



# Easy CON - 1000Base-T1 Media Converter Manual (Original Documentation)



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Table 1: List of changes to this document

Date	Editor	Rev	Comment
2020-09-18	E. Richter	2.0.0	Document created in LaTeX
2021-05-21	E. Richter	2.0.1	Driver information expanded

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# 1 Introduction

## 1.1 Notes on this Document



This document applies only to the device type **Easy CON**. Any handling of the device requires the exact knowledge and observance of this manual. The operational safety and the function of the device can only be guaranteed if both the general safety and accident prevention regulations of the legislator and the safety instructions in the manual are observed.



The manual is part of the product. Please make sure that all persons who operate the device have read and understood the manual. Keep the manual in a safe place so that it can be used whenever needed.

This guide highlights some important comments as follows:

Table 1.1: Symbols

Symbol	Description
	<b>Warning</b> that indicates risk situations and dangers. Disregard can lead to life-threatening situations.
	<b>Information</b> that indicates certain aspects or is important for a particular topic or goal.

## 1.2 Intended Use

The **Easy CON** by **GÖPEL electronic** connects automotive ethernet networks with standard LAN networks with 100Base-Tx / 1000Base-T as physical layer or with USB 3.0.

Typical features are:

- Coupling of Automotive Ethernet components to a standard PC
- Support of both master and slave operation
- Converting of Automotive Ethernet to USB 3.0, therefore no additional network interface on the PC is necessary
- Simple mode-selection by keypad on the top of the device



The system is not determined for other usage types than those listed here. Nevertheless, if you use it for any purpose other than stated, then **GÖPEL electronic GmbH** can not be held liable for resulting damages.

The device is intended for indoor use only and to be used only at an ambient temperature of 0 °C - +45 °C. It must not be exposed to extreme temperatures, temperature fluctuations, heating and cooling systems, direct sunlight, high levels of dust, vibration and impact, extreme humidity or moisture.

The device is only to be used in a technically perfect condition as well as in accordance with its intended use, in a safety-conscious and hazard-conscious manner, observing the operating instructions! In particular, faults that may affect safety must be rectified immediately!

### 1.3 EMC - Protection Measures

The **Easy CON** complies with the Electromagnetic Compatibility Directive (2014/30/EU).

In order to comply with the electromagnetic compatibility, the system may only be operated in the delivered condition. Mechanical and electrical changes of any kind are not allowed. Use only suitable shielded signal and control cables.



If the product is installed and operated in a system with other equipment, accessories and components, the system as a whole and all its equipment, accessories and components must conform to the EMC directives and standards. The system integrator is responsible for compliance with the EMC Directive 2014/30/EU and national EMC laws for installed systems, system accessories and system components that have not been supplied or tested and approved by **GÖPEL electronic** as manufacturer of the equipment.

### 1.4 EU Declaration of Conformity

The EU Declaration of Conformity can be found in the appendix to this documentation.

### 1.5 General Safety Regulations

To avoid personal injury and / or property damage, follow these general safety instructions.

#### **Risk of accident due to electric shock or fire**

- In addition to the operating instructions, observe the legal requirements and regulations for accident prevention and environmental protection of the countries in which you operate the system.
- Do not make any changes to the system without the written consent of the manufacturer.
- Never operate damaged devices or components.
- Keep liquids away from the unit and do not place any containers with liquid on the unit.

#### **Danger of tripping or falling due to improperly laid cables**

- Lay cables so that nobody can step on them or trip over them.
- Never try to stretch cables to enable a connection. The cables must always have enough clearance.

Damage caused by improper use or failure to observe the safety instructions and warnings is not covered by the warranty. For consequential damages no liability is assumed by **GÖPEL electronic**!

## 1.6 Liability and Warranty Exclusion

The **Easy CON** has not been developed, tested or intended for use in safety-related applications. Do not use the device for safety-related systems or vehicle subsystems. The use of such a device within motor vehicles to control the main vehicle functions can be dangerous and lead to malfunction of motor vehicles.

In no event shall **GÖPEL electronic** be responsible for any direct, indirect, incidental, special, exemplary, or consequential damages (including but not limited to the purchase of replacement goods or services, loss of use, loss of data or profit, breakdowns, injury, or potential death) in any way in the case of improper use of the **Easy CON** Media Converter.

