

## 1000BASE-T1TX-TI



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## 1. General Description:

The 1000BASE-T1TX-TI Media Converter enables seamless bi-directional conversion between Standard Ethernet (1000BASE-TX) and Automotive Ethernet (1000BASE-T1). It is an automotive Ethernet physical layer transceiver that complies with IEEE 802.3bp and Open Alliance standards, ensuring compatibility and reliable performance in automotive and industrial applications.

The power supply side is designed with ESD protection and LC filter components, effectively mitigating power fluctuations. The BASE-T1 interface includes ESD protection and common-mode filtering technology, while the BASE-TX interface is also equipped with ESD protection. These features allow the device to perform reliably in harsh automotive environments, effectively handling power disturbances such as load dumps caused by vehicle starters.

The device features an OLED display, which provides real-time status information, including the T1 TX status, signal quality, and fault detection for open-circuit and short-circuit issues in cables. It also displays the current temperature of the PHY chip, enabling convenient on-site diagnostics. The diagnostic process may briefly affect the communication rate but ensures efficient troubleshooting and system monitoring.

The 1000BASE-T1TX-TI Media Converter requires no customized drivers and communicates seamlessly with standard Ethernet through an RJ-45 connector. It comes with TE and MOLEX adapters, making it adaptable to different usage scenarios. The device supports all PCs, industrial control computers, and ARM SBCs, offering plug-and-play functionality for quick and hassle-free integration.

This device performs physical layer conversion only, preserving the original network protocols without any alteration or disruption. It ensures that network speeds and performance remain unaffected during operation. It is also compatible with a wide range of popular network communication software, including IPERF3, Wireshark, and rsync, making it a versatile tool for data transmission and diagnostics.

The 1000BASE-T1TX-TI Media Converter is a reliable and versatile device designed for automotive, industrial, and testing environments. Its robust build, advanced diagnostic capabilities, and ease of use ensure high performance and stability, making it an ideal choice for professionals and engineers.

## 2. Features

1. Establishes a direct point-to-point conversion between automotive ECU's using 1000BASE-T1(1000 Mbit/s Full duplex,) and any standard Fast Ethernet (1000 Mbit/s, 1000BASE-TX) device with an standard ethernet RJ45 connector. Only supports 1000BASE communication, not compatible with 100BASE.
2. By using the AEC-Q100 qualified TI DP83TG720SWRHATQ1 IEEE 802.3bp and Open Alliance compliant automotive Ethernet physical layer transceiver, ensure a trustworthy and effective tool to customers that are looking for a cost-efficient, quick and manageable solution for testing requirements, with no latency and no packet loss.
3. Comes with 1x TE MATenet and 1x MOLEX adapter. Do not provide the over unshielded twisted pair (UTP) cables.
4. Features with 1000BASE-T1 Master / Slave configuration and an OLED screen. Support Cable open and short fault detection and Signal quality indicator.
5. Plug and Play, performs physical layer conversion only, preserving the original network protocols without any alteration or disruption, data pass-through

## 3. Hardware Description

### 3.1 General Information

Items	Description
Power Input Requirement	TYPE C (5V/2A) Or DC-JACK (9V-12V/1A)
Power Consumption	< 1W
Size W* L * H	84mm x 83mm x 28mm
Weight	0.148kg
Operating Temperature	-40-85 Celsius
T1 Phy Chip	DP83TG720SWRHATQ1
TX Phy Chip	DP83867ERGZR

### 3.2 Interface



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## **(1) Display**

Refer to 3.3 Display Interface and Keys Description

## **(2) Key**

Refer to 3.3 Display Interface and Keys Description

## **(3) Ethernet Port**

There is one RJ45 Standard Ethernet connector for Fast Ethernet(1000 Mbit/s, 1000BASE-TX)

## **(4) 1000Base-T1**

1000Base-T1 port, 2xpins and 5.08mm Pitch.

## **(5) TX/RX LED**

The TX/RX indicate LED for 1000Base-T1 port.

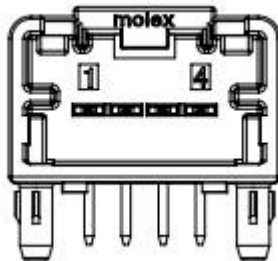
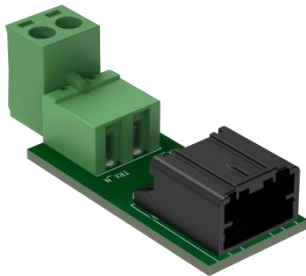
## **(6) Master / Slave configuration Key**

In a 1000BASE-T1 Link one device has to be set as Master, the other has to be set as Slave. If you don't know the mode of DUT, you could switch the mode of 100BASE-T1TX-TI device for testing.

