High precision time server, grandmaster and PRC

DTS 4210.timecenter

The DTS 4210.timecenter is a combined time distribution and synchronization device with up to 16 network ports (IPv4/IPv6). With its high-precision and intelligent concept for redundant operation, it offers a high degree of reliability and availability.

Your benefits using DTS 4210.timecenter:

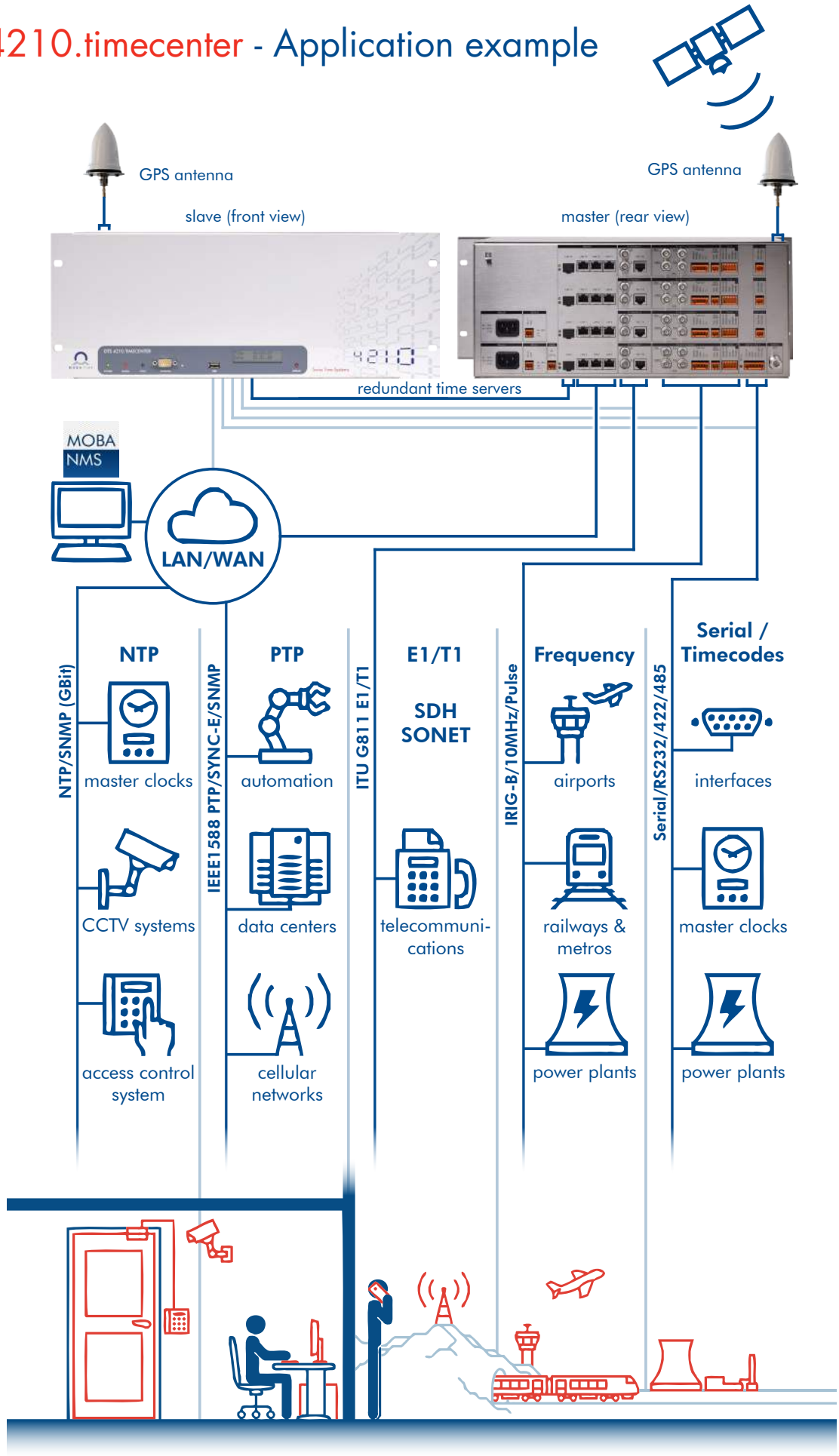
- 16 completely separated LAN ports (12x RJ45, 4x SFP):
  - provides PTP on 12 ports
    - 1- and 2-step master
    - different profiles and domains per port
    - multicast
    - IPv4/IPv6/Layer 2
  - provides NTP on 16 ports (>5000 requests/s each)
- Multi-purpose device due to the different time code and frequency outputs:
  - 4x E1
  - 4x 10MHz
  - 4x pulse/frequency output
  - 4x IRIG-B
  - 8x serial output
  - 4x DCF
- High degree of system redundancy by connecting two DTS 4210 via fiber-optic link:
  - high availability
  - master-slave operation with automatic switch over in case of an error
- High precision time:
  - Time reception from GPS, GLONASS or Beidou
  - GPS disciplined oscillator (GPSDO)

