

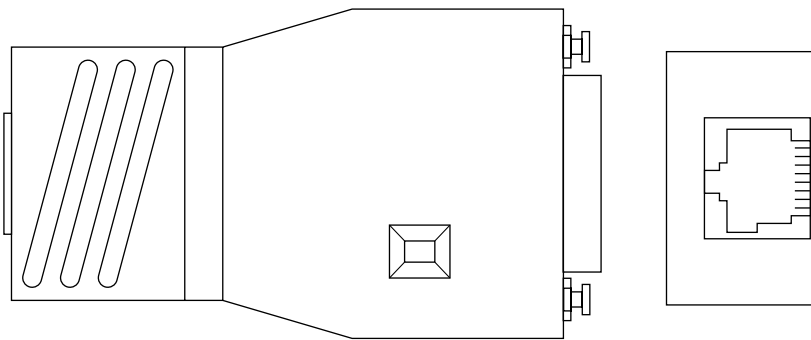


Description and Operating Instructions Twisted-Pair-Transceiver

Mini-UTDE-RJ45

Order No.

943 270-002



Enables a device (DTE) with an AUI interface to connect to a 10 Mbit/s CSMA/CD LAN (ISO/IEC 8802-3, 10BASE-T).

Connection via unshielded twisted pair cable in compliance with IEEE 802.3 10BASE-T or shielded twisted pair cable.

Monitoring LEDs for

- Power,
- Collision
- TxData,
- RxData und
- Link-Status

SQE test can be disabled externally

Can be plugged directly to the device interface

Low current consumption

Compact construction

The performance features described here are binding only if they have been expressly guaranteed in the contract. We have checked that the contents of the technical publication agree with the hardware and software described. However, it is not possible to rule out deviations completely, so we are unable to guarantee complete agreement. However, the details in the technical publication are checked regularly. Any corrections which prove necessary are contained in subsequent editions. We are grateful for suggestions for improvement.

We reserve the right to make technical modifications.

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Note

We would point out that the content of these operating instructions is not part of, nor is it intended to amend an earlier or existing agreement, permit or legal relationship. All obligations on Hirschmann arise from the respective purchasing agreement which also contains the full warranty conditions which have sole applicability. These contractual warranty conditions are neither extended nor restricted by comments in these operating instructions.

We would furthermore point out that for reasons of simplicity, these operating instructions cannot describe every conceivable problem associated with the use of this equipment. Should you require further information or should particular problems occur which are not treated in sufficient detail in the operating instructions, you can request the necessary information from your local Hirschmann sales partner or directly from the Hirschmann office (address: refer to chapter entitled „Notes on CE identification“).

Safety Instructions

This manual contains instructions which must be observed to ensure your own personal safety and to avoid damage to devices and machinery. The instructions are highlighted with a warning triangle and are shown as follows according to the degree of endangerment:

 **Danger!** means that death, serious injury or considerable damage to property **will** result if the appropriate safety measures are not taken.



Warning! means that death, serious injury or considerable damage to property **can** result if the appropriate safety measures are not taken.



Caution! means that light injury or damage to property can result if the appropriate safety measures are not taken.

Note: is an important piece of information about the product, how to use the product, or the relevant section of the documentation to which particular attention is to be drawn.

Certified usage

Please observe the following:



Warning! The device may only be employed for the purposes described in the catalog and technical description, and only in conjunction with external devices and components recommended or approved by Hirschmann. The product can only be operated correctly and safely if it is transported, stored, installed and assembled properly and correctly. Furthermore, it must be operated and serviced carefully.

Notes

Relevant for North America

Wiring must be in accordance with Class I, Div. 2 wiring methods and in accordance with the authority having jurisdiction.

Twisted pair and coax cables are to be installed in conduit.



Warning! This equipment is suitable for use in Class I, Division 2, groups A, B, C and D or non-hazardous locations only.



Warning! Explosion hazard – Substitution of components may impair suitability for Class I, Division 2.



Warning! Explosion hazard – Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

Peripheral equipment must be suitable for the location it is used in.

Safety Guidelines Housing



Warning! Only technicians authorized by Hirschmann are permitted to open the housing.

Make sure that the electrical installation meets local or nationally applicable safety regulations.

Safety Guidelines Environment



Warning! The device may only be operated in the listed ambient temperature range at the listed relative air humidity (non-condensing).

