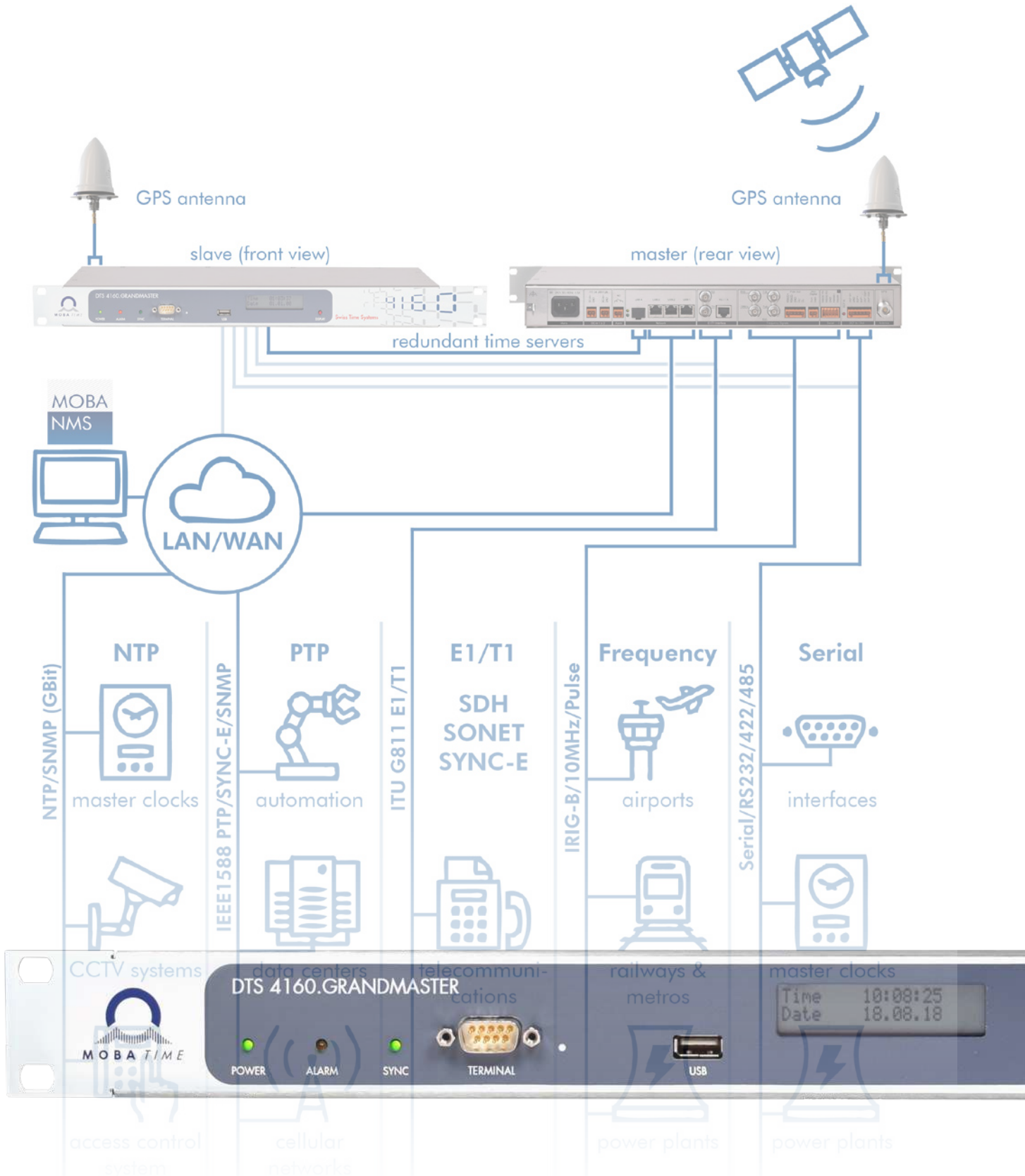


# OVERVIEW

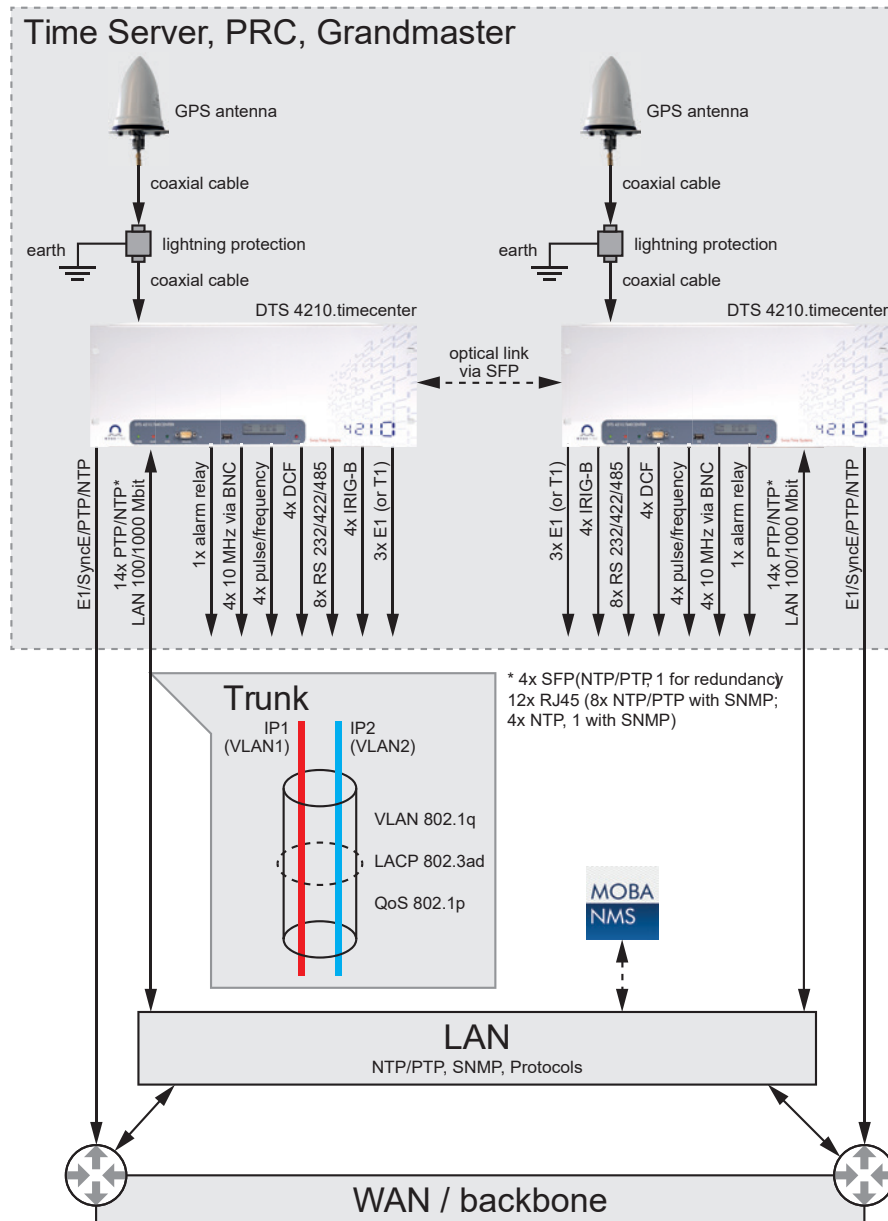
# NETWORK TIME SERVERS



# HIGH PRECISION PTP