used as desktop unit or can be rack-mounted through the optional rack-mount-kit. It fits in 30 cm deep ETSI racks with all connectors and indicators on the front. Combined with its low power consumption it is easily stackable.

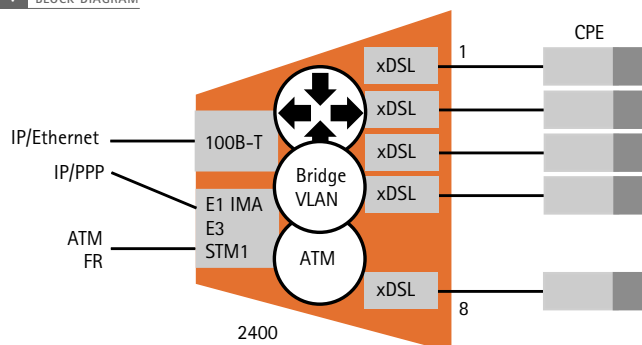
In case of IP routing, bridging or VLAN switching, several units can be cascaded via the fixed and modular Ethernet interfaces. On the last Telindus 2400 unit, the data is encapsulated for the WAN interface. In case of ATM switching, 2 units can be cascaded over Ethernet using a proprietary mechanism.

Typical applications include the rollout of business-oriented services over DSL as it is applicable in operator or campus network environments.

#### CAMPUS NETWORK CONCENTRATION



#### BLOCK DIAGRAM



Business oriented services based on:

- IP
- ATM
- Frame-Relay
- Clear channel

#### VERSIONS

Version	# DSL ports	Options	Power supply
2401 ADSL	8	Annex A / annex B, built-in splitter	-48VDC, AC
2402 ADSL	16	Annex A / annex B	-48VDC
2403 ADSL	24	Annex A / annex B	-48VDC
2421 SHDSL	8		-48VDC, AC
2422 SHDSL	16		-48VDC
2423 SHDSL	24		-48VDC

#### ADSL LINE INTERFACE

- > Single-pair ADSL line access
- > Coding: compliant to ITU-T G.992.1 (ADSL G.dmt), ITU-T G.992.2 (ADSL G.Lite), ETSI TS 101 388 v1.3.1, ITU-T G.992.3 (ADSL2 G.dmt)\* and ITU-T G.992.4 (ADSL2 G.Lite)\*
- > Support for ITU-T annex A (POTS) or Annex B (ISDN and POTS)
- > Optional integrated POTS or ISDN splitters (on 2401 versions)
- > Connector: 50 pin telco connector
- > Line speeds: Downstream: 32 kbps up to 12\* Mbps  
Upstream: 32 kbps up to 1024\* kbps
- > Performance monitoring: compliant G.826 (errored seconds, severely errored seconds, unavailability seconds)

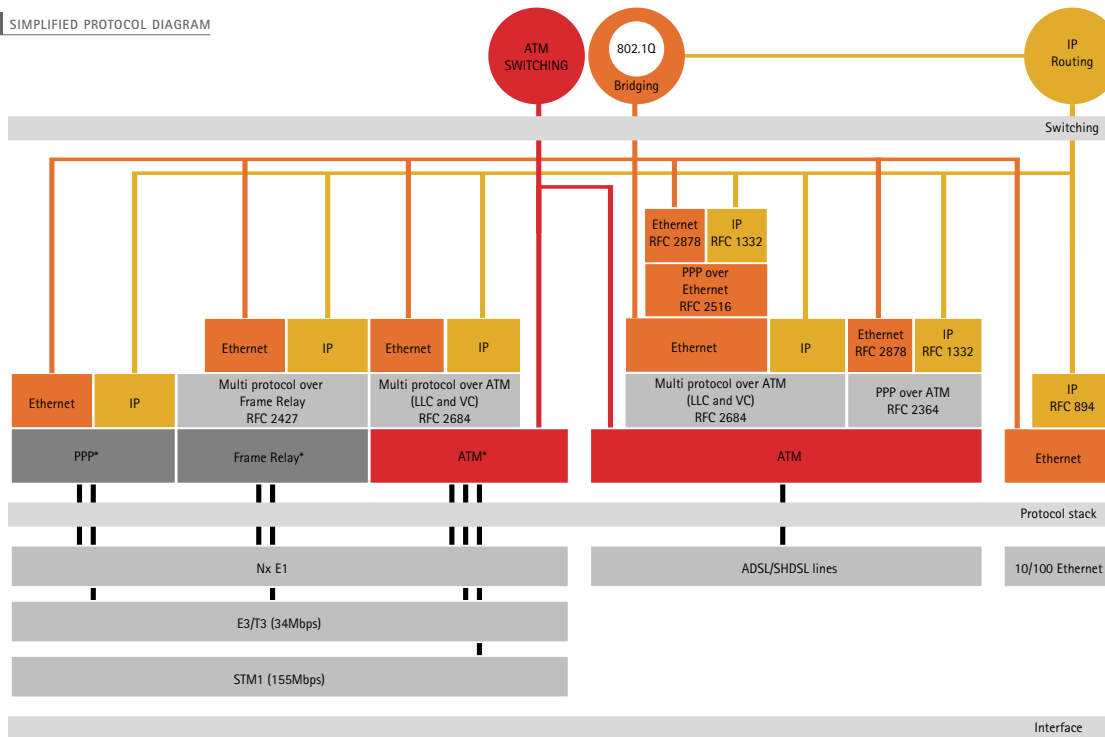
#### SHDSL LINE INTERFACE

- > Single or two-pair SHDSL line access (configurable)
- > Coding: TC PAM, compliant to ITU-T G.991.2 (G.SHDSL) and ETSI TS 101524
- > Connector: 50 pin telco connector
- > Line speeds: Single-pair: N x 64 kbps (N = 3 ... 36)  
Two-pair: N x 128 kbps (N = 3 ... 36)
- > Handshaking: compliant G.994.1 (automatic speed negotiation) or fixed speed
- > Performance monitoring: compliant G.826 (errored seconds, severely errored seconds, unavailability seconds)

