

TC EXTENDER 2001 ETH-2S

 perle.com/products/ethernet-extenders/tc-extender-2001-eth-2s.shtml

Long Range Ethernet Extender

- Transmit Ethernet data up to 20km
- Automatic SHDSL data rate detection
- Network transparent (no IP configuration required)
- Protocol transparent

The TC EXTENDER transparently extends **Ethernet data transmission up to 20 km** across single twisted pair (CAT5/6/7), coax or any existing copper wiring previously used in alarm circuits, E1/T1 circuits, RS-232, RS-422, RS-485, CCTV and CATV applications.



Long Distance Ethernet Transmission over Copper

SHDSL is the technology of choice for the transmission of digital **data over long distance copper wires** of a network. Although performance depends on the characteristics of the cable used, the reach of SHDSL is much further than any other DSL technology currently available. In addition, upload and download bandwidth is symmetrical boasting data rates as high as **15.3 Mbps over 2-wire copper** and **30 Mbps over 4-wire copper**.

The TC EXTENDER is **protocol transparent**. With two SHDSL ports you can easily set up **point-to-point, linear or ring network structures** with ranges of up to 20 km. These simple and effective Ethernet Extenders are perfect for industrial environments, commercial buildings, residential units, hospitality environments, connecting a remote office or private-network backbone to a corporate LAN ... anywhere you need Ethernet communication links between separated LANs or LAN devices (i.e. PCs, digital sensors, VoIP phones, WiFi APs, IP cameras and more).

Two software configurable digital outputs are available for external device alarm generation.

For “**plug and play**” long distance Ethernet data transmission, the TC EXTENDER 2001 ETH-2S is the ideal solution.

Long Distance Ethernet Extender Features

- Robust modulation method (SHDSL)
- Future proof (IPv4 and IPv6-compatible)
- Automatic detection of network cable type (auto MDI(X))
- Automatic network data rate detection (10/100 Mbps)
- Easy startup, plug and play
- Two alarm and signal outputs



Ethernet



TC EXTENDER 2001 ETH-2S Technical Specifications

Serial interface

Interface 1 Ethernet interface, 10/100Base-T(X) in acc. with IEEE 802.3u

Interface Ethernet

Connection method RJ45 socket, shielded
1 port 10/100Base-T(X), auto negotiation

Transmission length < 100 m (shielded twisted pair)

Protocols supported Protocol-transparent for TCP/IP, IPv4, and IPv6

Serial transmission speed 10/100 Mbps, auto negotiation

Interface 2 SHDSL interface according to ITU-T G.991.2.bis

No. of channels 2 (2-wire operation)

Connection method 2 x 2-pos. COMBICON plug-in screw terminal blocks

Transmission length < 20 km (Depending on data rate and cable cross section)

Conductor cross section solid min. 0.2 mm²

Conductor cross section solid max. 2.5 mm²

Conductor cross section flexible min. 0.2 mm²

Conductor cross section flexible max. 2.5 mm²

Conductor cross section AWG min. 24

Conductor cross section AWG max. 14

Serial transmission speed 4-wire operation: 64 kbps ... 30 Mbps
2-wire operation: 32 kbps ... 15.3 Mbps

Interface 3 USB 2.0

Connection method Mini-USB type B, 5-pos.

Transmission length < 5 m (only for configuration and diagnostics)

Digital outputs

Output name	Digital output
Number of outputs	2
Voltage output signal	depending on the operating voltage
Current output signal	≤ 150 mA (Short-circuit-proof)
Connection method	2 x 2-pos. COMBICON plug-in screw terminal blocks
Behavior of the outputs	Deactivated for device supply via DIN rail connector

Function

Management	Plug and Play, diagnostics via PSI-CONF software or web-based management (only with managed Ethernet extenders)
Status and diagnostic indicators	LEDs: US (supply voltage), ACT/LINK (Ethernet data traffic), ERR (errors) 2x LINK / 2x STAT (DSL data traffic port A and port B), DIAG (diagnostic messages)

