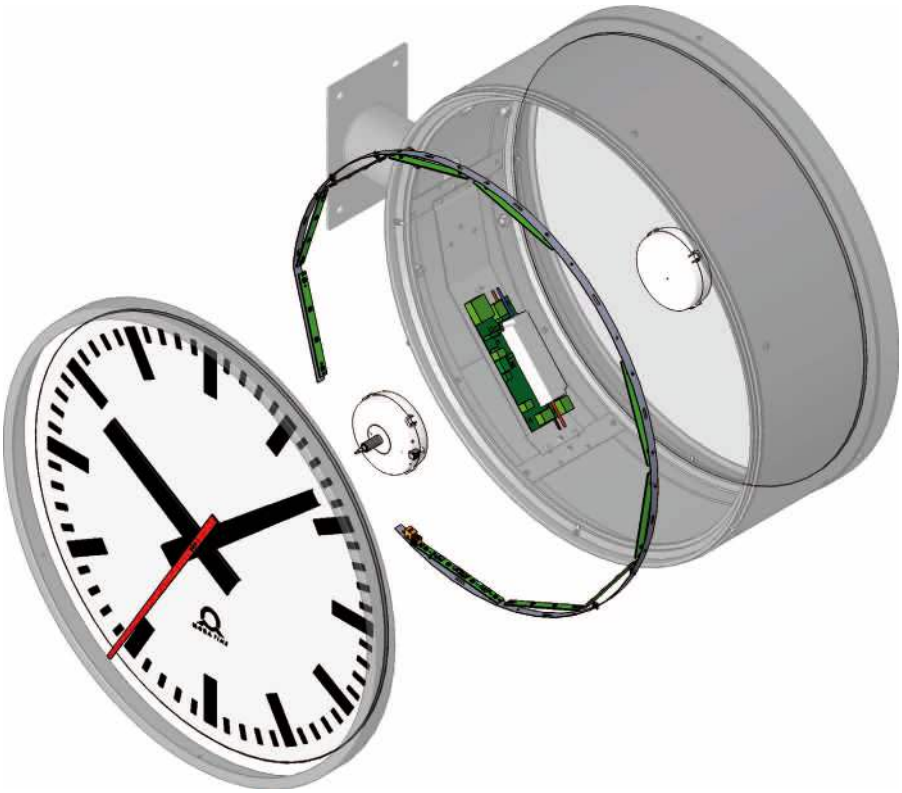


Clock technology for outdoor clocks

Clock Set

The Clock Set is a modular construction system for outdoor clocks, consisting of a Clock Controller, LED illumination and up to two movements with dial and hands.

The core of the clock and LED illumination control is the Clock Controller. He provides the clock connectors as well as the signal and power supply of the movements and LED illumination. With the Clock Set concept, the setup of an outdoor clock including control of the movements and clock illumination is highly simplified.

Your advantages:

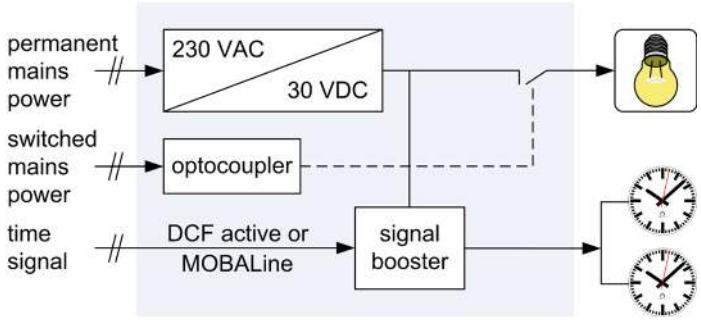
- You build the clock, we provide the technology
- One movement for all clock types
- Modular setup ➔ simple installation and maintenance
- Big range of diameters (Ø 40-100 cm) thanks to latest clock technology

DCC - DCF Clock Controller

The DCF Clock Controller is the low priced solution for the automation of the clock illumination and control via DCF or MOBALine. It can be used in single- and double-sided clocks. With the DCC, the illumination can be directly connected to mains power supply or be controlled via an external switch clock.