## **(7) Power Input**

Alternative power input options: 5V/1A through a Type-C port (compatible with phone chargers) or 9V-24V via a DC jack.

## (8) Molex BR Adapter



Manufactory: Molex

Part Number: 34793-0040

Pin (from left to right)	Description
1	NC
2	Data Line Plus (Positive)
3	Data Line Minus (Negative)
4	NC

## (9) TE MATEnet Adapter



Manufactory: TE Connectivity

Part Number: 2304372-1

Pin (from left to right)	Description
1	Data Line Plus (Positive)
2	Data Line Minus (Negative)



### 3.3 Display Interface and Keys Description

#### (1) Display

The display screen has a total of five display modes, and none of them will affect network data communication. However, if the user uses the device for open-circuit and short-circuit fault detection on cables, it may impact the communication quality and result in packet loss. Therefore, please avoid using the fault detection function while transmitting important data.

Display Interface	Description
Display Mode 1	Display the status of the 1000BASE-T1 interface of the product.
1000Base-T1 NET Link:OK! /Link:? Mode:Master/Mode:Slave SQI :	Line 2: Whether the connection is successful. Line 3: Current working mode Line 4: Signal quality indicator. 0 to 7. the higher the number, the better the quality.
Display Mode 2	The 1000Base-T1 functionality diagnostic interface
1000Base-T1 Diag Note:This function should run with T1 linknot active! Start by press Diag key!	After pressing the " <b>Diag</b> " button, the device will start detecting the status of the T1 port. Once the detection is complete, the results will be displayed. At this point, you need to press the <b>Exit</b> button to exit the diagnostic function, allowing you to start the next detection or switch to another interface.
1000Base-T1 Diag Start....	After pressing the " <b>Diag</b> " button, the T1 interface detection will start. During this time, network transmission speed may be affected. Therefore, avoid transmitting important data while performing the detection.
1000Base-T1 Diag T1 TDR HAS DONE! Short/Noise/Open at XX m/Cable ok!	Display the current T1 network diagnostic results and indicate the location of any issues. The effective inspection distance is XXX meters.
Display Mode 3	Display the status of the 1000BASE-TX interface of the product.
1000Base-TX NET Link:OK! /Link:? xxxMbps? /1000Mbps/100Mbps Duplex?/Full duplex/Half duplex	Line 2: Whether the connection is successful. Line 3: Current working mode Line 4: Full duplex or Half duplex

Display Mode 4	The 1000Base-TX functionality diagnostic interface
1000Base-TX Diag Note: This function should run with Tx linknot active! Start by press Diag key!	After pressing the " <b>Diag</b> " button, the device will start detecting the status of the T1 port. Once the detection is complete, the results will be displayed. At this point, you need to press the <b>Exit</b> button to exit the diagnostic function, allowing you to start the next detection or switch to another interface.
1000Base-TX Diag Start....	After pressing the " <b>Diag</b> " button, the TX interface detection will start. During this time, network transmission speed may be affected. Therefore, avoid transmitting important data while performing the detection.
1000Base-TX Diag TX TDR HAS DONE! Short at: XXm/Open at: XXm/Cable ok!	Display the current TX network diagnostic results and indicate the location of any issues. The effective inspection distance is XXX meters.
Display Mode 5	Display the temperature of T1 PHY chip
Temp Monitor Temp: XX C	This is an auxiliary function that reads the current temperature from the T1 PHY chip registers. However, during practical testing, we occasionally found that this temperature is not always accurate. Therefore, it is recommended that users only use this feature as a reference.

## (2) Keys

Key Name	Description
Menu+	The menu scroll-up function allows switching between five menus in a loop. Note that during detection, this button will be disabled. It will only be reactivated after the detection is completed and the EXIT button is pressed to exit the detection mode.
Menu-	The menu scroll-down function allows switching between five menus in a loop. Note that during detection, this button will be disabled. It will only be reactivated after the detection is completed and the EXIT button is pressed to exit the detection mode.
Diag	The Start Detection button can initiate detection in the 1000Base-T1 Diag and 1000Base-TX Diag interfaces.
Exit	The Exit Detection button must be pressed after each detection is completed to proceed with the next detection or return to the main menu.