Ambient Conditions

Ambient temperature (operation)	-20 °C ... 60 °C (Freestanding (40 mm spacing to the right and left), no supply of other modules via the device) -20 °C ... 55 °C (Mounted in rows with zero spacing and low power dissipation of aligned modules) -20 °C ... 50 °C (Mounted in rows with zero spacing) -20 °C ... 45 °C (Mounted in rows with zero spacing and supply of other modules via the device)
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Permissible humidity (operation)	10 % ... 95 % (non-condensing)
Permissible humidity (storage/transport)	10 % ... 95 % (non-condensing)
Altitude	5000 m (For restrictions see manufacturer's declaration)
Degree of protection	IP20

General

Electrical isolation	VCC // Ethernet // DSL (A) // DSL (B) // FE
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Test voltage data interface/power supply	1.5 kVrms (50 Hz, 1 min.)
Standards/regulations	EN 50121-4
Electromagnetic compatibility	Conformance with EMC Directive 2014/30/EU
Net weight	258.7 g
Housing material	PA 6.6-FR
Color	gray
MTTF	711 Years (SN 29500 standard, temperature 25°C, operating cycle 21 % (5 days a week, 8 hours a day))
	308 Years (SN 29500 standard, temperature 40 °C, operating cycle 34.25 % (5 days a week, 12 hours a day))
	125 Years (SN 29500 standard, temperature 40°C, operating cycle 100 % (7 days a week, 24 hours a day))
Conformance	CE-compliant
Power supply	
Nominal supply voltage	24 V DC \pm 5 % (as an alternative or redundant, via backplane bus contact and system current supply)
	5 V DC (configuration only, via mini-USB type B)
Supply voltage range	18 V DC ... 30 V DC
Typical current consumption	< 180 mA (24 V DC)
Connection method	COMBICON plug-in screw terminal block
Dimensions	
Width	35 mm
Height	99 mm
Depth	114.5 mm
Environmental Product Compliance	
China RoHS	Environmentally Friendly Use Period = 50
Reach and RoHS Compliant	<u>Reach and RoHS Compliant</u>
Standards and Regulations	

Electromagnetic compatibility	Conformance with EMC Directive 2014/30/EU
Vibration resistance	In acc. with EN 60068-2-6/IEC 60068-2-6 Result: 5g, 10...150 Hz, 2.5 h, in XYZ direction
Shock	In acc. with EN 60068-2-27/IEC 60068-2-27 Result: 15g
EMC Immunity	EN 61000-4-2: Contact discharge ± 6 kV, Indirect discharge ± 6 kV EN 61000-4-3: Frequency range 80 MHz ... 3 GHz EN 61000-4-4: Criterion B EN 61000-4-5: Signal ± 1 kV (asymmetrical, shielded Ethernet cable) EN 55011 EN 61000-4-6: Frequency range 0.15 MHz ... 80 MHz EN 50121-4
Conformance	CE-compliant
ATEX	II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	cULus listed UL 508