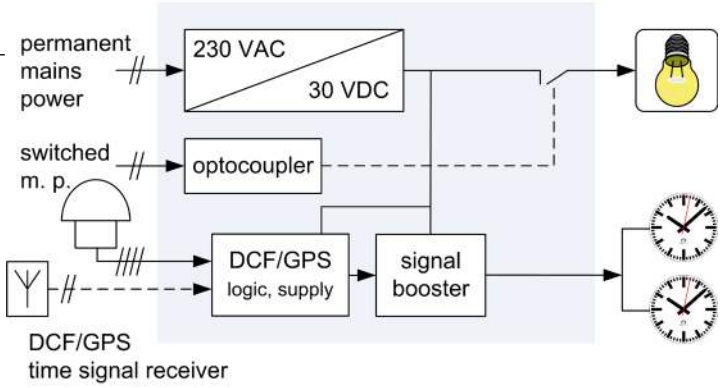
DCF or MOBALine slave clock, mains powered

- Mains power 100 – 240 VAC for LED illumination and movements
- Separate mains power 100 – 240 VAC input for illumination control (without load)
- Synchronization: DCF active or MOBALine
- Connection terminals for MOBALine or DCF signal, mains power, movements and illumination



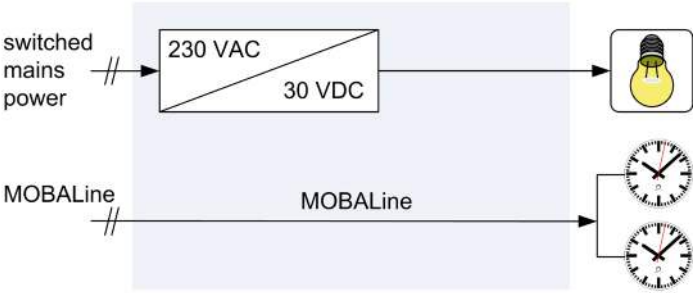
Stand-alone DCF/GPS radio clock

- Mains power 100 – 240 VAC for LED illumination and movements
- Separate mains power 100 – 240 VAC input for illumination control (without load)
- Synchronization: DCF current loop from DCF or GPS receiver
- Connection terminals for DCF signal, mains power, movements and illumination



MOBALine-powered slave clock

- Switched mains power 100 - 240 VAC input for LED illumination
- Movements powered by MOBALine
- Connection terminals for MOBALine signal, mains power, movements and illumination

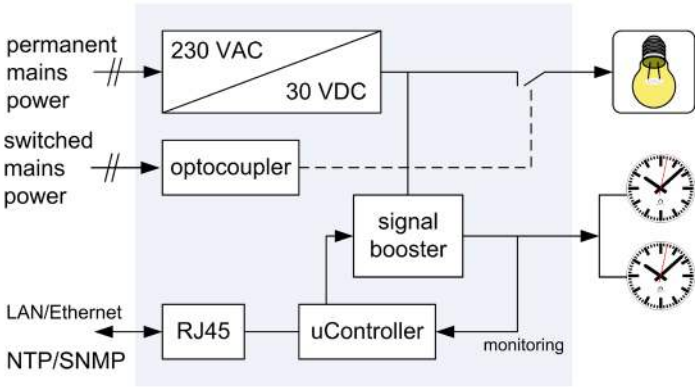


NCC - Network Clock Controller

The Network Clock Controller offers complete control and monitoring of the movements, illumination and intensity thereof as well as the second/minute hand modes via the software MOBA-NMS. It can be used for single- and double-sided clocks.

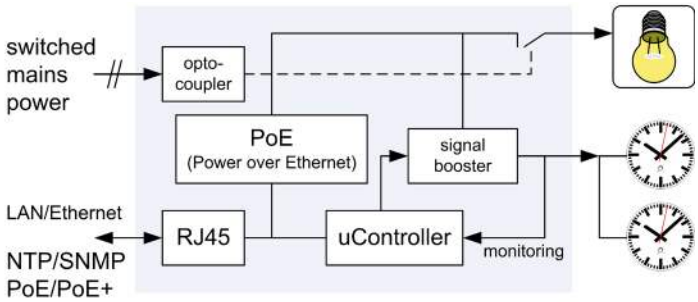
Network clock, mains powered

- Mains Power 100 – 240 VAC for LED illumination
- Separate mains power 100 – 240 VAC input for illumination control (without load)
- Synchronization: NTP Unicast or Multicast
- Connection terminals for LAN/Ethernet , mains power, movements and illumination



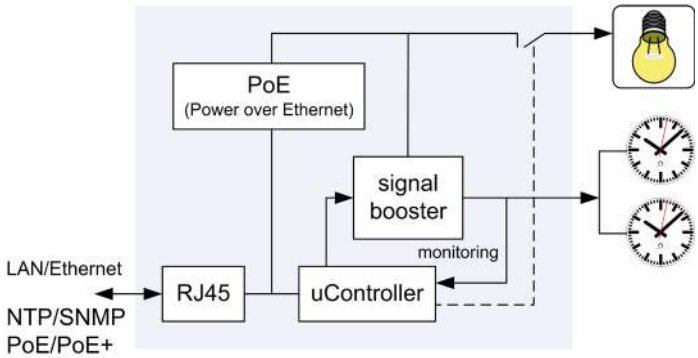
Network clock, fully PoE powered (illumination control by switched mains power)

