

Fusion of Time Distribution Technology: Time over Ethernet and MOBALine

In our January 2012 Newsletter we highlighted the state of the art in time distribution technology. Nowadays new installations of time systems and clocks are network-based and rely on LAN-cabling. NTP (Network Time Protocol) is the reliable time standard for the synchronization of clocks as well as for the time reference of IT-sub-systems.

Nevertheless, there are few drawbacks of the Time over Ethernet concept. First, a LAN-based installation may cause higher costs due to necessary Ethernet cabling, switches and injectors. Secondly, LAN-cabling is limited to 100 meters without adding additional switches. Furthermore, cabling topology of the LAN needs to be star-shaped and connections

between clocks are not possible. Finally, existing buildings are often not equipped with an Ethernet and retrofitting with a LAN is too expensive.

The drawbacks of the Time over Ethernet concept create a demand for other time distribution technologies. A vast part of this demand is dedicated to time codes for self-setting clocks. These time codes benefit from the use of a simple two-wire cable which is of less cost than a LAN-cabling and is often already available in an existing building. MOBATIME – SWISS TIME SYSTEMS, set some twenty years ago, the industrial standard for time codes for self-setting clocks with MOBALine. The main advantages of MOBALine compared to other time codes in the market

are: free cabling topology (parallel, serial, star), time and date information, no extra powering of slave clocks, low power consumption (6mA per slave clock), world time function on one line, switching functions on the same MOBALine, alarm detection, etc.

Having two major technologies at one's fingertips offers the possibility to customize a time distribution system. Besides the above mentioned advantages and disadvantages of the different technologies, there are other criteria to be considered when evaluating a suitable time system. The following table highlights the main decision criteria and its characteristics in the different technologies:

Decision criteria	Time over Ethernet (NTP)	MOBALine
Facility: new building or renovation	Well suited for new buildings which are often equipped with a LAN for IT-sub-systems.	The simple two-wire system allows the use of existing telephone cabling in buildings to be renovated where a LAN cannot be installed
Investment protection	Nowadays, state-of-the-art technology	State-of-the-art technology for more than 20 years.
Functionality	Remote configuration, management and supervision of the entire time system (master and slave clocks) by MOBA-NMS.	Self-setting clocks with limited supervision from distant location (loss of synchronization of slave clocks can be observed visually).
Investment costs	Rather high costs due to investments for Ethernet network, switches and routers.	Cost-efficient solution where long distances and low cost cabling are requested without addition of any external devices or infrastructure management.

In reality a decision for a time distribution system is not always "take it or leave it" for one specific technology. There are good reasons why a mix of different technologies can make sense:

- Expansion: a building with an existing time distribution system shall be expanded.
- Upgrade: certain components of the time system shall be upgraded without eliminating still usable devices (e.g. master clocks).
- Cost-savings: an Ethernet cabling is foreseen as the major network in a building, but the detailed dispersion shall be done with a more economical cabling.
- Flexibility: the detailed installation place of the slave clocks are not yet defined during design phase which should allow a certain flexibility to place the slave clocks in the final installation.

MOBATIME develops its products and provides solutions which allow the fusion of different technologies and respond to the above mentioned challenges of practical installations.

Master clocks: DTS 4801/4802

Besides the NTP-output the DTS master clocks offer one (DTS 4801) or two (DTS 4802) lines, either in MOBALine or impulse mode. This structure allows the management of two or even three different time codes with one master clock at the same time: NTP, MOBA-Line and impulse. So in any case of an expansion or an upgrade of an already installed MOBALine system the DTS master clocks are of great help. They provide the MOBALine functionality on the old two-wire network and, in parallel, the distribution of NTP for IP-based clocks on the LAN. The multi-output concepts of DTS master clocks ensure also a cost-efficient, step-by-step transformation of a MOBALine / impulse time system into an NTP-system and therefore guarantee an investment protection for ages.

Movements: SAN/SEN 40 - SAM/SEM 40 and NBU 190 - MLU 190

The MOBATIME movements for small (30 / 40 cm) and medium (50 to 80 cm) size clocks for different time codes (NTP or MOBALine) are of the same shape and they make use of the same hand fixation. This uniformity is of great advantage when it comes to the retrofitting of existing clocks. In case a building gets a new LAN-network instead of the two-wire cabling the existing slave clocks - running on MOBALine - can be retrofitted with new NTP-movements. Especially for ancient as well as for customized clock designs this uniformity helps to save costs and to preserve particular clocks.