Approvals

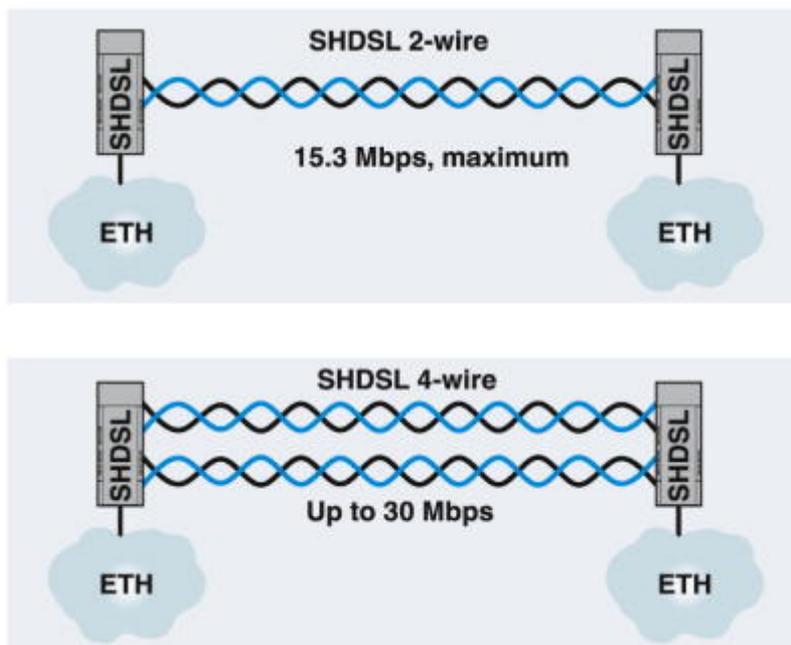
UL Listed
cUL Listed
ATEX
cULus Listed

Commercial data

Packing unit	1
Weight per piece	0.0 g
Country of origin	Germany

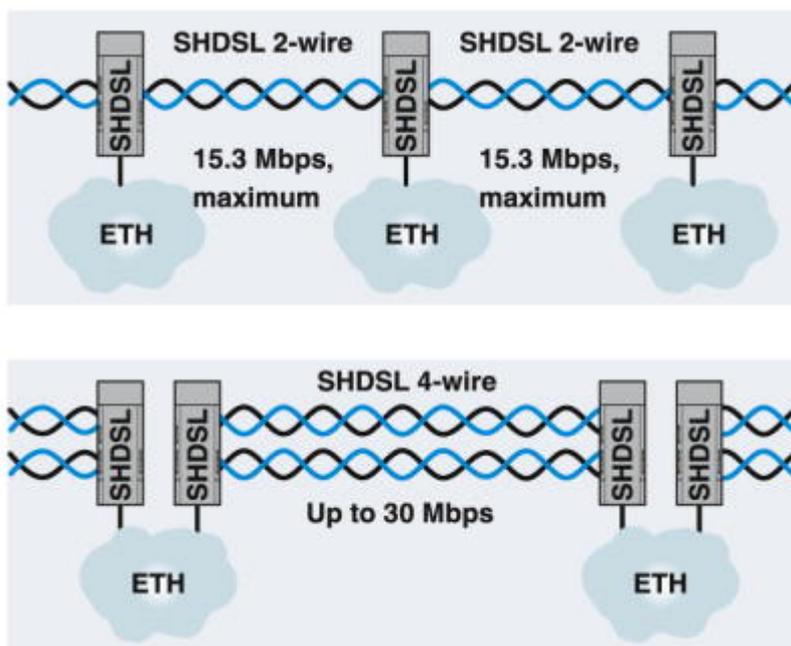
Point-to-point connection

There can be a maximum distance of 20 km between two devices. The Ethernet extender automatically recognizes if the path is constructed on a 2-wire or 4-wire path. If the devices have detected a 4-wire line, the transmission rate is automatically increased (usually doubled) depending on the line quality. If one of the connections fails, the data is transmitted via the remaining conductors at single transmission speed. In this way, a reliable redundancy operation is supported.



