



syn1588<sup>®</sup>

# syn1588<sup>®</sup> PCIe NIC – Revision 2

Brief Data Sheet

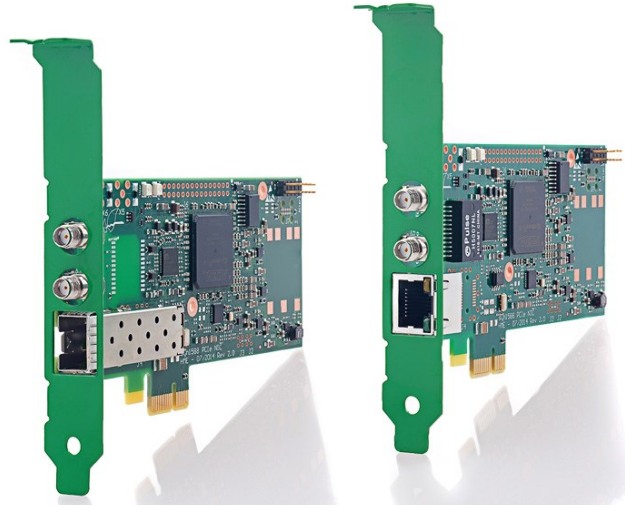
Version 2.4 - April 2019

## Features

- 10/100/1000 Mbit Ethernet network interface card
- Green Ethernet support IEEE 802.3az
- PCI Express card (half height)
- PCI Express V2.0 mode with 5 Gbit/s lane speed
- IEEE1588-2002 & IEEE1588-2008 compliant
- Master and Slave capable PTP Node (with syn1588<sup>®</sup> PTP Stack)
- IEEE1588 hardware timestamping
- Patented on-the-fly timestamping (1-step mode)
- Clock accuracy up to  $\pm 4$  ns
- syn1588<sup>®</sup> PTP Stack binary run-time license included (Linux & Windows)
- Up to 4 programmable I/O signals available on SMA jacks
- Connectivity to an external GPS receiver via the 1PPS input and RS232 port of the host PC
- Drivers for Linux & Windows
- User configuration, remotely upgradeable

## Options

- Oscillator option: OCXO
- 1000BASE-X (fiber) mode using SFP type interface
- Timestamping of arbitrary packets via user configurable packet filter engines
- External clock input driving the syn1588<sup>®</sup> clock signal



The syn1588<sup>®</sup> PCIe NIC is a standard 10/100/1000 Mbit PCI Express Ethernet network interface card with enhancements to provide highly accurate clock synchronization via the IEEE1588 standard. The syn1588<sup>®</sup> PCIe NIC provides all real-time functions required for an IEEE1588 node to operate both in master and slave mode.

The syn1588<sup>®</sup> PCIe NIC comes with the network driver and a run-time license of the syn1588<sup>®</sup> PTP Stack. The latter performs all IEEE1588 tasks like master/slave selection via the best master clock algorithm. Both driver and stack are available for Linux and Windows.

Furthermore, the syn1588<sup>®</sup> PCIe NIC may operate either in 2-step or 1-step PTP mode using Oregano Systems' patented on-the-fly time stamping technique for the latter mode.

The syn1588<sup>®</sup> PCIe NIC is capable of handling up to four high accuracy digital IO signals directly linked to the high accuracy clock within the FPGA device. The direction and functions of these I/O signals may be selected by the user via a remote configuration interface. The options for these signals are:

**1PPS output** A rising edge is generated once every second.

**1PPS input** Used to link to an external GPS timing receiver that supplies absolute time reference for grand master applications.

**EVENT input** A signal transition of an external signal (e.g. a sensor value reaching a threshold) will be time stamped using the high accuracy clock.

**TRIGGER output** A single event (change of signal state) at a programmable time derived from the high accuracy clock.

**PERIOD output** An arbitrary, user selectable frequency derived from and phase locked to the high accuracy clock with a resolution of 0.0001 Hz may be generated

**IRIG-B output** Optionally an IRIG-B000 output signal is generated instead of the 1PPS signal.

The syn1588<sup>®</sup> PCIe NIC offers two additional user configurable packet filter engines allowing to generate highly accurate time stamps upon receiving or transmitting of an arbitrary class of Ethernet messages.

### New with Revision 2

The native PCIe interface supports PCIe version 2.0 (5 Gbit/s) with improved access times that will increase the accuracy for synchronizing the host PC's local clock. Additionally, the syn1588<sup>®</sup> PCIe NIC now supports Green Ethernet (IEEE802.3az).

The default oscillator is now a TCXO. Optionally, the card is available with a 1000BASE-X fiber interface (SFP type). An on-board high performance analog PLL allows generation of synchronized, high quality single ended clock frequencies up to 156.25 MHz.



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Technical Specifications	
Standards	IEEE802.3-2008 IEEE802.3az Energy-Efficient Ethernet IEEE802.1Q Virtual Bridged Local Area Networks IEEE1588-2002 Precision Time Protocol IEEE1588-2008 Precision Time Protocol PCI Express interface & signaling V1.1a and V 2.0
Installable PCI slot	PCI Express 1/2/4/8/16 lane slot
Supported functions	Programmable hardware timestampers IEEE1588 compatible high precision hardware clock Up to 4 programmable SMA I/Os
Storage temperature	40°C to 85°C
Operating temperature	0°C to 50°C
Humidity	5% to 80% non-condensing
Dimension	135 x 66,4 mm Half height PCI card with bracket (two bracket options available)
Driver support	Linux kernel version 2.6.16 to 4.10 Microsoft Windows XP Microsoft Windows Server 2003 (32/64 bit) Microsoft Windows Server 2008 (32/64 bit) Microsoft Windows 7 (32/64 bit) Microsoft Windows 10 (32/64 bit)



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