SAN/SEN 40 movement



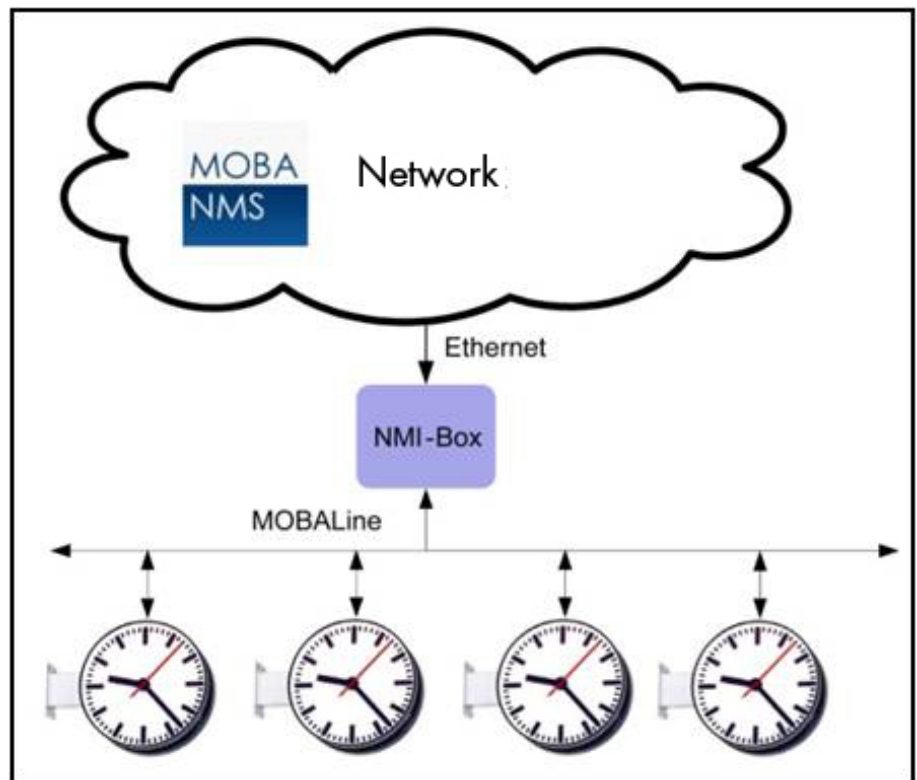
DTS 4801 .masterclock

NMI: Network-MOBALine-Interface

The latest product for the fusion of NTP and MOBALine technology is the NMI. Its interfacing characteristics help to combine NTP and MOBALine installation and to benefit from the advantages of both technologies. The NMI contains the following features:

- Synchronization of the NMI over the Ethernet by means of NTP.
- The NMI provides a MOBALine output for up to twelve self-setting slave clocks.
- The supervision of the NMI is done with the MOBA-NMS.
- The enhanced functionality of the MOBALine output allows the supervision of the connected slave clocks by MOBA-NMS.
- The NMI is powered over the Ethernet (PoE).
- The slave clocks are powered through MOBALine connected to the NMI.

The NMI tremendously increases the flexibility and reduces the costs of a time system. By installing one NMI e.g. on an office or hospital floor the costs for twelve Ethernet connectors and several dozen meters of Ethernet cabling can be saved. Furthermore, the exact location of a clock can be defined when interior installations (e.g. furniture, pictures) have been decided and the wiring can be done easily by the simple two-wire cable. In addition, Ethernet networks are often installed at the bottom in the floors but the clocks are suspended two or more meters above the floor. The remaining distance can be overcome with the MOBALine cabling. Finally, the NMI increases the functionality of MOBALine slave clocks.



Their limitation in supervision - only a visual control is possible - is eliminated: MOBALine slave clocks plugged to an NMI will show their proper operation in the MOBA-NMS (Network Management System) and ensure the entire visibility of the time system from a remote location.

MOBATIME – SWISS TIME SYSTEMS is in the front line when it comes to state-of-the-art technology for time distribution systems. The proof is our Distributed Time System (DTS) for IP-based time systems which sets the industrial standard in that field. Since 75 years we ensure the availability, development and combination of different technologies such as NTP and MOBALine. Our customers benefit from our efforts by unexcelled functionalities, increased flexibility, cost-efficient installations and a great deal of investment protection.