- PoE power for movements and LED illumination (or PoE+ , depending on clock diameter)
- Separate mains power 100 – 240 VAC input for illumination control (without load)
- Synchronization: NTP Unicast and Multicast
- Connection terminals for LAN/Ethernet and illumination control



Network clock, fully PoE powered

- PoE power for LED illumination and movements (or PoE+, depending on clock diameter)
- Automatic illumination control via week program from NCC
- Synchronization: NTP Unicast or Multicast
- Connection terminals for LAN/Ethernet incl. PoE



Clock Set - Illumination unit LED ring

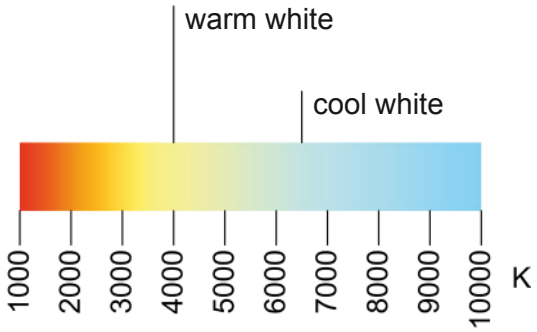
The LED illumination unit consists of a connection print and multiple standard prints mounted on a steel ring. This ring is screwed to the clock housing and can easily be mounted and dismounted. The number of LED prints in a clock depends on the execution and diameter of the clock.

The connection print features temperature monitoring – in case of too high temperature (> 70°C) the illumination is automatically turned off to prevent damage.

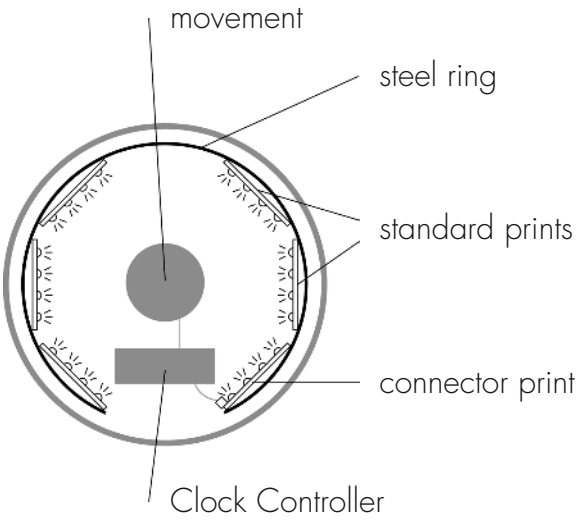
The LED illumination is offered in a cool white and a warm white version.

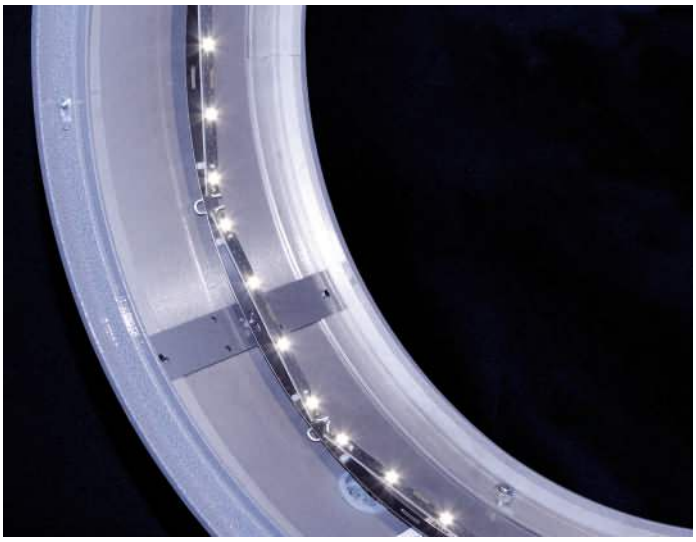
LED standard print: consisting of 4 LEDs, with fail-safe layout

LED connection print: consisting of 4 LEDs, temp.-sensor and connector plug for power supply