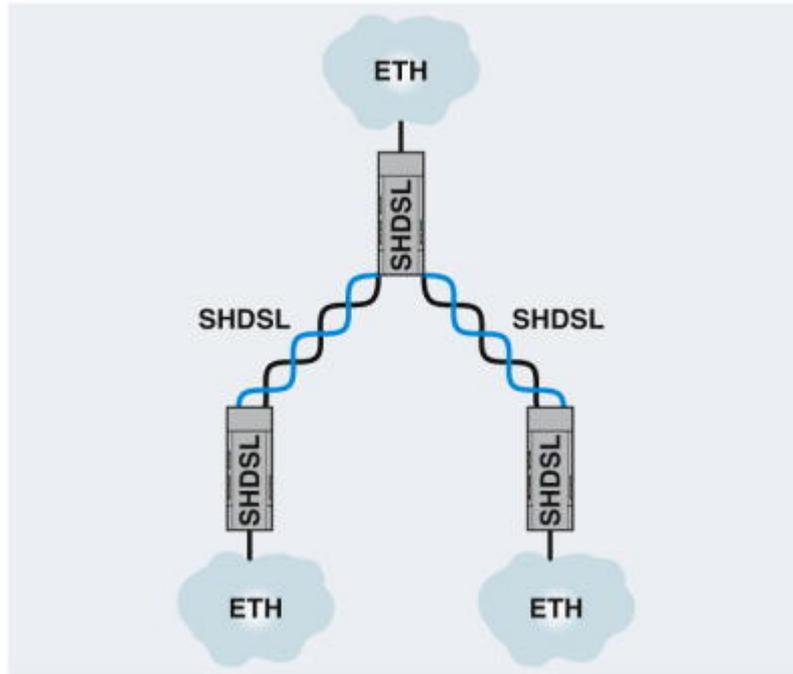
Line structure

There can be a maximum distance of 20 km between two devices.



Star structure

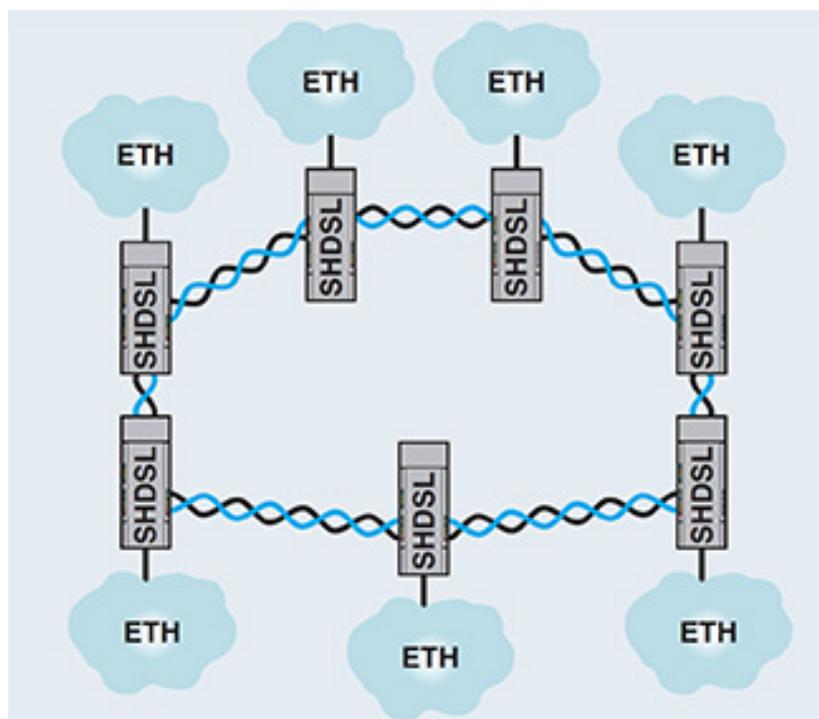
Since each device features two SHDSL ports, you need only three devices.



