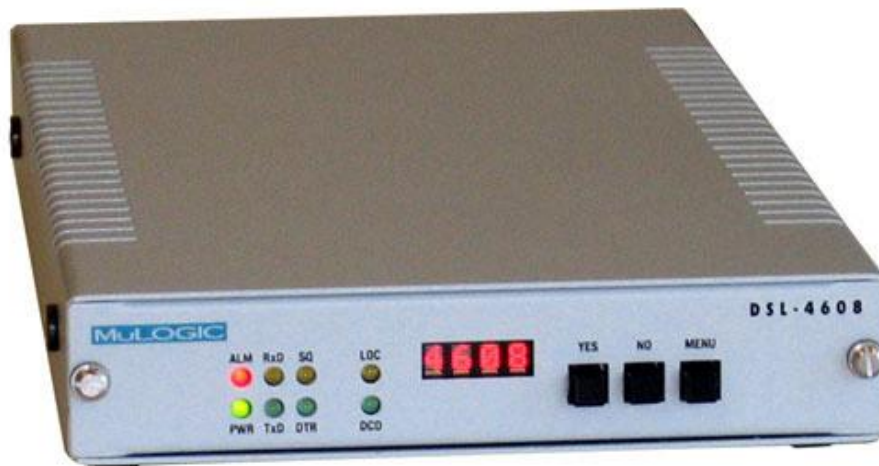# MuLOGIC

DSL-4608.Eth

High speed wire modem for industrial Ethernet applications

Introduction

The MuLogic DSL-4608.Eth is a modem for high speed transparent Ethernet bridging over unconditioned metallic cable.

Using cable with 0,5 mm copper wire gauge, the modem has a reach of over 12km at its lower rates and will operate at a rate of 4608 kbit/s using 2 pairs of copper over distances up to 5km.
At larger wire diameters the reach is even longer.

The modem offers a transparent link for Ethernet protocols regardless of the higher level protocol. It is therefore transparent to protocols like TCP/IP, Modbus/TCP, or any protocol used over Ethernet.

The Spanning-tree link management protocol prevents undesirable loops in case the modems form a grid or ring network.

The DSL-4608.Eth was designed for industrial applications: it operates over a temperature range of -20 to +60°C and can be powered from any 18 to 60 Vdc (18.42Vac) power source. For mains power operation a power adapter is available.

The modem is available as desktop version and as rack card for use in the UCF-16.3 and UCF-3.1 card frames.

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Features

- High speed modem for metallic lines.
- Data rates from 64 kbit/s up to 4608 kbit/s.
- Operates over unconditioned "dry copper" cables (1 pair or 2 pair)
- IEEE 802.3 compatible 10baseT Ethernet interface.
- Automatic learning Ethernet bridge with Spanning-tree link management protocol.
- Protocol independent.
- No routing configuration needed.
- Configuration and control by: frontpanel, web browser, telnet connection, or serial port.
- SNMP (optional).
- Toggle switch for straight or crossed cable selection.
- Isolated supply voltage (ac and dc) for industrial applications.
- 18 to 60 Vdc (18-42Vac) supply voltage range.
- Extended temperature range –20 to +60°C

Application and use

Transparent Ethernet bridging over copper wire

Be it for connecting just two Ethernet devices, for connecting a remote Ethernet device to a LAN or even for connecting two LANs, the DSL-4608S.Eth can be used for any device equipped with an Ethernet port: from Personal Computer to PLC.

The DSL-4608S.Eth is 100% protocol independent. It will bridge Modbus/TCP, TCP/IP, AppleTalk, DecNet, Netbui, or any protocol that can be transported over Ethernet.

LAN to LAN, Device to LAN or Device to Device connection

Because of the automatic MAC address filtering, only those Ethernet packets destined for the remote end are send over the modem link. All other packets are blocked. In this way, no bandwidth is consumed by data traffic between devices at the same location of the modem.

Configuration

The DSL-4608S.Eth can be configured and controlled by means of push buttons on the front panel, via a serial command port, or via the network ports (Ethernet or line). For access via the network, both telnet and web browser protocols are supported. SNMP is available on request.

Power supply

The power supply input of the DSL-4608S.Eth is galvanically isolated from the rest of the circuit and housing. The modem can be powered from a 18 to 60 Vdc (18-42 Vac) source. Versions for other voltages are available on request
For stand alone mains power (100..240Vac) operation, an external power adapter is available.

Extended temperature range

The modem can be used in many environments. It is suitable for operating at ambient temperatures ranging from -20°C to +60°C.

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DSL-4608.Eth rear panel

Technical Specifications

LINE INTERFACE

Modulation mode and data rates

- Modulation type: Trellis coded PAM 16 according to ITU-T G.991.2
- Modem data rate: 64 to 2304 kbit/s on one pair, 128 to 4608 kbit/s on 2 pairs.
- Data rates configurable in steps of 64 kbit/s.

Line connection

- Unconditioned metallic lines.
- Dry copper wire cables (max. cable length depends on wire gauge) .
- 1-pair (2 wires) and 2-pair (4 wires) operation.
- Line impedance: 135 Ohms.
- RJ-45 connector.

Cable length	Maximum data rate	
	1 pair	2 pairs
5 km	2304 kbit/s	4608 kbit/s
7,5 km	1024 kbit/s	2048 kbit/s
10 km	768 kbit/s	1536 kbit/s

Data rate vs. cable length (0,5mm copper diameter, low noise)

ETHERNET INTERFACE

- 10baseT Ethernet: IEEE 802.3 compatible
- Type: Remote Bridge/Switch
- Spanning-tree protocol: IEEE 802.1 compatible
- MAC Address filter: automatic learning and ageing
- Ageing time: user configurable
- Connection type: 10baseT UTP at RJ45 connector.
- 10baseT polarity detection: Automatic polarity reversal

DATA THROUGHPUT

- TCP/IP throughput @ 4608 kbit/s line rate: 512 kbyte/s
- Latency (throughput delay): 2 ms at 4608 kbit/s

HARDWARE

LED indicators on front panel

- TxD: Data transmitted to remote modem
- RxD: Data received from remote modem
- DTR: Local 10baseT link connected
- ALM: Alarm signalling
- PWR: Power ready
- CO: CO/CPE indicator
- L1: DSL line 1 connection status
- L2: DSL line 2 connection status

LED indicators on rear panel

- LTx: Data transmitted from modem to 10baseT port
- LRx: Data received from 10baseT port (LAN or Ethernet device)
- Coll: Collision detected
- Err: Buffer overflow
- Lnk: 10baseT Ethernet link connected

Controls

- Push buttons and 4 digit display for configuration at the front panel.
- Push button switch for selecting 10baseT straight or crossed cable.

Connectors

- Line connection: RJ45
- Ethernet connection: RJ45
- Power: Screw terminal connector (2x)
- Serial config port: miniature 4-pin connector.

Dimensions and weight

- **Desktop:** DSL4608S.Eth: 250x130x30 mm LxWxH, Weight: 995gr.
- **Rack card:** DSL-4608R.Eth: 3U (HE) 5HP (TE) with IOC-ETHP interface board: 240mm

Power Supply and environmental characteristics

- **Power supply**:
  - VR1 versions: 10..36 Vdc (18..26Vac) (7,5 Watts max.) (available on request)
  - VR2 versions: 18..60 Vdc (18..42Vac) (7,5 Watts max.)
  - Rush-in current: Below operating current.
  - Mains power adapter (optional): 100..240Vac (8 Watts)

- **Temperature range**:
  - Extended temperature range: -20°C to +60°C
  - Humidity: 5..95%