INSTRUCTION MANUAL

DTS 4128.timeserver

Network Time Server

Important Note:
This Manual is applicable for Firmware version 04270121.040201.02030208.
(firmware file: 129406_DTS4128V1_MOBA_V02022021_05_20210202_IMG.ZIP)
For older firmware versions please use the User-Manual BE-800847.05.

Certification of the Producer

STANDARDS

The DTS 4128.timeserver was developed and produced in accordance with the EU Guidelines:
2006 / 95 / EC
2004 / 108 / EC
96 / 48 / EC

CB TEST CERTIFICATE

Ref. Certificate No.

CH-6672

References to the Instruction Manual

1. The information in this Instruction Manual can be changed at any time without notice.
   The current version is available for download on www.mobatime.com.
2. The device software is continuously being optimized and supplemented with new options. For this reason, the newest software version can be obtained from the Mobatime website.
3. This Instruction Manual has been composed with the utmost care, in order to explain all details in respect of the operation of the product. Should you, nevertheless, have questions or discover errors in this Manual, please contact us.
4. We do not answer for direct or indirect damages, which could occur, when using this Manual.
5. Please read the instructions carefully and only start setting-up the product, after you have correctly understood all the information for the installation and operation.
6. The installation must only be carried out by skilled staff.
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Overview

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1   Safety

1.1   Safety instructions
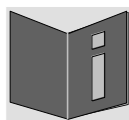
Read this chapter and the entire instruction manual carefully and follow all instructions listed. This is your assurance for dependable operations and a long life of the device.

Keep this instruction manual in a safe place to have it handy every time you need it.

1.2   Symbols and Signal Words used in this Instruction Manual

	Danger! Please observe this safety message to avoid electrical shock! There is danger to life!
	Warning! Please observe this safety message to avoid bodily harm and injuries!
	Caution! Please observe this safety message to avoid damages to property and devices!
	Notice! Additional information for the use of the device.

1.3   Intended Use

The **DTS 4128.timeserver** is a time server for the use in network environments. It can be synchronized from NTP and be used as NTP server. In addition, it can read the time from DCF or GPS (e.g. from GPS 4500).

For additional functions, see the device descriptions in chapter 3.

The device is designed for 19" racks and intended to be installed in a 19" cabinet. Operate the device only in installed condition and with all connectors plugged in.

Use this product only as stated in this instruction manual. Any other use is considered improper use.

1.4 Observe operating safety!

Caution!

- Never open the housing of the device! This could cause an electric short or even a fire, which would damage your device. Do not modify your device!

- The device is not intended for use by persons (including children) with limited physical, sensory, or mental capacities or a lack of experience and/or knowledge.

- Keep packaging such as plastic films away from children. There is the risk of suffocation if misused.

1.5 Consider the installation site!

Caution!

- To avoid any operating problems, keep the device away from moisture and avoid dust, heat, and direct sunlight. Do not use the device outdoors.

- The device is designed for 19" racks and should only be operated installed in a 19" cabinet.

- By operating the device, the heat sinks attached to the sides get warm.
  Make sure there is enough air circulation for the heat to dissipate.
  The device shuts off when overheated. After it has regained its normal operating temperature, it will restart automatically. The settings are saved.

Danger! Make sure
that you wait before using the device after any transport until the device has reached the ambient air temperature. Great fluctuations in temperature or humidity may lead to moisture within the device caused by condensation, which can cause a short.

1.6 Please observe the electromagnetic compatibility!

Caution!

- This device complies with the requirements of the EMC and the Low-voltage Directive.

1.7 Network security

Caution!

- The default password shall be changed after the commissioning of the device.

- A reset of the password to default through hardware is not possible.
  Using MOBA-NMS the password can be modified.
  In case an access via MOBA-NMS is not possible, support effort will be needed or the device has to be sent back to the factory.

- All unused services shall be deactivated: FTP, Telnet,…

2   Maintenance

2.1   Troubleshooting: Repairs

Please read carefully Appendix "D Troubleshooting" if your device does not work properly.

If you cannot rectify the problems, contact your supplier from whom you have purchased the device.

Any repairs must be carried out at the manufacturer's plant.

Disconnect the power supply immediately and contact your supplier, if …

- liquid has entered your device

- the device does not properly work and you cannot rectify this problem yourself.

2.2   Cleaning

- Please make sure that the device remains clean especially in the area of the connections, the control elements, and the display elements.

- Clean your device with a damp cloth only.

- Do not use solvents, caustic, or gaseous cleaning substances.

2.3   Disposing

Device
At the end of its lifecycle, do not dispose of your device in the regular household rubbish. Return your device to your supplier who will dispose of it correctly.

Packaging
Your device is packaged to protect it from damages during transport.
Packaging is made of materials that can be disposed of in an environmentally friendly manner and properly recycled.

3 General Information: Introduction

3.1 Scope of Delivery

Please check your delivery for completeness and notify your supplier within 14 days upon receipt of the shipment, if it is incomplete.

The package you received contains:

- DTS 4128.timeserver

- Mounting set for rack mounting consisting of:
  - 4 pcs nuts for 19" housing
  - 4 screws M6 for the nuts
  - 4 plastic discs for screws M6

- Connector set
  - 1 * spring terminal 6-pole orange
  - 2 * spring terminal 2-pole orange

- 2 pcs mounting tools with spring terminals

3.2 Technical Data

See Appendix F Technical data.

3.3 Introduction

The **DTS 4128.timeserver** is a NTP Time Server for use in network environments. It can be synchronized by DCF or GPS (e.g. from GPS4500) and act as a NTP server in a network.

In addition, it can be used as a master clock for NTP slave clocks, synchronized via multicast with NTP and time zone table.

As a "main" master clock the DTS 4128 can synchronize further master clocks or other equipment by synthetic DCF.

The DTS 4128 can send e-mails as well as SNMP traps.

Via SNMP configuration and system status can be requested and the DTS 4128 can be operated.

To maintain a redundant time source, two DTS 4128 can be linked by an optical link.

3.4 Device types

Model:	Features:	Product no.:
DTS 4128.timeserver	According above description with TCXO (temperature compensated quartz)	**205285**
DTS 4128S.timeserver	Like DTS4128, Siemens version	**204732**

Device descriptions:

The front plate always has DTS 4128.timeserver printed on it. The precise description is made on the identification plate on the back.

3.5   DTS distributed time system

The DTS (Distributed Time System) is a system developed by Moser-Baer AG to connect decentralized master clocks, slave clock lines and time servers. For communication, standard LAN (Ethernet) is used. The DTS can be centrally operated and monitored.
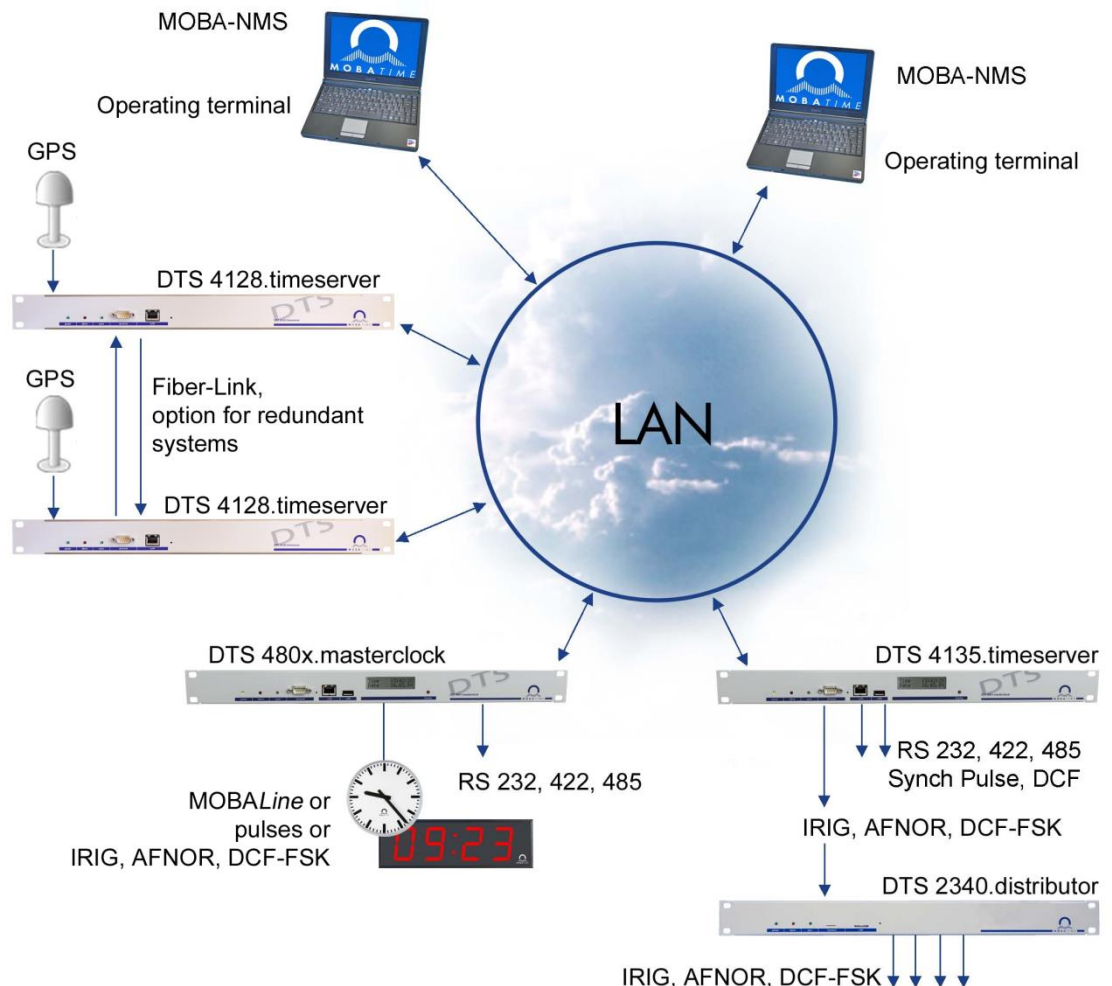
3.6   MOBA-NMS - Network Management System

MOBA-NMS is a software used for central management and inquiry of state and alarm information. It supports DTS devices as well as all MOBATime analog and digital network clocks and can handle a network with more than 1000 devices. This software provides

extensive functions for the configuration, installation, back-up / recovery etc. especially for DTS devices.

True to the DTS concept, MOBA-NMS can be installed multiple times in one network. With different user rights on the device and software level, the configuration abilities of different users can be set as required.

For DTS devices, all communication is conducted over SNMP V3. The SFTP protocol is used for broadcasting files.

3.6.1   Overview of the main functions

The main MOBA-NMS functions for DTS devices and network clocks are listed below:

- automatic device scan over multicast or IP range
- device management using user-defined device groups ➔ see chapter „3.6.2 Device management"
- intuitive user interface with input check for the device configuration
- status / alarm request and display on the device group level
- device firmware update for one or several devices (parallel)
- support for device commands, e. g. reset, restart etc.
- back-up / recovery of DTS devices
- transfer of the whole DTS configuration to another device
- user management with different access rights
- monitor for NTP and time zone packages
- editor for time zone files
- online help
- etc.

3.6.2 Device management

All MOBATime network devices are displayed in the so-called device view. Here, the devices can be grouped according to user-defined criteria. For this, the individual devices can simply be moved to the according groups and sorted using drag and drop. There is no limit to the number of groups and sub-groups.

Besides the organizational advantages (easier locating, better overview), a device group has the following advantages:

- commands and device updates can be applied to the whole group (including sub-groups).

- Alarms and errors of included devices are displayed on the group level.

- Complete groups can be moved / sorted among themselves.