GRANDMASTER, PRC AND NTP TIME SERVER

## DTS 4210.timecenter

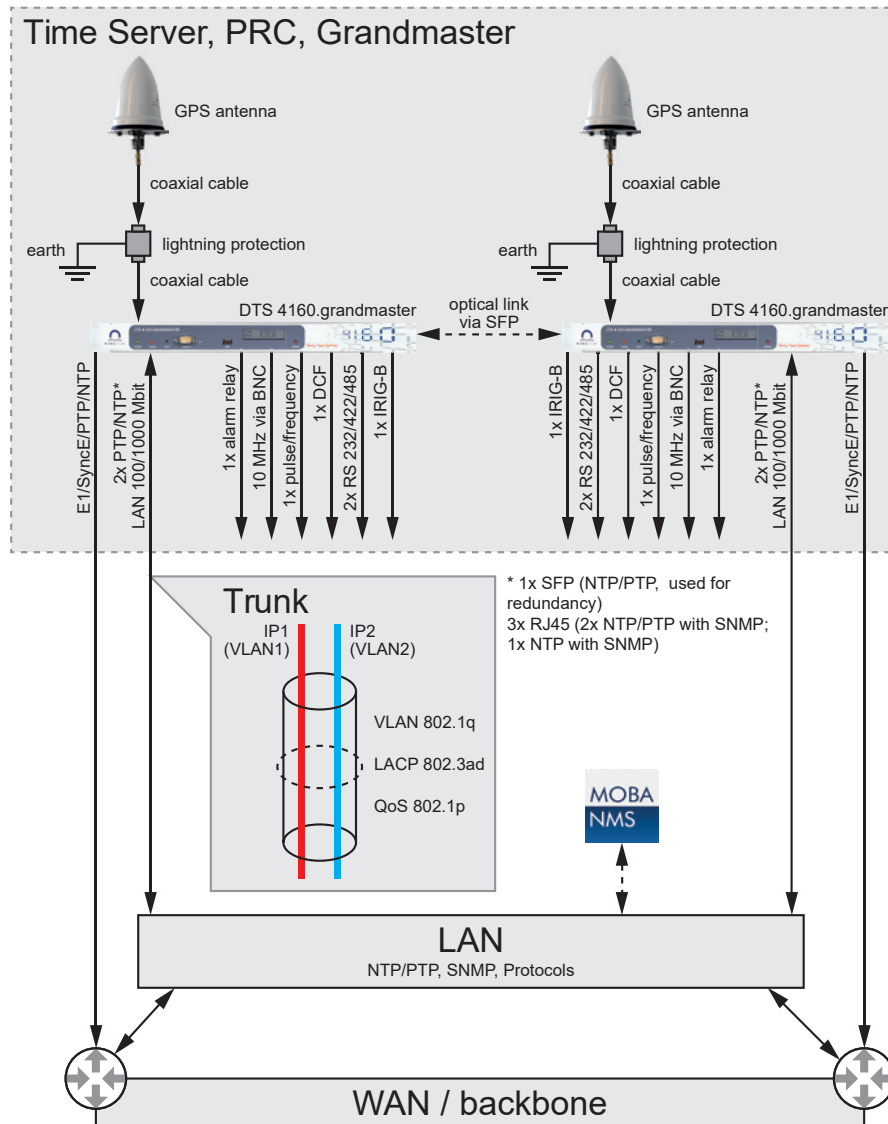
Versatile, highly accurate Time Center: Redundant and reliable Network Time Server, PRC and Grandmaster for multiple networks, e.g. ports, ATC, airports, railways OCC, power plants...



