

## ADSL-2401D.S

Industrial ADSL modem with integrated serial port gateway



### Introduction

The MuLogic ADSL-2401D.S is an ADSL2+ modem-router with Ethernet port and serial port. The serial port is connected with an integrated serial port gateway which can be accessed via the LAN and the DSL port.

The modem is designed for industrial applications and can be powered from low voltage DC or AC power sources. The ADSL-2401D.S operates over a temperature range from -40°C to +70°C.

### Features

- ADSL modem supports standards for ADSL, ADSL2 and ADSL2+
- Hardware versions for Annex A/Annex M (for PSTN lines) and Annex B\* (for ISDN lines).
- Downstream rates up to 24 Mbit/s, upstream rates up to 1.4 Mbit/s (Annex A/B).
- Annex M version (G.992.5 Annex M) supports upstream data rates up to 2.5Mbit/s.
- ATM Encapsulation Protocols: PPPoA, PPPoE, MPoA, IPoE and CLIP.
- Ethernet port supports 10/100baseT, Auto-MDI/MDIX.
- Ethernet port supports SCADA protocols like Modbus/TCP, DNP3/IP and IEC60870-5-104.
- Serial Port Gateway for remote serial data (TCP/IP or UDP/IP).
- Serial port RS232/RS485 interface for data rates from 300 to 115200 bit/s.
- Serial port supports SCADA protocols like Modbus RTU/ASCII, DNP3 and IEC60870-5-101.
- Secure access for Serial port gateway. (IPsec or access restrictions by IP address).
- IPsec VPN tunnels (up to 10) for secure communication with Ethernet and serial port.
- Layer-2 bridging over IPsec tunnel: transparent and secure Ethernet tunnel.
- Internal DHCP server, DNS gateway and Dynamic DNS client.
- Static and dynamic routing (RIP Version 1 and 2).
- Dynamic DNS support for assigning a static hostname to a dynamic IP address.
- NAT router for remote access to devices attached to Ethernet and Serial port.
- Management: Web browser, Telnet/SSH, SNMP and serial command port.
- Email alerts for system messages like change of WAN address etc.
- Independent watchdog/reset controller for monitoring vital functions.
- Dry Contact sensor (optional) with status reporting via SNMP and HTTP.
- Isolated supply voltage input for industrial applications (suitable for AC and DC).
- Supply voltage ranges: 11-36Vdc/11-28Vac (Vr1) or 18-60Vdc/18-30Vac (Vr2).
- Extended operating temperature range: -40°C to +70°C
- Din-Rail or panel mounting.

\*N.b: For public networks in Germany, Annex B is used on both PSTN and ISDN.

## Application Areas

### Remote access applications

The ADSL-2401D.S is intended for access to remote terminal units with an Ethernet port or serial port. The integrated Serial Port gateway allows the unit's serial port to be used as virtual com port of a central site PC. The network connection can be in TCP/IP or UDP/IP mode allowing the use of various tools like "virtual com port drivers", "serial to Ethernet converters" direct IP socket connection (e.g. "WinSock"), a dedicated application software or another ADSL-2401 unit. The serial port can also be accessed by means of a telnet connection.

The ADSL-2401D can be used to replace Dial-up and leased line modems and offers high speed Ethernet communications while maintaining support of serial communication. This allows for easy migration to the use of remote terminal units with Ethernet interface and other devices such as remote surveillance cameras while maintaining connectivity to devices with a serial port.