The content of the device view can be saved and opened at a later time. The created structure and breakdown into groups is preserved.
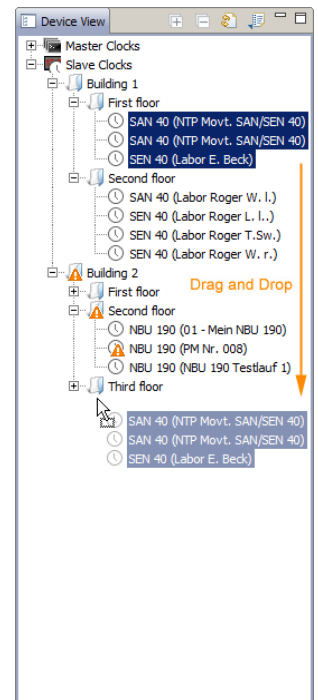
4 Displays

4.1 LED displays
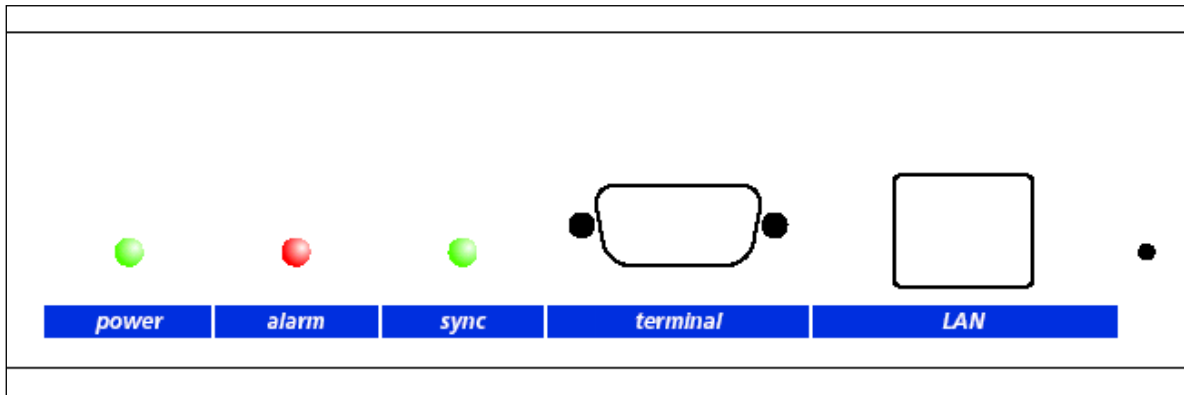
Description	Color	Status	Description
Power	Green	On	Mains or DC power supply is in order
		Off	No power supply
Alarm	Red	On	The alarm relay signalizes an alarm
		Off	No active alarms
Sync	Green	On	DTS 4128 can read the time from a synchronization source
		Off	Synchronization source is not available
LAN control lamps:			
Left	Green	Blinking	Network activity
	Orange	Blinking	No connection to network
Right	Yellow	Off	10 Mbit
		On	100 Mbit

4.2 LED indication back side
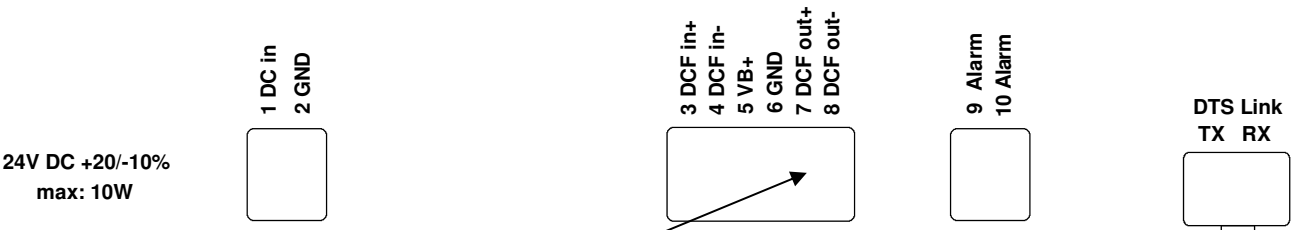
Description	Color	Status	Description
DCF reception	red	Blinking	DCF (GPS reception)

5 Installation

5.1 Connections

The connections are specified in Appendix "A Connection diagrams".

Only connect the designated devices to the various inputs and outputs.

5.2 Boot procedure of the DTS 4128.timeserver

The normal booting time of the DTS 4128 is approx. 45 sec. with pre-set IP and 50 sec. with DHCP. The booting procedure of the operating system is displayed on the serial console. After that, the 'sync' control lamp is switched off and only switched on again when time is received from the time source. Without any connection to a DHCP server, the first start up can take up to 1 minute. Afterwards, the DHCP option must be set to "off" in the network settings.

5.3 Firmware

It is recommended to install the current firmware on your device prior to the definite commissioning. The current firmware can be found under *www.mobatime.com* ➔ *Customer Data* ➔ *Product Ressources* ➔ *Time Server*.

5.4   Basic settings (factory settings)

General	Internal time zone	MEZ
	Menu password	dts
	Power	single
	Language	English
Time source	Source	DCF-GPS (UTC)
	Alarm delay for failure	off
	Stratum	auto
	Error stratum	12
	DCF timeout	24hrs
	DCF correction	0ms
	Offset per stratum	50ms
	Max. offset time ok	50'000us
Time-keeping	Mode	Catch up
	Catch up speed	100'000ns/s
	Quartz type	0
	Synch only offset	800ms
Redundant operation		off
Lines	DCF output	on, UTC
	NTP slave clocks /	
	Time zone server	off
Network	DHCP	on
	Link	auto
	Hostname	DTS4128
Alarm	Relay	all on
	Mail	off
	SNMP traps	off
NW Services	SSH	on
	Telnet	on
	FTP	on
SNMP	Modus	off
	RO-Community	romobatime
	RW-Community	rwmobatime
SNMP Traps	Mode	off
	Trap Community	trapmobatime

6 Operation

6.1 General

Operation occurs via a terminal menu or SNMP. SNMP operation is explained in Chapter "9 SNMP". Operation with the terminal menu takes place either via Telnet, SSH, or via a serial terminal. The serial terminal is particularly used for the first configuration. After a connection has been set up, the login screen is displayed:

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                    _ □ ×

DTS Linux (DTS4128)

DTS4128 login:
```
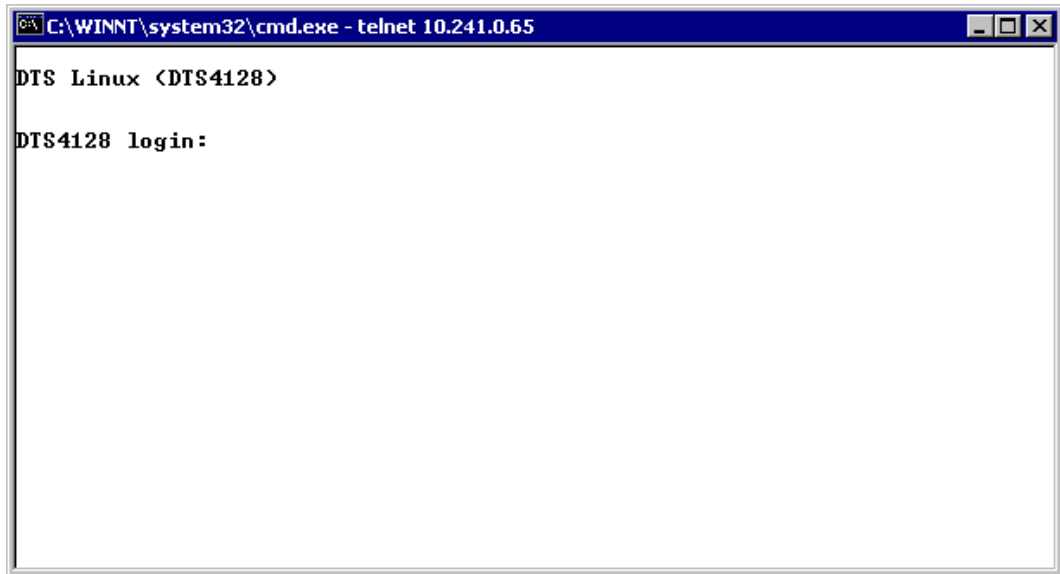
 To start the menu, *dts* must be logged in as user. The standard password is *dts*. (Changing the password ➔ see Chapter "6.5.15 General Settings").

Only one menu can be open at any time. The first menu started has priority. The menu is automatically closed after 10 min. without operation, and any possible connection via Telnet or SSH interrupted.

Backspace:

Backspace must be set to "delete" with the serial terminal:

For example, for **HyperTerminal** under "File ➔ Properties ➔ Settings - Backspace sends DEL" must be selected.

Local echo:

Some terminals (serial or Telnet) do not display the characters entered. It is, therefore, necessary to switch on the "local echo" in the terminal.

6.1.1 Serial connection

38400 Bauds, 8 data bits, no parity, 1 stop bit.

Windows 2000, XP, Vista: HyperTerminal

Linux: Minicom

Switch off Xon/Xoff and hardware handshake.

After establishing the serial connection, the menu can be initialized with ENTER. When rebooting, the boot process will be displayed on the serial console.

Important: The serial connection should always be disconnected before switching off the operating PC (exit terminal program or pull out the RS232).

6.1.2 Telnet

Windows 98, 2000, XP, Vista, 7:   Start ➔ Run ➔ *telnet [IP-address]*
                                                            Password: by default, no password
                                                            NetTerm (Shareware)

Linux: Start console and enter "*telnet [IP-address]*

6.1.3 SSH

Windows 98, 2000, XP, Vista, 7:   e.g. with Putty

Linux: Start console and enter "*ssh dts@[IP-address]*"

6.1.4 Menu structure


```
Auswählen C:\WINNT\system32\cmd.exe - telnet 10.241.0.65       _ □ X

   DTS 4128.timeserver    Moser-Baer AG
   =====================================

   TIME SOURCE◄─────────────[menu title]
   1  Source type◄                                    2   ◄──────[parameters]
   2  Alarm delay for failure of the source          20min
   3  DTS stratum (0=aut───[menu options]             1
   4  Stratum limit fo                                12
   5  Stratum TO (0-16)                               24h
   6  Offset per stratum                              50ms
   7  Max. offset for time ok                         50000us
   8  Time source correction (DCF/GPS only)           0ms

   98 Return and save
   99 Return and discard changes ───────[response line]

   Unknown command: "9"◄

   Enter desired menu number>◄──────────[input line (prompt)]

   ──────────────AN ALARM IS ACTIVE!──────────────
                                                    ◄───[status line]
```

The current menu is always displayed in the **menu title**. The **menu options** show all the selectable menu functions. Provided the menu item is not a further menu, the set **parameters** are displayed. Error messages (e.g. invalid entries) or additional information to the selected menu items are displayed in the **response line.** The **input line** shows the current input values or options possible. The **status line** only appears, when an information has to be displayed, e.g. "An alarm is active".

All entries must be completed with ENTER (Return) (e.g. also ESC).
The menu window can always be exited with *Ctrl-C* (incl. termination of the Telnet and SSH connection).
The desired menu can be selected with the relevant number.

The numbers 98 and 99 are always used identically:

1 With 98, the settings entered are saved and the menu exited. Depending on the change, the DTS 4128, or only partial functions, are rebooted.

2 With 99, all changes to the menu are reversed and the menu exited.
   In the menus where data cannot be saved (command 98), the menu is only exited with 99, but any changes are not saved.

The current menu is updated, without any further entry, with ENTER.

6.2   MOBA-NMS operation

For the configuration of DTS devices via GUI, MOBA-NMS (see chapter „3.6 MOBA-NMS - Network Management System") can be used. All configuration possibilities are subordinated in different configuration pages (called „tabs"). These tabs are connected to the terminal menu and designated accordingly. Example: The terminal menu „Configuration ➜ Alarms" can be found in MOBA-NMS under the tab „Alarms".

Configuration example of a DTS 4801.masterclock:

For further details on the general MOBA-NMS operation, check the integrated online help (menu „Help ➜ Show help").

Important: In order for the communication between MOBA-NMS and the DTS devices to work, SNMP must be activated! Set terminal menu „Configuration ➜ SNMP ➜ SNMP Mode" to „on". SNMP is active by default.

6.3   Main menu

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                          _□×

    DTS 4128.timeserver    Moser-Baer AG
    ===================================

    MAIN SELECTION
    1   Status
            (Actual alarms and history, timesource state, version
    2   Configuration
            (Configuration of the lines, timesources, alarms ...)
    3   Maintenance
            (Update, backup ...)



    99 Exit DTS menu


    Enter desired menu number>_
```
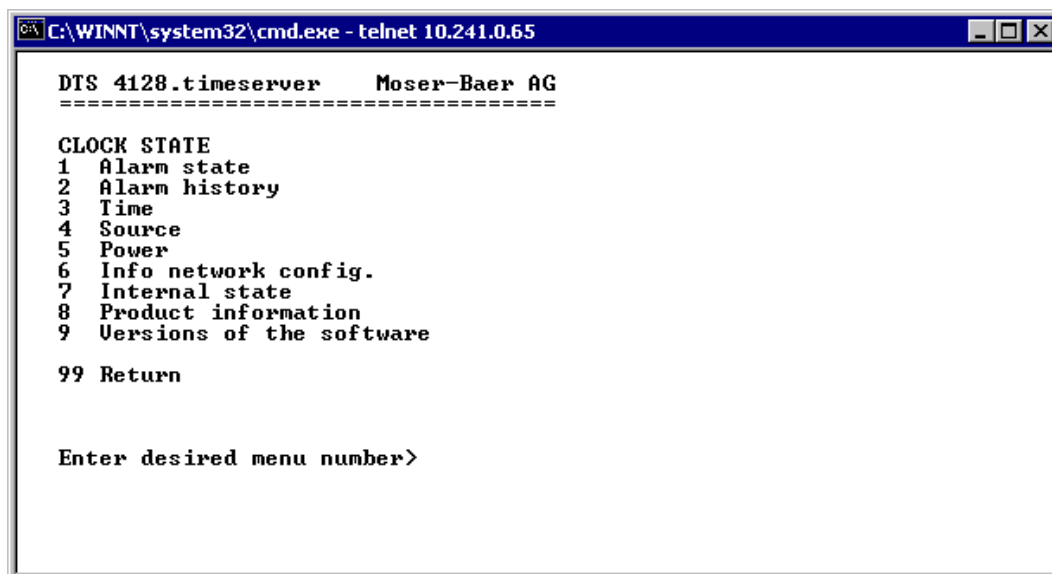
Menus:

Status: Display of various information regarding operation and environment
                    See Chapter "6.4 Status Menu"

Configuration: Configuration of the DTS 4128
                    See Chapter "6.5 Configuration Menu"

Maintenance: Software update, backup and restore
                    See Chapter "6.6 Maintenance Menu"

6.4   Status menu

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                    _ □ ×

    DTS 4128.timeserver    Moser-Baer AG
    ===================================

    CLOCK STATE
    1   Alarm state
    2   Alarm history
    3   Time
    4   Source
    5   Power
    6   Info network config.
    7   Internal state
    8   Product information
    9   Versions of the software

    99 Return


    Enter desired menu number>
```

The menu shows various information on the current operating status.

1.   Requesting alarm status, display of all the DTS 4128 active errors.
     Display of the DTS 4128 alarms (64) on 4 pages. The ALARM DETAIL menu
     pages can be scrolled through with ENTER. Active alarms are displayed with a *.
     The ALARM DETAIL menu page can be exited with ESC. All DTS 4128 active
     alarms are displayed, masking (e-mail, traps, relay) only occurs later.

2.   Alarm history display.
     Display of the DTS 4128 alarm record, newest alarm first. The ALARM RECORD
     menu pages can be scrolled through with ENTER. The ALARM RECORD menu
     page can be exited with ESC.

3.   Current time and status display. See Chapter "6.4.1 Time Information and Status"

4.   Time source information display. See Chapter "6.4.2 Time Source Information"

5.   DTS applications software versions display.

6.   Linux system software versions display.

7.   Power supply information (voltage) display.

8.   Current network configuration display.

9.   DTS 4128 system information display (internal status, control voltage, quartz..).
     This information is for support purposes.

6.4.1 Time information and status

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                        _ □ ×

    DTS 4128.timeserver     Moser-Baer AG
    ====================================

    TIME INFORMATION AND STATUS
    Internal time of the DTS (local time)       17:00:24 06.12.07
    Stratum and state of DTS                    1   MASTER
    Last measured drift                         0.0039ppm
    Last quartz correction                      15:00:01 06.12.07 UTC
    Time source                                 GPS (DCF)
    Offset to source                            0us
    Last time information from source           16:00:01 06.12.07 UTC
    Jitter of the source                        0us
    Quality of the source                       100%

    99 Return


    Enter desired menu number>
```

-Internal time of the DTS:	local time
-Stratum and status of the DTS:	current stratum, status: MASTER, SLAVE, not defined
-Last measured drift:	drift before the last quartz correction
-Last quartz correction:	time of the last quartz correction
-Time source:	current time source
-Offset to source:	offset to source (source – system time)
-Last time info. from source:	time of the last information from source
-Jitter of the source:	current jitter
-Quality of the source:	quality of the source

6.4.2 Time source information
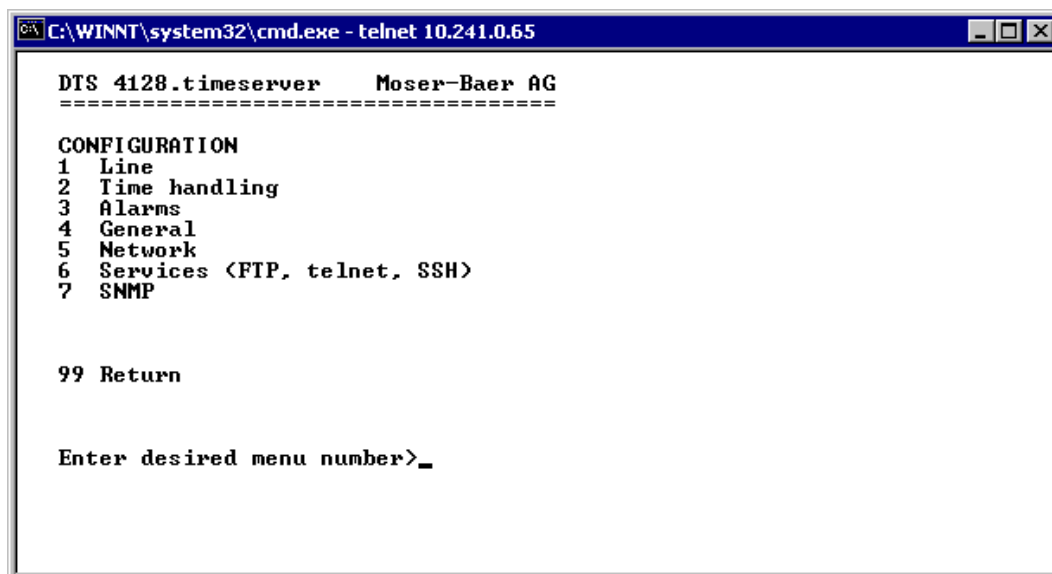
```
 C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                    _ □ ×

    DTS 4128.timeserver    Moser-Baer AG
    ====================================

    TIMESOURCE INFORMATION
    Actual measured offset                        0us GPS FPGA
    Last time received DCF                        15:59:00 06.12.07 UTC
    Sec. counter DCF                              31
    Last time received link                       00:00:00 01.01.70 UTC
    Sec. counter link                             0
    NTP source                                    Antenna
    NTP source offset                             0us
    NTP source jitter                             1us
    NTP source stratum                            0

    99 Return


    Enter desired menu number>_
```

- Currently measured offset:	last measured offset with source info and type of measurement (only needed for Moser-Baer support).
- Last time received DCF:	last time received from DCF source
- Sec. counter DCF:	the counter is incremented by 1 with each DCF pulse. For the minute marker, the counter is set to 0.
- Last time received link:	last time received from DTS Link
- Sec. counter link:	analogue sec. counter DCF
- NTP – Source:	current time source (system-peer) of the NTP Server
- NTP source offset:	current offset of the NTP Server
- NTP source jitter :	jitter of the current source
- NTP source stratum:	stratum of the current source

6.5   Configuration menu


```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                          _ □ ×

    DTS 4128.timeserver     Moser-Baer AG
    =====================================

    CONFIGURATION
    1   Line
    2   Time handling
    3   Alarms
    4   General
    5   Network
    6   Services (FTP, telnet, SSH)
    7   SNMP


    99 Return


    Enter desired menu number>_
```

Configuring the DTS 4128 through various submenus:

1. Configuring the lines / outputs (DCF out, NTP slave clock line)
    See Chapter "6.5.1 Lines"

2. Configuring the time source, time-keeping etc.
    See Chapter "6.5.4 Time Administration"

3. Alarm settings (alarm relay, e-mail, SNMP)
    See Chapter "6.5.10 Alarms"

4. General settings of the DTS 4128 (language, time zone for alarms and display,
    password for menu, power supply monitoring...)
    See Chapter "6.5.15 General Settings"

5. Network Settings
    See Chapter "6.5.16 Network"

6. Services (switching network services such as FTP, Telnet, SSH on or off)
    See Chapter "6.5.17 Services (Network services FTP, Telnet, SSH....)"

7. SNMP Configuration for GET/PUT.
    See Chapter "6.5.18 SNMP" (Traps are dealt with in menu '2. Configuration' ➜'3.
    Alarms' ➜ '3. Traps'. See also Chapter 6.5.14 SNMP Traps

6.5.1   Lines
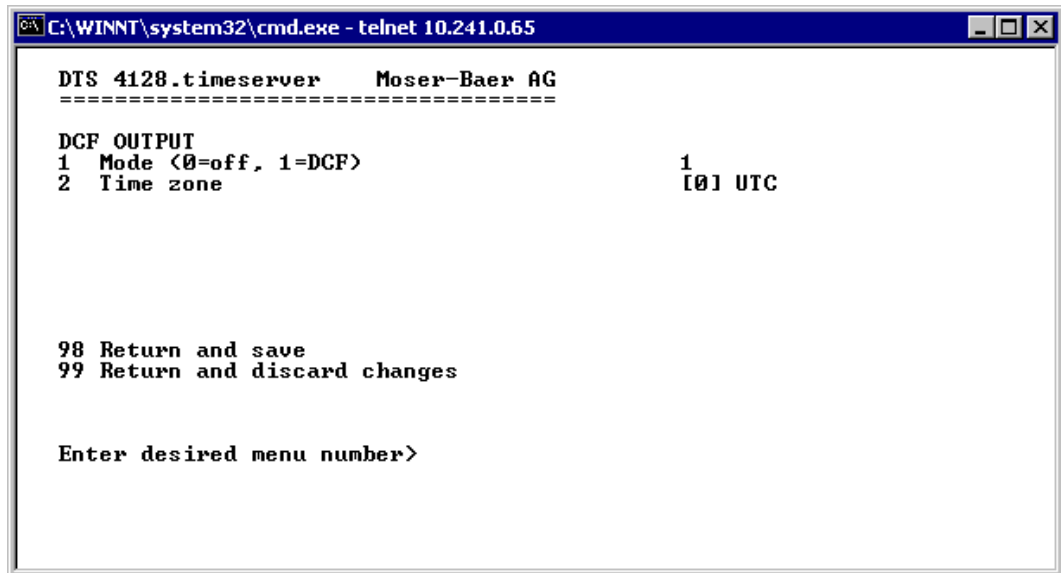
Under lines, settings can be undertaken for the following 3 functions:

1   DCF - Output ➜ see Chapter "6.5.2 DCF - Output"

2   NTP slave clocks / time zone server
    ➜ see Chapter "6.5.3 NTP Slave Clocks / Time Zone Server "

6.5.2 DCF – output

The DTS 4128 is equipped with one DCF output line.
This line is available as an electrical current loop DCF output.

The settings of the DCF line:

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                          _ □ X

   DTS 4128.timeserver    Moser-Baer AG
   ====================================

   DCF OUTPUT
   1   Mode (0=off, 1=DCF)                          1
   2   Time zone                                    [0] UTC




   98 Return and save
   99 Return and discard changes


   Enter desired menu number>
```

1. Select line function: off or DCF on

2. Select time zone: see Chapter "6.5.21 Time Zone Selection"

6.5.3 NTP slave clocks / time zone server

NTP slave clock line for operating slave clocks on the LAN (Ethernet). With this clock line, a world time function can be realized.

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                          _ □ x

    DTS 4128.timeserver    Moser-Baer AG
    ====================================

    NTP_SLAVE CLOCKS AND TIME ZONE SERVER
    1   Mode(0=off 1=NTP 2=NTP+TZ 3=TZ)         0
    2   Multicastaddress
    3   Multicastport                           65534
    4   Pollinterval for NTP                    0
    5   Packet time to live (hops)              1
    6   Repeat time to send TZ-tables (sec)     60
    7   Delay time between packets (sec)        1
    8   Configure time zone table

    98  Return and save
    99  Return and discard changes



    Enter desired menu number>
```

1. Mode of clock line: 0 = off, 1 = Send NTP multicast, 2 = Send NTP Multicast and Time zone table, 3 = Send Time zone table, 4 (only for maitenance) = Send an empty Time zone table and return to previous mode.

2. Multicast adress for NTP and time zone server: **239.192.54.x**
   Group address: x = 1..15 for MOBATIME devices, e.g. NCI, SEN 00.

3. Multicast port for Time zone server (enter an arbitrary value, empty is not allowed ! Value e.g.: 65530).

4. Poll-interval for NTP Multicast in 2^**poll-values** in seconds (range: 1 – 16).
   E.g. poll-value = 2 ➔ interval: 2^2 = 4 sec., poll-value = 5 ➔ interval: 2^5 = 32 sec.
   For redundant Multicast time servers see remark next page.

5. Packet time to Live (TTL) for NTP- and time-zone-Multicast-packets in hops.
   (Number of Routers in a network to transfer the packets through; for simple network without routing, enter value "1", for 1 Router enter "2").

6. Repeat time to send time zone table: 10 – 86400 sec

7. Delay time between the sending of the individual time zone entries (one entry per Multicast packet) of the table: 1 – 60 sec.

8. Configuration of individual time zone entries. Displays menu "TIME ZONE TABLE".

Important: Changes of multicast-address, pollinterval and TLL lead to a **restart** of the NTP server.

Important: For the operation of a **Multicast** communication (NTP and Time Zone Server) **the configuration of a gateway is required** (see chapter 6.5.16 Network). The gateway can be set manually or by using DHCP.
If there's no gateway available, it's possiible to set the own IP as gateway.

Important: **Redundant Multicast time server:**
If in the same network two NTP server should send NTP with same Multicast IP address (redundancy), then the first time server has to be configured with a small **pollinterval** (e.g. 2 ➜ sec.) and second time server with a large pollinterval (min. 100 x larger, e.g. 9 ➜ 512 seconds). As long as the first time server is sending NTP Multicast packets, the packets from second time server are ignored. This configuration is needed, to reach a defined situation for the end devices (the DTS with the more frequently NTP send rate gets higher priority for time reception).

