

# 100BASE-T1 MEDIACONVERTER EMC\_Set

## **USER MANUAL**

February 2019

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# 1 GENERAL INFORMATION

## 1.1 Functionality and Features of the 100BASE-T1 MediaConverter\_EMC Set



Figure 1–1: 100BASE-T1 MediaConverter\_EMC\_Set

The Technica Engineering 100BASE-T1 MediaConverter\_EMC Set is always in a set of two devices. One device transmits data frames directly from the physical layer 100BASE-T1 to a propriotor optical Ethernet SFP-module port. The delay time is constant  $2.0\mu\text{s}$ . The standard operational area is getting a connection to a device under test in a shielded EMC Chamber. The recommended application can be seen in the following picture:

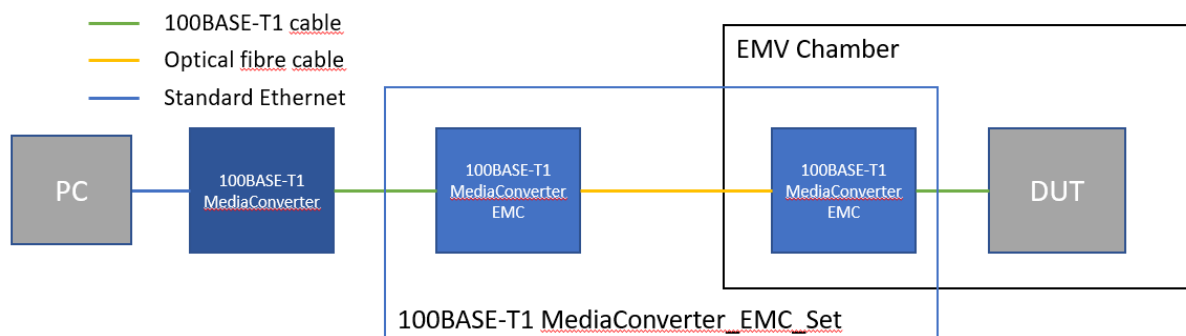


Figure 1–2: Recommended application of the 100BASE-T1 MediaConverter\_EMC\_Set  
(For more details please see [CHAPTER 4](#))

#### Features of one device:

- 1 Port BroadR-Reach Ethernet 100 MBit/s Full duplex on a single unshielded twisted pair
- 1 Port optical Ethernet SFP Module
- Automotive Tyco MQS Connectors for BroadR-Reach and Power Supply
- Robust steel case
- DIP Switches for easy configuration

#### General Information:

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Power requirement:	10 to 13 Volt DC (nominal 12 Volt DC)
Power consumption:	3 Watt
Size:	92 x 63 x 30 mm
Weight:	0,2 kg
International Protection:	IP 2 0
Operating temperature:	-40° to +80 °Celsius

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#### LINKS:

The User can download the latest firmware and documentation for the 100BASE-T1 MediaConvert\_EMG\_Set here:

[https://technica-engineering.de/en/produkt/100base-t1-mediaconverter\\_emc-set/](https://technica-engineering.de/en/produkt/100base-t1-mediaconverter_emc-set/)

## 1.2 Warranty and Safety Information



Before operating the device, read this manual thoroughly and retain it for your reference.

The latest documentation for the 100BASE-T1 MediaConverter EMC Set can be downloaded here:

[https://technica-engineering.de/en/produkt/100base-t1-mediaconverter\\_emc-set/](https://technica-engineering.de/en/produkt/100base-t1-mediaconverter_emc-set/)



Use the device only as described in this manual.

Use only in dry conditions.

Do not apply power to a damaged device.



Do not open the device. Otherwise warranty will be lost.



This device is designed for engineering purpose only.

Special care must be taken for operation.

Do not use this device in a series production car.

As this device is likely to be used under rough conditions, warranty is limited to 1 year.

Manufacturer liability for damage caused by using the device is excluded.

## 1.3 Declaration of conformity


<b><u>EG-Konformitätserklärung</u></b>	
<b>gemäß der EG-Richtlinie 2004/108/EG (elektromagnetische Verträglichkeit) vom 15. Dezember 2004</b>	
<p>Hiermit erklären wir, dass das nachstehend bezeichnete Gerät in seiner Konzeption und Bauart sowie in der von uns in Verkehr gebrachten Ausführung den grundlegenden Sicherheits- und Gesundheitsanforderungen der EG-Richtlinie 2004/108/EG entspricht. Bei einer mit uns nicht abgestimmten Änderung des Gerätes verliert diese Erklärung ihre Gültigkeit.</p>	
<b>Hersteller:</b>	Technica Engineering Leopoldstr. 236 80807 München
<b>Bevollmächtigter:</b>	Joseba Rodriguez
<b>Beschreibung des Gerätes:</b>	100BASE-T1 MediaConverter_EMC
<b>Datum der Erklärung:</b>	11.01.2016
<b>Name des Unterzeichners:</b>	Joseba Rodriguez
<b>Unterschrift:</b>	 .....