The installation location is to be selected so as to ensure compliance with the climatic limits listed in the Technical Data.

To be used in a Pollution Degree 2 environment only (IEC 60664-1).

Staff qualification requirements

Note: Qualified personnel, as understood in this manual and in the warning signs, are persons who are familiar with the setup, assembly, startup, and operation of this product and are appropriately qualified for their job. This includes, for example, those persons who have been:

- trained or directed or authorized to switch on and off, to ground and to label power circuits and devices or systems in accordance with current safety engineering standards
- trained or directed in the care and use of appropriate safety equipment in accordance with the current standards of safety engineering
- trained in providing first aid.

General Safety Instructions



Warning! Failure to observe the information given in the warnings could result in serious injury and/or major damage.

Only personnel that have received appropriate training should operate this device or work in its immediate vicinity. The personnel must be fully familiar with all of the warnings and maintenance measures in these operating instructions.

Correct transport, storage, and assembly as well as careful operation and maintenance are essential in ensuring safe and reliable operation of this device.

Use only undamaged parts!

These products are only to be used in the manner indicated in this version of the “Description and Operating Instructions”.

Particular attention is to be paid to all warnings and items of information relating to safety.



Warning! Any work that may have to be performed on the electrical installation should be performed by fully qualified technicians only.

Based specifications and standards:

The devices fulfil the following specifications and standards:

- EN 61000-6-2:2001 Basic standard - interference resistance in industry
- EN 55022:1998 + A1 2000 - Interference characteristics for IT systems
- EN 60950:1997 - Security in IT systems
- FCC 47 CFR Part 15:2000 – Code of Federal Regulations
- cUL 508:1998 – Safety for Industrial Control Equipment
- cUL 1604 Electrical Equipment for Use in Class I and Class II, Div.2 and Class III Hazardous (Classified) Locations
- cUL 60950 Safety for Information Technology Equipment.

Certified devices are marked with a certification identifier.

CE Notes on CE identification

The devices comply with the regulations of the following European directive:

89/336/EEC

Council Directive on the harmonization of the legal regulations of member states on electromagnetic compatibility (amended by Directives 91/263/EEC, 92/31/EEC and 93/68/EEC).

The EU declaration of conformity is kept available for the responsible authorities in accordance with the above-mentioned EU directives at:

Hirschmann Electronics GmbH
Automation and Network Solutions
Stuttgarter Straße 45-51
D-72654 Neckartenzlingen
Telephone ++49-1805-14-1538

The product can be used in the residential sphere (residential sphere, business and trade sphere and small companies) and in the industrial sphere.

- Interference immunity:
EN 61000-6-2:2001
- Radio interference level:
EN 55022:1998 + A1 2000
+ A2 2003 Class B

The precondition for compliance with EMC limit values is strict adherence to the construction guidelines specified in this description and operating instructions.

FCC Note:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



Recycling Note:

After its use, this product has to be processed as electronic scrap and disposed of according to the prevailing waste disposal regulations of your community / district / country / state.

Description

The Twisted Pair Transceiver UTDE can be connected to the AUI interface of a device either directly or via an AUI cable. It is connected to the twisted pair cable by a 8-pin RJ45 socket.

The UTDE twisted pair transceiver offers the following functions according to IEEE 802.3 10BASE-T:

- indication via a LED of data transmission and reception through the twisted pair cable;
- detection of data collisions in the network and reporting them to the terminal equipment as well as indicating them by a LED;
- SQE test switchable: transmitting a short collision signal (heart beat) of approx. 1 μ s duration at the end of each transmission to monitor the electronics;
- Jabber control and display: protecting the network from data packets that are too long (> 20 ms);
- Link control and display: continuous monitoring the twisted pair cable segment with link test pulses for short-circuits or idling;
- Auto Polarity Exchange (APX) and display: the polarity is reversed automatically if the receiving wire pair is connected incorrectly (RD+ and RD- switched round).

