



# ToE – precise, cost-effective time synchronization for all Ethernet LAN „Clients“

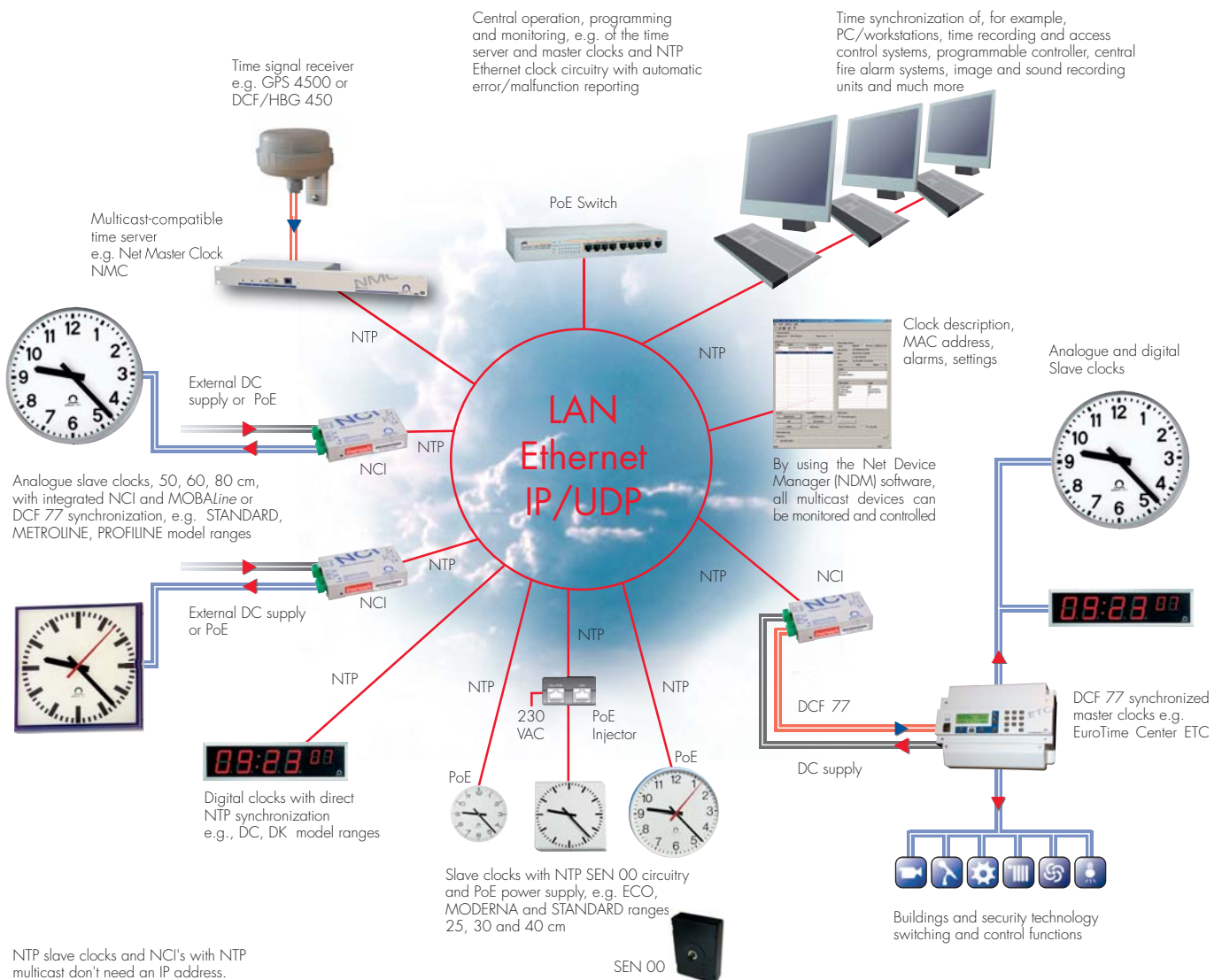
Considerable advantages can be gained by using networks for time synchronization of clocks, clock systems and time servers.

- Installation costs for networked clock systems can be drastically reduced.
- The entire network including all components and systems is absolutely synchronized to the same time.
- By including a time server (e.g. MOBATIME NMC or DTS 4130.timeserver) the exact atomic clock time signal received via the DCF 77 or GPS can be fed directly into the network in the form of NTP time information.
- A considerable advantage is gained by the option of being able to integrate modern com-

puter master clocks directly into the network. Via Ethernet LAN and NTP an almost unlimited number of slave clocks can be synchronized, no additional time signal receivers being necessary. In addition you can include numerous time-dependent switching and control functions for buildings system technology and other connected devices.

- A LAN-based time system can be configured and monitored from any computer in the network. Malfunctions, error messages and alarms are signalled via alarm relays, using SNMP traps or e-mails. If the clocks have the new LAN-compatible MOBATIME clock circuitry on the network it is even possible to ascertain whether all the clocks are functioning correctly using the MOBATIME software Net Device Manager (NDM).

- Using the NCI Network Clock Interface, non-LAN-compatible master clocks or even existing master clocks and slave clocks can also be connected to the LAN. Cabling can be reduced to the plug-in to the LAN of the individual end units.



NTP slave clocks and NCI's with NTP multicast don't need an IP address.

# ToE System Components

## Slave clocks with NTP synchronization

### NTP movements SAN 00/SEN 00 for clocks up to 40 cm in size

These newly developed self-setting movements are synchronized directly from the network via NTP and powered by PoE. Detailed technical information on the SAN 00/SEN 00 is contained in the table on the reverse page of the brochure.