Time zone table for the NTP slave clock line:

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65              _ □ ×

    DTS 4128.timeserver    Moser-Baer AG
    =====================================

    TIME ZONE - TABLE
    Zone01: 2 [+1] Brussel          Zone02: -1 Unknown season
    Zone03: -1 Unknown season       Zone04: -1 Unknown season
    Zone05: -1 Unknown season       Zone06: -1 Unknown season
    Zone07: -1 Unknown season       Zone08: -1 Unknown season
    Zone09: -1 Unknown season       Zone10: -1 Unknown season
    Zone11: -1 Unknown season       Zone12: -1 Unknown season
    Zone13: -1 Unknown season       Zone14: -1 Unknown season
    Zone15: -1 Unknown season



    Enter requested entry

    Press enter for next part, 99 to leave>_
```

Display of all time zone entries (15) of time zone servers for NTP slave clock lines.

Choose a zone number to change selected zone.

Time zone selection (see chapter 6.5.21 Time zone selection).

The page can be exited with 99. Changes are first stored or reset on the overlying menu page.

6.5.4   Time administration

Under time administration, settings can be undertaken for the following functions:

- Time source configuration ➜ see chapter 6.5.5
- Time-keeping configuration ➜ see chapter 6.5.6
- Redundant Operation ➜ see chapter 6.5.7
- NTP Server ➜ see chapter 6.5.8
- For setting the time manually / Leap second ➜ see chapter 6.5.9

6.5.5 Time source

Time source configuration.

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                          _ □ ×

    DTS 4128.timeserver    Moser-Baer AG
    ====================================

    TIME SOURCE
    1   Source type                              2
    2   Alarm delay for failure of the source    10min
    3   DTS stratum (0=auto, 1-15=fix)           0
    4   Stratum limit for synchalarm             12
    5   Stratum TO (0-16) DCF/GPS fail           24h
    6   Offset per stratum                       50ms
    7   Max. offset for time ok                  50000us
    8   Time source correction (DCF/GPS only)    0ms

    98 Return and save
    99 Return and discard changes


    Enter desired menu number>_
```
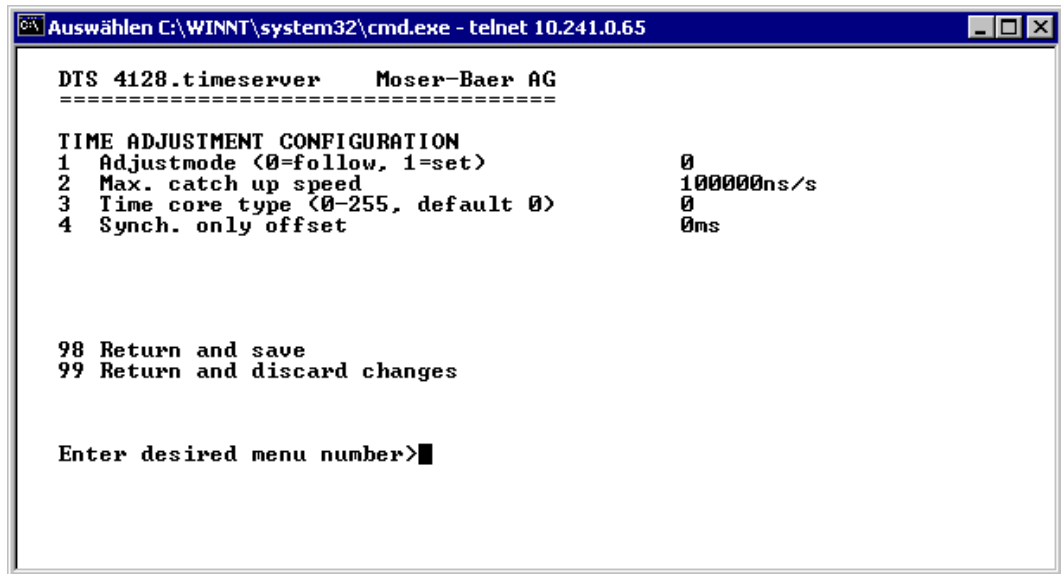
1. Type of time source: 0=none, 1=DCF MEZ, 2=GPS-DCF (UTC),
                            3=GPS serial (not available), 4=NTP

2. Alarm delay at failure of time source (minutes):
                            0 = off, 1-2'160min, default = 0
                            Error: "loss of time source TO"

3. DTS stratum   0=Stratum is automatically calculated according to
                            the time source.
                            1-15=Stratum is manually set

4. Stratum limits for alarm Limits for alarm "Time source lost" (1-16)
                            Error: "loss of time source stratum"

5. Duration of stratum change 1 to 16 in the case of time loss (1-999h),
   e.g. 24 hrs ➔ stratum counts up from 1 to 16 within 24 hrs.

6. Offset per Stratum in ms (0-40'000ms). Stratum is calculated with this value when
   time is received again:
   Offset/Stratum = 30ms, offset of the time source 150ms ➔ Stratum = 5

7. Max. offset for time source to set valid time in µs at start up.
   (0-1'000'000µs)

8. Time source correction (only for DCF), +/-60'000ms

For description of time source see Chapter "8 Time administration "

6.5.6 Time-keeping

```
Auswählen C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                    _ □ ×

  DTS 4128.timeserver    Moser-Baer AG
  ====================================

  TIME ADJUSTMENT CONFIGURATION
  1  Adjustmode (0=follow, 1=set)            0
  2  Max. catch up speed                     100000ns/s
  3  Time core type (0-255, default 0)       0
  4  Synch. only offset                      0ms




  98 Return and save
  99 Return and discard changes


  Enter desired menu number>█
```
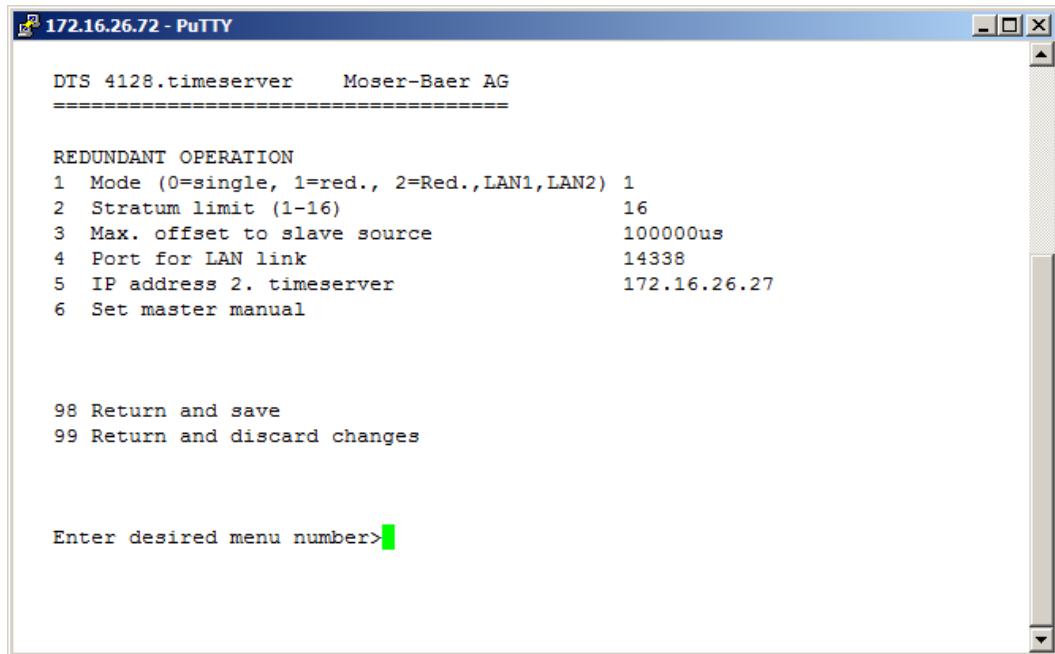
1. Adjust mode: 0=time is slowly adjusted (accord. to "Max. catch-up speed")
                     1=time is set immediately

2. Maximum catch up speed in ns/s (0-10'000'000).

3. Quartz type: Standard=0 (0-255)

4. Synch. only offset: 0=off
                     100-5000ms=Limits as from which time is no longer accepted
                     ➜ Alarm "Syn only diff too great"

For a description of time-keeping see Chapter "8 Time administration"

6.5.7   Redundant operation

```
172.16.26.72 - PuTTY                                              _ □ ×

  DTS 4128.timeserver    Moser-Baer AG
  ====================================

  REDUNDANT OPERATION
  1  Mode (0=single, 1=red., 2=Red.,LAN1,LAN2) 1
  2  Stratum limit (1-16)                   16
  3  Max. offset to slave source            100000us
  4  Port for LAN link                      14338
  5  IP address 2. timeserver               172.16.26.27
  6  Set master manual



  98 Return and save
  99 Return and discard changes



  Enter desired menu number>
```

Path: 2 Configuration ➔ 2 Time handling ➔ 3 Redundant operation

1. Mode: 0=single operation
             1=redundant operation of 2 DTS 4128 (Master-Slave operation)
             2=redundant operation of 2 DTS 4128 (Master-Slave operation) without
                LAN communication between the 2 devices

2. Stratum limit to switch from slave to master. Standard 16 (1-16)

3. Max. offset of slaves to the slave time source for triggering the alarm "Offset Source (Slave)" (0-5'000'000us)

4. Port for LAN-Link. default 14338

5. IP address of the 2nd DTS 4128. Only required, if the optical link is not working. Format 10.241.23.99
    ENTER without entering an address will delete the entry.

6. Manual change from slave to master. The command is effected immediately. Saving with '98' is not required when exiting the menu.
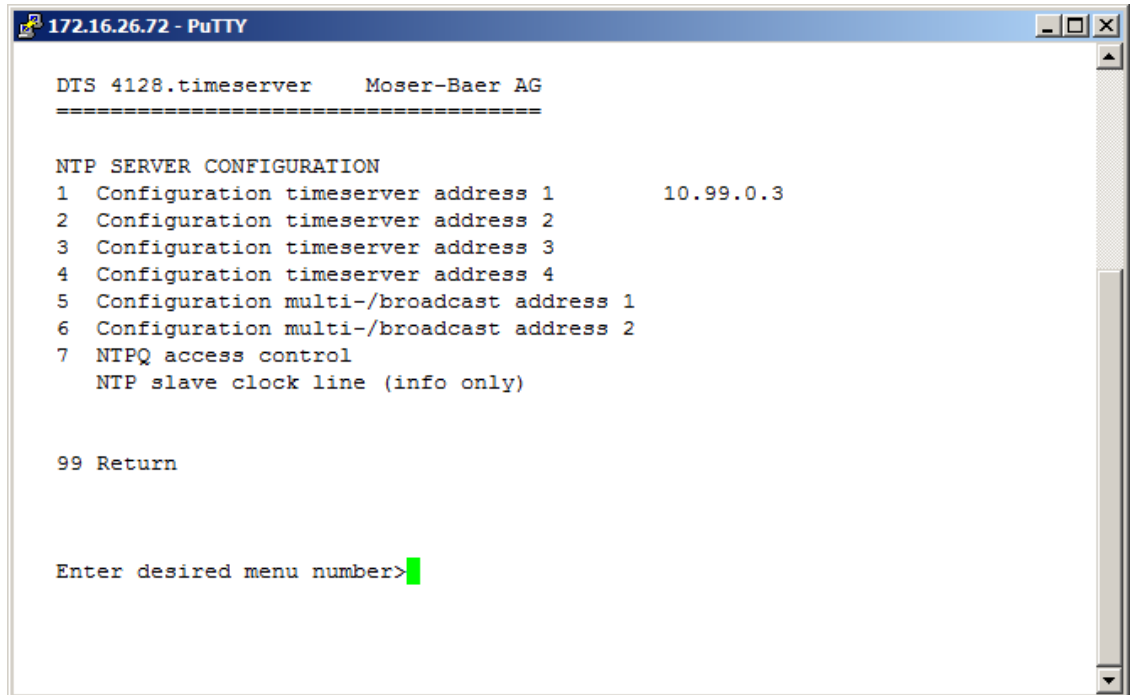
For a description of redundant operation, see Chapter "8.8 Redundant Operation of 2 DTS 4128.timeservers"

6.5.8 NTP server

NTP can run as server or combined as server/client. To run NTP as source (NTP as client), in the menu '2. Configuration' ➔ '2. Time handling' ➔ '1. Time source setting' ➔ '1. Source type' choose NTP and set at least one server. If NTP server is configured, but NTP is not indicated as time source, NTP only runs as backup time source (redundancy) to the actual time source.
The exact behavior of NTP time sources is described in chapter "8.3 Time acceptance from NTP".

Further two multicast or broadcast addresses can be configured.

```
172.16.26.72 - PuTTY                                                    _ □ ×

  DTS 4128.timeserver    Moser-Baer AG
  ====================================

  NTP SERVER CONFIGURATION
  1  Configuration timeserver address 1        10.99.0.3
  2  Configuration timeserver address 2
  3  Configuration timeserver address 3
  4  Configuration timeserver address 4
  5  Configuration multi-/broadcast address 1
  6  Configuration multi-/broadcast address 2
  7  NTPQ access control
     NTP slave clock line (info only)


  99 Return




  Enter desired menu number>▇
```

Path: 2 Configuration➔ 2 Time handling ➔3 NTP server configuration

1.-4.   Summary about configured NTP – time sources. Select to configure.