## 1.7 Supplied Accessories

As accessories to **Easy CON** you get:

- 1 adapter cable RJ45 to D-Sub 9-pin
- 1 USB 3.0 cable



Figure 1.1: Accessories

## 2 Technical Description

### 2.1 Overview



Figure 2.1: Housing Top

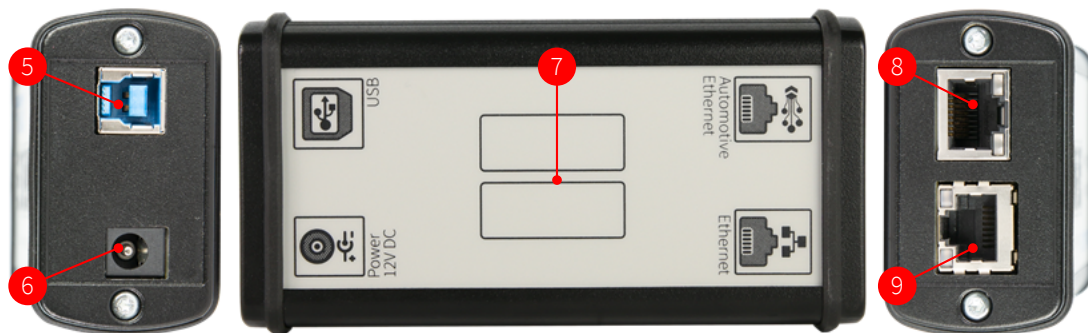


Figure 2.2: Housing Bottom and Outer Sides

Table 2.1: Components of the Easy CON

Position	Designation
1	Device Status LED
2	Link Status LED
3	Keypad
4	Speed Modi LEDs
5	Node 3 (Socket "USB")
6	Socket "Supply"
7	Placeholder nameplate
8	Node 2 (Socket "Automotive Ethernet")
9	Node 1 (Socket "Ethernet")

The interfaces on the outside of the Easy CON are marked on the bottom of the device.



## 2.2 Technical Specifications

### 2.2.1 Easy CON

Table 2.2: Technical Specifications of the **Easy CON**

Property	Value	Unit	Comment
Baud rate	100 bzw. 1000	MBit/s	Full duplex
DC supply voltage	5 .. 30	V	or via USB socket
DC input power	2.5	W	
Operating temperature	-40 .. +80	°C	
Protection class	IP 20		
Dimensions	35 x 60 x 114	mm x mm x mm	H x W x D
Weight	160	g	

### 2.2.2 Power Supply (optional)

Table 2.3: Technical Specifications of the Power Supply

Property	Value	Unit	Comment
Model	HNP42		
Cable length	1.5	m	
AC input voltage	90 .. 264	V	
DC output voltage	12	V	
DC output current	max. 3500	mA	
Operating temperature	-10 .. +40	°C	
Power	42	W	
Ripple	200	mV	Peak to peak
Weight	160	g	
Input connector type	EU, US, UK, SAA		Adapter included

The power supply can optionally be purchased to the **Easy CON** device via the **GÖPEL electronic sales department**.

## 2.3 Interfaces

### 2.3.1 Node 1

#### Socket "Ethernet"

Physical Layer: 100Base-T / 1000Base-Tx Ethernet

Auto-crossover MDI-X

Connector type: RJ45 socket with status LEDs

### 2.3.2 Node 2

#### Socket "Automotive Ethernet"

Physical Layer: 1000/100 Base-T1 Automotive Ethernet

Connector type: RJ45 socket with status LEDs

Table 2.4: Pinout Automotive Ethernet Socket

Pin	Automotive Ethernet
1	TRx+
2	TRx-
3	Not used
4	Not used
5	Not used
6	Not used
7	Not used
8	Not used
Shield	Ground

An adapter cable from RJ45 to D-Sub 9-pin is included.

Table 2.5: Pinout of the Adapter Cable

D-Sub		RJ45	
Pin	BroadR-Reach	Pin	BroadR-Reach
1	Not used	1	TRx+
2	Not used	2	TRx-
3	Ground	3	Not used
4	TRx+	4	Not used
5	TRx-	5	Not used
6	Not used	6	Not used
7	Not used	7	Not used
8	Not used	8	Not used
9	Not used	Shield	Ground

### 2.3.3 Node 3

#### Socket "USB"

Connector type: USB 3.0 socket type B

## 2.4 Status Indication

The **Easy CON** provides various information about the operational status and status of both Ethernet links.

