The Master Clock for networks

Net Master Clock
DTS 4801/4802/4806.masterclock

The Net Master Clock DTS 480x. masterclock is developed especially for network environments.
It is able to control conventional impulse clocks, self-setting MOBALine or IRIG-B / AFNOR slave clocks and is used as an accurate NTP time reference (time server) for computer systems.
The DTS 480x.masterclock can be synchronized by a time signal receiver (DCF 4500 or GPS 4500) and/or by NTP time servers (LAN / Internet).
The DCF current loop output can be used to synchronize other devices (e.g. master clocks).

The DTS 480x.masterclock is equipped with 4 alarm control inputs either to monitor other connected devices or to link external signals (e.g. from sensors) to switching commands.
A serial RS 232 / RS 485 interface with configurable script file, to output special synchronization telegrams, completes the features of this multipurpose master clock. Alarms are signaled by a relay, with SNMP traps or by e-mail.
By means of the management software MOBA-NMS, all DTS devices can be fully operated and monitored.

DTS 4801/4802/4806 Master Clock and NTP Time Server

DTS 4802.masterclock e.g. as NTP server and master clock for MOBALine and impulse clocks.

DTS 480x.masterclock synchronized and monitored from a Master Time Center MTC (with CAN Module) via LAN/WAN.
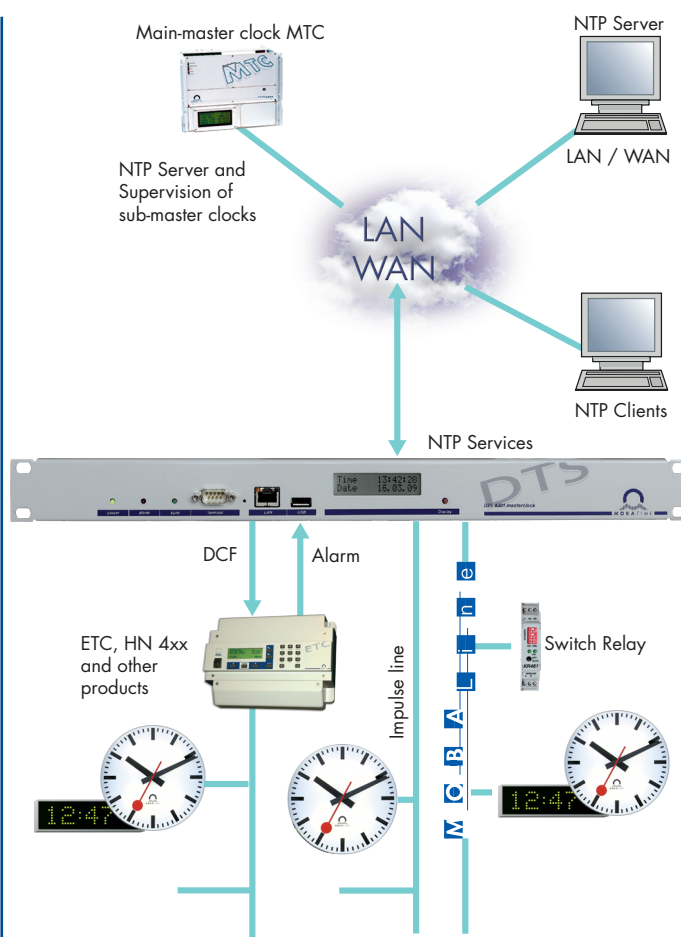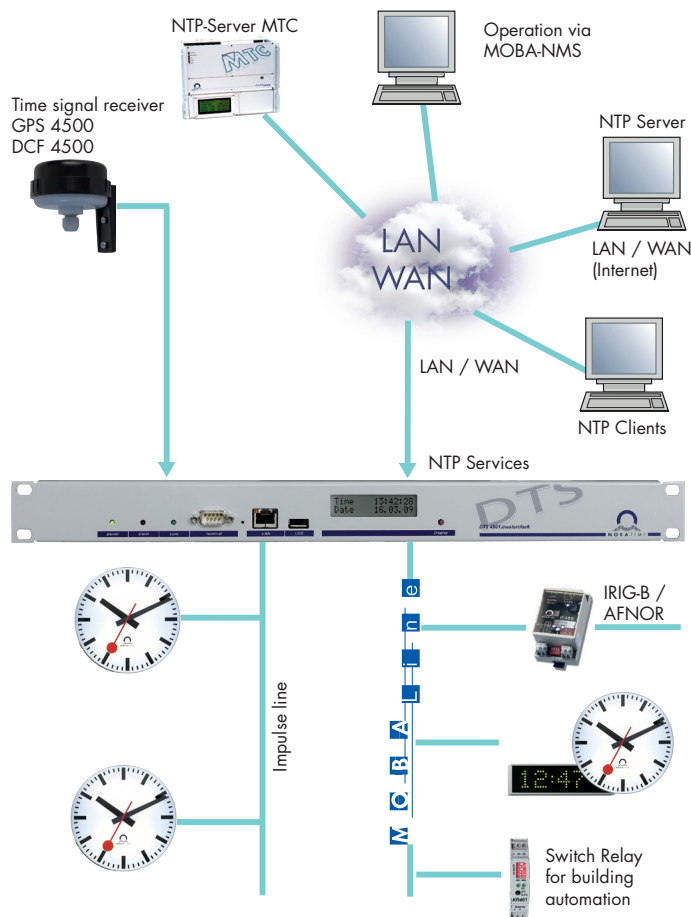
DTS 4802.masterclock as impulse and MOBALine master clock and NTP time server, synchronized by a time signal receiver (DCF 77 or GPS) or NTP servers (LAN / Internet).