# HIGH PRECISION PTP GRANDMASTER, PRC AND NTP TIME SERVER

## *DTS 4160.grandmaster*

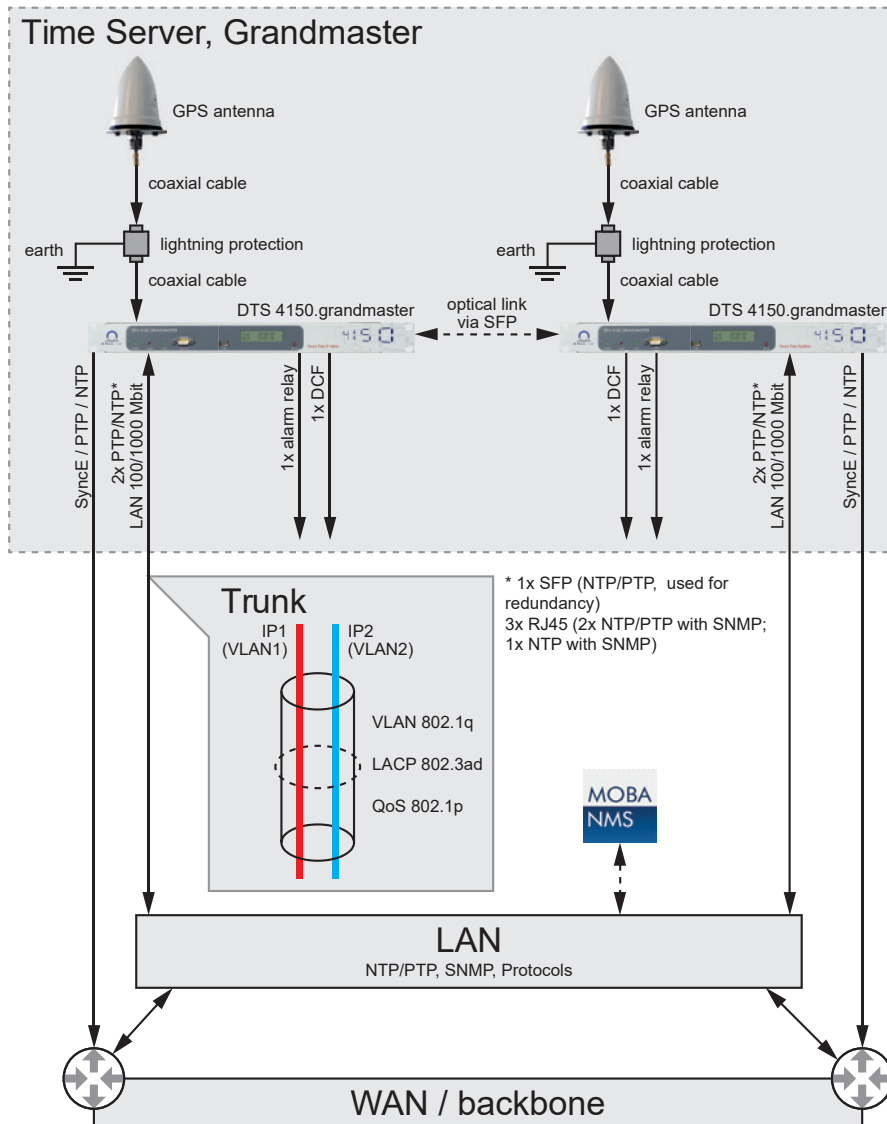
Highly accurate, redundant, and reliable Network Time Server, PRC and Grandmaster for multiple networks, e.g. ports, ATC, airports, railways OCC, power plants...



# PTP GRANDMASTER AND NTP TIME SERVER

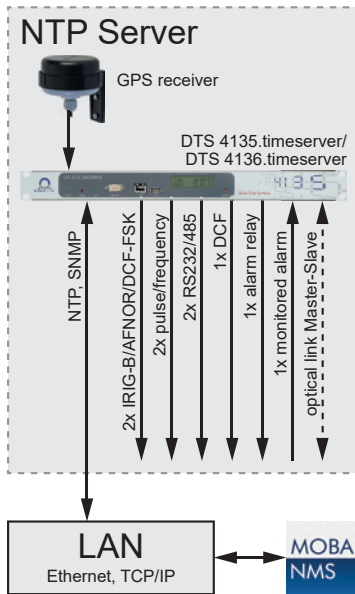
## *DTS 4150.grandmaster*

Highly accurate, redundant, and reliable Network Time Server and Grandmaster for multiple networks, e.g. ports, ATC, airports, railways OCC, power plants...