Redundant ring structure

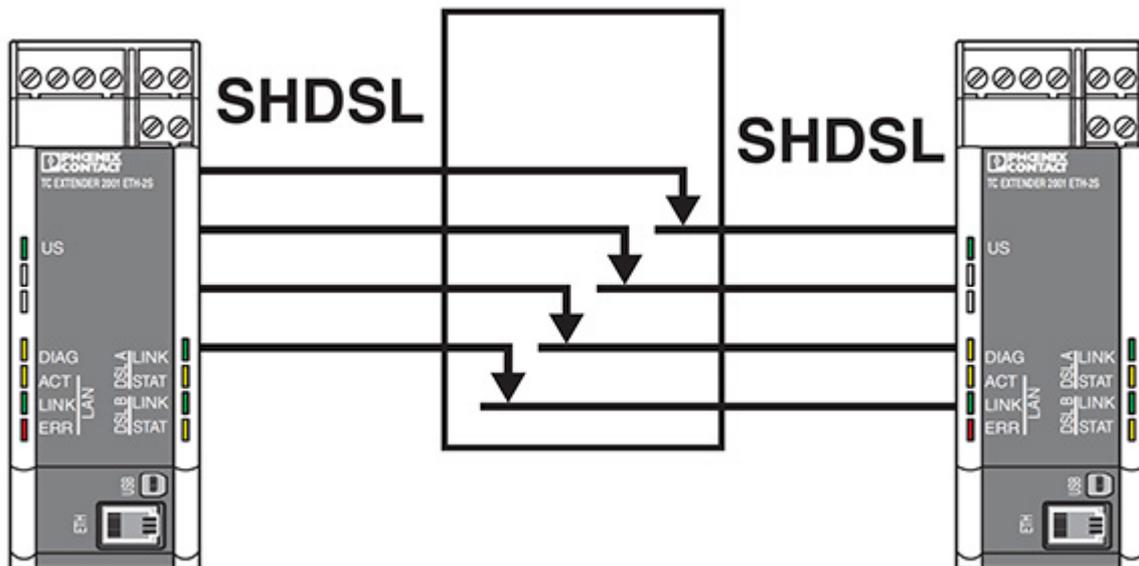
The overall availability of the system is significantly increased by a redundant ring. There can be a maximum distance of 20 km between two devices. You can integrate up to 50 devices in a ring. If there is a ring interruption, Ethernet communication is possible again after the following response time: $t_{\text{Recovery}} = 600 \text{ ms} + \text{number of devices} \times 100 \text{ ms}$.

The paths of the SHDSL ring should show a very high connection quality during normal operation. If that is not the case, the reaction time can deviate from the value calculated above.



Redundant data communication in rotating applications

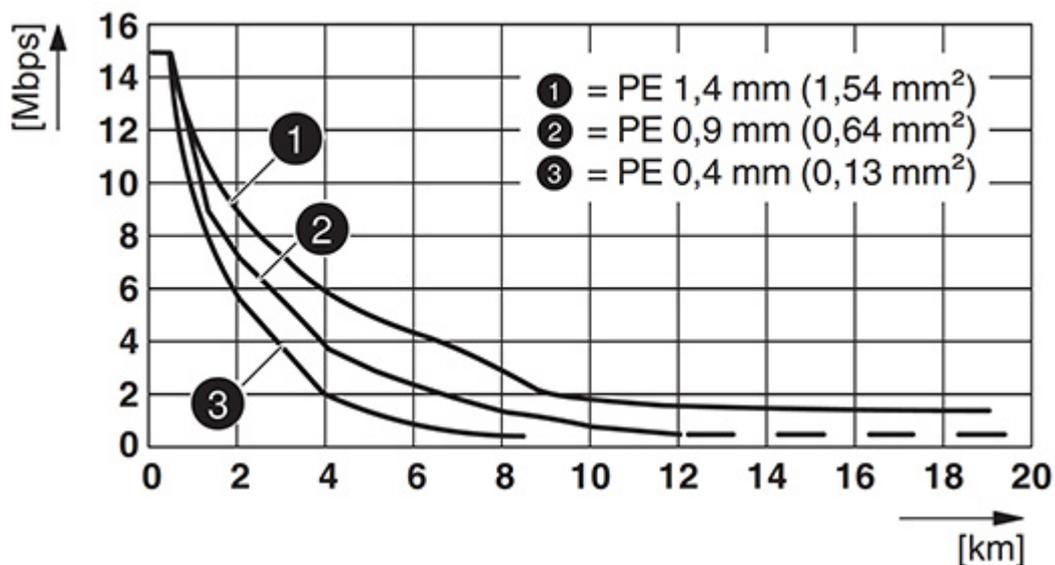
The Ethernet extenders are connected via a 4-wire line. The connection is therefore redundantly established. Using the two digital outputs on the Ethernet extender, you can monitor the slip ring communication.



Range

The maximum possible SHDSL data rate depends on several parameters. Two important parameters are the cable length and cable cross section. This diagram illustrates the dependency of the maximum SHDSL data rate on the line length with 3 cable types. Longer distances can be achieved using high-quality cables with larger diameters. The TC EXTENDER enables data rates over 2-wire copper from 32 kbps to 15.3 Mbps. Data rates of up to 30 Mbps are possible over 4-wire copper.