5.-6.   Summary about configured NTP – broadcast addresses. Select to configure.

7.   NTPQ access control (ntp-query)

   Submenu: 1 Access control for query
   0 = all access allowed (default)
   1 = access from local network allowed
   2 = all access blocked

Information about a multicast – address, configured for NTP slave clocks.

Configuration of the individual server/peer address is as follows:

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                           _ □ ×

    DTS 4128.timeserver    Moser-Baer AG
    ====================================

    ENTRY TIMESOURCE                                   1
    1   Source                                         10.99.0.3
    2   Minpoll                                        3
    3   Maxpoll                                        4
    4   Server/Peer                                    server
    5   Prefer                                         prefer


    98 Return and save
    99 Return and discard changes


    Enter desired menu number>_
```

1. Insert time sources (IP address or name, e.g. "ntp.metas.ch")
   ENTER without entry of an address will delete value.

2.-3. Configurations of **Minpoll** and **Maxpoll**: Inquiry interval 2^**poll value** in seconds.
   0 = automatically
   e.g. poll value=2 ➔ intervall 2: 2^2 = 4sec., poll value=5 ➔ intervall 5: 2^5 = 32sec.
   Range of poll values (exponent): 1 – 16
   To get an exact synchronization it's better to limit Maxpoll to 6 (64 sec.).

4. Set type of inquiry: server or peer

5. Preferred source: on or off

Important: All changes lead to a restart of the NTP server.

Important: If NTP only runs as a backup (source DCF or GPS), no NTP source should be indicated as **prefer**.

Configuration of the Multi- / Broadcast address is as follows:

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                          _ □ ×

   DTS 4128.timeserver    Moser-Baer AG
   ===================================

   NTP MULTI- / BROADCAST-ENTRY                1
   1  Multi- or  broadcast IP address         239.192.54.5
   2  Interval                                4sec
   3  TTL (only for multicast)               4hops




   98 Return and save
   99 Return and discard changes


   Enter desired menu number>
```
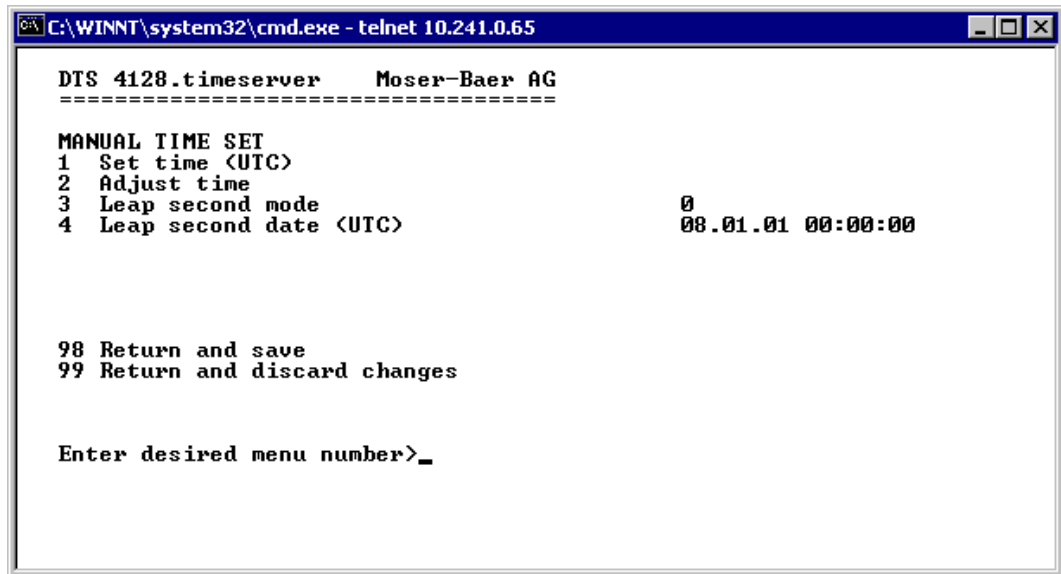
1. IP address of the destination network (multicast or broadcast).
    ENTER without entering an address will delete the entry.

2. Interval for sending out the NTP information in seconds.
    The interval is rounded after the entry to NTP standard, which only permits values
    of format 2^x: 1,2,4,8,16,32,64. Maximum 65536 seconds.

3. TTL (time to live) in hops. Only required for multicast.
    Number of routers over which the multicast packet should be transmitted:
    for simple networks without a router - enter 1, for 1 router - enter value 2.

Important: All changes lead to a restart of the NTP server.

6.5.9 Manual time set / Leap second

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                          _ □ ×

   DTS 4128.timeserver    Moser-Baer AG
   ====================================

   MANUAL TIME SET
   1   Set time (UTC)
   2   Adjust time
   3   Leap second mode                              0
   4   Leap second date (UTC)              08.01.01 00:00:00



   98 Return and save
   99 Return and discard changes


   Enter desired menu number>_


```

1. Set UTC time in the format "YY.MM.DD hh:mm:ss".
   Time is set with ENTER!

2. Correct time in ms (- = backwards). Range: +/-10'000ms
   Time is set with ENTER!

3. Leap second mode
   0   Off
   1   Additional second will be inserted at entered time
   -1   Second will be deleted at entered time

4. Set UTC time of leap second in format: "YY.MM:DD hh.mm.ss"
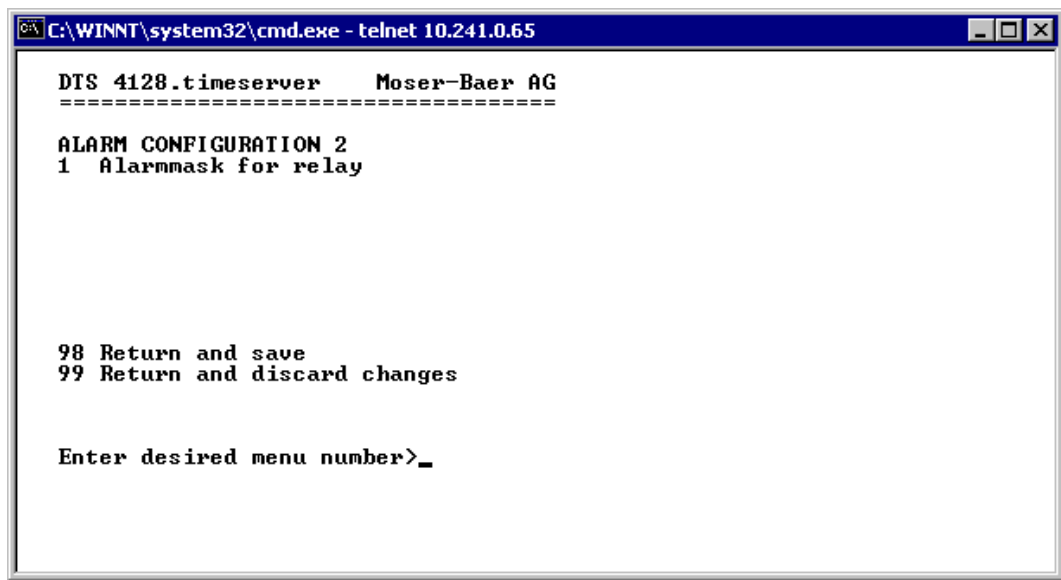
Operation of leap second see chapter "8.7 Leap second".

6.5.10 Alarms

Under alarms, settings can be undertaken for the following functions:

- Alarm relays ➔ see Chapter 6.5.11
- E-Mail ➔ see Chapter 6.5.13
- SNMP-Traps ➔ see Chapter 6.5.14

6.5.11 Alarm relay
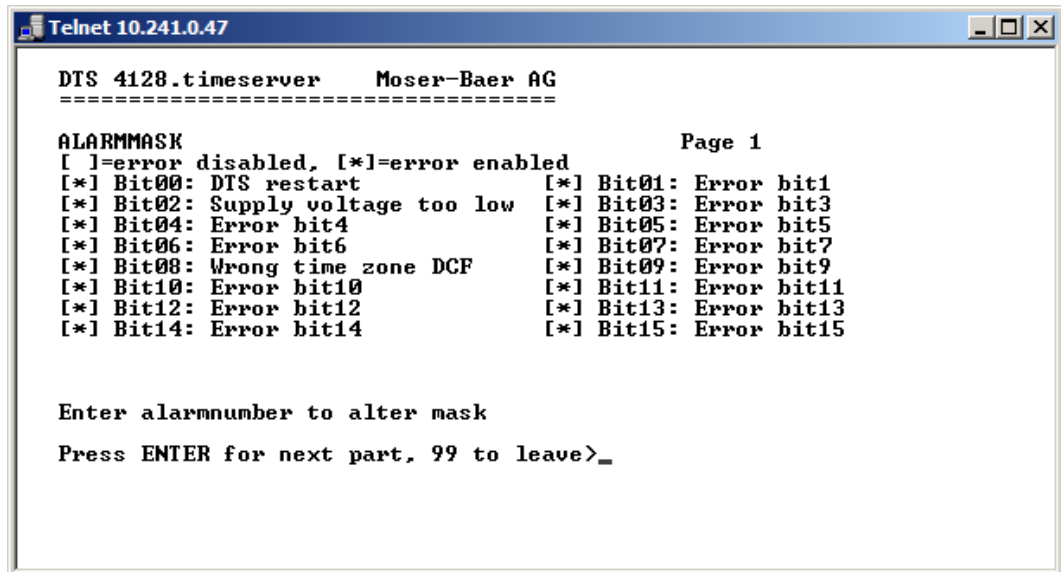
```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                        _ □ ×

   DTS 4128.timeserver    Moser-Baer AG
   ====================================

   ALARM CONFIGURATION 2
   1  Alarmmask for relay




   98 Return and save
   99 Return and discard changes


   Enter desired menu number>_

```

1. Alarm mask for relay (see Chapter "6.5.12 Alarm mask")

6.5.12 Alarm mask

```
Telnet 10.241.0.47                                          _ □ ×

  DTS 4128.timeserver    Moser-Baer AG
  ====================================

  ALARMMASK                              Page 1
  [ ]=error disabled, [*]=error enabled
  [*] Bit00: DTS restart           [*] Bit01: Error bit1
  [*] Bit02: Supply voltage too low [*] Bit03: Error bit3
  [*] Bit04: Error bit4            [*] Bit05: Error bit5
  [*] Bit06: Error bit6            [*] Bit07: Error bit7
  [*] Bit08: Wrong time zone DCF   [*] Bit09: Error bit9
  [*] Bit10: Error bit10           [*] Bit11: Error bit11
  [*] Bit12: Error bit12           [*] Bit13: Error bit13
  [*] Bit14: Error bit14           [*] Bit15: Error bit15



  Enter alarmnumber to alter mask

  Press ENTER for next part, 99 to leave>_
```

Display of all the DTS 4128 alarms (64) on 4 pages. Pages can be scrolled through with ENTER.

An alarm on the current page can be switched on or off by entering an error number. The page can be exited with 99. The modifications will be saved or restored one menu level higher in "ALARM CONFIGURATION". All Alarms with "error bitxx" are not yet used.

A description of individual errors can be found in Appendix "C Alarm list"...

The alarm masks for the various applications (E-Mail, SNMP, SNMP Traps, alarm relay) can differ.

6.5.13 E-mail

1. E-mail function on or off.

2. Alarm mask for e-mail notifications (see Chapter "6.5.12 Alarm Mask")
   Changes are stored or reset on the overlying menu page "MAIL CONFIGURATION".

3. IP address of the mail server e.g. 10.249.34.5
   ENTER without entering an address will delete the entry.

4. Mail server port (often 25)

5-6. Destination e-mail address.
   ENTER without entering an address will delete the entry.

7. Reply address (e.g. support, administrator...)
   ENTER without entering an address will delete the entry.

8. Sender address (important for authentication through the mail server)
   ENTER without entering an address will delete the entry.
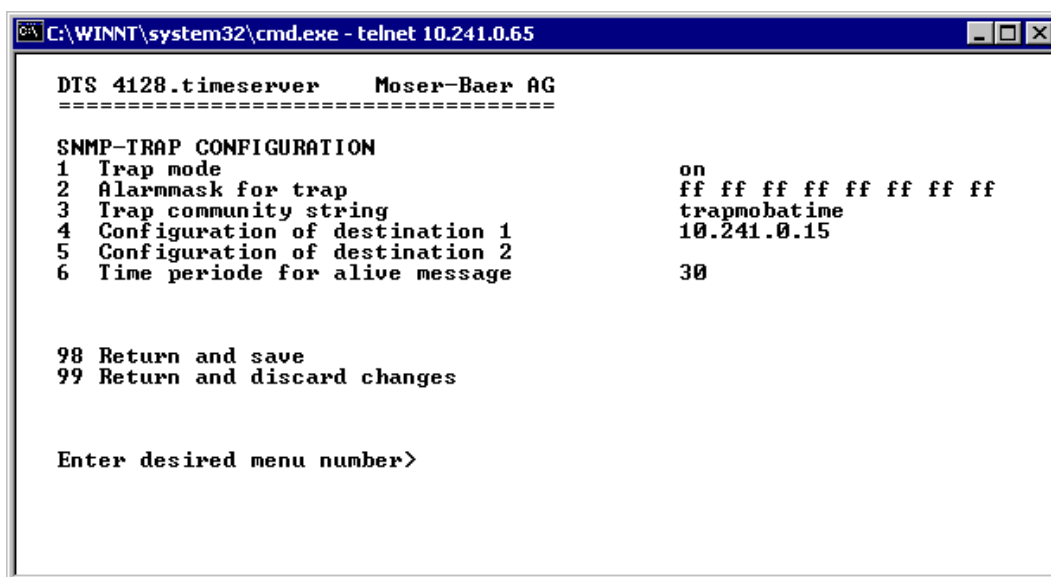
Important: Configuration of a gateway is required for sending e-mails (see Chapter "6.5.16 Network"). This can be set via DHCP or manually.

Format of an error message via E-Mail:

```
Event <Alarm 03 set: Power failure 1>
Time <11:26:45 10.01.07>
Hostname <DTS4128 (10.241.0.30)>
```

6.5.14 SNMP traps

For a description of SNMP functionality, see also Chapter "9 SNMP".

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                    _ □ X

   DTS 4128.timeserver    Moser-Baer AG
   ====================================

   SNMP-TRAP CONFIGURATION
   1   Trap mode                           on
   2   Alarmmask for trap                  ff ff ff ff ff ff ff ff
   3   Trap community string               trapmobatime
   4   Configuration of destination 1      10.241.0.15
   5   Configuration of destination 2
   6   Time periode for alive message      30



   98 Return and save
   99 Return and discard changes


   Enter desired menu number>
```

1. Trap mode on or off

2. Alarm mask for SNMP trap messages (see Chapter "6.5.12 Alarm Mask")
   Changes are first stored or reset on the overlying menu page "SNMP TRAP
   CONFIGURATION".

3. Trap community string (group membership for traps).
   Standard: *trapmobatime*.

4. Configuration of the receiving system (trap sink) 1

5. Configuration of the receiving system (trap sink) 2

6. Time period for alive messages in seconds. 0 = no alive traps are sent
   Range: 1-7'200sec

Important: General settings for SNMP can be found in menu '2. Configuration' ➔
'7. SNMP'. See also Chapter "6.5.18 SNMP".

Important: Configuration of a gateway is required for sending SNMP traps (see
Chapter 6.5.16 Network). This can be set via DHCP or manually.

Important: Each configuration change leads to a restart of the DTS SNMP Agent.

Configuration of the receiving systems

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                          _ □ ×

  DTS 4128.timeserver    Moser-Baer AG
  ====================================

  SNMP-TRAP DESTINATION CONFIGURATION           1
  1   Address trap destination                  10.241.0.15
  2   Port trap destination (default 162)       162
  3   SNMP version                              2




  98 Return and save
  99 Return and discard changes


  Enter desired menu number>_
```
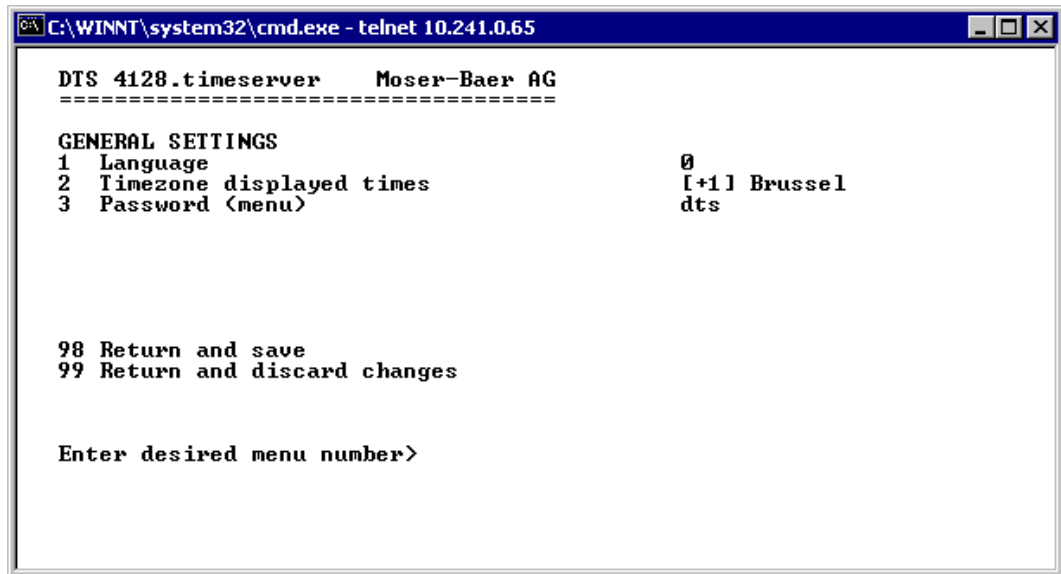
1. Address of the evaluation system e.g. 10.241.0.15.
   ENTER without entering an address will delete the entry.

2. Port of the evaluation system (usually 162).

3. SNMP Version: 1=SNMP V1,   2=SNMP V2c

Important: Each configuration change leads to a restart of the DTS SNMP Agent.

6.5.15 General settings

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                          _ □ ×

   DTS 4128.timeserver    Moser-Baer AG
   ====================================

   GENERAL SETTINGS
   1   Language                                   0
   2   Timezone displayed times                   [+1] Brussel
   3   Password (menu)                            dts




   98 Return and save
   99 Return and discard changes


   Enter desired menu number>


```

1. Setting the display language

2. Setting the time zone for the display, and also all alarm logs, e-mail and SNMP. (See chapter 6.5.21 Time Zone Selection)

3. Enter password for the menu (user *dts*) (max. 15 characters). A password must be configured.

6.5.16 Network

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                              _ □ ×

    DTS 4128.timeserver    Moser-Baer AG
    ====================================

    NETWORK
    1    DHCP                                              on
    2    IP address                                        DHCP
    3    Subnet mask                                       DHCP
    4    Gateway                                           DHCP
    5    DNS server                                        DHCP
    6    Hostname (Devicename)                             DTS4128
    7    Domainname                                        DHCP
    8    Interface                                         auto

    98 Return and save
    99 Return and discard changes


    Enter desired menu number>_
```

1. DHCP on or off, the following fields serve in case of DHCP = on only as display. A DHCP **renew** can also be triggered via this point.

Important: DHCP on, if no DHCP server is available, leads to longer start-up time (<1 Min.) of the DTS 4128.
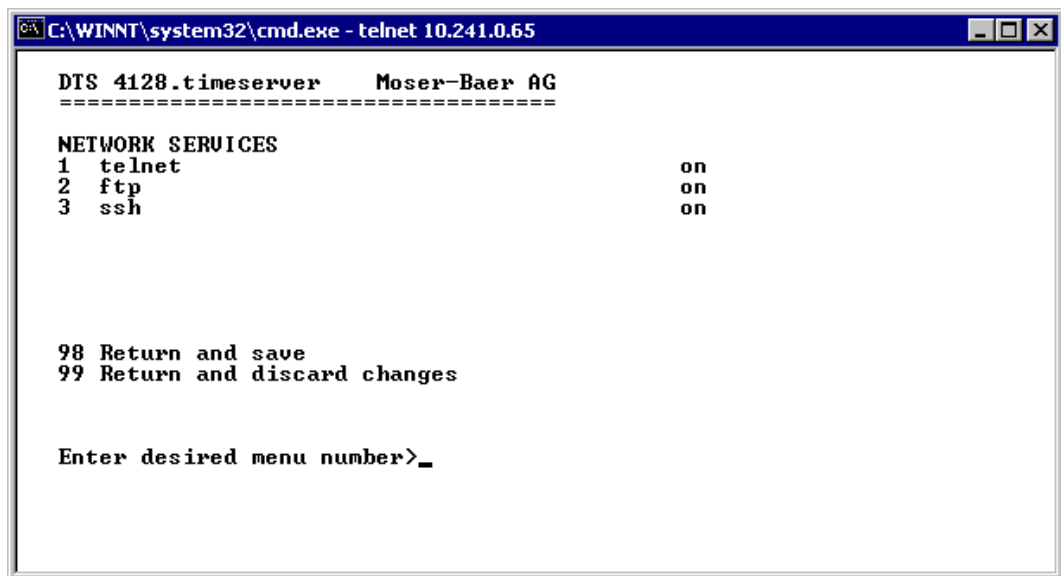
2.-5. Set IP address, subnet mask, gateway and DNS-Server. Format = 10.240.98.7

6. Set hostname.

7. Set domain e.g. test.org

8. Set network interface: Auto, 100/10Mbit, half, full duplex.

Important: The menu is closed, when the IP or the DHCP mode is modified.

View of the actual network status in the menu: '1 Status' ➔ '8 Information Network'

6.5.17 Services (network services FTP, telnet, SSH...)

Network services configuration:

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65

   DTS 4128.timeserver     Moser-Baer AG
   =====================================

   NETWORK SERVICES
   1   telnet                                on
   2   ftp                                   on
   3   ssh                                   on




   98 Return and save
   99 Return and discard changes


   Enter desired menu number>_
```
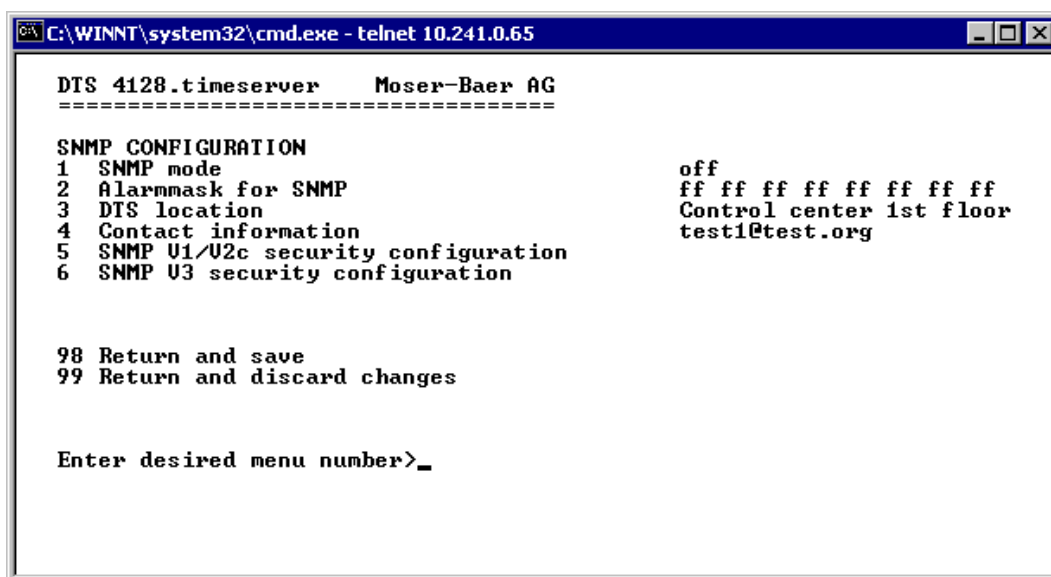
1-3. Switch the individual services off or on.

6.5.18 SNMP

For a description of SNMP functionality, see also Chapter "9 SNMP".

