

# TN9710x-TB3

## Multi-speed 10GBase-T / NBASE-T Thunderbolt™ 3 Adapter

Low Power - Low Area - Low Cost

10 Gigabit Performance, More than 1G over legacy cables!

With low power consumption, the TN9710x-TB3 is the first bus-powered 10GBase-T/NBASE-T Thunderbolt™ 3 adapter.

It offers attractive cost and small size required for the consumer market.

The ideal solution for USB type-C based products such as Apple's MacBook Pro (2016), thin Ultrabook computers and other Thunderbolt™ 3 Technology equipped devices, which seek to communicate with an existing Ethernet infrastructure while coping with the increasing demand for higher network bandwidth.

### Overview

The TN9710x-TB3 Network Adapter reference design hosts the latest Tehuti TN4010 controller, an optimized 10GbE controller designed for low-power, low-cost and single-port applications. The TN4010 MAC is paired with Intel's DSL6340 Thunderbolt™ 3 Alpine ridge Single port device and with one of the Marvell Alaska® X 88X3310P/88E2010P transceivers, single-port, low power, high performance NBASE-T PHYs devices which support the new IEEE 802.3bz 5GBase-T and 2.5GBase-T standard.

The Tehuti adapter reference design supports auto-negotiation allowing the NBASE-T solution to optimally select the best speed: 10 Gigabit Ethernet (10GbE), 5 Gigabit Ethernet (5GbE), 2.5 Gigabit Ethernet (2.5GbE), 1Gigabit Ethernet (GbE) or 100 Megabit Ethernet (100MbE) over Cat5e/Cat6 or better cabling.

### Key Features

- USB Type-C and Thunderbolt™3 technology: One port to connect them all
- IEEE 802.3an 10G, 1G and 100M over up to 100m of Cat6a (or better) cables
- IEEE P802.3bz (NBASE-T) 5G and 2.5G over up to 100m of Cat5e (or better) cables
- Low Cost, Low Power, 10 Gigabit performance
- 9K Jumbo Frames
- IP, TCP, UDP checksum offloading
- RMON statistics
- IEEE 802.1Q Tagged VLAN
- Virtual NIC support
- Reduced CPU utilization and improved throughput

Solution	MAC	PHY	Speed	PCIe
TN9710P-TB3	TN4010	88X3310P	10G,5G,2.5G,1G,100M	4 Lanes
TN9710Q-TB3	TN4005	88E2010P	5G,2.5G,1G,100M	2 Lanes

# TN9710x-TB3: Multi-speed 10GBase-T / NBASE-T (™) to Thunderbolt™ 3 Adapter

Features	Benefits
<b>Host Bus Interface</b> <ul style="list-style-type: none"> <li>Thunderbolt™ 3 over USB Type-C connector</li> </ul>	<ul style="list-style-type: none"> <li>Standard high performance bus interface</li> </ul>
<b>Reduced System complexity</b> <ul style="list-style-type: none"> <li>1Mbit internal memory</li> <li>Internal OTP</li> </ul>	<ul style="list-style-type: none"> <li>No on-board DRAM required</li> <li>No Flash/EEPROM required on board</li> </ul>
<b>Flexible solution support</b> <ul style="list-style-type: none"> <li>TN9710P-TB3: TN4010+88X3310P, 5-speed, 4 lane PCIe</li> <li>TN9710Q-TB3: TN4005+88E2010P, 4-speed, 2 lane PCIe</li> </ul>	<ul style="list-style-type: none"> <li>10GBASE-T (IEEE 802.3an) and NBASE-T (IEEE P802.3bz)</li> <li>NBASE-T (IEEE P802.3bz)</li> </ul>
<b>Ethernet and Media support</b> <ul style="list-style-type: none"> <li>Full IEEE Std 802.3ae Compliant</li> <li>Full IEEE Std P802.3bz specification compliant</li> <li>10G/5G/2.5G/1000M/100M auto negotiation support</li> <li>Jumbo frame support (9K)</li> <li>IEEE 802.1q VLAN support</li> <li>RFC2819 RMON MIB statistics</li> <li>Multicast</li> <li>Up to 100 meters over Cat5e (or better) cables</li> </ul>	<ul style="list-style-type: none"> <li>Up to 10Gb/s over unshielded twisted pair (UTP)</li> <li>Backward compatibility for wide range of systems</li> <li>Higher network utilization for large data transfers</li> <li>Traffic isolation for security</li> <li>Generic statistics monitoring</li> <li>Reduce network traffic</li> <li>Maximize network throughput via teaming</li> <li>Virtually no distance limitations</li> </ul>
<b>Thunderbolt™ 3 technology Media support</b> <ul style="list-style-type: none"> <li>Runs at 40Gbps bi-directional (as long as the cable is 0.5m or shorter)</li> <li>USB-C connection type (USB 3.1)</li> </ul>	<ul style="list-style-type: none"> <li>Thunderbolt™ 3 technology brings workflow versatility to content creators with simultaneous 4K video delivery and editing.</li> <li>Super set of : Thunderbolt 2 (adapter required,) DisplayPort, PCIe 3rd Gen</li> </ul>
<b>Performance enhancements</b> <ul style="list-style-type: none"> <li>Microsoft Scalable Networking</li> <li>Receive-side scaling (RSS)</li> <li>MSI</li> <li>IP, TCP and UDP checksum offloading</li> <li>Large Send (up to 64 KB)</li> <li>Low Latency (&lt; 4 uS)</li> </ul>	<ul style="list-style-type: none"> <li>Reduced host bus traffic</li> <li>Efficiently support multi-core systems</li> <li>Minimize overhead and eliminates interrupt sharing</li> <li>Lower CPU utilization</li> <li>Increased network throughput</li> <li>Ideal for high performance computing applications</li> </ul>
<b>Driver support</b> <ul style="list-style-type: none"> <li>Microsoft Windows 10 32/64 bit</li> <li>Microsoft Windows 8.1 32/64 bit, Microsoft Windows 7 32/64 bit</li> <li>Linux Linux 4.x (with Thunderbolt™ 3 supported kernel)</li> <li>Apple macOS 10.12 or later</li> </ul>	<ul style="list-style-type: none"> <li>Short time to market</li> <li>Seamless software integration</li> <li>No interference with existing TCP/IP implementations</li> <li>Advanced multi-processor platforms support</li> </ul>
<b>Manageability</b> <ul style="list-style-type: none"> <li>Advanced cable diagnostics</li> <li>Comprehensive Built-In self-test</li> </ul>	<ul style="list-style-type: none"> <li>On the field cable and network connection debug</li> <li>Improves yield, increases reliability, and lowers overall cost</li> <li>Optimizing system management &amp; thermal design</li> </ul>
<b>Physical and Electrical</b> <ul style="list-style-type: none"> <li>Voltage: 3.3V , 12V</li> <li>Power consumption (Full bidirectional traffic, 100m cable): <ul style="list-style-type: none"> <li>10G speed: TBD</li> <li>5G speed: TBD</li> <li>2.5G speed: TBD</li> <li>1G speed: TBD</li> <li>100M speed: TBD</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Operating Temperature 0÷C to 70÷C</li> <li>Storage Temperature -40÷C to 85÷C</li> <li>Green &amp; RoHS Compliant</li> <li>Size: 82mmX62mm</li> </ul>