Figure 1: SHDSL data rate depending on the distance, 2-wire



Product Image	Description	Power Cord	Product Number
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Product Image	Description	Power Cord	Product Number
	TC EXTENDER 2001 ETH-2S - Long Range Ethernet Extender. 1 port 10/100Base-TX (RJ-45) . SHDSL via 4-pin terminal blocks. Links up to 20km - requires external DC power supply	None	27024098
	TC EXTENDER 2001 ETH-2S - Long Range Ethernet Extender. 1 port 10/100Base-TX (RJ-45) . SHDSL via 4-pin terminal blocks. Links up to 20km – 24VDC, 18W USA wall power adapter with tinned leads included	USA	27024094
	TC EXTENDER 2001 ETH-2S - Long Range Ethernet Extender. 1 port 10/100Base-TX (RJ-45) . SHDSL via 4-pin terminal blocks. Links up to 20km – 24VDC, 18W UK wall power adapter with tinned leads included	UK	27024091
	TC EXTENDER 2001 ETH-2S - Long Range Ethernet Extender. 1 port 10/100Base-TX (RJ-45) . SHDSL via 4-pin terminal blocks. Links up to 20km – 24VDC, 18W EU wall power adapter with tinned leads included	EU	27024092

Accessories

Accessory Image	Description	Model Number	Accessory Number
	DT-TELE-SHDSL Surge Protector - surge protection device for two SHDSL telecommunications interfaces (ports). Connection: RJ45 (RJ12/RJ11) and plug-in screw terminal block	Surge Protector	28015938
Power Supply			

Accessory Image	Description	Model Number	Accessory Number
	AC US WALL MOUNT ADAPT TL 24VDC , 18W wall power adapter, with tinned leads - 0 to 60C. For use with TC EXTENDER, PSI-MOS Converters, PSM-ME Isolator, PSM-ME Converter and PSM-ME Repeater	AC US WALL MOUNT ADAPT TL24VDC	2300234
	AC UK WALL MOUNT ADAPT TL 24VDC , 18W wall power adapter with tinned leads - 0 to 60C. For use with TC EXTENDER, PSI-MOS Converters, PSM-ME Isolator, PSM-ME Converter and PSM-ME Repeater	AC UK WALL MOUNT ADAPT TL24VDC	2300235
	AC EU WALL MOUNT ADAPT TL 24VDC, 18W wall power adapter with tinned leads - 0 to 60C. For use with TC EXTENDER, PSI-MOS Converters, PSM-ME Isolator, PSM-ME Converter and PSM-ME Repeater	AC EU WALL MOUNT ADAPT TL24VDC	2300236
	MINI-SYS-PS-100-240AC/24DC/1.5 Power Supply - For use with modular TBUS DIN rail connector system. 24VDC / 1.5 A, 36 Watts with universal 85 to 264 VAC, -25 °C to 70 °C extended operating temperature	MINI-SYS-PS-100-240AC/24DC/1.5 Power Supply	28669838
	UNO-PS/1AC/24DC/60W DIN-Rail Power Supply: 24 VDC, 60 Watt with universal 85 to 264 VAC, -25 to 70°C extended operating temperature.	UNO-PS/1AC/24DC/60W Power Supply	29029928

Accessory Image	Description	Model Number	Accessory Number
	<p>UNO-PS/1AC/24DC/150W Power Supply - DIN-Rail 24 VDC , 150 Watt power supply with universal 85 to 264 VAC, -25 to 70°C extended operating temperature</p>	<p>UNO-PS/1AC/24DC/150W Power Supply</p>	<p>29043768</p>
<p>TBUS</p>			
	<p>Transmit power voltage across the bus. Gold-plated contacts with 2 parallel positions. UL 8A / cUL 6A, 150 V. Width 17.5cm. Carton of 10. For use with PSI-MOS Serial to Fiber Converters and PSI-MODEM-SHDSL/SERIAL Copper Extenders.</p>	<p>ME 17,5 TBUS 1,5/PP000-3,81 BK - TBUS DIN Rail Connector</p>	<p>28900148</p>

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