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

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
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 ±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	Reach and RoHS Compliant
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

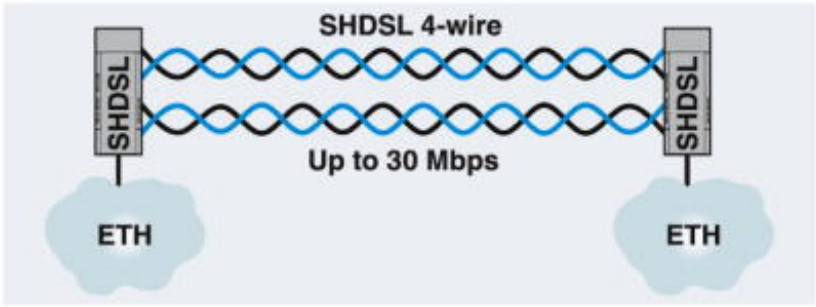
	UL Listed cUL Listed ATEX cULus Listed

Commercial data

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

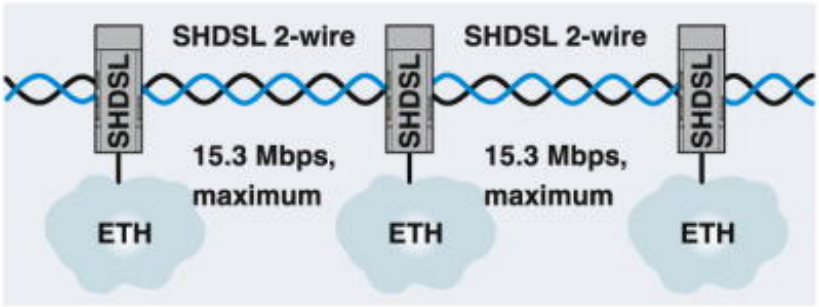
Point-to-point connection

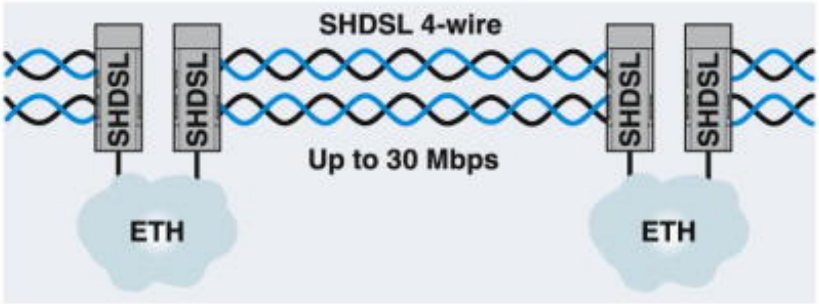
There can be a maximum distance of 20 km between two devices. The Ethernet extender automatically recognizes if the path is constructed on a 2-wire or 4-wire path. If the devices have detected a 4-wire line, the transmission rate is automatically increased (usually doubled) depending on the line quality. 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

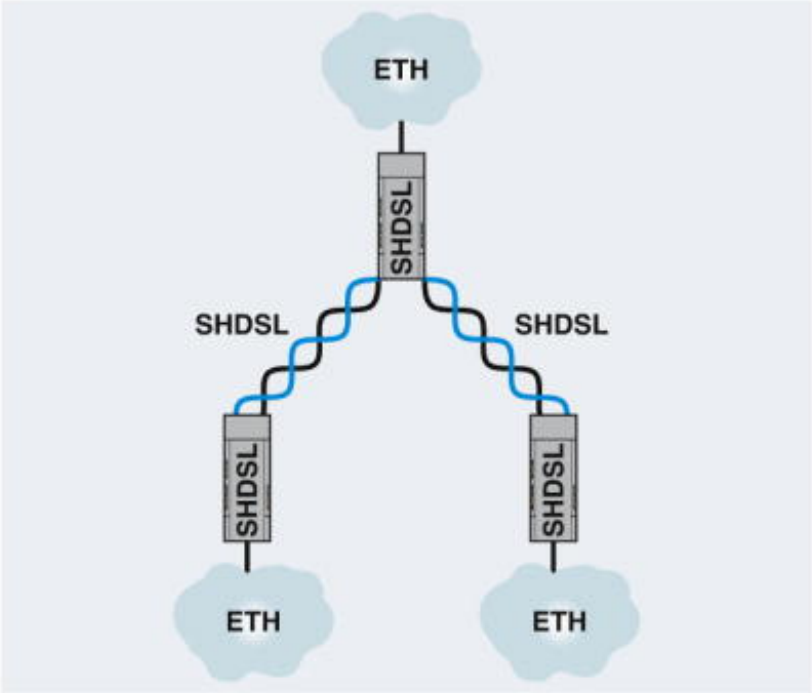
There can be a maximum distance of 20 km between two devices.