Figure 1–3: Declaration of conformity

## 2 HARDWARE INTERFACES

### 2.1 Connectors

On the label on top of the device you can see an overview about all HW-Interfaces of the 100BASE-T1 MediaConverter\_EMC Set

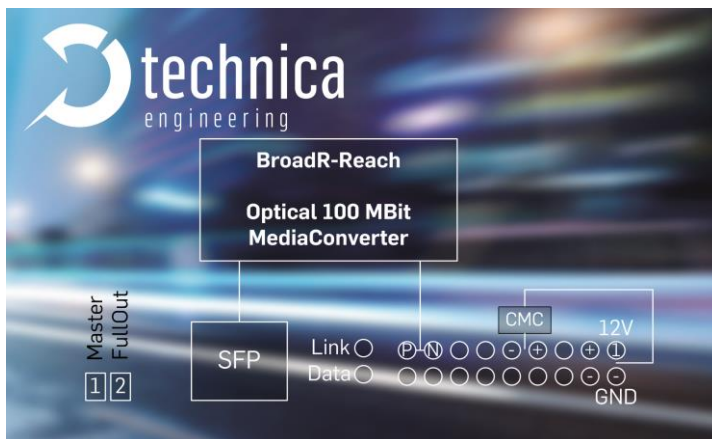


Figure 2–1: Label of 100BASE-T1 MediaConverter\_EMC Set

#### 2.1.1 Black MQS Connector

The pinning of the ECU connectors is listed on the label on top of the device as well. (See [FIGURE 2–1](#)).

The Connector color is black.

The power supply for the device is supplied by pin 1 (12 Volt) and pin 10 (Ground)

**Warning:** If you apply a voltage higher than 13 Volt, the device will be damaged!

The Tyco Electronics (TE) Micro Quad Lock System (MQS) is used.




Name	Picture	Part Number
Tyco, MQS Abdeckkappe 2x9 Pol, black Alternative		1-967416-1 1-1355350-1
Tyco, MQS Buchsengehäuse 2x9 Pol Alternative		965778-1 962108-2
Tyco crimp contact		928999-1

Table 2–1: Parts of black MQS connector

**Note:** You can use the official Tyco tool for these crimp contacts. A cheap variant is the crimp tool for “PSK” contacts.

Pin	Function	Pin	Function
1	Battery +12 Volt Input	10	Power Ground
2	Reserved	11	Reserved
3	n.c.	12	n.c.
4	Power output + fed through CMC*	13	n.c.
5	Power output - fed through CMC*	14	n.c.
6	n.c.	15	n.c.
7	n.c.	16	n.c.
8	BroadR-Reach Port, Negative	17	n.c.
9	BroadR-Reach Port, Positive	18	n.c.

Table 2–2: Pinning of black MQS connector

\*These pins supply power to another device with common mode choke filter inside.

**Note:** The power supply on these pins are maximum 0,6A



## 2.1.2 SFP-Interface

There is one SFP cage for a MiniGBIC module.

It is not possible to use standard SFP-modules in this SFP-cage. In the parts list of the 100BASE-T1-MediaConverter\_EMC\_Set there are special reworked optical SFP-modules, which are matching to the 100BASE-T1 MediaConverter EMC. It is recommended to use these modules.

## 2.2 Other interfaces

### 2.2.1 DIP-Switches

The 100BASE-T1 MediaConverter\_EMC has two DIP-Switches for configuration (see [CHAPTER 3](#)).

### 2.2.2 Status LEDs

The 100BASE-T1 MediaConverter\_EMC\_Set has two status LEDs at the frontside of the case for the 100BASE-T1 Port.

Upper LED:

Green Color. It is lit when there is a linkup on the 100BASE-T1 port.

Lower LED:

Yellow Color. It is toggling in alternation with the green LED when there is communication.

**Note:** There is a bug in the used BroadR-Reach PHY. When the BR Plus and Minus lines are swapped, and the 100BASE-T1 port is set to Slave then the Link LED is lit, but there is no data transmission possible. So please connect the 100BASE-T1 lines correctly.