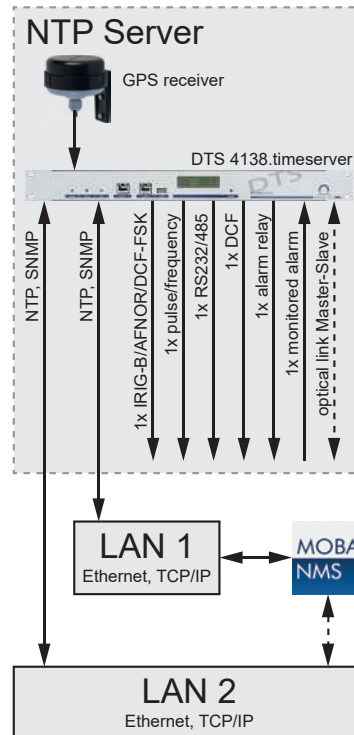


# NTP TIME SERVERS FOR TECHNICAL APPLICATIONS

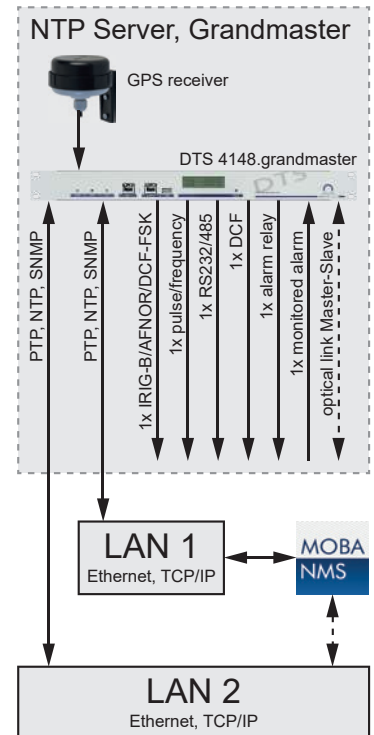
**DTS 4135.timeserver**  
**DTS 4136.timeserver**  
 High precision time server for technical applications, e.g. power stations, OCCs, hospitals...



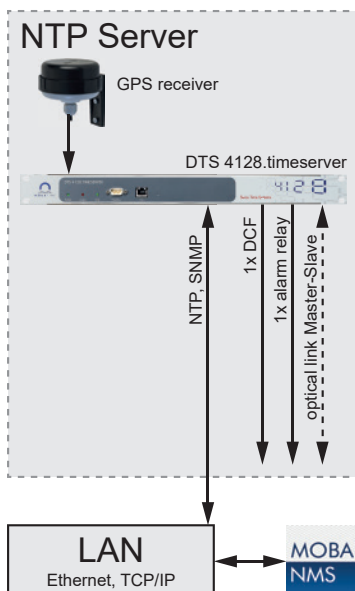
**DTS 4138.timeserver**  
 High precision time server for technical applications where devices in two isolated networks need to be synchronized, e.g. power stations, OCCs, IT applications...



**DTS 4148.grandmaster**  
 High precision time server and grandmaster for technical applications where devices in two isolated networks need to be synchronized, e.g. power stations, OCCs, IT applications...



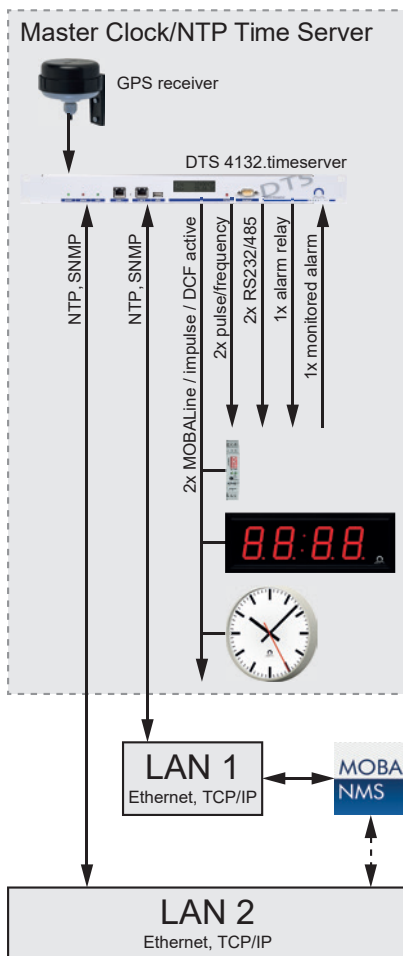
**DTS 4128.timeserver**  
 Accurate time server for IT applications, e.g. banks, industries, airports, OCCs, universities...