DTS 4210.timecenter - Technical details

General specifications			
System	CPU	ARM Cortex dual core	
	Oscillator	Rubidium	
Housing	Dimensions (W x H x D)	483 x 178 x 190 mm	19", 4 HU
	Weight	5.6 kg	
Display	LCD, 2 lines, for status and time info	✓	
LAN interfaces	100/1000 MBit, RJ45	12	3 maintenance ports
	SFP (miniGBIC interface)	4	May be used for: - redundant operation (see redundant link) - Optical network for NTP/PTP
RS 232 interface	For operation control, D-Sub 9 connector	1	
USB interface	For firmware update	1	
Redundant link	For redundant operation of 2 corresponding DTS 4210 with master/slave negotiation	✓	Option to additional network port. See also LAN interfaces miniGBIC/SFP
Power supply	Redundant power supply	2x 240 VAC 2x 22..29 VDC	
Ambient temperature	at 10-90% relative humidity, without condensation	0 to 50°C	
Reference signal inputs			
	GPS RF input (for GPS Antenna, N female connector) to internal GPS receiver; GPS, GLONASS*, Beidou* included 72 channels, tracking sensitivity -165 dBm	1	*future option
	Optical link from second DTS 4210.timecenter (SFP)	1	
Reference signal outputs			
Network	NTP server	>5000req/s	
	PTP Grandmaster (E2E, P2P, 1-step, 2-step, Multicast, Layer 2, IPv4/IPv6)	RJ45 over 8 Gbit ports SFP over 4 Gbit ports	
	PTP profiles	default, utility	future option: telecom
	SyncE	12	
Others	IRIG-B	4 precision output, 50 Ohms	BNC (AM) spring terminal (DC)
	Precision pulse/frequency/DCF output* on RS422 and CL	4	*future option
	Serial outputs with configurable time telegrams (10 pin terminal block)	8 RS 232/422/485 RS 422: output only	
	E1 / 2.048MHz, G811, G.812, G813 compatible no protected output (1:1), no SSM, 4x BNC, 4x RJ48	4	RJ48 (balanced) BNC (unbalanced)
	DCF 77 CL (Current loop) passive output (2 pin terminal)	4	
Network interface			
	100/1000BaseT	12	
	SFP for miniGBIC module 100/1000Base-T(X) or FX	4	
Network services			
	PTP master IEEE1588-2008 (V2) 1 or 2-step	✓	8x RJ45 4x SFP
	SyncE master	✓	
	NTP V4 (V3 compatible) server	✓	
	NTP mode Server, Peer, Broadcast, Multicast	✓	
	SNTP	✓	
	MD5 authentication for NTP	✓	
	TIME, DAYTIME	✓	
	Telnet, SSH, FTP, SCP, SFTP - disengageable	✓	maintenance ports only
	SNMP Notifications (Traps)	V2c/V3	maintenance ports only
	SNMP Get, Put	V1/V2c/V3	maintenance ports only
	IP V6 support	✓	
	Link Aggregation (IEEE 802.3 ad)	✓	4x over 2 interfaces
	VLAN	✓	
IP configuration			
IPv4	DHCP	✓	
	static IP	✓	
IPv6	Autoconfiguration	✓	
	static IP	✓	
	DHCPv6	✓	