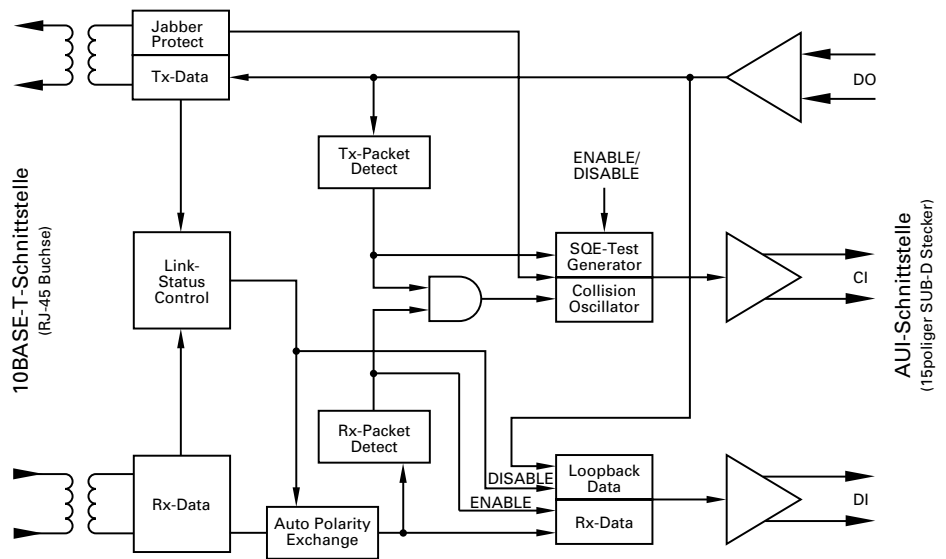


Fig. 1: Block diagram

Installation

Link attenuation

ISO/IEC 8802-3 (10BASE-T) specifies that the link attenuation of a single cable segment must not exceed 11.5 dB at frequencies between 5 and 10 MHz ($Z_L = 100 \Omega$). This value includes

- the attenuation of the twisted pair cable,
- connector attenuation and
- reflection attenuations as the result of adaption errors of the various components

belonging to the single cable segment, e.g. patch panels in which twisted pair cables are connected to each other which, within the scope of the tolerance, have differing characteristic impedance values at the coupling point.

Power supply

The operating voltage (+12 V) is taken from the connected device via the 15-pin Sub-D socket of the AUI interface.

SQE test

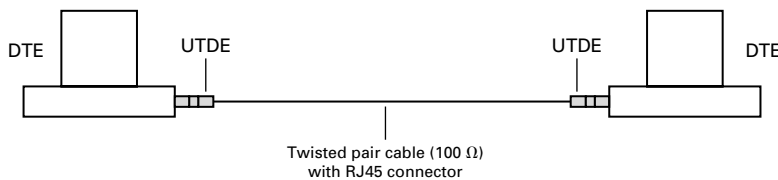
The slide switch located on the top of the transceiver case is used to activate and deactivate the SQE test.

Before placing the transceiver in operation, you should check to see whether the connected device requires the SQE test to be on or off.

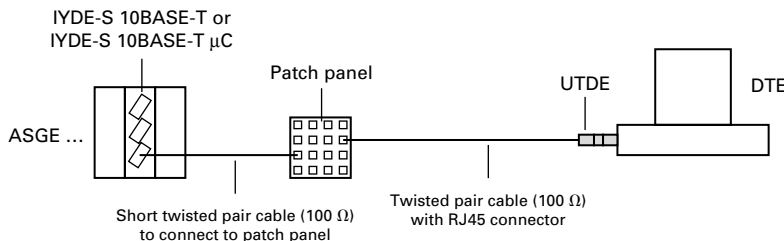
As delivered from the factory, the SQE test is on.

Connection

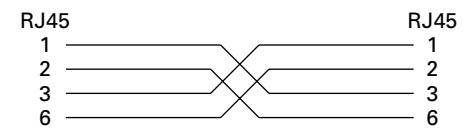
1. Connecton of two devices



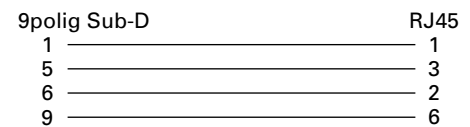
2. Connecting to a twisted pair interface card



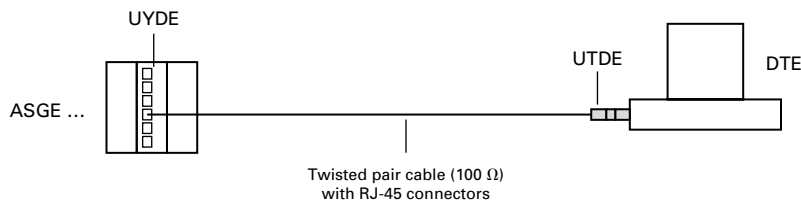
Pin assignments of the RJ45 to RJ45 connecting lead



Pin assignments of the 9-pin Sub-D to RJ45 connecting lead



3. Connecting to an unshielded twisted pair interface card



Pin assignments of the RJ-45 to RJ45 connecting lead

RJ45	RJ45
1	1
2	2
3	3
6	6

Note:

Connecting the Starcoupler (IYDE-S / UYDE) to the transceiver (Mini-UTDE) the twisted pair cable is connected 1:1.