# NTP TIME SERVERS AND NETWORK MASTER CLOCKS

## DTS 4132.timeserver

High precision network master clock and time server for applications where devices in two isolated networks need to be synchronized, e.g. for banks, industries, schools, railway stations, universities...

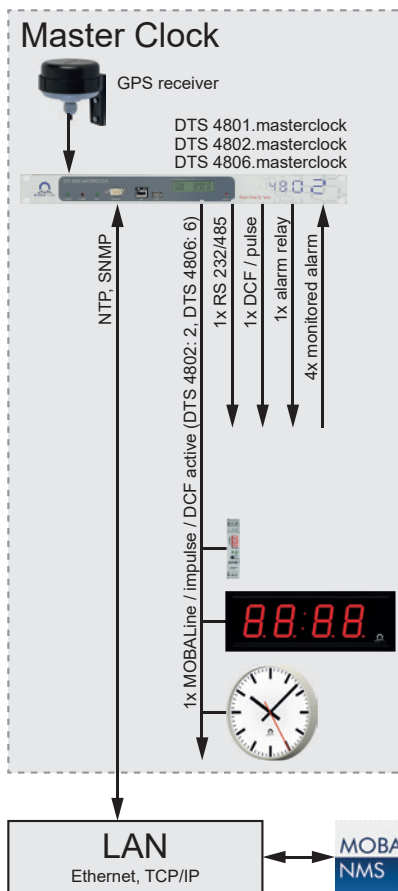


## DTS 4801.masterclock

## DTS 4802.masterclock

## DTS 4806.masterclock

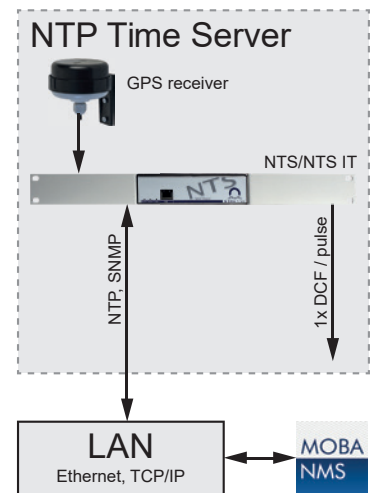
Accurate network master clock and time server, e.g. for banks, industries, schools, railway stations, universities...



## NTS

## NTS IT

Accurate time server for IT applications, e.g. for banks, industries, airports, OCCs, universities...



# OVERVIEW: THE RANGE OF GRANDMASTER, PRC & TIME SERVERS

## Overview table

On the top of the table you will find the most sophisticated and accurate network devices equipped with Rubidium oscillators. These network devices are providing, out of the traditional NTP, IRIG-B, RS422-232, PPS protocols, the up-to-date PTP, SyncE and E1 protocols for synchronization of large Gigabit Ethernet and SDH/SONET networks.

Grandmaster PRC/PRTC				
Rubidium	Oscillator type:	Output types:	Protocols:	Product types:
	- Rubidium	- Ethernet 1Gb/ PTP/NTP/SyncE - IRIG-B - ITU G811, E1 - Serial interfaces	- PTP, IEEE1588 - NTP - SyncE - IRIG-B/AFNOR - E1 (G811) - RS232/422/485 - TTL pulses - DCF	DTS 4210 DTS 4160

Eco-Grandmaster				
TCXO	Oscillator type:	Output types:	Protocols:	Product types:
	- TCXO	- Ethernet 1Gb/ PTP/NTP/SyncE	- PTP, IEEE1588 - NTP - SyncE - DCF	DTS 4150
OCXO	- OCXO	- Ethernet/NTP/PTP - IRIG-B - Serial interfaces	- PTP, IEEE1588 - NTP - IRIG-B/AFNOR - RS232/422/485 - TTL pulses - DCF	DTS 4148

