

SND's Ethernet Hub HYEPLHUB allows most efficient line topology

## Port to Port propagation delay reduced to 340 ns

*Jülich, February 2005 – Extremely fast, extremely compact, extremely fault-tolerant: with HYEPLHUB Smart Network Devices (SND) presents a cost-reducing alternative to star topologies, as usually found in Ethernet networks, on occasion of the Embedded World Exhibition 2005 in hall 11, stand 316.*

If industrial Ethernet nodes have at least 2 external ports, a line topology (daisy chain) can also be realised with Ethernet cables. With using Ethernet Powerlink as a protocol, synchronisation of sensors and actuators takes place by means of sync frames, which must pass a hub or switch as fast as possible in order to avoid cumulative delays. In fact hubs do have the advantage of being 10 to 100 times faster than switches, which makes them first choice. With average port-to-port propagation delays of 340 ns SND's hub solution HYEPLHUB is close to the physical limit of what is possible. In any case the conformity of a class 2 Ethernet hub as specified in the IEEE 802.3 (delay < 460 ns) is by far more than met.

Also the jitter of 40 ns can be considered an excellent value. The secret of the small delay lies in the use of the MII interface towards the host and the PHYs. Like this unnecessary bit buffering, as used with the more popular RMII-based solutions, are avoided. Another emerging feature of HYEPLHUB is a fault tolerance of 166 ppm regarding clock deviations of adjacent Ethernet nodes. If this tolerance value was too small, then environmental conditions such as temperature variations can cause packet loss or, in severe cases, even a loss of the Ethernet link. Therefore many tests have been achieved with a large number of nodes in a line and PHYs from different manufacturers in order to ensure the stability of the logic design.

The design of a fast Ethernet hub can be licensed from SND either as binary code for selected CPLDs or as VHDL source code for design porting. Several CPU manufacturers have announced an on-chip integration of SND's hub design.

*Picture material and more information regarding HYEPLHUB can be found on the Internet at:*  
**<http://www.smartnd.com/download/pressinfo>**

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### **Smart Network Devices GmbH**

Smart Network Devices GmbH (SND), established in 1999 in Neuss and now located in Jülich, has developed an innovative technique of their own, that makes it possible to handle complex communication requirements in wired and wireless networks on one single chip (System on Single Chip). Within shortest, SND advanced to one of the global leading business companies in this scope with cutting edge products like the embedded network operating system HyNetOS™, the Micro WebTarget™-board family, the Bluetooth board Micro BlueTarget™ as well as a large number of software protocol extensions (e.g. TCP/IP, HTTP, FTP, SSL, SNMP, Bluetooth protocol stack, EPL) for HyNetOS™. Today, SND's solutions allow cost-efficient and platform independent "Embedded Networking" in fields like industrial automation, facility management, wireless infrastructure etc.

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