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                    _ □ ×

DTS 4128.timeserver    Moser-Baer AG
=====================================

SNMP CONFIGURATION
1   SNMP mode                              off
2   Alarmmask for SNMP                     ff ff ff ff ff ff ff ff
3   DTS location                           Control center 1st floor
4   Contact information                    test1@test.org
5   SNMP V1/V2c security configuration
6   SNMP V3 security configuration


98 Return and save
99 Return and discard changes


Enter desired menu number>_
```

1. Mode. 0=off, 1=on. SNMP information of MIB 2 is always available.

Important: To send out MIB-2 traps, the trap community and the destination address must at least be configured in menu '2. Configuration' ➔ '3. Alarms'➔ '3. Traps'. See also chapter "6.5.14 SNMP Traps")

2. Alarm mask for SNMP status (see Chapter "6.5.12 Alarm mask"). The modifications will be saved or restored one menu level higher in "SNMP CONFIGURATION".

3. DTS Location information, which is displayed in the SNMP management tool.

4. Contact information, which is displayed in the SNMP management tool.

5. Configuration of SNMP V1 / V2 c (specific settings). See chapter "6.5.19 SNMP V1 / V2c"

6. Configuration of SNMP V3 (specific settings). See chapter "6.5.20 SNMP V3"

Important: Each configuration change leads to a restart of the DTS SNMP Agent.

6.5.19 SNMP V1 / V2c

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                          _ □ ×

   DTS 4128.timeserver     Moser-Baer AG
   ===================================

   SNMP V1/V2c CONFIGURATION
   1   Readonly community string              romobatime
   2   Read/write community string            rwmobatime




   98 Return and save
   99 Return and discard changes


   Enter desired menu number>
```
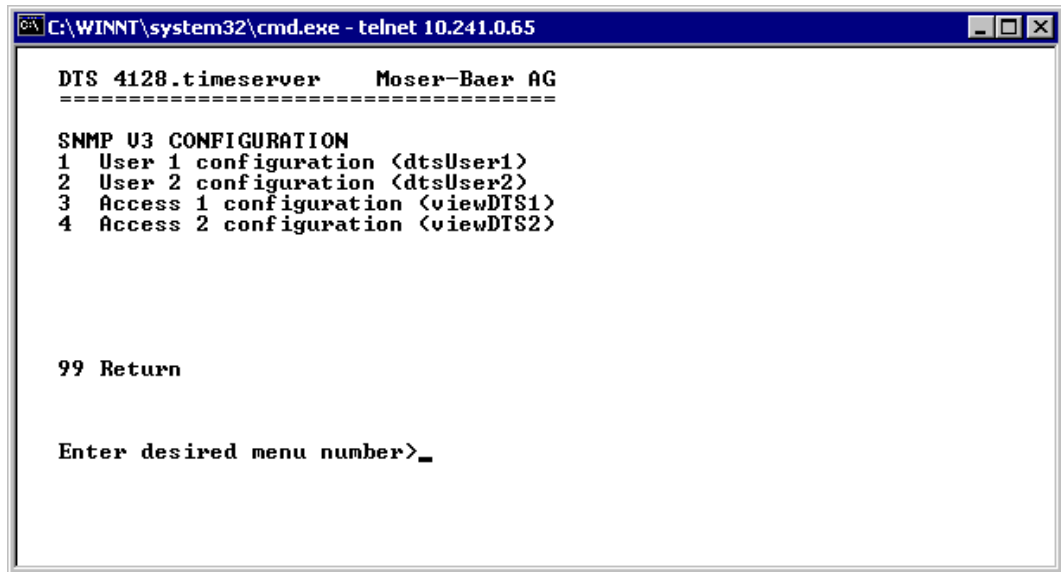
1. Community string for **read only** (Group membership for GET).
    Standard: *romobatime.*

2. Community string for **read/write** (Group membership for GET/PUT).
    Standard: *rwmobatime.*

> **i**   **Important:** Each configuration change leads to a restart of the DTS SNMP Agent.

6.5.20 SNMP V3

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                        _ □ ×

    DTS 4128.timeserver    Moser-Baer AG
    ====================================

    SNMP V3 CONFIGURATION
    1   User 1 configuration (dtsUser1)
    2   User 2 configuration (dtsUser2)
    3   Access 1 configuration (viewDTS1)
    4   Access 2 configuration (viewDTS2)




    99 Return


    Enter desired menu number>_

```

1. – 2.   Configuration of user-defined SNMP accounts dtsUser1 and dtsUser 2

3. – 4.   Configuration of user-defined SNMP access rights viewDTS1 and viewDTS2

Important: Each configuration change leads to a restart of the DTS SNMP Agent.

User configuration SNMP V3:

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                          _ □ ×

 DTS 4128.timeserver    Moser-Baer AG
 ====================================

 SNMP V3 USER CONFIGURATION                      dtsUser1
 1   Password for authent. and privacy          mobatime
 2   Min security level                          priv
 3   Read access (read view)                     _all_
 4   Write access (write view)                   viewDTS1



 98 Return and save
 99 Return and discard changes


 Enter desired menu number>
```

1. Password for authentication (MD5) and privacy (DES). 8 – 40 characters.

2. Minimal security level: 1=noauth (no authentication)
                              2=auth (only authentication)
                              3=priv (authentication and privacy)

3. SNMP read access: 0=none (no access)
                              1=all (full access)
                              2=DTS info (only DTS specific information)
                              3=user defined 1 (viewDTS1)
                              4=user defined 2 (viewDTS2)

4. SNMP write access   0=none (no access)
                              1=all (full access)
                              2=DTS info (only DTS specific information)
                              3=user defined 1 (viewDTS1)
                              4=user defined 2 (viewDTS2)

Important: Each configuration change leads to a restart of the DTS SNMP Agent.

Access configuration SNMP V3:

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                              _ □ ×

 DTS 4128.timeserver     Moser-Baer AG
 ==================================

 SNMP V3 ACCESS CONFIGURATION                    viewDTS1
 1   Include OID 1                               .1.3.6.1.4.1.8072
 2   Include OID 2                               .1.3.6.1.4.1.2021
 3   Include OID 3                               .1.3.6.1.4.1.13842.4
 4   Exclude OID 1                               .2
 5   Exclude OID 2                               .2
 6   Exclude OID 3                               .2


 98 Return and save
 99 Return and discard changes


 Enter desired menu number>_
```
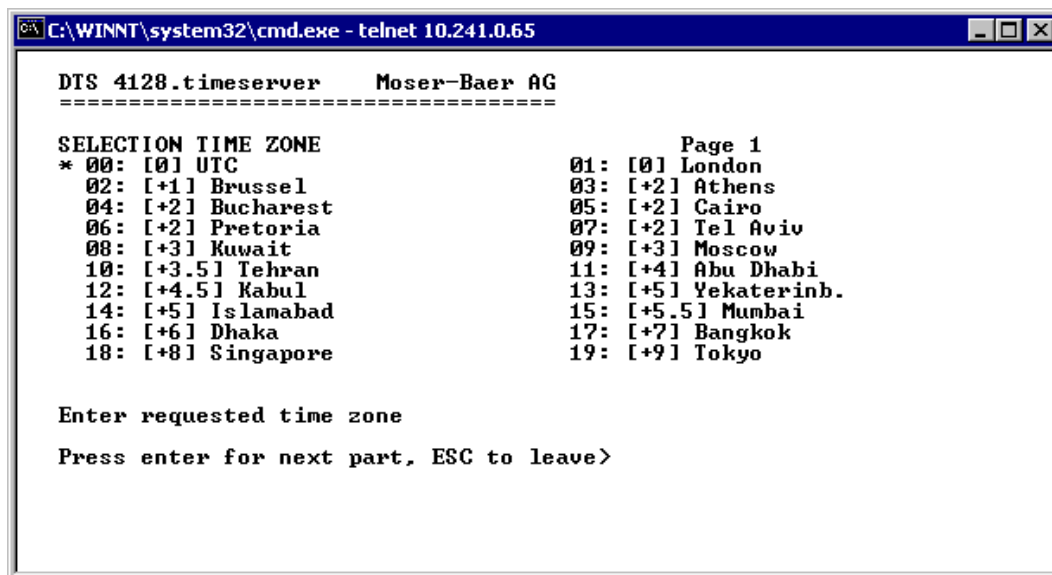
1. – 3.   Include View path, form: .1.3.6.1.4.1.13842.4 (DTS) or *.iso* (complete SNMP ISO path).

4. – 6.   Exclude View path: analogue include.

Important: Each configuration change leads to a restart of the DTS SNMP Agent.

6.5.21 Time zone selection

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                    _ □ X

   DTS 4128.timeserver     Moser-Baer AG
   ====================================

   SELECTION TIME ZONE                         Page 1
 * 00: [0] UTC                       01: [0] London
   02: [+1] Brussel                  03: [+2] Athens
   04: [+2] Bucharest                05: [+2] Cairo
   06: [+2] Pretoria                 07: [+2] Tel Aviv
   08: [+3] Kuwait                   09: [+3] Moscow
   10: [+3.5] Tehran                 11: [+4] Abu Dhabi
   12: [+4.5] Kabul                  13: [+5] Yekaterinb.
   14: [+5] Islamabad                15: [+5.5] Mumbai
   16: [+6] Dhaka                    17: [+7] Bangkok
   18: [+8] Singapore                19: [+9] Tokyo


   Enter requested time zone

   Press enter for next part, ESC to leave>

```
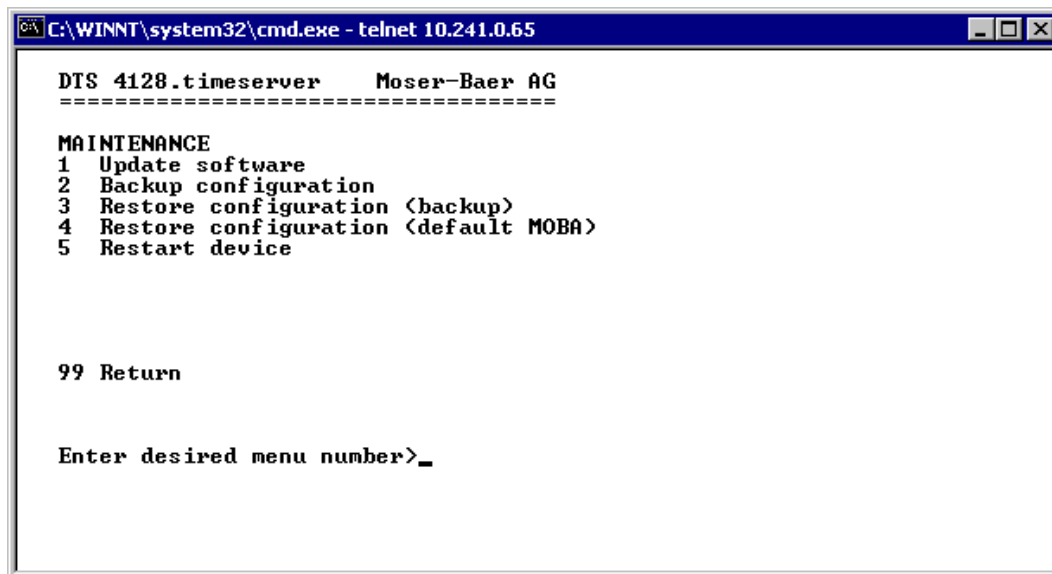
Display of all the DTS 4128 time zones (100) over several pages. The pages can be scrolled through with ENTER.

A time zone can be selected on the actual page by entering a time zone number.

Only one time zone is selected at any time.

Press ESC to leave the page. The modifications will be saved or restored one menu level higher.

6.6 Maintenance menu

```
C:\WINNT\system32\cmd.exe - telnet 10.241.0.65                    _ □ ×

    DTS 4128.timeserver    Moser-Baer AG
    ====================================

    MAINTENANCE
    1   Update software
    2   Backup configuration
    3   Restore configuration (backup)
    4   Restore configuration (default MOBA)
    5   Restart device



    99 Return


    Enter desired menu number>_
```

1. Initiating a software update (files must have been copied into the directory */ram* of the DTS 4128 before). ➔ See Chapter "7 Updates"

2. Backup the entire configuration

3. Restore the entire configuration from the saved backup.

4. Restore the entire configuration to factory settings.

5. Restart DTS 4128

See also Chapter "7 Updates".

7 Updates

7.1 Updating images with MOBA-NMS

Steps for updating images using MOBA-NMS:

1. Select DTS device(s) in the device view.

2. Menu 'Edit' ➜ 'Commands' ➜ Select 'Firmware Update…'.

3. Enter the path to the file 'dtscheck.md5' or select it using the 'Browse…' button.

4. Enter further paths to images or select them using the 'Browse…' button.

5. Optionally: Check the box 'Backup device(s) configuration before update' and enter the destination directory for the backup file(s). If a destination folder is selected, the whole device configuration will be saved before the backup. Additionally, if the image 'dts4128cfg.img' is written too, the saved configuration can be automatically restored after the update. For this, check the box 'restore configuration after update'.

6. By clicking the 'OK' button, the update is initiated.

Caution: The update procedure (item 6) can take some time (<5 min.) and may not be interrupted under any circumstances. In case of an interruption, the software on the DTS 4128 is destroyed and it can only be repaired in the factory.

7.2 Updating images with FTP

Possible images are: dts4128u-boot.bin, dts4128rootfs.img, dts4128uImage26, dts4128dtsapp.img, dts4128dtscfd.img. Additionally, the file dts4128check.md5 must exist. ➜ **all file names written in small letters.**

Steps for updating images:

1. Connect a FTP client software (binary format) to the DTS 4128 (e.g. with Internet Explorer enter: *ftp://**dts@[IP address]***) (as user dts).

2. After an update from image **dts4128dtscfd.img**, the configuration of DTS 4128 is overwritten. To save existing configuration, save file *dts4128.conf* from directory /etc. After updating, rewrite the file to DTS 4128 (see chapter 5.2 Updating applications or configurations).

3. Change to the directory */ram*.

4. Copy the image into the directory */ram*.

5. Close FTP connection.

6. The update procedure can be started on the DTS 4128 by selecting the menu '3. Maintenance' ➜ '1. Update Software' and press ENTER. The message "Update in progress" appears and at the same time, "Please wait!>" is shown in the command line. All files are copied. The DTS 4128 is automatically restarted on completion of the update.

   The telnet or SSH session has to be restarted.

Caution: The update procedure (point 6) may take longer time depending on the type and number of images (<5 min) and must not be interrupted under any circumstances. If interrupted, the software on the DTS 4128 will be destroyed and it has to be returned to the manufacturer for repairing.