### 2.4.1 Device Status LED

The Device Status LED indicates the following states:

- constantly **WHITE**: Device initialisation (after RESET)
- constantly **GREEN**: **Normal state**
- flashing **RED**: Malfunction software
- constantly **RED**: Malfunction hardware

#### 2.4.2 Link Status LED

The Link Status LED indicates the following states:

- constantly **RED**: No link
- constantly **WHITE**: Automotive Ethernet link OK
- constantly **BLUE**: Ethernet link or USB link OK
- constantly **GREEN**: Automotive Ethernet and Ethernet link or USB link OK

#### 2.4.3 Ethernet Phy Status LEDs

The left Phy Status LED 1 (yellow) indicates the following states:

- constantly **off**: No link
- **3 times** flashing: 1000 Mbit/s
- **2 times** flashing: 100 Mbit/s

The right Phy Status LED 2 (green) indicates the following states:

- constantly **off**: No link
- constantly **on**: Link OK
- **flashing**: Link OK / Activity

#### 2.4.4 Automotive Ethernet Phy Status LEDs

The 1000 Mbit/s Phy Status LEDs (left and right) indicate the following states:

- constantly **off**: No link
- constantly **on**: Link OK
- **flashing**: Link OK / Activity

The left 100 Mbit/s Phy Status LED (yellow) indicates the following states:

- constantly **off**: No link
- **2 times** flashing: Link OK / Activity

The right 100 Mbit/s Phy Status LED (green) indicates the following states:

- constantly **off**: No link
- constantly **on**: Link OK
- **flashing**: Data traffic

### 2.4.5 Speed Modi LEDs




The Speed Mode LEDs (white) indicate the following states:

- **Auto:** Auto Negotiation
- **100:** 100 Mbit/s
- **1000:** 1000 Mbit/s (flashing: [Legacy Mode](#) is set)

## 2.5 Keypad

Using the keypad on the top of the device you can switch between the different operating modes.

Table 2.6: Keypad

Key	Description
	<b>Master / Slave</b> lights up: Master off: Slave
	<b>USB / Ethernet</b> lights up: USB off: Ethernet
	<b>Speed Modi</b> Switch between Auto Negotiation - 100 Mbit/s - 1000 Mbit/s - 1000 Mbit/s with <a href="#">Legacy Mode</a> (if available) In Auto Negotiation Mode the Auto Negotiation LED and the LED of the determined transmission speed as well as the corresponding master / slave configuration light up.

# 3 Commissioning

## 3.1 First Steps

1. Connect **Easy CON** via USB to the PC or to the included AC adapter (optional)
2. Install the Windows driver
3. Set **Easy CON** according to the application on Master or Slave, USB or Ethernet and Auto Negotiation Mode
4. Insert network cable / USB cable and Automotive Ethernet Adapter according to the [housing labeling](#)
5. When the Link Status LED lights green, both a stable Automotive Ethernet connection and a stable network connection is established

## 3.2 Driver Installation

There are two Windows® driver variants for EasyCON 2. Please inform yourself which variant you need:

1. **VlanTag\_IEEE\_Vlan**: This version handles the VLAN tag IEEE standard compliant. The VlanTag is taken from the network packet and stored in the sideband of the operating system.
2. **VlanTag\_RawVlan**: This version handles the VLAN tag as a raw packet. The network packet is passed to the OS unchanged. This is not supported by all applications.

The driver supports the Windows® 7, 8 and 10 operating system. The plug-and-play capability of Windows automatically launches a driver installation for each newly detected hardware component through the Hardware Wizard. Using the **inf** file included on the enclosed CD, the Hardware Wizard can install the device driver. A restart of the system is not mandatory.

## 3.3 Connections

**Node 1** (Socket "Ethernet") has to be connected to a 100Base-Tx/ 1000Base-T Ethernet device. This can be an Ethernet-Switch or another Ethernet device (e.g. a PC). Most Ethernet devices support the 100Base-Tx / 1000Base-T baud rate, otherwise use an Ethernet switch to connect to 1000Base-T networks. Use CAT7 patch cable. Crossover cables are not required: The **Easy CON** device has an integrated auto-crossover switch, determines the required connection type and configures the connection accordingly.

**Node 2** (Socket "Automotive Ethernet") has to be connected to an Automotive Ethernet device. Use CAT7 patch cable or the supplied 9-pin D-sub adapter.

**Please note** : Automotive Ethernet devices can be either link master or link slave. If the connected device is a link master, the **Easy CON** device must be configured as a slave. In contrast, the **Easy CON** device must be configured as a master if the connected device is a slave. To do this, use the [master/ slave button](#) on the top.

If the device is to be connected to a PC via USB (**Node 3**) a USB 3.0 cable should be used. After installing the driver, a network adapter named **EasyCON1000BaseT1** is available.