NTP services: Server and Client are possible simultaneously. Switch program function via MOBALine e.g. with external switch relays KR 461 for bells or any building automation, programmable via LAN.

Typical application for schools with bells, universities, hospitals etc.

DTS 4802.masterclock as impulse and/or MOBALine sub-master clock and for synchronization and monitoring of a conventional slave master clock. All alarms reported to Master Time Center MTC.

Typical application for e.g. industries, hospitals, banks etc., where versatile technical solutions are requested with many different kind of time signals and different kind of equipment to be synchronized (existing master clocks, existing impulse clocks, new self-setting clocks etc.).

DTS 480x.masterclock front view with LEDs, display and connectors

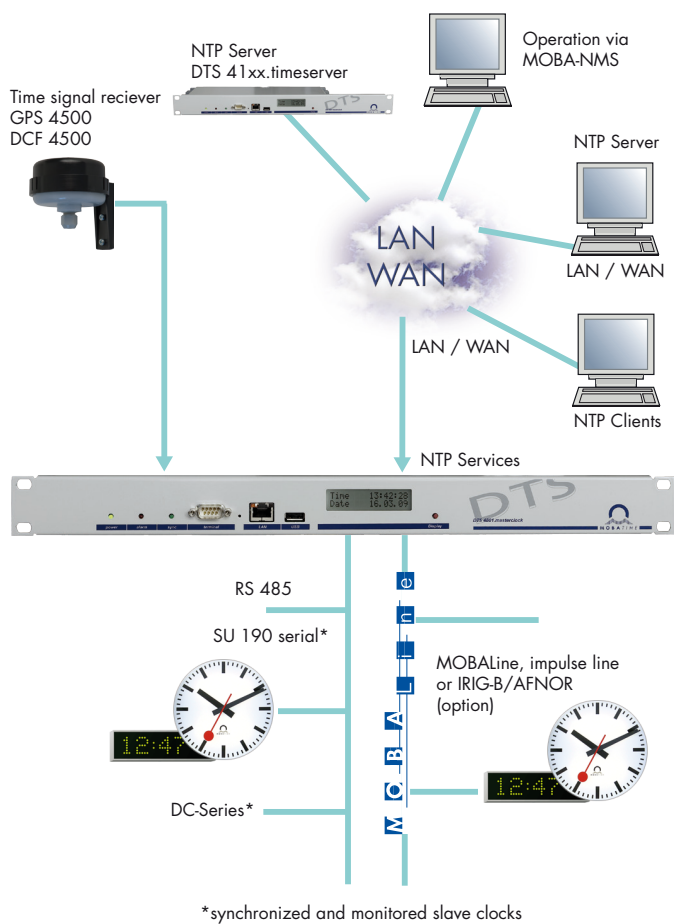LEDs: Power supply, synchronization and network monitoring

Display: time, date, status information, alarm, IP, etc.

Connectors:
- LAN connector RJ45, 10 / 100 Mbit
- PC terminal connector, RS 232 Sub-D 9p male
- USB connector for software update, maintenance or file download to the master clock (e.g. switch programs, telegram files etc.)

