*Smart solutions for smart networks*

Version 1.6

# SPEEDERLAN-BIS-GE

## MULTI PAIR ETHERNET EXTENSION SYMMETRICAL 120 MBPS EFM BONDING


## BENEFITS

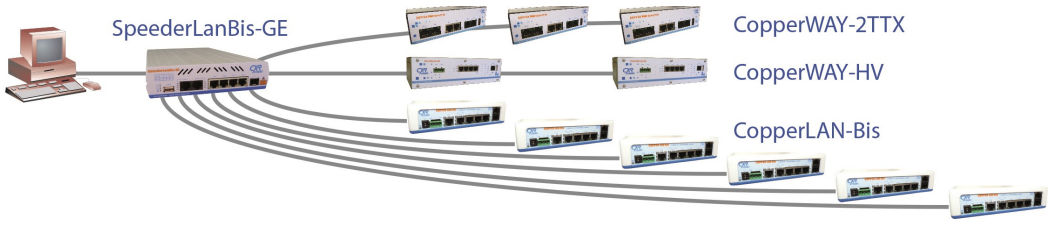
- Ethernet over 4 or 8 Pairs of Telephone Copper Wires
- High-speed symmetric bandwidth: 15 Mbps per pair, 60 Mbps over 4 pairs, and 120 Mbps over 8 pairs.
- Compliant with SHDSL Bis standards, ITU-T G.991.2, IEEE 802.3ah.
- Automatic rate adaptation from 192 kbps to 120 Mbps based on line quality.
- Distance up to 8 km on 0.4 mm cable.
- Aggregation: EFM IEEE 802.3ah and 802.3ad trunking
- 4 Gigabit Ethernet ports: 10/100/1000, RJ45
- 1 Optical Gigabit Ethernet port on SFP base
- Ethernet Bridge 802.1d
- VLAN per port and 802.1q
- QoS and traffic prioritization
- Rapid Spanning Tree, 802.1d
- Administration: Web interface in French and English, http/https, ssh, local console, USB memory card
- Remote IP Management via EOC channel
- Industrial and Cost-Effective Design
- 19'' Chassis Card for easy integration
- Flexible Power Options: 1 or 2 power inputs, supporting 24-48V DC or 110/230V AC

## Ethernet 802.3AH SHDSL Bis/EFM

**SpeederLan-Bis-*GE*** is a Ethernet First Mile network extension unit that provides high rate connection over one and up to eight bonded copper pairs. It operates as a manageable Gigabit Ethernet switch with VLAN, QOS, Traffic shaping and security capabilities. It complies to the ITU-T G.991.2, G.SHDSL Bis standard with 15 Mbps throughput per pair in both directions. It delivers up to 120 Mbps over eight pairs with EFM, Ethernet First Mile, IEEE 802.3ah standard. The modular Gigabit Ethernet optical interface provides very long distance connection. Four Gigabit Ethernet ports connect to the LAN and terminal equipment.

**SpeederLan-Bis-*GE*** offers a maximum rate of 120 Mbps or a maximum distance of 8 km over existing 0.4mm / AWG26 copper pairs - and much more on thicker cables.

**SpeederLan-Bis-*GE*** is suitable for any professional environment. It comes as a metallic compact and robust device powered from either a 110-230 Vac mains, or one or two 48Vdc power supply converters with redundancy. As a rack mount card, it can fit in an AMS4 or AMS16, 19'' chassis. The AMS16 chassis supports 16 device slots, 2 power supply slots and one slot for a centralized management card with TCP-IP, SNMP protocols.




**SpeederLan-Bis-*GE*** is a perfect aggregation / central point for many industry applications. It can be the first network access of Transportation or Utility infrastructure. For such Utility substation requirement the **SpeederLan-Bis-*GE*** is offered with a choice of single DIN Rail isolation transformer or a 19'' shelf of 16 isolation transformers for the 6 to 20 kV substation environment.

One single **SpeederLan-Bis-GE-8** card can aggregate traffics of up to 8x remote devices or sub-networks of remote sites made of Add-Drop SHDSL modems.
AMS16 chassis has a capacity of 96 SHDSL lines.