### 3.4 Legacy Mode - PHY compatibility mode

The PHY (Ethernet Physical Layer transceiver) 88Q2112 from Marvell is integrated into the **Easy CON** device. Depending on the version, this PHY is revision A0 or A2. To check, which generation is installed in your **Easy CON** you can contact **GÖPEL electronic Support** by indicating the serial number. PHYs with revision A2 on the **Easy CON** are compatible to A0 transceivers. To do this, the A2 transceivers have to be Legacy Mode. In Auto Negotiation Mode, the system automatically searches for possible modes. If the opponent is an A0 transceiver, this is detected and the Legacy Mode (with 1000 Mbit/s) is set. The Legacy Mode can also be set manually using the **Speed Modi button**. When Legacy Mode is set the white Speed Modi LED 1000 flashes.

# 4 Service and Support

## 4.1 Spare Parts and Accessories

If necessary, please contact our sales department:

**GÖPEL electronic GmbH**  
ATS-Vertrieb  
Goeschwitzer Str. 58 / 60  
D-07745 Jena  
Tel.: +49-3641-6896-508  
E-Mail: [ats.sales@goepel.com](mailto:ats.sales@goepel.com)  
<http://www.goepel.com>

## 4.2 Warranty and Repair

### 4.2.1 Conditions

We guarantee the accuracy of the test system for a period of 24 months from the date of sale. The warranty does not apply to errors that are based on improper interventions or changes or improper use.

### 4.2.2 Identification

Furthermore, we ask you to announce possible warranty cases as such. Repair orders without reference to an existing warranty claim will in any case initially be paid. If the warranty has expired, we will of course also repair your test system in accordance with our general installation and service conditions.

If necessary, please contact our support service:

**GÖPEL electronic GmbH**  
ATS-Support  
Goeschwitzer Str. 58 / 60  
D-07745 Jena  
Tel.: +49-3641-6896-597  
E-Mail: [ats.support@goepel.com](mailto:ats.support@goepel.com)  
<http://www.goepel.com>

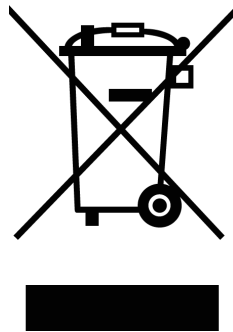
# 5 Disposal

## 5.1 Disposal of used Electrical / Electronic Equipment

The device implements the following EU directives:

- 2012/19/EU (WEEE) Waste Electrical and Electronic Equipment and
- 2011/65/EU on the restriction of the use of certain hazardous substances in electronic equipment (RoHS directive)

At the end of the life of the device, this product must not be disposed of with other household waste. The improper disposal of this type of waste can have a negative impact on the environment and health due to the potential hazardous substances in electrical and electronic equipment. Dispose of the product at a suitable collection point.



When disposing of the device in countries outside the EU, local laws and regulations must be observed.

## 5.2 Disposal of used Disposable Batteries / Rechargeable Batteries

At the end of the service life of disposable batteries / rechargeable batteries, these must not be disposed of with the normal household waste. Dispose of the disposable batteries / rechargeable batteries at a recycling center for disposable batteries and rechargeable batteries.

Please dispose of only discharged disposable batteries / rechargeable batteries.



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# Anhang A Declaration of Conformity



## EU-Konformitätserklärung EU Declaration of Conformity

**GÖPEL electronic GmbH, Göschwitzer Straße 58-60, D-07745 Jena**

Wir erklären hiermit die Übereinstimmung des genannten Produktes mit der Richtlinie 2014/35/EU – Niederspannungsrichtlinie, der Richtlinie 2014/30/EU über die elektromagnetische Verträglichkeit und der Richtlinie 2011/65/EU über Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten (RoHS). Bei Änderungen am Produkt, die nicht von uns autorisiert wurden, verliert diese Erklärung ihre Gültigkeit.

We declare the compliance of the product with the requirements of the Directive 2014/35/EU – Low Voltage Directive, with the Directive 2014/30/EU about the Electromagnetic Compatibility and the Directive 2011/65/EU on the use of certain dangerous substances in electrical and electronic equipment (RoHS). Any modification to the product, not authorized by us, will invalidate this declaration.

**Produktbezeichnung / Product name:**

### EasyCON 1000Base-T1 Media Converter

**Normen / Standards:**

EN 61326-1  
IEC 61000-4-2  
IEC 61000-4-3  
IEC 61000-4-4  
IEC 61000-4-6

**Das Produkt ist gekennzeichnet mit / The product is marked with**



Jena, 20.11.2018

GÖPEL electronic GmbH

Jörg Schneider  
Geschäftsführer

Geschäftsführer: Alice Göpel, Jörg Schneider, Thomas Wenzel  
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