Every port of the IYDE-S / UYDE interface cards includes the crossover function, which however can be switched off at one port: Port 3 at IYDE-S / Port 6 at UYDE.

5. Further support

In the event of technical queries, please talk to the Hirschmann contract partner responsible for looking after your account or directly to the Hirschmann office. You can find the addresses of our contract partners – on the Internet
(<http://www.hirschmann.de>).

Our support line is also at your disposal:
Tel. ++49 1805-14-1538 (Fax -1542)

Answers to Frequently Asked Questions can be found on the Hirschmann internet site

www.hirschmann.de

The FAQs are located under „Service“ in the Automation and Network Solutions section.

www.hicomcenter.com gives you an up-to-date overview of training courses about technology and products.

Technical Data

Operating voltage	+10 V to +16 V
Current consumption (no signal)	60 mA (+12 V)
Bit rate (Manchester Code)	10 Mbit/s

Twisted pair cable interface Transmitter

Output signal on 100 Ohm	5,4 V _{PP}
Preamble loss transmit	1 bit
Steady State Delay	75 ns typ.
Jabber time out	80 ms
Jabber reset	500 ms

Twisted pair cable interface Receiver

Input resistance	100 Ohm at 5 MHz
Sensitivity	800 mV _{PP}
Preamble loss receive	3 bit
Steady State Delay	75 ns typ.
Collision recognition time (Data in → SQE out)	300 ns

Transceiver interface (AUI)

Input:	
Terminator	78 Ohm ±1%
Sensitivity	400 mV _{PP}
Maximum DC component	± 50 V
Output:	
Output voltage (Data and CD signal)	1,4 V _{PP}
Frequency CD signal	10 MHz ± 10%
SQE test (heart-beat)	switchable on/off
Delay time	1000 ns
Length	1000 ns
AUI cable length	0 to 50 m max.

Insulation voltage	
Transceiver interface/twisted pair cable compliance with IEEE 802.3 10BASE-T	1500 V~ from 50 to 60 Hz for 60 seconds 2250 V= for 60 seconds

Pin assignment	
Twisted pair interface (RJ45 socket)	Transmit: TD+: Pin 1; TD-: Pin 2
Transceiver interface (15-pin Sub-D plug)	Receive: RD+: Pin 3; RD-: Pin 6
	Transmit: DO+: Pin 3; DO-: Pin 10
	Receive: DI+: Pin 5; DI-: Pin 12
	Collision detect: Cl+: Pin 2; Cl-: Pin 9
	Power: GND: Pin 6; +12 V: Pin 13
	Shield: Pin 1, 4, 8, 11, 14
Connections	
Transceiver interface	15-pin Sub-D plug
Twisted pair interface	8-pin shielded RJ45 socket
Connections capabilities	
Transceiver interface	plugged directly onto the AUI interface of connected device or connected by an AUI cable (50 m max. length)
Twisted pair interface	unshielded or shielded twisted pair cable segment
Line attenuation	≤ 11,5 dB at 5-10 MHz ($Z_L = 100 \Omega$)
Displays	* green LED: P (Power) on – supply voltage present
	* yellow LED: DO (TxData) on – transmitting data into the twisted pair cable
	* red LED: CD (Collision) shortly on – Collision
	* yellow LED: DI (RxData) on – receiving data from twisted pair cable
	* green LED: LS (Link Status) on – Link status ok
Dimensions W x H x D	45 mm x 21 mm x 81 mm (1.7 in x 0.83 in x 3.2 in)
Weight	100 g (0.22 lb.)
Ambient temperature	Surrounding air 0 °C to +50 °C
Storage temperature	Surrounding air -20 °C to +80 °C
Relative humidity	10 % to 90 % (non-condensing)
Atmospheric pressure	up to 2000 m (795 hPa, higher altitudes on demand)
Protection type	IP 30
Radio interference level	EN 55022 Class B
Interference immunity	EN 50082-2

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