#### FIXED ETHERNET UPLINK

- > Compliant with IEEE 802.3 10Mbps HDX/FDX Ethernet
- > Compliant with IEEE 802.3u 100Mbps HDX/FDX Ethernet
- > 10/100Mbps auto-sense
- > RJ45 Unshielded Twisted Pair (UTP)

## V SIMPLIFIED PROTOCOL DIAGRAM



\*Notes:  
-The STM1 module only supports ATM encapsulation  
-The 6x E1 module supports multilink operation or IMA

### MODULAR UPLINK INTERFACE:

- > Number: 1
- > For use in combination with Telindus Interface Modules (TIMs)
  - > Multiple E1 TIM
    - Support for Frame-Relay & Multilink Frame-Relay\* (up to 8 ports)
    - Support for PPP & Multilink PPP (up to 8 ports)\*
    - Support for ATM & ATM IMA (up to 6 ports)
  - > E3/T3\* TIMs
    - Support for Frame-Relay, PPP & ATM
  - > STM1\* TIM
    - Support for ATM
  - > 4 port Ethernet TIM

### CONTROL INTERFACE

- > Applicable standards: ITU-T V.24, V.28, EIA/TIA 574
- > DCE signals: RXD, TXD, SGND
- > Connector: female DB9

### STATION CLOCK INTERFACE

- > G.703/G.704, 2048 kbps, RJ45 120 Ohm

### IP ROUTING

- > Conform TDRE (Telindus Dynamic Routing Engine)
- > Protocol on DSL lines: ATM
- > Uplink Protocols: ATM, IP, PPP\*, Frame-relay\*
- > L2TP LAC\* including the use of RADIUS (RFC 2809)

### ROUTING AND BRIDGING PERFORMANCE

- > Minimum routing performance: 150.000 pps
- > Minimum bridging performance: 150.000 pps
- > Minimum supported number of Frame-Relay DLCIs on uplink: 200
- > Supported number of ATM PVCs: 32 per DSL port
- > Supported number of L2TP tunnels: 256
- > Supported number of VLANs: 256
- > Supported number of bridge-groups: 24

### FRONT PANEL INDICATIONS

- > PWR: Power indication for each power inlet
- > R: Reset condition
- > LAN: Lan status
- > CLK: Station clock status
- > DCD: Data Carrier Detect for each SHDSL line

### CLOCKING

- > Slave on STM1, E3, T3 or E1 uplink
- > Station clock (G.703 clock input)
- > Internal

### MAINTENANCE AND MANAGEMENT SUPPORT

- > Conform TDRE (Telindus Dynamic Routing Engine)
- > 2 alarm contact outputs (normally open and closed contacts)
- > 7 alarm input contacts with common return (normally closed contacts)

### MEMORY

- > 32 MByte DRAM
- > 16 MByte Flash

### MECHANICAL DATA (H X W X D)

- > 44 x 440 x 240 mm (desktop)
- > Weight: 3.5 kg

### POWER REQUIREMENTS

- > Single or dual powered
- > DC: -36 up to -72V
- > AC: 85 – 264V, 47 – 63 Hz
- > Power consumption: 8P versions: 25 W  
16P versions: 35W  
24P versions: 45 W

\* feature soon available

### SALES CODES

- > 182573 8 lines ADSL annex A, internal line splitter, redundant 48VDC
- > 182735 8 lines ADSL annex A, internal line splitter, 48VDC and 230VAC
- > 182736 8 lines ADSL annex A, redundant 48VDC
- > 182737 8 lines ADSL annex A, internal line splitter, 48VDC and 230VAC
- > 182574 8 lines ADSL annex B, internal line splitter, redundant 48VDC
- > 182738 8 lines ADSL annex B, internal line splitter, 48VDC and 230VAC
- > 182739 8 lines ADSL annex B, redundant 48VDC
- > 182740 8 lines ADSL annex B, internal line splitter, 48VDC and 230VAC
- > 182577 24 lines ADSL annex A, redundant 48VDC
- > 182578 24 lines ADSL annex B, redundant 48VDC
- > 181305 8 lines SHDSL, redundant 48VDC
- > 183065 8 lines SHDSL, 48VDC and 230VAC
- > 181307 24 lines SHDSL, redundant 48VDC
- > 184106 24 lines POTS splitter
- > 184107 24 lines ISDN splitter
- > 185881 Desk-top Power supply module 70W (230/115Vac -> 48Vdc)
- > 183021 Rack mount kit (19" or ETSI)
- > 182590 CBL Telco M /wires 24\*2\*0,14 120" 2M
- > 182591 CBL Telco M/M 24\*2\*0,14 120" 2M

- > 16 port models are available on request
- > Sales codes and for Telindus Interface Modules (TIMs) can be found in the modular interface section and the sales code quick reference