Alarm I/O			
Electrical	Output: Relay contact	✓	
Network	Output: SNMP notifications (traps)	V2c/V3	maintenance ports only
	Output: Mail	✓	maintenance ports only
	Supervision possible with MOBA-NMS EXPERT (DSS)	✓	maintenance ports only
Oscillator			
	Rubidium	+/- $3*10^{-11}$ @ 1sec +/- $1.6*10^{-11}$ @ 10sec +/- $8*10^{-12}$ @ 100sec +/- $2.5*10^{-11}$ per day +/- $1*10^{-10}$ per month +/- $1*10^{-9}$ per year	Hold over (after >7 days synchronization)
Accuracy			
Internal accuracy	GPS to internal time	typ. < +/- 50ns	
GPS RF input, internal module	GPS to NTP	typ. < +/- 100µs	
	GPS to PTP	typ. < +/- 0.25µs	
	GPS to DCF	typ. < +/- 5µs	
	GPS to IRIG (analog)	typ. < +/- 200µs	
	GPS to IRIG (digital)	typ. < +/- 1µs	
	Pulse/frequency output, BNC & RS422	typ. < +/- 200ns	
	Pulse/frequency output, current loop	typ. < +/- 10µs	
	SyncE	compatible	G.811, G.812, G.813
	E1	compatible	G.811, G.812, G.813
	GPS to serial output	typ. < +/- 10ms (jitter <10ms)	
Redundant link	Master to slave (redundant operation)	typ. < +/- 0.25µs	GPS receiver required for each device
Operation control			
	MOBA-NMS	✓	maintenance ports only
	Telnet	✓	maintenance ports only
	SSH	✓	maintenance ports only
	SNMP (V2c/V3 get, put)	✓	maintenance ports only
	RS 232 (PC-Terminal)	✓	
	LED Alarm	✓	
	LED Power	✓	
	LED Sync	✓	
Compliancy			
	EMC: EN 50121-4, 61000-6-4, EN 61000-6-2	✓	
	Safety: IEC 60950-1	✓	
	CB	✓	
	G.703	compatible	
	G.811, G.812, G.813	compatible	
	IEEE 1588-2008	✓	
	NTP RFC 5905	✓	
	IEC 61850	✓	applicable for SNTP/NTP/ PTP synchronization only

DTS 4210.timecenter - Application example



DTS 4210.timeserver - Redundant operation

Redundant time

To avoid time deviation between two DTS 4210.timecenters, they can be linked via a fiber-optic connection by using two GBIC modules. Both timecenters use a GPS source as primary time reference.

The two timecenters automatically negotiate their state as master or slave. The slave is synchronized by the master in case of a failure of the synchronization source (GPS). Swap between master and slave state will occur automatic.

Redundant outputs

In case of GPS failure, the "master" DTS timecenter always has the better NTP stratum level than the slave.

The slave PTP Grandmaster is in passive mode.

Frequency and time code outputs are generated on both devices all the time.