### 3 CONFIGURATION OF THE DEVICE

The 100BASE-T1 MediaConverter EMC is configured by two DIP-Switches on the front of the device.

DIP-Switch	Status	Description
1	ON (up)	100BASE-T1 Port is set to Master
	OFF (down)	100BASE-T1 Port is set to Slave
2	ON (up)	100BASE-T1 Port is set to FullOut
	OFF (down)	100BASE-T1 Port is set to HalfOut

Table 3–1: Configuration of DIP-Switches

**Note:** In a 100BASE-T1 Link one device must be set to Master, the other must be set to Slave Mode.

**Note:** The MediaConverter should always be set to FullOut. HalfOut was a former configuration for EMC optimization but will cause an instable link.

## 4 EMC Measurement Setup

The following diagram shows a typical EMC measurement setup.

The device under test is placed in a shielded EMC chamber together with one optical MediaConverter. All devices inside the chamber are supplied by a 12 V car battery. The only connection to the outside is a fiber Ethernet connection so no guided radiation can occur.

The optical MediaConverter has been built to be EMC clean. At the end the source of all radiation measured in the chamber will be the DUT.

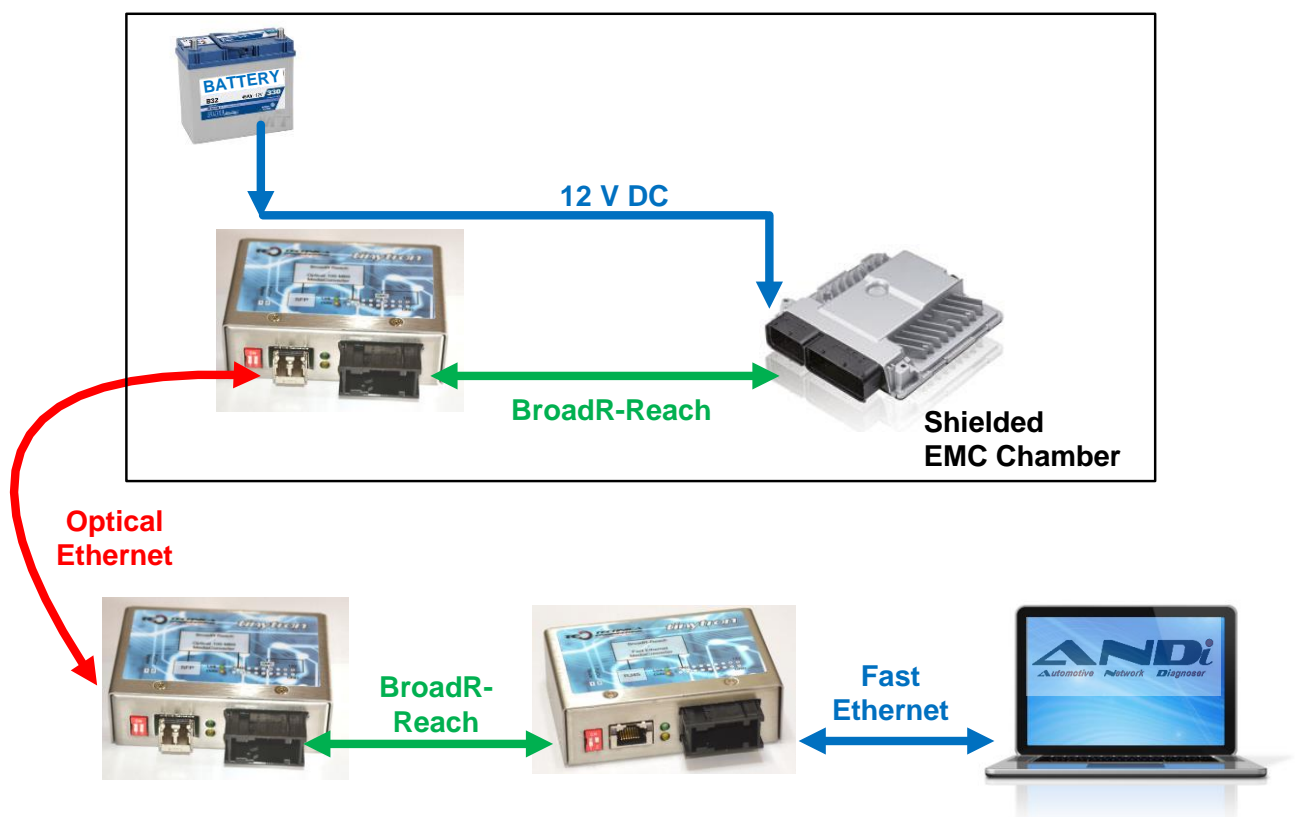


Figure 4–1: Measurement Setup

**Note:** The standard 100BASE-T1 MediaConverter (100BASE-T1 to Fast Ethernet) is not part of the 100BASE-T1 MediaConverter\_EMC\_Set.