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## ARCHITECTURE

The SpeederLanBis-GE is an Ethernet switch equipped with four 10/100/1000BT ports on RJ45, one SFP optical Gigabit Ethernet port, and eight SHDSL.Bis Ethernet First Mile modem interfaces. A Power Quicc Pro communication processor manages system operation, converting data flows through two optional RS232 RTU-type interfaces. The power connector (and optional RS232) is located on the rear panel, while Ethernet, SHDSL, and USB ports are on the front panel.

## ETHERNET SWITCH

The SpeederLan-Bis-GE includes a high-performance, low-latency Gigabit Ethernet switch that supports all four RJ45 ports, the SFP port, and eight SHDSL interfaces. This switch has an 8K CAM memory for learning and switching MAC addresses of network devices, plus 1 Mb of frame memory for buffering frames between the Gigabit ports and SHDSL interfaces.

The Ethernet switch supports all traffic management protocols. Incoming traffic is classified and regulated according to Quality of Service IEEE 802.1P. Bandwidth limiting prevents network saturation, while buffer management rules provide prioritization for critical data flows, such as signaling and security.

VLANs allow isolation of data flows from different Ethernet ports, assigning VLANs to incoming traffic, and applying QoS rules. 802.1Q VLANs limit broadcast domains, isolate application traffic, enhance control over secure ring topologies, and help improve overall QoS across the network.

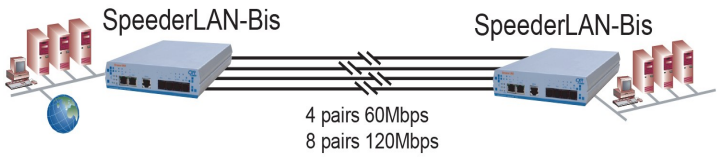
The four RJ45 ports are compatible with any Ethernet equipment, with automatic detection of 10/100/1000 Mbps speeds and polarity. The Gigabit optical port supports SFP modules for distances up to 120 km and WDM options.

## ETHERNET FIRST MILE, G.SHDSL-BIS

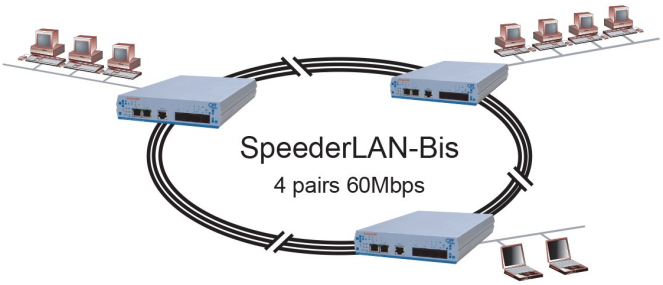
The SpeederLan-Bis-GE integrates eight SHDSL.Bis modems, Ethernet First Mile, compliant with ETSI, ITU-T, and IEEE 802.1ah standards. The EFM processor ensures minimal latency for Ethernet traffic over DSL lines. The SpeederLan-Bis-GE enables long-distance high-speed symmetrical connections up to 120 Mbps on existing copper cables, supporting up to 60 Mbps on four copper pairs, and can be used for any bus or secure ring topology over extended distances.

## APPLICATIONS AND NETWORK TOPOLOGIES

The SpeederLan-Bis-GE provides Ethernet throughput of 120 Mbps in Point-to-Point mode over 8 copper pairs.




It enables the creation of multipoint networks in bus or secure ring topologies, protected by the RSTP protocol. Each access point delivers Ethernet speeds of 60 Mbps over 4 copper pairs.




The SpeederLan-Bis-GE also enables aggregation of up to 8 DSL links in star or secure loop mode, connecting to remote equipment or multipoint buses as illustrated in the diagram on the first page.

## DESIGNED WITH INDUSTRY STANDARDS

The SpeederLan-Bis-GE is built on industry standards and is compatible with other Ethernet products on the market.

This approach safeguards customer investments and ensures adherence to best practices in industrial development, fostering sustainable and responsible progress.