Timeserver				
OCXO TCXO	Oscillator types:	Output types:	Protocols:	Product types:
	- OCXO - TCXO	- Ethernet/NTP - IRIG-B - Serial interfaces - Clock lines	- NTP - IRIG-B/AFNOR - RS232/422/485 - MOBALine - Polarized impulses - DCF	DTS 4132 DTS 4135 DTS 4136 DTS 4138

Eco-Timeserver				
XO	Oscillator type:	Output type:	Protocols:	Product types:
	- XO (software compensated)	- Ethernet/NTP	- NTP - DCF	DTS 4128 (TCXO) NTS NTS IT

Master clock				
XO	Oscillator type:	Output types:	Protocols:	Product types:
	- XO (software compensated)	- Ethernet/NTP - Serial interfaces - Clock lines	- NTP - RS232/422/485 - MOBALine - Polarized impulses - DCF	DTS 4801 DTS 4802 DTS 4806 DTS 4132 (TCXO)

# TECHNICAL DATA

General	DTS 4801 DTS 4802 DTS 4806	NTS NTS IT	DTS 4128	DTS 4132	DTS 4135 DTS 4136	DTS 4138 DTS 4148	DTS 4150	DTS 4160 (DTS 4160i)	DTS 4210
Housing (19")	1U	1U <sup>2</sup>	1U	1U	1U	1U	1U	1U	4U
Redundant power supply (mains/DC or DC/DC)	dual PS			✓	✓	✓	✓	✓	✓
Mains power supply (VAC)	85-265	100-240		90-240	90-240		90-240	90-240	2x 90-240
DC power supply (VDC)	22-29 4806: 22-70	22-29	22-29	2x 22-29	2x 22-29	2x 22-29	1x 22-29	2x 22-29	2x 22-29
<b>External time source</b>									
NTP / SNTP servers	✓	✓	✓	✓	✓	✓	✓		
GPS 4500, GNSS 3000	✓	✓	✓	✓	✓	✓	✓	✓	✓
PTP, GPS Antenna (1590 MHz)							✓	✓	✓
IRIG-B					✓	✓			
GBIC-Link for redundant operation, master-slave negotiation			✓	✓	✓	✓	✓	✓	✓
<b>Time signal outputs</b>									
IRIG-B, AFNOR, DCF-FSK					2 precision outputs, 50 Ω	1 precision output, 50 Ω		1 precision output, 50Ω	4 precision outputs, 50Ω
NTP slave clocks + time zone server	1	1	1	1	1	1	1	1	1
PTP Grandmaster (E2E, P2P, 1-step, 2-step, Unicast, Multicast, Layer 2)						DTS 4148: only 2-step, no unicast	✓	✓	✓
Serial outputs with configurable time telegrams: RS 232/422/485 (RS422: output only)	1 (4802: RS232 only)			2	2	1		2	8
E1/2.048MHz, G.811, G.812, G.813 according oscillator option, no protected output (1:1), no SSM, BNC								1 (4)	4
DCF current loop (CL) passive output	1 (+ pulse)	1	1	1	1	1	1	1	4
Precision pulse/frequency/DCF output on RS422 and CL 10 MHz (BNC connector)				1	2	1	DCF	1	4
MOBALine, DCF active or polarized Impulses (Impulse line)	4801: 1 4802: 2 4806: 6			2				1	4
<b>Network interface</b>									
SFP for miniGBIC module 100/1000Base-T(X) or FX 10BaseT / 100BaseTX	1	1	1	2	1	2		1	4
100BaseTX / 1000BaseT							3	3	12
<b>Network services</b>									