## 4. Usecase

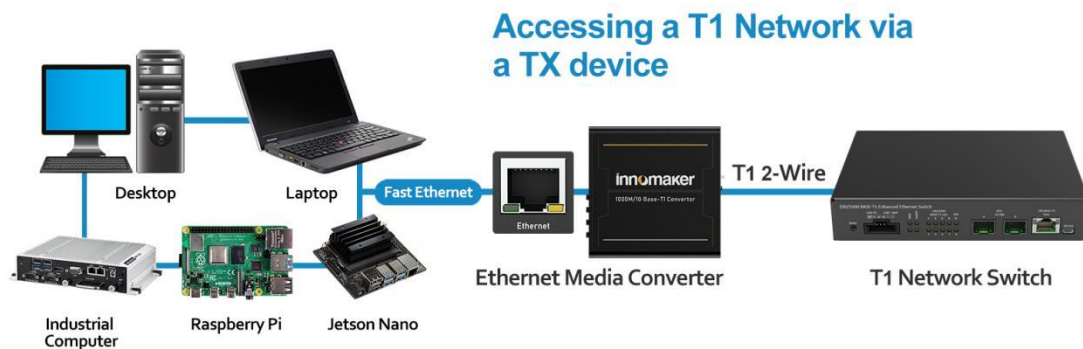
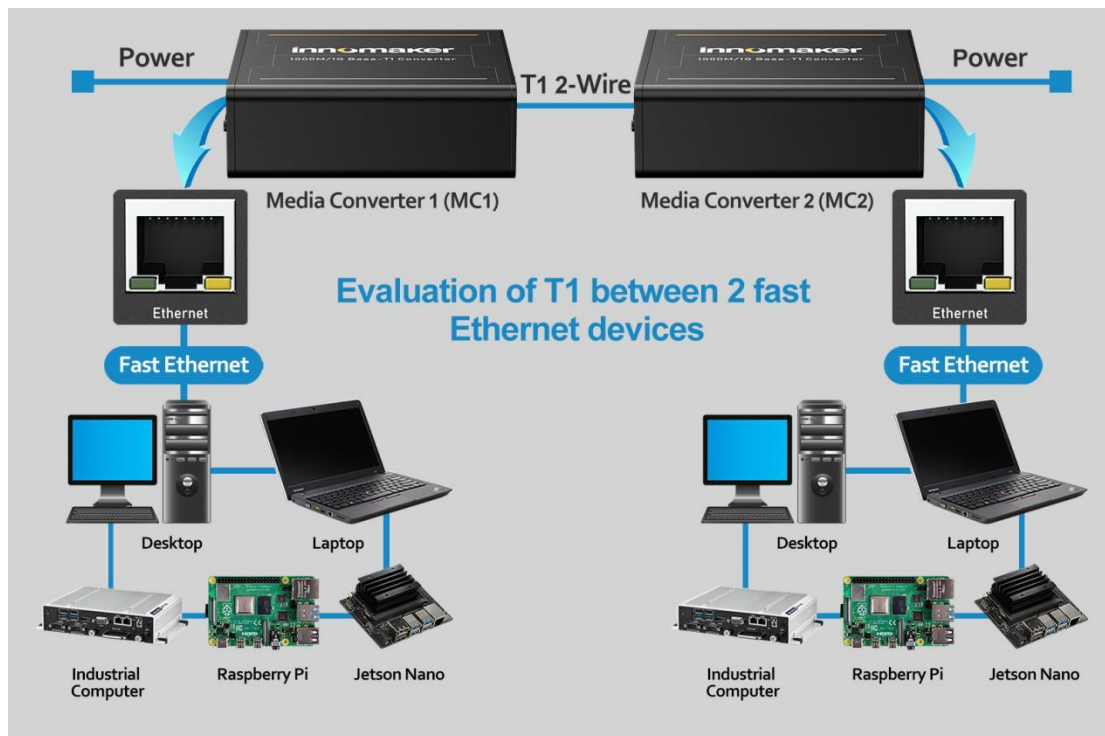
### 4.1 Standard Usecase



100BASE-T1-TX device is used to connect a PC/SBC to a T1 peripheral.

The mode of device is dependent on the DUT. If DUT is Master, MC must be configured as Slave (DIP-switch : S) and vice versa. If you don't know the mode of DUT, you could switch the mode of 100BASE-T1-TX for testing. The BR Link led will be lit when the 100BASE-T1-TX is paired with the DUT.

## 4.2 Evaluating T1 between two 100BASE-TX devices



You could use two 100BASE-T1-TX and two standard PCs/SBC with RJ45 connectors together over a 2-wire T1 network. The converters communicate with each other via T1 2-Wire.

## 5.User Manual Version Descriptions

Version	Description	Date	E-mail
V1.0		2024.11.04	<a href="mailto:support@inno-maker.com">support@inno-maker.com</a> <a href="mailto:sales@inno-maker.com">sales@inno-maker.com</a>

If you have any suggestions, ideas, codes and tools please feel free to email to me. Look forward to your letter and kindly share.