## PRESENTATION AND INTEGRATION

The SpeederLanBis-GE features a robust aluminum casing, providing excellent mechanical strength, high electromagnetic immunity, and enhanced performance in challenging environments. The card model fits into an AMS4 chassis (for up to 4 modems) or an AMS16 chassis, which can host 16 communication cards, 2 redundant power supplies, and an SNMP supervision card.

## RS232 SERIAL INTERFACE

Optionally, the SpeederLanBis-GE provides two RS232 serial interfaces for connecting to an RTU-type asynchronous terminal. The asynchronous-to-IP conversion is adapted and optimized for all types of asynchronous protocols. IP transport can be carried out via TCP, ensuring data integrity, or UDP when integrity controls are managed by the application. A message consistency control application allows emulation of protocols sensitive to inter-message delays during IP network traversal.

The SpeederLan-Bis-GE can emulate any type of modem, including point-to-multipoint configurations with a large number of slave modems.

## TOPOLOGY, REDUNDANCY, AND RELIABILITY

The SpeederLanBis-GE supports multipoint bus and ring topologies with a mix of optical and copper links, utilizing STP/RSTP protocols for resilience and rapid recovery. It is designed for high reliability and resistance to harsh environments, featuring industrial-grade components and surge- and overload-protected interfaces. The SHDSL interfaces are equipped with ST3 lightning protection.

Power fault tolerance is enhanced by an optional dual 24-48 VDC redundant converter setup. The SpeederLan-Bis-GE meets rigorous requirements for shock, vibration, and severe electromagnetic disturbance resistance.

## SECURITY AND ACCESS CONTROL

The SpeederLan-Bis-GE manages system security through multiple layers of defense. The 802.1X protocol and an internal MAC address memory provide strong authentication for Ethernet devices connecting to the network. The internal authentication memory allows for control over devices that do not support the 802.1X protocol. Additionally, unused ports can be disabled to enhance security.

## ADMINISTRATION

The SpeederLan-Bis-GE is managed through a comprehensive set of protocols, including SSH for command-line interface (CLI) commands. An intuitive web interface in both French and English provides clear and secure menus accessible via HTTP and HTTPS. System configuration and internet software can be transferred via FTP or automatically loaded from a USB memory stick through the USB port. Product administration is protected by two levels of passwords.

A network comprising numerous products can be monitored through an SNMP management system. CXR products come with a graphical monitoring interface associated with Snmp-c™ software, providing a graphical view of the product and its status indicators.

Installation of the SpeederLan-Bis-GE is straightforward, and the factory configuration meets most application needs. Configuration can be prepared in advance and automatically loaded from a USB drive during installation, eliminating the need for a computer.

## ALARMS AND EVENT LOGGING

The SpeederLan-Bis-GE maintains a log of system, major, and critical events, which can be displayed or stored on a USB drive. Alarms can be sent to an SNMP supervisor or a simple Syslog server for monitoring and management.

## NETWORK ARCHITECTURE AND SERVICES

The SpeederLan-Bis-GE is part of a comprehensive range of networking and communication products. This offering includes EFM/SHDSL.Bis products and industrial Ethernet switches ranging from 100 Mbps to 10GE, incorporating Carrier Ethernet protocols. CXR's network engineers are dedicated to assisting with architecture design, deployment, monitoring, and network maintenance.

## SUSTAINABLE DEVELOPMENT

CXR is certified ISO 14001 for its strong environmental practices. The SpeederLanBis-GE benefits from eco-design processes that focus on the optimal use of natural resources and minimal energy consumption.