NTP server, max. (S)NTP client requests per s (typical)	3000	250	1500	1500	3000	1500	10000 / device	10000 / device	5000 / port
NTP client (configurable timeserves)	4	4	4	4	4	4	4	future option	
NTP V4 (V3 compatible); NTP modes: Server, Peer, Broadcast, Multicast; NTP MD5 authentication; SNTP	✓	✓	✓	✓	✓	✓	✓	✓	✓
PTP 1588-2008 Grandmaster						4148 only	✓	✓	✓
SyncE							✓	✓	✓
TIME, DAYTIME; Telnet, SSH, FTP - disengageable; SNMP Notifications (V1/V2c); SNMP Get, Put (V1/V2c/V3)	✓	✓	✓	✓	✓	✓	✓	✓	✓
IP V6 support	✓	✓	✓	✓	✓	✓	✓	✓	✓
DHCP; static IP	✓	✓	✓	✓	✓	✓	✓	✓	✓
LAG; VLAN, QOS			✓	✓	✓	✓	✓	✓	✓
<b>Accuracy (typical values)</b>									
GPS to NTP Server	<+/-0.5ms	<+/-0.5ms	<+/-0.1ms	<+/-0.1ms	<+/-0.1ms	<+/-0.1ms	<+/-0.1ms	<+/-0.1ms	<+/-0.1ms
GPS to PTP						4148: <+/-10µs	<+/-250ns	<+/-250ns	<+/-250ns
GPS to DCF output	<+/-1ms	<+/-1ms	<+/-10µs	<+/-10µs	<+/-10µs	<+/-10µs	<+/-5µs	<+/-5µs	<+/-5µs
GPS to Pulse / frequency output	<+/-1ms			<+/-10µs	<+/-10µs	<+/-10µs		current loop output: <+/-10µs BNC output: <+/-200ns	current loop output: <+/-10µs BNC output: <+/-200ns
GPS to IRIG (analog modulated)	<+/-15ms <sup>1</sup>				<+/-0.2ms	<+/-0.2ms		<+/-0.2ms	<+/-0.2ms
GPS to IRIG (digital)					<+/-10µs	<+/-10µs		<+/-1µs	<+/-1µs
GPS to serial output	<+/-10ms			<+/-10ms	<+/-10ms	<+/-10ms		<+/-10ms <sup>1</sup>	<+/-10ms
Master to slave (redundant operation)			<+/-1µs	<+/-1µs	<+/-1µs	<+/-1µs		<+/-250ns	<+/-250ns
Quartz Oscillator	standard	standard	TCXO	TCXO	4135: TCXO 4136: OCXO	4138: TCXO 4148: OCXO	TCXO	OCXO/Rubidium (Option)	Rubidium
Hold over (after >24h synchronisation) @ 20°C +/- 5°C	<+/-0.1s/d	<+/-0.1s/d	<+/-10ms/d	<+/-10ms/d	4135: <+/-10ms/d 4136: <+/-1ms/d	4138: <+/-10ms/d 4148: <+/-1ms/d	<+/-10ms/d	Option A: <+/-152µs/d Option B: <+/-43µs/d Option C: <+/-2.4µs/d	<+/-2.4µs/d
<b>Operation control</b>									
MOBA-NMS	✓	✓	✓	✓	✓	✓	✓	✓	✓
Telnet	✓	✓	✓	✓	✓	✓	✓	✓	✓
SSH	✓	✓	✓	✓	✓	✓	✓	✓	✓
RS 232 (PC-Terminal)	✓	✓	✓	✓	✓	✓	✓	✓	✓
SNMP (V2c/V3 Get, Put)	✓	✓	✓	✓	✓	✓	✓	✓	✓
LED for alarm, synch, power	✓	✓	✓	✓	✓	✓	✓	✓	✓
USB for update	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Alarm output</b>									
Relay contact	✓		✓	✓	✓	✓	✓	✓	✓
SNMP Notifications	V1/V2c	V1/V2c	V1/V2c	V1/V2c	V1/V2c	V1/V2c	V1/V2c	V1/V2c	V1/V2c
E-Mail	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Alarm input</b>									
control inputs	4			1	1	1			

<sup>1</sup>option <sup>2</sup>with brackets