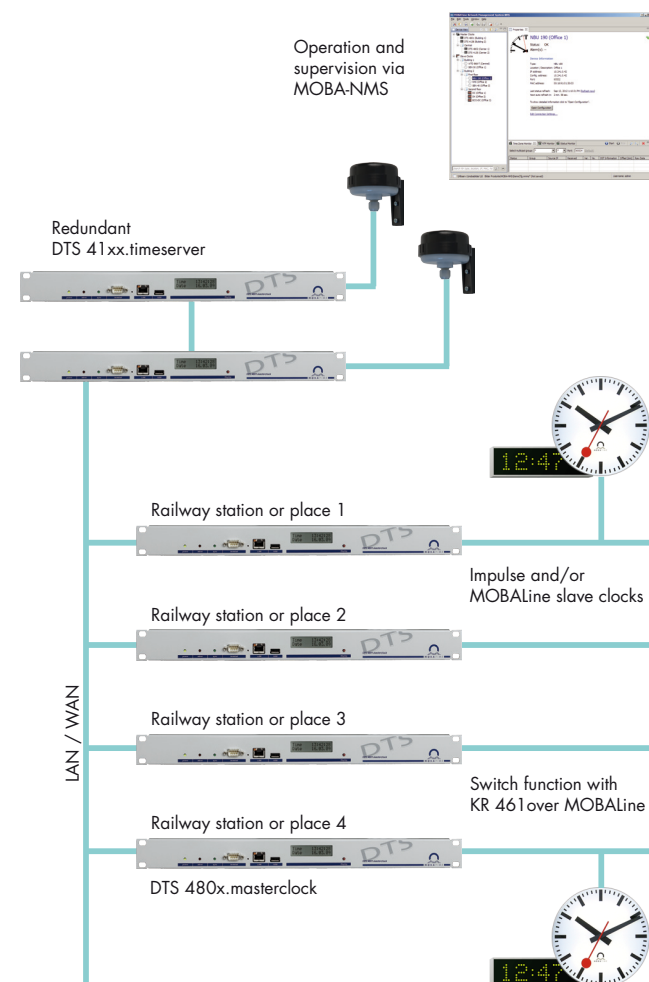## DTS 4801.masterclock e.g. as a master clock for monitored slave clocks.

NTP Server
DTS 41xx.timeserver

Operation via
MOBA-NMS

Time signal reciever
GPS 4500
DCF 4500

NTP Server

LAN WAN

LAN / WAN

NTP Clients

LAN / WAN

NTP Services

RS 485

SU 190 serial*

MOBALine, impulse line
or IRIG-B/AFNOR
(option)

DC-Series*

*synchronized and monitored slave clocks

Local DTS 480x.masterclocks, synchronized from redundant time servers (DTS 41xx.timeserver or DTS 4160.grandmaster)

Operation and
supervision via
MOBA-NMS

Redundant
DTS 41xx.timeserver

Railway station or place 1

Impulse and/or
MOBALine slave clocks

Railway station or place 2

Railway station or place 3

Switch function with
KR 461 over MOBALine

Railway station or place 4

DTS 480x.masterclock

LAN / WAN

DTS 4801.masterclock to control and monitor up to 31 self-setting slave clocks (including clock illumination control and monitoring) and to synchronize self-setting MOBALine slave clocks, self-setting IRIG-B/ AFNOR clocks (option) or conventional impulse clocks.

Typical application for railways, airports and other public areas.

Application example for railways, airports, schools, hospitals etc.: Central place with high accurate timeserver as main master clock, with high availability. Local sub-master clocks, for synchronization of all local equipment. Remote operation of all devices through LAN.

Centralized status/alarm monitoring via SNMP or alarm reporting via e-mail.

DTS 4801.masterclock rear view with connectors

Connectors: Mains power connector, DC power supply input, 4 alarm or control inputs, DCF input, DCF or pulse output, serial interface RS 232 for script file programmed serial messages and DC output for GPS 4500.
4801: 1 x MOBALine or impulse line or IRIG-B/ AFNOR (option), RS 485 clock line (instead of serial interface).
4802: 2 x MOBALine or impulse line
4806: 6 x MOBALine or impulse line

