


Abstract

This application note describes the process of running the Precision Time Protocol (PTP) as defined in IEEE1588-2008 on a PC using a syn1588[®] PCIe NIC. It highlights the basic steps required to operate the card as well as references to the syn1588[®] User Guide (UG indicated by this symbol: ).


Prerequisites

- A syn1588[®] PCIe NIC.
- A PC with a free PCIe slot.
- The wooden USB-Stick bundled with your syn1588[®] NIC containing both the syn1588[®] PTP software and all accompanying drivers all bundled within a syn1588[®] Linux Live System.
- In case the software is to be installed on an existing operating systems rather than using the syn1588[®] Linux Live System administrator rights are required.

Basic Installation of the syn1588[®] PCIe NIC

To set up the syn1588[®] PCIe NIC please start with the following steps:

- Power off your PC.
- Insert the syn1588[®] PCIe NIC into an empty PCIe slot.
- Connect the syn1588[®] PCIe NIC to a network or to another PC using a standard Ethernet cable.

There are two different ways of continuing: Either use the bootable syn1588[®] Linux Live System contained on the USB Stick provided with the syn1588[®] PCIe NIC or you could install the software together with the drivers onto an existing Windows/Linux PC. If there are any problems during the installation of the syn1588[®] PCIe NIC, please consult the UG at chapter  4.4.

Using the syn1588[®] Linux Live System

The syn1588[®] Linux Live System starts a dedicated Linux (Ubuntu 13.04, 32-bit) with all drivers and tools pre-installed. Make sure the PC you are using is able to boot from an USB-Stick.


Insert the USB-Stick into your computer and select the appropriate boot option. After the boot procedure has completed successfully you will see an Ubuntu desktop. There are several icons on the desktop of the syn1588[®] Linux Live System. To run PTP using the syn1588[®] PCIe NIC double-click one of the icons on the desktop:

- “PTP-Stack in Master mode” to start a syn1588[®] PTP master
- “PTP-Stack in Slave mode” to start a syn1588[®] PTP slave

Installing Driver and Software on your PC


The first step which has to be completed after powering up your PC is the installation of the device driver. Please note, that this step usually needs Administrator-Rights on Windows, root-rights on Linux respectively.

Installation of the Device Driver

For Windows: If not already prompted to install a new device, simply browse to the Control Panel and open the Device Manager. Select the new device, which may be listed as "unknown device" and update the drivers. Manually select "syn1588.inf" in the device driver folder (/sw/drv/win) on the provided USB-Stick. After successful installation, the syn1588[®] PCIe NIC should be listed at the section "network cards". For troubleshooting or further information refer to  4.4.2.

For a Linux operating system open a root shell, browse to the Linux-driver-directory (/sw/drv/linux) and execute:

```
> make
> make modules_install
> modprobe SyncDriver
```

Note, that all corresponding source files for your kernel have to be installed prior compiling the driver. For details and information about a permanent installation, refer to  4.4.1.

Because systems may behave differently causing different problems, there are tools to ensure the correct working of the syn1588[®] PCIe NIC hardware. All of these tools can be found on the provided USB-Stick or other medium. If you are able to see an additional network adapter in the system you can proceed.

First Steps with your installed syn1588[®] PCIe NIC

The easiest way to use the syn1588[®] PTP Stack and other tools is the command line or shell. Please ensure your shell-session has sufficient rights. For Windows an administrator-command line, and for Linux a root-shell is recommended.

As a first step you need to ensure that the syn1588[®] PCIe NIC has a valid IP-address assigned to it either via DHCP or manual configuration. For Windows write down this IP-address (i.e. 192.168.0.123) for further reference. For Linux you require the adapter name (i.e. eth3).

First change to the folder where the mentioned tools are: `/sw/apps/win32`
or `/sw/apps/linux`

```
> cd sw/apps/win32
> syn1588.exe
```

```
> cd sw/apps/linux
> ./syn1588
```

Version- and status information about the tool and your syn1588[®] PCIe NIC is shown, if everything was set up correctly. If any problems occur, please ensure the previous steps were completed successfully.

To start your PC as a PTP node, run the syn1588[®] PTP-Stack as follows:
(change your IP-address or interface name accordingly)


```
> ptp.exe -i 10.0.0.2 -v2
```

```
> ptp -i eth4 -v2
```

If you have several PTP nodes in your network, you can use a command line parameter to force the PTP mode of your nodes. Use the command line parameter `-CM_EXT` to force a node into Master-Mode. Use the command line parameter `-CS` to force your node into Slave-Mode.

FAQ, Caveats, and Common Traps and Pitfalls

- Linux kernels between 2.6.16 and 3.13 are supported.
- Windows Versions 7, 8, 8.1, 10, Server 2003, Server 2008 and Server 2012, 32 bit and 64 bit versions are supported.
- Please ensure, that your syn1588[®] PCIe NIC has an IP-address assigned to it. Check also for correct setting of the subnet mask, gateway IP address and DNS server.
- Check, if the IP address set does not interfere with other IP addresses on the same machine or in the network. Ideally a separated subnet should be assigned to all PTP devices at least during initial testing.
- On all operating systems the syn1588[®] PTP-stack requires root-privileges to run correctly.
- Check, if the firewall blocks any PTP traffic. PTP (in layer 3 mode) communicates via IP/UDP port 319 and 320. Please make sure that these ports are not blocked by your firewall.
- Simple way to check the configured IP address and functioning of hardware and/or software is to ping another host IP address. Also Wireshark can be used to check if the packets are received/transmitted at the configured network interface.
- If there are difficulties in using the syn1588[®] hardware and/or software, generate a system information report as specified in the application note syn1588[®] System Information Report and send it to us for further support.

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