### ECO indoor slave clocks for NTP synchronization

With NTP movement SAN 00/SEN 00, powered by PoE, up to Ø 40 cm. Available with dial types 200 and 210 with defined hands specially for SAN/SEN movements.

### MODERNA indoor slave clocks for NTP synchronization

With NTP movement SAN 00/SEN 00, powered by PoE, up to Ø 40 cm. Available with dial types 360 and 310 with defined hands specially for SAN/SEN movements.

### STANDARD indoor slave clocks for NTP synchronization

With NTP movement SAN 00/SEN 00, powered by PoE, up to Ø 40 cm. Available with dial types 360 and 310 with defined hands specially for SAN/SEN movements. Clocks with Ø 50 to 80 cm need an integrated NCI and a MLU 190 movement.

### Analogue slave clocks 50, 60 and 80cm in size with integrated NCI interface.

Clocks in the STANDARD, PROFILINE and METROLINE ranges for MOBALine or DCF 77 synchronization can be supplied with an integrated NCI interface and they can then be connected to the Ethernet LAN.

### Digital clocks with direct NTP control

Even LED digital clocks, e.g. those in the DC and DK model ranges, can be fitted on request with an NTP input. In that way they can be connected directly to the Ethernet LAN.

More information about the mentioned products are available in the respective leaflets.

## MOBATIME Time Server

The MOBATIME time servers (e.g. the NMC Net Master Clock) have been specially developed as NTP network time servers. They provide an NTP time reference for devices and systems connected to the network. The time server synchronization can be realized with DCF 77 or GPS time signal receivers and/or by means of another NTP server in the LAN. Detailed information regarding these innovative servers and their use is contained in the corresponding product brochures.



Type 200

Type 210



Type 360

Type 310



Other NTP timeservers available from MOBATIME on request.

## NCI Network Clock Interface

With the NCI interface conventional clocks become network-compatible

This interface developed by MOBATIME engineers is synchronized within the network via the Network Time Protocol (NTP) by an NTP multicast-compatible time server and generates the usual MOBALine and DCF time codes in local time format. In that way slave clocks with MOBALine or DCF 77 input plus all master clocks with DCF 77 input are synchronized.

### Simple, cost-effective installation

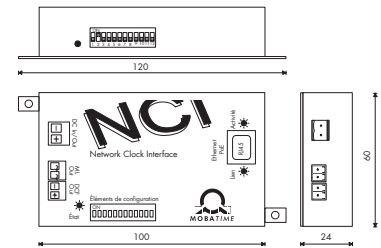
With its excellent price, performance ratio, simple setup and minimal dimensions the NCI is suitable for most new or existing LAN/WAN Ethernet installations. Due to multicast updating (Ethernet, IP) it is not necessary to set an IP or Gateway address or subnet mask.

### Multicast and PoE

As most routers can relay multicast messages the system can consist of several networks. All necessary configurations such as for example selection of the multicast address or time zone entry can be performed on installation using a DIP switch. When feeding the NCI via Power over Ethernet (PoE) a single connection to a PoE-compatible LAN Switch/Router is needed. An additional DC input enables supply to the interface via an external DC feed or DC supply via a connected digital clock or master clock if no PoE is available.

### Time zone servers for multicast-compatible devices

NTP time servers such as for example the Net Master Clock NMC can provide the NCI with a time zone table for the local time. When using a standard multicast NTP server with no time zone server function it is possible to select one of 56 entries from a predefined table on each NCI.



Thanks to the small dimensions the NCI can be integrated in slave clocks or mounted in cable ducts.

## Technical Data

NTP movement SAN 00 / SEN 00	
SAN 00	NTP movement for hour and minute hands up to diameter 40 cm
SEN 00	NTP movement for hour, minute and second hands up to diameter 40 cm
Ethernet connection	10 MBit/s Ethernet controller RJ45 connector with integrated LEDs (active, connection)
Synchronization	Via LAN using Network Time Protocol (NTP, UTC)
Accuracy	+/- 100 ms (synchronized)
Time keeping	Autonomous quartz based operation over 24 hours
Power supply	Power over Ethernet (PoE): 48 VDC, I = 25 mA
Configuration	12 x DIP switches
Temperature range	0..50° C, 10–90% relative humidity, non-condensing
Case	2-part plastic (polycarbonate), black
Dimensions	90 x 60 x 22 mm (L x W x H), weight: approx. 100 g
NCI Network Clock Interface	
Ethernet connection	10 MBit/s Ethernet controller RJ45 connector with integrated LEDs (active, connection)
Synchronisation	Via LAN using Network Time Protocol (NTP, UTC)
Timecode outputs	MOBALine: 15 V / 50 Hz, 20 mA max. DCF 77: passive current loop, Optocoupler: Umin= 5 V, Umax= 30 V, Ion= 10–15 mA, Ioff=2 mA @ 20 V
Accuracy	+/- 20 ms (synchronized)
Time retention	Autonomous quartz based operation over 24 hours
Power supply	DC input: 24..56 VDC or PoE: 48 VDC (Phantom/Pins 4, 5 und 7, 8)
Current consumption	<100 mA @ 24 V / <50 mA @ 48 V
Configuration	12 x DIP switches
LED	Red status LED
Temperature range	-20..+70° C, 10–90% relative humidity, non-condensing
Case	Stainless steel, wall-mounting plates
Dimensions	120 x 60 x 24 mm (L x W x H), weight: approx. 200 g