## 5 100BASE-T1 FILTER

The following 100BASE-T1 Filter is used in the 100BASE-T1 MediaConverter\_EMC:  
In Version 3.0 the TDK CMC ACT45L-201-2P is used for L32.

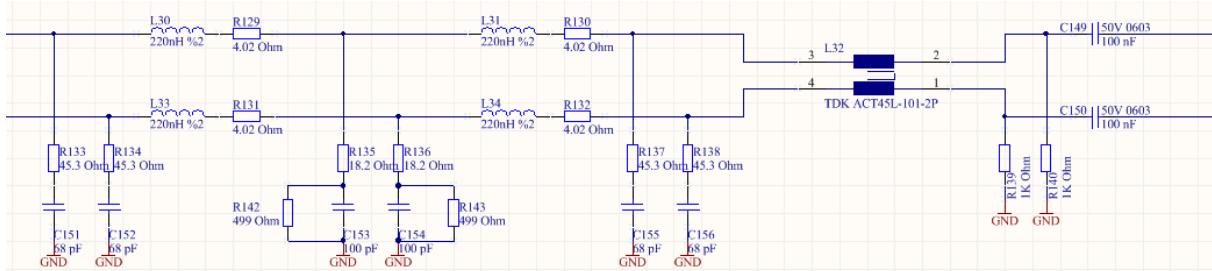


Figure 5–1: Used Filter in 100BASE-T1 MediaConverter EMC

All Filter Versions are compatible, and it will be possible to set up a stable link.  
However, it is recommended to use the latest filter version.

## 6 GENERAL EMC TEST INFORMATION

### Testcases:

We test our EMC products with 350 V/m in a Stripline setup from 1 MHz to 1 GHz. The devices are not damaged in this setup.

There will be no Link Drop on 100BASE-T1 or 1000BaseT1.

**Warning:** At frequencies below 1 MHz immunity must be tested at a maximum of 100V/m. Otherwise the devices will be permanently damaged!

We test our EMC products with 200 mA in a BCI substitution setup from 1 MHz to 1 GHz. The devices are not damaged in this setup.

There will be no Link Drop on 100BASE-T1 or 1000BaseT1.

**Warning:** BCI closed loop method is not allowed for 100BASE-T1 or 1000BaseT1 products. This test would permanently damage any device (independent of the vendor of device) if your generator is strong enough.

**Warning:** At frequencies below 1 MHz the immunity must be tested at a maximum of 40 mA. Otherwise the devices will be permanently damaged!

### Emission:

We test our EMC devices according to automotive emission standards. Because standards and expectations vary, we grant a 4 week return period. You can test our device according to your needs in your chamber. If you are not satisfied with the result you can return the devices and get refunded.

## 7 ADDITIONAL INFORMATION

- The delay time is constant 2.0 $\mu$ s. The delay is independent of the Ethernet packet frame size.
- The 100BASE-T1 MediaConverter\_EMC Set is optimized for automotive use. The maximum line length for each BroadR-Reach segment is limited to 15 meters.
- For best EMC performance only linear power regulators have been used in the EMC version of the MediaConverter. The case has been designed to act as a heat sink.
- At 12 Volt VBAT the loss is very big. If you have the chance to use 10 Volt VBAT this would prevent the device getting hot.
- The 100BASE-T1 MediaConverter is a physical layer changer. It is independent from transmitted protocol sent on the 100BASE-T1.

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## 9 CHANGELOG

Version	Chapter	Description	Date
1.0	All	First release	
2.0	All	Second Release	16.11.2018
2.1.1	All	Design and content reworked	25.02.2019



## 10 CONTACT

If you have any questions regarding this product, please feel free to contact us:

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80807 München  
Germany

Technical support:  
[support@technica-engineering.de](mailto:support@technica-engineering.de)

General information:  
[Info@technica-engineering.de](mailto:Info@technica-engineering.de)

Most current user manuals and product information:  
<https://technica-engineering.de/>