Net Master Clock DTS 4801/4802/4806 - Technical details

Technical Data	DTS 480x.masterclock	4801	4802	4806
Time signal outputs	MOBALine/impulse line 24V/DCF active/DCF impulse	1	2	6[1]
	output current	700 mA[2]	700 mA[3]	700 mA[2]
	NTP / SNTP (server)	✔	✔	✔
	NTP slave clock line with time zone server	✔	✔	✔
	RS 485 clock line to connect up to 31 devices (DC series, SU 190, DMU 140...)	✔	–	–
	DCF time code output (current loop passive) or pulse output	✔	✔	✔
	IRIG, AFNOR, DCF-FSK: Ri < 600 ohm (line configured for MOBALine)	option	–	–
	Serial interface RS 232/485, serial message programmable by script file	RS 232/485	RS 232	RS 232
Network services	NTP client	✔	✔	✔
	NTP server, max. number NTP and SNTP client requests: typical 250 requests / sec.	✔	✔	✔
	SNMP V1, V2c, V3 (get, put, notification, trap) with MD5 authentication and DES for encryption	✔	✔	✔
	E-mail for alarm messages (2 addresses possible)	✔	✔	✔
	DATE, TIME, FTP (for update)	✔	✔	✔
	Time synchronization and monitoring from MTC (Master Time Center)	✔	✔	✔
Network interface	10BaseT / 100BaseTX (IEEE 802.3), connection: RJ45	✔	✔	✔
	Auto-negotiation / manual, IPv4 / IPv6	✔	✔	✔
IP configuration	DHCP, static IP	✔	✔	✔
Operating control	Serial terminal via RS 232 (front side, sub-D 9p male)	✔	✔	✔
	Telnet or SSH via LAN. Also possible with SNMP or MOBA-NMS	✔	✔	✔
	USB connector for software update, maintenance (config. and log files upload) or file download (e.g. switch programs ...)	✔	✔	✔
LED indication	Power supply, synchronization status, LAN status, alarm, DCF input	✔	✔	✔
Display	Display for status information: Time, date, IP, alarm... (2 lines with 16 characters (4806: 20))	✔	✔	✔
Local time calculation	Automatically, preprogrammed daylight saving time change over. Up to 80 predefined time zone entries, 20 entries user programmable. All outputs can be individually allocated to a time zone (UTC or local time)	✔	✔	✔
Accuracy	GPS (DCF input) to NTP server:		typical < +/- 0.5 ms	
	NTP client to NTP server:		typical < +/- 0.5 ms	
	GPS (DCF input) or NTP client to clock lines: (details for each output in manual)		typical < +/- 0.5 ms	
	Time deviation without external time source (at 20°C +/- 5°C):		< +/- 0.1 sec./day (< 1ppm)	
	(After 24 hours synchronization from time source)			
	Remark: With NTP synchronization the accuracy may be degraded, depending e.g. on network topology, traffic etc.			
External time source	External NTP / SNTP servers (4 NTP sources programmable) and / or	✔	✔	✔
	DCF 77 time signal receiver (current loop, e.g. DCF 4500) or	✔	✔	✔
	GPS time signal receiver (current loop, e.g. GPS 4500)	✔	✔	✔
4 inputs for alarm contact	To connect external devices / control inputs e.g. for external sensors	✔	✔	✔
Alarm relay	Potential free close contact for the signalization of alarms (open -> alarm)	✔	✔	✔
Power supply	AC input: 90 - 240 VAC / 50 - 60 Hz / max. 30 VA (typical < 5 VA, without ext. load)	✔	✔	✔
	DC input: 24 - 28 VDC / 1.5 A (28 V required for MOBALine)	✔	✔	✔
	DC output: nominal 28 VDC, max. 400 mA, for supplying e. g. GPS 4500	✔	✔	✔
Dimensions	19" rack mounting, 1 height unit, W x H x D mm		483 x 44 x 125 (4806: D = 224)	
Running reserve	No internal active running reserve, time keeping with RTC for short power outages		passive	
Ambient temperature	-5 to +50 °C, 10 - 90 % relative humidity, without condensation	✔	✔	✔

[1]optionally 48/60V   [2]per line   [3]total

DTS - Distributed Time System

The DTS 480x.masterclock is part of the Distributed Time System, developed by Moser-Baer AG. Various devices, such as master clocks and time servers are being connected via standard LAN (Ethernet). The whole DTS is synchronized, monitored and operated through the LAN; this includes remote operation control, supervision and error handling, e.g. via Management software MOBA-NMS.

e.g. DTS 4135.timeserver; highly accurate multipurpose timeserver