

Live Demonstration: Precise Time Protocol Tester

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Abstract - Node synchronization can be implemented in an Ethernet network using time protocols; e.g. IEEE 1588 [1]. Active network components like switches and routers influence the accuracy of synchronization because they affect the packet delay variation in the network. Therefore, the delay is not constant and, as well, the delay in one direction is not equal to the delay in the opposite direction. An additional device information is available in the 12th IMEKO TC10 Workshop article [2, 3].

1. DESCRIPTION AND TECHNICAL SPECIFICATIONS

The network parameter measurement setup consists of two special terminal nodes. These nodes are designed to be able to send and receive packets, provide their timestamps and evaluate a packet delay. Packet delays are later post-processed and used to calculate a packet delay variation, path asymmetry and dependency of the delay in one direction on the delay in the opposite direction.

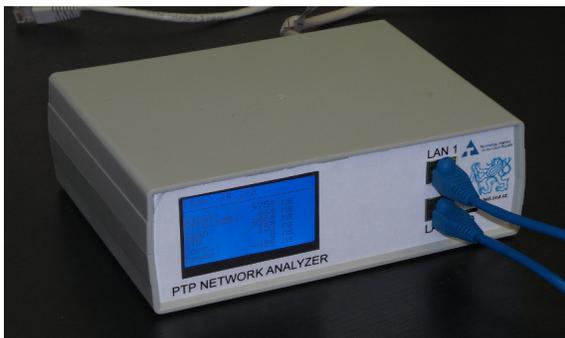


Fig. 1. PTP tester device.

2. DEVICE FOR LOCAL MEASUREMENT

Device is fully functional for the local measurement with an accuracy of 8 ns. Thanks to a local time scale, the nodes are fully synchronous, and thus the device is able to measure the asymmetry of the network connection at the same time. The measured delay asymmetry can be used for further determination of the algorithm of the packet processing in an active network device, for example in a network switch.

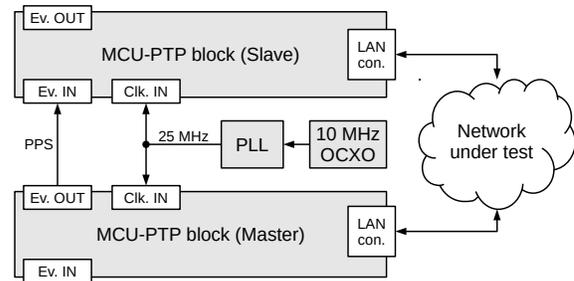


Fig. 2. Device for local measurement.

3. DISTRIBUTED MEASURING SYSTEM

The distributed measuring system is composed of two independent devices. The first one behaves like a PTP Master and the second one behaves similarly to the PTP Slave. A Master device can be composed of the basic building block depicted in Fig. 2 or it can be replaced by any PTP Master bound to the UTC time scale. A Slave device is composed of a basic building block, accurate clock source and GPS receiver, as shown in Fig. 3. It communicates in the same way as a PTP Slave but it is synchronized by GPS.

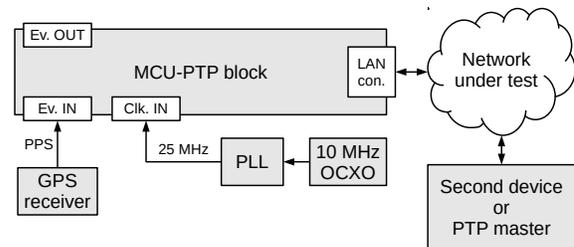


Fig. 3. Distributed measuring system (one device).

REFERENCES

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