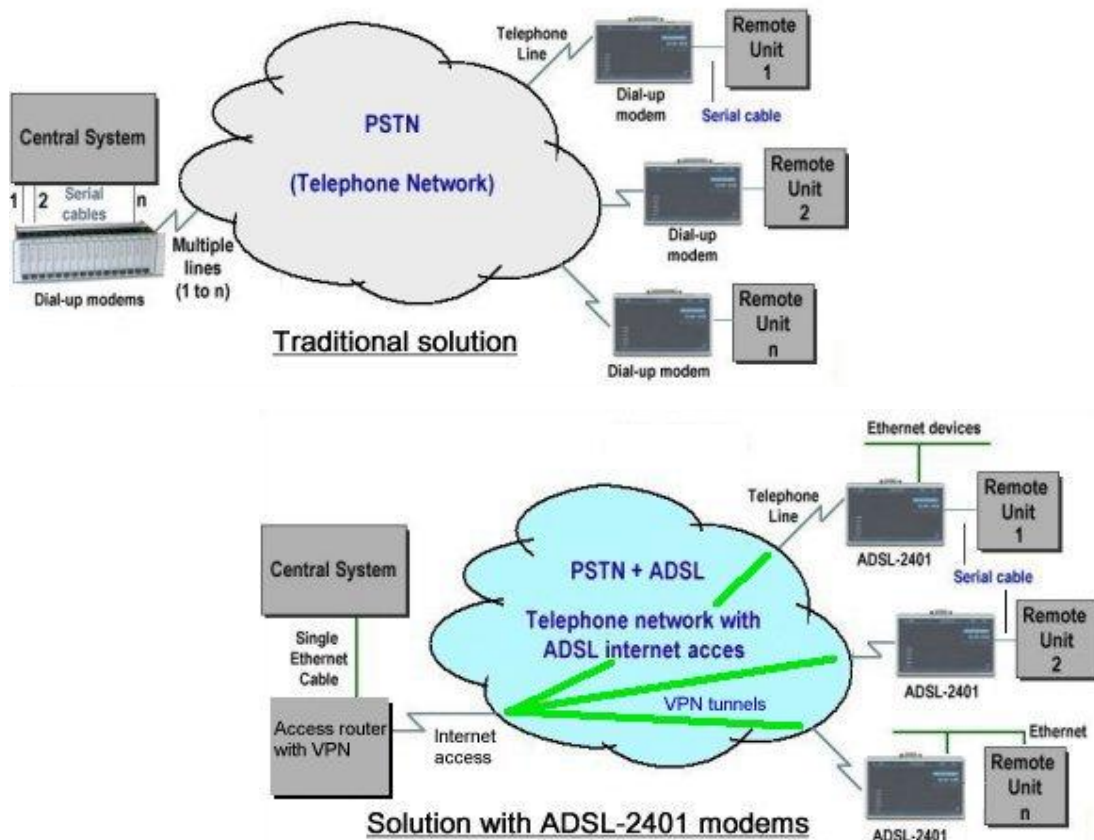
Replacing Dial-up modems for the ADSL-2401D.S cuts the costs for the telephone calls made for each session. The ADSL-2401D.S can be installed without the need for replacing the telephone line. Just add ADSL service on the existing line.

### Information Security

As the unit in most cases will be connected to the public internet, extra security features such as IPsec VPN are supported. IPsec protects against unwanted access and eavesdropping of the data. The IPsec feature creates an encrypted virtual tunnel connection over the internet. Only devices at the end-points of the tunnel can communicate.

A single ADSL-2401 can support up to 10 IPsec tunnels. The IPsec tunnels can operate in routing mode (layer-3) but can also be used to bridge Ethernet frames (Layer-2).

In addition, access to the management functions of the unit, the serial port and the devices attached to the Ethernet port, can also be limited to pre-defined IP addresses, making it impossible to have access from unknown IP addresses.



## Configuration and access control

The ADSL-2401D.S can be configured and managed in multiple ways:

- Web browser.
- Telnet connection.
- SSH connection.
- SNMP manager

Access restrictions can be set for each protocol for both local LAN port or access via the DSL network.

In addition, the serial port can be used for configuration, should no network connection be present.

The ADSL-2401D.S modems are equipped with a galvanic isolated power input. Three voltage ranges are available:

- 11-36Vdc/11-28Vac.
- 18-60Vdc/18-30Vac.
- 18-72Vdc.

For mains power operation (100..240Vac) an external power adapter or power supply is used.

## Extended temperature range

The modem can be used in many environments. It is suitable for operating at ambient temperatures ranging from -40°C to +70°C.