Star structure

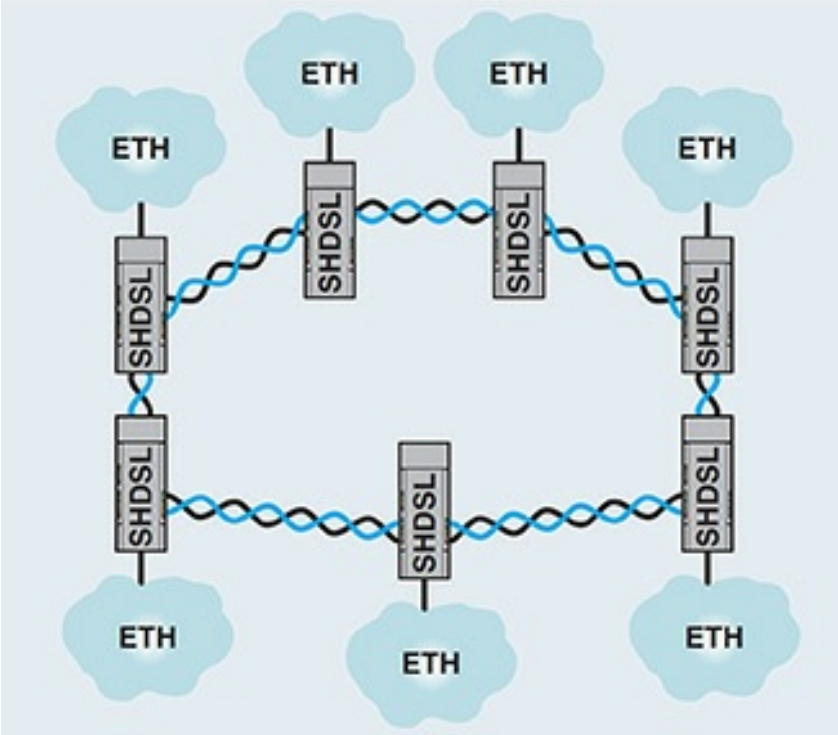
Since each device features two SHDSL ports, you need only three devices.



Redundant ring structure

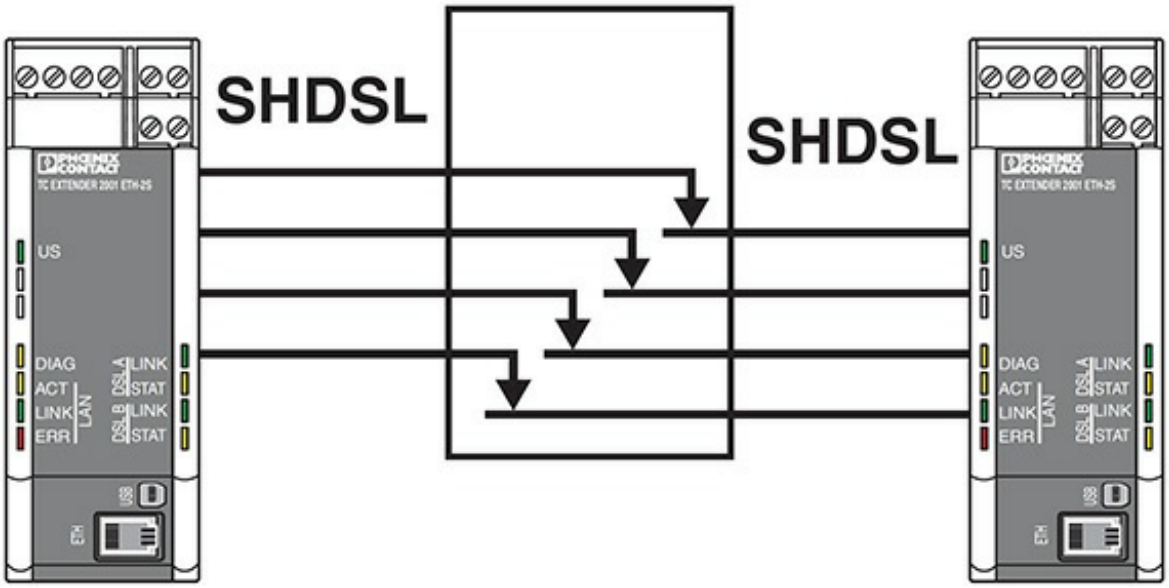
The overall availability of the system is significantly increased by a redundant ring. There can be a maximum distance of 20 km between two devices. You can integrate up to 50 devices in a ring. If there is a ring interruption, Ethernet communication is possible again after the following response time: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