Nokia D500 – Delivering ATM and IP today

Quante Netzwerke GmbH

Nokia
Connecting People
The Nokia D500 can support residential and business services from a central office or remote sites; from Fast Internet access to a variety of services such as Voice (POTS, ISDN), Video on Demand (VoD), digital broadcast and interactive TV. Its IP capabilities make it an active part of the network infrastructure offering support for various business models, including support for mass market high-bandwidth video and broadcast TV and its multiple ATM and/or gigabit Ethernet trunks enable the most cost efficient network architecture. This wealth of new features will allow operators to differentiate in a fast moving business environment.

The Nokia D500 IP and ATM DSLAM is a powerful multi-service access platform, bringing unrivalled benefits for operators, including:

- Multi-Service Capabilities
- High Scalability
- ATM and Ethernet Trunking Simultaneously
- Media Enabled
- Smooth Introduction of Voice Services
- Flexibility
- Reliability by Design
- Ease of Implementation and Management
D500 System Features

Multi-Service Access
The flexible Nokia D500 architecture readily accommodates mixed DSL interfaces including ADSL, ADSL2+, SHDSL and VDSL. The trunk interfaces include support for standard broadband interfaces such as Ethernet (Gigabit Ethernet, Fast Ethernet) and ATM UNI (OC-3/STM-1, OC-12/STM-4) interfaces. Such a wide range of interfaces and speeds coupled with IP and ATM protocol support provide the key ingredient in supporting Fast Internet access and other higher bandwidth applications such as media on demand or interactive gaming at home and video conferencing at work.

High Scalability
The Nokia D500 has a variety of configurations from up to 192 DSL Lines on a D500 RAM (Remote Access Module) platform to 720 lines in the 19-inch ETSI compliant mechanics (D500-17) and up to 912 lines in the 23-inch ANSI mechanics (D500-21) chassis. Additionally, the Nokia D500 can support thousands of lines in single or multiple sites through node subtending, giving a fully scalable solution.

ATM and Ethernet Trunking Simultaneously
The Nokia D500 is designed with a network processor to support native IP and ATM protocols enabling support for convergence of services and traffic from multiple networks to an all-IP network. The Nokia D500 is easily deployed into an all-ATM network, an all-IP network, or a hybrid of ATM and IP where operators carry different services over different networks.

Media-Enabled
The Nokia D500 provides the necessary key features to enable optimal broadband media services. Through IP multicasting and support of IGMP, the Nokia D500 enables services such as broadcast, TV, and streaming audio. The support of IP multicasting for minimising the transmission network costs, for multiple video streams per user in metro and access networks and may facilitate provisioning requirements for Broadband media services.

Flexibility
From the physical perspective, the Nokia D500 comes in various mechanical forms to support operator deployments, in areas such as central offices, building basements, street side cabinets, and controlled environmental vaults. The Nokia D500 supports operator’s access network architecture evolution from CO-based to distributed deployments.

From the deployment perspective, the Nokia D500 supports various modes of operation, such as Bridged mode, Routed bridged mode, Routed mode, PPPoA and PPPoE – all configurable by the users to fit deployment models.

Smooth Introduction of Voice Services
The Nokia D500 is a true Multi Service Access platform supporting multiple services, including native POTS (Plain Old Telephone Service). As an Integral part of the Nokia Voice Solution, the Nokia D500 POTS card allows an operator to evolve their fixed access voice network to an IP based solution, with no disruption for existing customers. Operators can now consolidate access network services onto a single platform, thereby reducing costs, while smoothly migrating to packet-based IP services.

Reliability by Design
With the Nokia D500, maximum system uptime and the security of 1+1 protection switching for both link and Control / Management Unit can be achieved.

Easy Implementation and Management
The D500 integrates seamlessly into operators’ access networks through the use of standards-based optical and electrical trunk, tributary broadband interfaces, and standards-based xDSL line interfaces. A wide range of standards-compatible Customer Premises Equipment (CPE) is assured for interoperability.

Nokia NetAct™ for Broadband
Nokia NetAct for Broadband provides broadband access network operators with a carrier-class management system that meets their scalability, reliability, performance, and ease of use requirements. A complete, integrated element management system, NetAct for Broadband features topology, fault, inventory, configuration, performance, and security management as well as cut-through command line interfaces.

In addition to its network-to-port drill-down and profile-based provisioning capabilities for the Nokia D500, Nokia NetAct for Broadband standards-based XML and CORBA northbound interfaces allow for fast integration with existing operations support systems.

Web-Based Craft Interface
The Nokia D500 Web-Based Craft Interface provides an embedded graphical user interface tool to perform local administration and maintenance operations. From a Java-enabled web browser, this portable craft terminal application allows for provisioning, troubleshooting and performance monitoring of the Nokia D500.