Installation example





LED prints per illumination unit

∅	no. of prints
40	6
50	8
60	10
80	14
100	16

Technical data	
Overheating protection	automatic switch-off at 70°C
Reliability	Outage of an LED diode does not affect the function of the other diodes
LED color temperatuer	warm white: 4000 K +/- 275 K cool white: 6500 K +/- 500 K
No. of prints per ring	min. 6, max. 16

Clock Set - Ordering key

Ordering code

Type	Illumination	Ø	Version	Movement type	Dial	Hands	Options
CS	0 = none 2 = LED warm white 4 = LED cool white	40 50 60 80 100	R1 = round single-sided R2 = round double-sided Q1 = square single-sided Q2 = square double-sided	C01 = SAM 100t + DCC C03 = SEM 100t + DCC C09 = SAM 100t + NCC C11 = SEM 100t + NCC (see leaflet SAM/SEM 100t)	000 = without 120 300 315	0 = without 1 = with	00 = none 10 = LED steel ring

Order example: CS2.50.R1.C01.100.1.00.0000
(Clock Controller set with LED illumination, Ø 50 cm, round single-sided, movement SAM 100t with NCC, dial 100 with hands)
The sequence number at the end of the key designates special fabrications (e.g. clocks with a special dial). Use the sequence number 0000 (standard fabrication) when ordering; for special fabrications, we will adjust the number. Special fabrications can be reordered anytime using the sequence number.


dial 120


dial 300

dial 315

Advantages of the clock set solution:

- Uniform setup: Clock Controller and LED illumination
- Support of four time signals: MOBALine, NTP, DCF current loop (GPS for MEZ), DCF active bipolar
- Always the same movement, only difference with/without second hand
- Illumination depends only on diameter

Advantages of the clock controller solution:

- Switch between DCF or MOBALine and NTP synchronization by simply exchanging the clock controller board. ➔ no change or modification to the movements required.
- Power supply and connection terminals for LED illumination, movements and time code, all on one board. ➔ no additional cabling in clocks.
- Separate mains power input for illumination control available ➔ illumination control from external system possible
- Wide power supply range: 100 - 240 VAC, 50 – 60 Hz ➔ No special version required for USA and other countries with lower mains power and 60 Hz
- NCC is able to directly control the illumination, programmable via week program from MOBA-NMS (future function)
- Supervision of the movements from NCC via MOBA-NMS
- Light sensor (possibly with adjustable threshold) (future function)
- Brightness of the clock illumination adjustable via DIP switch
- Direct control of the clock

Clock Set - Technical details

Technical data		DCC	NCC
Synchronization		DCF current loop / DCF active bipolar MOBALine	NTP
Power supply	from mains	100-240 VAC, 0.55 A, 50/60 Hz (20 W)	100-240 VAC, 0.55 A, 50/60 Hz (20 W)
	from LAN	-	Power over Ethernet, 802.3at, class 4, < 22 Watt Phantom or spare-pair power
Start-up current		Cold start: 70A (t_{width} = 200 µS measured at 50% I_{peak})	
Power reserve		ext. UPS	
Time-keeping without synchronization ➔ afterwards to 12:00 position		DCF: 7 days MOBALine: 1 day	NTP. 1 day
Accuracy	synchronized	-	typically < +/- 50 ms
	unsynchronized	-	typically < +/- 2 seconds after 24h
Outputs		DCF active, MOBALine	MOBALine: local time, max. 100mA
Illumination		30V / max 700mA	
Week program function		no	no (future function)
Time zone setting		no (local time from master clock)	yes (via MOBA-NMS)
Operating elements	DIP switch	1-3 illumination PCB (power) 4 illumination control	1 single- or double-sided clock 2 network surveillance 3-5 illumination PCB (power) 6 not used
	Push-button	-	Software reset Reset to factory settings
Displays (LEDs)		Power LED (green) Signal LED (orange) External illumination control (red)	Power (green) LAN link (green) LAN activity (yellow) Alarm (red) Synch. (green) PoE(+) (orange) External illumination control (red)
Operation		DIP switch	MOBA-NMS, DIP switch, push-button
Weight		250 g	
Temperature range		-30 °C ... +70 °C	
Remote operation		Via MOBALine master clock: second and minute hand behavior, time zone, 12:00 position	Via MOBA-NMS, SNMP or from DHCP server (network settings only): second and minute hand behavior, time zone, 12:00 position, illumination on/off, illumination control, illumination PCB
Surveillance		none	SNMP (traps, SNMP V2a) MOBA-NMS: MOBALine voltage Synchronization
Protection class		Protection class I	

Safeguard table				
Safeguard type (LS)	B10	B16	C10	C16
No. Clock Controllers	4	7	7	11