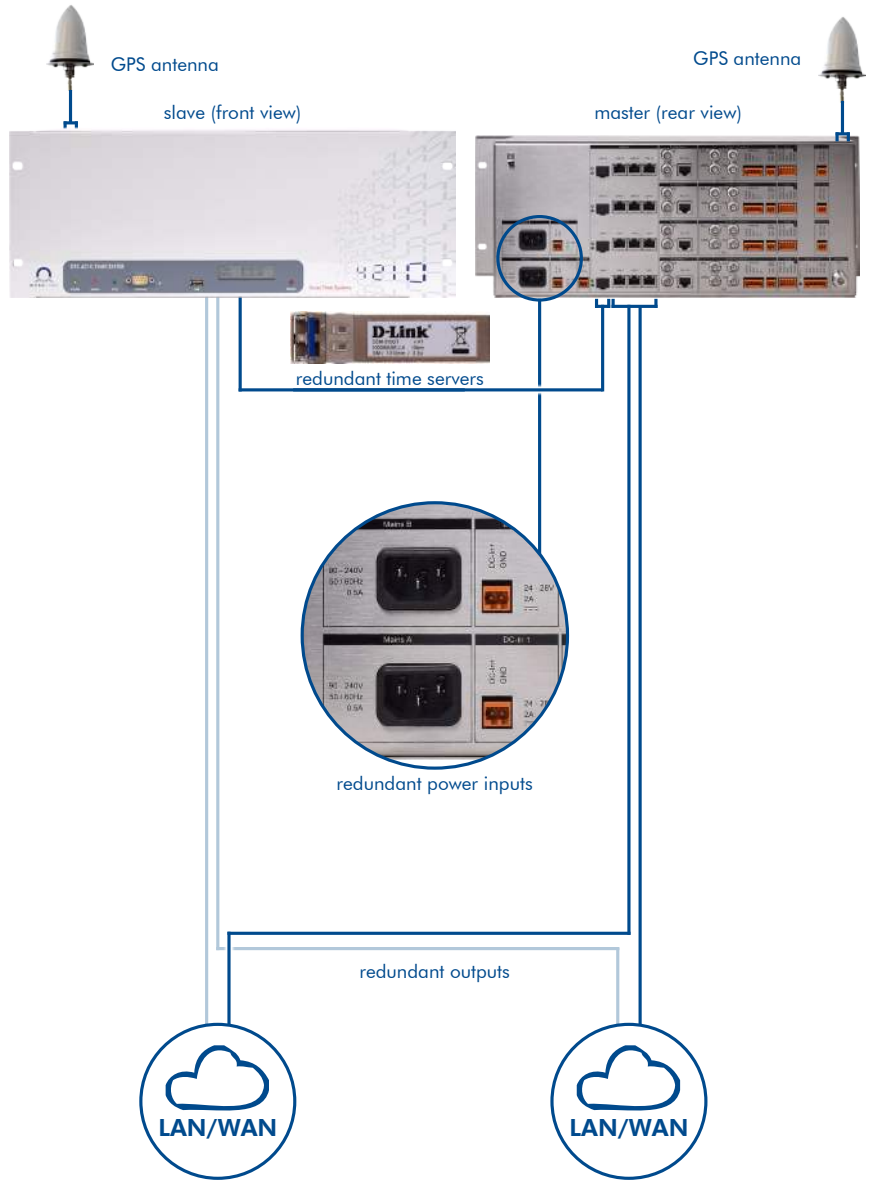
Redundant serial telegrams, DCF, 1PPS and IRIG-B can be achieved by the external change over unit (ECO).

Redundant power

The DTS 4210.timecenter has two monitored inputs for entirely redundant power supply. The stand-by power supply input is also monitored.

Possible power variants:

- 24 VDC, non-redundant
- 24 VDC + 24 VDC, redundant
- 230 VAC + 24 VDC, redundant
- 230 VAC + 230 VAC, redundant
- 230 VAC, non-redundant



DTS 4210.timecenter - Features

Time precision

Utmost accuracy is achieved with GPS synchronization. An intelligent time management ensures lasting high accuracy by continuously compensating oscillator drift and aging.
The internal time is adjusted to the time reference (e.g. GPS) in one step (initial time set) or slowly shifted (in adjustable micro steps) to avoid any time leaps (e.g. after a longer loss of the time source).

Top performance for large networks

The high performance DTS 4210.timecenter can reply more than 5000 NTP and SNTP requests per second, which allows for the synchronization of several thousand clients.

PTP Grandmaster

PTP according to IEEE 1588-2008 for the synchronization of highly accurate clients. Usable for telecom (e.g. LTE), energy (e.g. smart grid), automation, ...

NTP authentication

The DTS 4210 supports NTP authentication for increased security, which allows the clients to verify the source of the received NTP packets.

Safe and convenient operation

Operation over LAN via MOBA-NMS (SNMP), SSH or SNMP protocols is possible. SSH and SNMP (MD5 authentication and DES for encryption) enable a secured connection. Additional connection over RS232 is possible.

Alarm indication

Alarms are reported via SNMP messages, e-mail or by alarm relay.
Additionally, the alarm is indicated on the display and on the Alarm LED.

▲ Front view

- Serial Terminal for operation (RS232)
- USB connector for software update, file upload and maintenance
- Status LEDs for power, alarm and synchronization
- Display to show time, date, status, alarm, IP address..

▲ Rear view

- Power: 2x mains power connector, 2x DC power supply input
- alarm relay contact
- Synch. outputs
  - 4x E1, DCF, IRIG-B, pulse output
  - 8x serial RS 232 / RS 422 / RS 485 interface
- LAN connectors
  - 12x RJ45 100/1000MBit
  - 4x SFP
- GPS antenna connector (N female)

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