Command Line Interface
The Nokia D500 Telnet-based Command Line Interface (CLI) provides a text-based interface, allowing for provisioning, troubleshooting and performance monitoring, as well as easy scripting of any sequence of operations.
## D500 System Specifications

<table>
<thead>
<tr>
<th>Node Dimensions</th>
<th>ANSI subrack (D500-21)</th>
<th>ETSI subrack (D500-17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>23.62 in (60.00 cm)</td>
<td>60.00 cm (23.62 in)</td>
</tr>
<tr>
<td>Width</td>
<td>21.26 in (54.00 cm)</td>
<td>44.20 cm (17.40 in)</td>
</tr>
<tr>
<td>Depth</td>
<td>10.55 in (26.80 cm)</td>
<td>26.30 cm (10.35 in)</td>
</tr>
</tbody>
</table>

| 17-slot Low Pass Filter Shelf           | Height – 44.0 cm (17.32 in)                                                           | Height – 11.5 cm (4.50 in)                                                             |
| Width                                  | 44.0 cm (17.32 in)                                                                     | Width – 43.3 cm (17.05 in)                                                            |
| Depth                                  | 25.3 cm (9.96 in)                                                                      | Depth – 25.3 cm (9.96 in)                                                             |

| 4-slot Low Pass Filter Shelf            | Height – 44.0 cm (17.32 in)                                                           | Height – 11.5 cm (4.50 in)                                                             |
| Width                                  | 44.0 cm (17.32 in)                                                                     | Width – 43.3 cm (17.05 in)                                                            |
| Depth                                  | 25.3 cm (9.96 in)                                                                      | Depth – 25.3 cm (9.96 in)                                                             |

| D500RAM (D500-6 for ANSI and ETSI remote site applications) | For horizontal and vertical installations in 19”, ETSI and 23” ANSI racks (max 192 lines). Also wall mounting possible. |
| Height                                 | 21.2 cm (8.35 in)                                                                      | Height – 21.2 cm (8.35 in)                                                            |
| Width                                  | 49.3 cm (19.40 in)                                                                     | Width – 49.3 cm (19.40 in)                                                            |
| Depth                                  | 25.3 cm (9.96 in)                                                                      | Depth – 25.3 cm (9.96 in)                                                             |

### Operating Temperature
- Temperature: –20°C (–4°F) to +55°C (131°F) Remote Installation
- Relative Humidity: 0 to 95 % (non-condensing)

### Environmental Compliance
- GR-63-CORE
- ETS 300 019-1-1: Class 1.2
- ETS 300 019-1-2: Class 2.3
- ETS 300 019-1-3: Class 3.1E

### Electromagnetic Compliance
- EN 55022 Class A
- CISPR 22 Class A
- GR-1089-Core
- ETSI EN 300 386
- FCC Part 15, Class A

### Certification
- NEBS Level 3
- UL 60950 Safety Certification

### Power Requirements
- –40.5 to –72.0 VDC (protected feeds)

### Physical Connectors
- E1, E3 & DS1, DS3 – SMB Coaxial (E1, E3, DS3), EURO (E1), AMP Champ (DS1), RJ-48, BNC (DS3)
- STM/OC – Optical LC and MTRJ
- Fast Ethernet – RJ-45 (100BaseTX)
- Tail cabling – AMP Champ (50-pin)
- Local Management Port – RJ-45
- Gigabit Ethernet – LC

### Physical Interfaces
- **Trunk Interfaces**
  - 8 x E1 2 Mbs ATM IMA (G.703, G.804)
  - 1 x E3 34 Mbps ATM UNI
  - OC-3/STM-1 ATM UNI 155.52 Mbps Single Mode Short Haul (G.957 S1.1)
  - OC-3/STM-1 ATM UNI 155.52 Mbps Single Mode Long Haul (G.957 L1.1)
  - OC-3/STM-1 ATM UNI 155.52 Mbps Multimode
  - 2 x 100BaseTX, Fast Ethernet (IEEE 802.3)
  - 1000BaseLX and 1000BaseSX, Gigabit Ethernet (IEEE 802.3)
## Physical Interfaces

**Tributary Interfaces**
- 16 x E1 2 Mbps ATM IMA (G.703, G.804)
- 16 x DS1 ATM IMA
- 8 x E3 34 Mbps ATM UNI
- 8 x DS3 45 Mbps ATM (GR-499-CORE)
- OC-3/STM-1 ATM UNI 155.52 Mbps Single Mode Short Haul (G.957 S1.1)
- OC-3/STM-1 ATM UNI 155.52 Mbps Single Mode Long Haul (G.957 L1.1)
- OC-3/STM-1 ATM UNI 155.52 Mbps Multimode

**NOTE:** All tributary interfaces can be used as a trunk interface.

## Linecards
- 48 x ADSL
- 48 x ADSL2+
- 24 x G.SHDSL
- 24 x VDSL

## Low Pass Filter Units
- 24/48 x POTS Splitter (Annex A)
- 24/48 x ISDN Splitter (Annex B)

## Other Supported Standards
- ITU-T G.992.1 Annex A & B (ADSL over POTS and ADSL over ISDN)
- ITU-T G.992.2
- ITU-T G.992.3
- ITU-T G.992.4
- ITU-T G.992.5
- ITU-T G.991.2 (SHDSL)
- ITU-T G.993.1 (VDSL)
- ITU-T G.994.1
- ITU-T G.997.1
- T1.413 Issue 2, 1998
- ETSI TS 101 388 v1.1.1
- ITU-T G.957 (optical)
- ATM Forum UNI3.1
- ITU-T 1.610/1.432 (ATM OAM)
- IEEE 802.1q (VLAN)
- IEEE 802.3
- RS-232C (CLI)