## Technical Specifications

### ADSL Standards

- ANSI T1.413 Issue 2 (ADSL)
- ITU-T G.992.1 (G.dmt)
- ITU-T G.992.2 (G.lite)
- ITU-T G.992.3/4 (ADSL2)
- ITU-T G.992.3 Annex L (RE-ADSL)
- ITU-T G.992.5 (ADSL2+)
- ITU-T G.992.5 Annex M (ADSL2+M)
- Hardware versions for: Annex A, Annex B or Annex M

### Encapsulation protocols

- PPP Over ATM (PPPoA, RFC2364)
- PPP Over Ethernet (PPPoE, RFC 2516)
- Ethernet Over ATM (IPoE - MpoA, RFC 2684 Bridge Mode)
- Ethernet Over ATM (MpoA, RFC 2684 Router Mode)
- IP Over ATM (IPoA - CLIP, RFC 1577)
- MAC Encapsulation Routing (MER, RFC 1483)

### IP routing

- Static routing
- Dynamic routing: RIP Version 1 and 2

### Dynamic DNS support

- DynDNS
- TZO

### IPSec operation

- Mode of operation: Tunnel mode.
- Key exchange Method: Automatic IKE or Manual.
- Authentication Method: Pre-shared key or X.509 Certificate.
- PFS support (Perfect Forward Secrecy): RFC 2412.
- Phase 1 mode: Main or Aggressive.
- Phase 1 and 2 Encryption Algorithms: DES-CBC, 3DES-CBC, AES-128-CBC, AES-192-CBC or AES-256-CBC
- Phase 1 and 2 Integrity Algorithms: MD5 or SHA-1
- Diffie-Hellman groups for key exchange: DH Group 1 (768 bit), DH Group 2 (1024 bit), DH Group 5 (1536 bit), DH Group 14 (2048 bit), DH Group 15 (3072 bit), DH Group 16 (4096 bit), DH Group 17 (6144 bit) or DH Group 18 (8192 bit)
- Key Lifetime: 1-28800 seconds.
- DPD (dead peer detection).
- NAT-traversal and NAT KeepAlive.
- Up to 10 IPsec tunnels.
- Layer-2 bridging over IPsec tunnels.

### Ethernet port

- 10/100baseT
- Half and Full duplex
- Auto-MDI/MDIX

## Serial port

- RS232 DB9 Male connector (DTE pinout).
- RS485/RS422 at 4-pin screw term. connector.
- Port rates: 300, 600, 1200, 2400, 4800, 9600, 19k2, 38k4, 57k6 or 115k2 bit/s.
- Data formats: 8N, 8E, 8O, 7E, 7O. One or two stop bits.
- Buffer size: 10, 20, 50, 100, 200, 300, 400, 500, 1000 or 1500 bytes.
- Forwarding timeout: 1, 2, 5, 10, 15, 20, 50, 100 or 200 msec.

## Serial gateway

- Operating modes: TCP server, TCP client, Telnet server, UDP client/server
- Maximum number of concurrent connections: 256.
- TCP Alive check and Data Activity check.
- Statistics per connection.
- Access restrictions by source IP address.

## Power supply voltage ranges

- ADSL-2401D.S/Vr1: 11-36Vdc/11-28Vac (4.1W)
- ADSL-2401D.S/Vr2: 18-60Vdc/18-30Vac (3.6W)
- ADSL-2401D.S/Vr3: 18-72Vdc (3.6W)

## Dimensions and weight

- Dimensions: 95x145x30mm LxWxD, Weight: 240 gr.

## Environment

- Operating temperature range: -40°C to +70°C, Humidity: 5..95%
- Storage temperature range: -50°C to +75°C, Humidity: 5..95%

## Compliances

- CE directives: 2004/108/EC and 2006/95/EC.
- EMC: EN 55022, EN55024: Emission limits and immunity for residential environments.
- EMC: EN 61000-6-2: Immunity for industrial environments.
- Network: Compatible with 1TR112 for U-R and U-R2 interfaces.
- Safety: EN 60950.

## Order codes

- ADSL-2401D.S/Vr1-A (11-36Vdc, Annex A)
- ADSL-2401D.S/Vr2-A (18-60Vdc, Annex A)
- ADSL-2401D.S/Vr3-A (18-72Vdc, Annex A)
- ADSL-2401D.S/Vr1-B (11-36Vdc, Annex B)
- ADSL-2401D.S/Vr2-B (18-60Vdc, Annex B)
- ADSL-2401D.S/Vr3-B (18-72Vdc, Annex B)
- ADSL-2401D.S/Vr1-M (11-36Vdc, Annex M)
- ADSL-2401D.S/Vr2-M (18-60Vdc, Annex M)
- ADSL-2401D.S/Vr3-M (18-72Vdc, Annex M)