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# Technical Standards

## SHDSL INTERFACES

- Standards: G.SHDSL Bis, ITU-T G.991.2 Annex A/B, ETSI TS-101524, IEEE 802.3ah
- Symmetrical throughput: 15 Mbps per pair
- 4/8 pair mode: EFM bonding, IEEE 802.3ah and 802.3ad group trunking
- Encoding: TC-PAM 16/32/64/128
- Media: 4/8 copper pairs with metallic continuity
- Data rates: 192 kbps to 15 Mbps per pair
- Line protection: Type 3; external Type 2 GDT protection is recommended
- Impedance: 135 Ohms
- Connectors: RJ45

## GIGABIT ETHERNET INTERFACES

- Ports: 4 Ethernet 10/100/1000 BaseT
- Connectors: RJ45
- Automatic speed detection: 10/100/1000 Mbps
- Auto MDI/MDI-X support

## OPTICAL GIGABIT INTERFACE

- Connector: 1 SFP slot
- Throughput: 1,000 Mbps

## ETHERNET SWITCH

- Ethernet Bridge: 802.1d
- Frame memory: 1 MB
- MAC address memory: 8K
- Aging time: 300 seconds
- VLAN support: per port and 802.1q
- Spanning Tree Protocol: 802.1d
- Maximum frame size: 1,536 bytes
- Quality of Service (QoS) and traffic prioritization: DSCP, VLAN
- Rate limiting

## POWER SUPPLY

- Maximum consumption: 18 W
- Input: 24-48 V DC (18 to 56 V DC), with 1 or 2 inputs
- AC Power: 110/230 V AC, 50-60 Hz

## ADMINISTRATION

- USB Port: H/D for CLI, web interface, configuration/software/event log transfer
- Web Interface: Supports HTTP/HTTPS
- Access Protocols: SSH, Telnet
- FTP: For configuration file transfers
- SNMP: Support for v1/v2/v3
- Syslog: Critical event reporting
- Event Log: Comprehensive logging of system events
- Remote and Local Administration: Via TCP/IP
- Local Console Port: USB
- Diagnostics and Statistics: Extensive for all protocols and interfaces
- Real-Time Clock: Battery-backed for timestamping events, compatible with 8 pairs

## LED INDICATORS

- Power: Power status indicator
- CD1-8: Activation of SHDSL links
- ACT: Traffic on Ethernet interfaces
- FO: Activation of Gigabit Ethernet optical link
- TD/RD: Traffic on RS232 interfaces (optional)

## GENERAL CHARACTERISTICS

- Dimensions (W x D x H): 287 x 175 x 41 mm
- Weight: 1 kg
- Protection Class: IP-40
- Operating Temperature: -10 to +60°C
- Humidity: 10 to 90%, non-condensing
- MTBF: 180,000 hours
- Safety Compliance: EN-60950
- EMC Compliance: EN-55022, EN-55024, EN-50121-4

## SHDSL RANGE

- Line Type: Unconditioned line
- Cable Specifications: 0.4 mm—AWG 26

| Data rate (Mbps) | 0.192 | 1.280 | 2.048 | 4.6 | 5.7 | 11.4 | 15.3 |
|---|---|---|---|---|---|---|---|
| Range (km) | 7 | 4.5 | 4 | 2.5 | 2 | 0.9 | 0.4 |

# Product Références

| | |
|---|---|
| SpeederLanBisGE-4C: | Enclosure with 24-48 Vdc power supply, 4 SHDSL pairs, 60 Mbps |
| SpeederLanBisGE-4I: | Enclosure with 110-230 Vac power supply, 4 SHDSL pairs, 60 Mbps |
| SpeederLanBisGE-4R: | Card for AMS4 or AMS16 chassis, 4 SHDSL pairs, 60 Mbps |
| SpeederLanBisGE-8C: | Enclosure with 24-48 Vdc power supply, 8 SHDSL pairs, 120 Mbps |
| SpeederLanBisGE-8CD: | Enclosure with dual 24-48 Vdc power supplies, 8 SHDSL pairs, 120 Mbps |
| SpeederLanBisGE-8I: | Enclosure with 110-230 Vac power supply, 8 SHDSL pairs, 120 Mbps |
| *SpeederLanBisGE-8R:* | *Card for AMS4 or AMS16 chassis, 8 SHDSL pairs, 120 Mbps* |

CXR Networks
CXR
T +33 (0) 237 62 87 90
www.cxr.com
17 Rue de l'Ornette 28410 Abondant France
contact@cxr.com

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