Important: With this update procedure **the whole configuration of the DTS is lost**. Therefore after the update the current IP address (set from DHCP) has to be read again via a serial connection, before via FTP the earlier saved file **dts4128.conf** can be copied back (see procedure in chapter 7.3).

7.3 Updating applications or configurations

To update individual files such as, e.g. dts4128, dts4128menu, dts4128ntpd, dts4128dts_time.ko, dts4128.conf, dts4128mbsn.tbl, dts4128usersn.tbl (time zone table) etc. on the DTS 4128, the following steps are carried out ➔ **all file names must be written in small letters.**:

1. Connect a FTP client software to the DTS 4128 (e.g. with Internet Explorer enter: **ftp://dts@[IP address])** (as user dts).

2. Change to the directory */ram*.

3. Copy all the files to be updated into the directory */ram*.

4. Close FTP-Connection.

5. The update procedure can be started on DTS 4128 by selecting the menu '3. Maintenance' ➔ '1. Update Software' and press ENTER. The message "Update in progress" appears and at the same time, "Please wait!>" is shown in the command line. All files are copied. The DTS 4128 is automatically restarted on completion of the update.

   The telnet or SSH session has to be restarted.

Caution: The copy procedure (point 5) may take longer depending on the type and number of images (<5 min) and must not be interrupted under any circumstances. If interrupted, the software on the DTS 4128 will be destroyed and it has to be returned to the manufacturer for repairing.

7.4 FTP connection

Connect a FTP client software (binary format) by entering **ftp://dts@[IP address of the DTS 4128]** (e.g. with Internet Explorer enter: *ftp://dts@10.241.0.5*).

To directly reach the sub-directory */ram*, you can enter **ftp://dts@[IP address]/ram**.

Caution: The FTP client must be set to binary mode. An update with images transferred in ASCII mode may destroy the DTS device.

FTP-Tools

	Windows 98, ME, 2000, XP, Vista	**Linux (Suse, Redhat)**
Integrated in the system (file manager):	Windows Explorer *Start* ➔ *Execute:* Explorer	Konqueror
Programs (examples)	CuteFTP	KBear

7.5 Save Configuration externally

(for backup or copy to another DTS 4128)

Save the current configuration via MOBA-NMS:

1. Select DTS device in the device view.

2. Menu 'Edit' ➔ Select 'Backup configuration…'.

3. Select the elements that are to be saved. (In case of doubt, select everything)

4. Click button 'Next >'.

5. Indicate destination file by clicking the 'Browse…' button.

6. Optionally: enter a free backup comment. E.g. reason for the backup, use, etc. This comment will then be shown during the restoration of the backup.

7. By clicking the 'Finish' button, the backup is created.

8. Am Ende des Backup-Vorgangs wird eine Übersicht über den Verlauf angezeigt. Daraus ist ersichtlich, welche Elemente gesichert wurden und welche nicht vorhanden sind oder nicht gesichert werden konnten.

Save the current configuration via FTP:

1. Connect a FTP client software to the DTS 4128 (e.g. with Internet Explorer enter: *ftp://dts@[IP address])* (as user dts).

2. Change to the DTS 4128 directory */etc*.

3. Save the *dts4128.conf* (configuration) to the user PC (e.g. copy the file to the Desktop or to the directory *My Documents*).

Copy configuration to another DTS 4128:

In order to copy the entire configuration or elements of it from a DTS device to another, the according assistant in MOBA-NMS can be used. For this, select the source device (from which the configuration shall be transferred) and start the assistant in the menu 'Edit' ➔ 'Transfer configuration…'. It will lead you through the individual steps.

Without MOBA-NMS, perform the procedure explained in chapter 7.3.

Important: When copying the configuration from one DTS 4128 to another, the IP address may have to be changed after the download by serial connection.

8 Time administration

8.1 Time acceptance

Variants of time synchronization
- Adjusting:
  After starting the DTS 4128, the time is set for a first time (from source or manually). Afterwards, the time will only be aligned with maximum adjusting speed if deviating from the source.
  Configuration, see Chapter "6.5.6 Time-keeping"
- Setting:
  Time deviations are always corrected in full immediately: Seconds are set immediately; partial seconds are corrected with 50ms/s.

Manual time set:
- The time is always set immediately. The stratum is set to 1 or pre-set to a fix stratum. If new source time information is available, the time will be adjusted again and the stratum set accordingly.

8.2 Time acceptance from an external source (DCF or GPS)

Acceptance from an external source (DCF input):
- At least 2 minutes reception (DCF-GPS) is required, before the NTP server is available.
  Time source stratum = 0 ➜ stratum of the DTS 4128 = 1

Stratum normal, synchronized operation:
- The stratum value behaves as follows for synchronization from the time source:
  If $St\_fix > 0$: then stratum = St_fix (particularly for manually set time) applies
  If $St\_fix = 0$: then stratum = stratum of the source + 1 applies

Stratum in case of error:
- The stratum value behaves as follows in the case of external time source loss:
  To: Timeout time 1-999 [h], configured for the external source
  St_fix: 0..15, configurable stratum, 0 = auto
  St_max: 1..16, configurable max. stratum in the case of
                  synchronization loss

  If $St\_fix > 0$: then stratum = St_fix applies
  If $St\_fix = 0$:
  then stratum = MIN((t_current - t_lastsynch)/(To * 255), St_max) applies
  whereby: t_current [s]:   current time
           t_lastsynch [s]:   time of the last synchronization

- Adjusting the clock after identifying a leap in time:
  Tst: 0..60'000 [ms], parameter time deviation for stratum alteration by 1
  Tdiff: current time difference in ms

  If $St\_fix > 0$:   then stratum = St_fix applies
  If Tst > 0 AND $St\_fix = 0$:   then stratum = MIN(Tdiff/Tst, St_max) applies
  If Tst = 0 AND $St\_fix = 0$:   then stratum = 1 (auto) applies

8.3 Time acceptance from NTP

Acceptance:

- As NTP RFC 1305 (www.ntp.org)
  (see http://ntp.isc.org/bin/view/Servers/WebHome for internet-server)

Stratum normal, synchronized operation:

- Stratum value of DTS is always one step higher then the actual NTP timeserver

Stratum in case of an error

- As NTP RFC 1305 (www.ntp.org)

8.4 NTP as backup

If DTS 4128 is synchronized with a DCF or GPS source, the NTP can be used as redundancy source. This function is active, as soon as at least one timeserver is configured in menu '2. Configuration' ➜ '2. Time handling ➜ '4. NTP server').

Stratum normal, synchronized operation:

- Equal Stratum value "Time Acceptance from an external source (DCF or GPS)"

Behavior in case of an error:

- Failure of primary Source:
  St. est.: expected NTP Stratum
  St. est = MAX(Stratum NTP candidates)
  If Stratum > St. est + 1, then change to NTP as source takes place (internal stratum is one step higher than the poorest available NTP source).
  As soon as the primary source is available again, the changes are set back.

8.5 Time server

- NTP v4 (compatible with v3) as per RFC 1305 (Port 123)

- SNTP (UDP), RFC2030 (Port 123)

- TIME (TCP/UDP), RFC 868 (Port 37)

- DAYTIME (TCP/UDP), RFC 867 (Port 13)

8.6 Time accuracy, time-keeping

See technical data Appendix F.

8.7 Leap second

The announcement of the switching second is outputted by DCF and NTP each time 1 hour before the defined time .

8.8   Redundant operation of 2 DTS 4128.timeservers

For redundant operation two DTS 4128 devices are synchronized via optical fibers. For this purpose, a mini GBIC module is plugged into both devices and connected via optical fibers (see Appendix F, Technical Data):

mini GBIC Module

Both devices have a GPS receiver in redundant operation. Both devices are configured for the redundant mode, but are basically equal and work out the master/slave role among themselves. The slave is always synchronized to the master in operation. The slave supervises the system time on the basis of its own GPS time and generates an error message, should the time difference amount exceed the configurable value of n milliseconds.
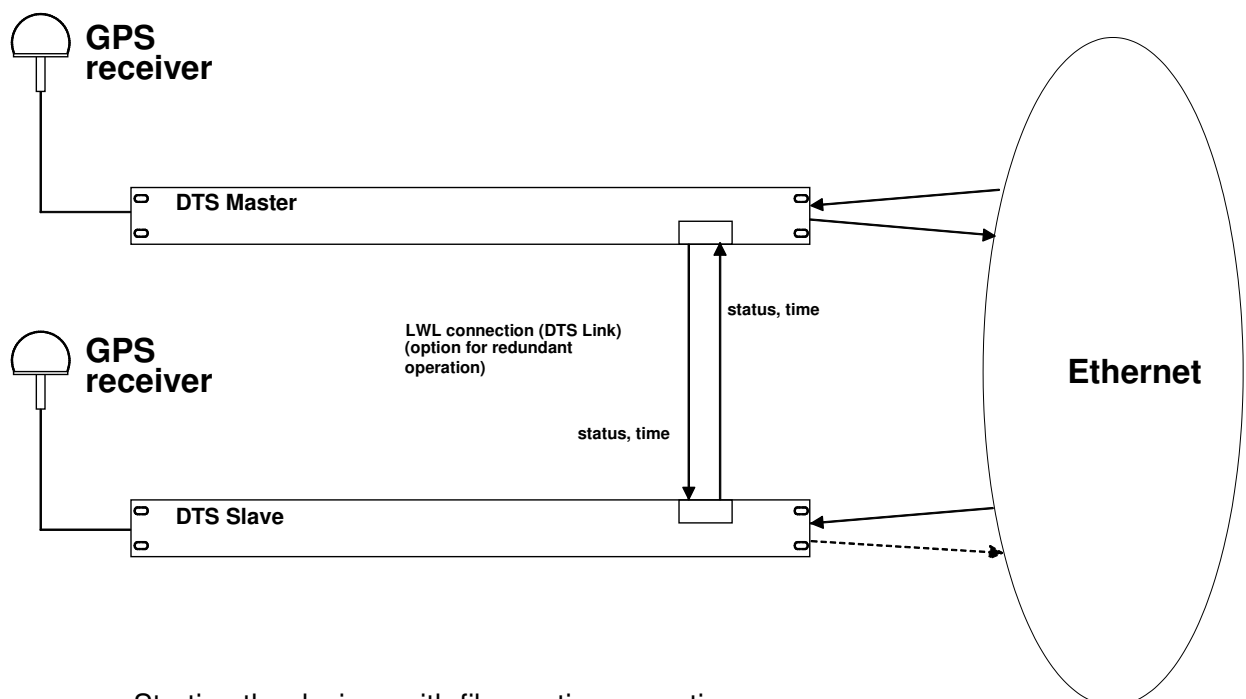
- Starting the devices with fiber optic connection
  The devices work out among themselves which is the master (normally the one synchronized first)

- Starting the devices without fiver optic connection
  The devices do not send out any time information until there is an LWL connection, or the devices are reconfigured.

- The slave synchronizes to the master.
  Whereby stratum/slave = stratum/master +1
  The time of the slave is always set immediately to the master time (no fine adjustment).

- In case of loss of the master GPS, the master stratum increases on the basis of the configurable parameters up to the maximum stratum. The slave follows, i.e. the slave stratum is always 1 higher. The slave takes over the master role from a configurable stratum value (if the status of the slave is better than that of the master) and synchronizes to its own GPS. The previous master becomes the slave. This distribution of roles remains until the new master loses GPS synchronization.

- The slave assumes the master function in the case of a loss of the master.

- If the former master is working again, it assumes the actual time of the current master and remains in slave mode.

- In the case of an fiber optic connection loss, the slave checks the status of the master over the network and remains in slave mode as long as the master is accessible and is working normally. If the master is no longer accessible, no longer sends out any SINEC telegrams, or has a worse status, the slave assumes the master function.

NTP

The NTP clients select the server with the lower stratum.

DCF77 coded (fiber optic output)

No redundancy

9 SNMP

9.1 General

The SNMP version **V2c** or **V3** for *Get*, *Put* and *Notification* (Trap) is used.

A full SNMP agent is implemented on the DTS (MIBII, DTS4128).

For SNMP V2c, following standard *Communities* are used:
Read only :   *romobatime*
Read/write: *rwmobatime*
Trap: *trapmobatime*

For SNMP V3, following standard *User I Passwords* are used:
dtsUser1:   *mobatime*
dtsUser2:   *mobatime*
dtsInfo: *mobatime*   *(not changeable, read only)*

DtsUser1 and dtsUser2 have full read/write access on all objects. With SNMP V3 rules, access can be reduced. Changes of the rules can only be modified over the DTS menu but not via SNMP.

SNMP V3 agent supports user validation (authentication MD5) and encoding (encryption DES).

MIBII values like sysDescr, sysContact, sysName, or sysLocation can only be modified over the DTS menu but not via SNMP.

The following MIB definitions are used:

SNMPv2-SMI, SNMPv2-MIB, SNMPv2-CONF, SNMPv2-TC, SNMPv2-TM, SNMP-FRAMEWORK-MIB, SNMP-MPD-MIB, SNMP-NOTIFICATION-MIB, SNMP-TARGET-MIB, SNMP-USER-BASED-SM-MIB, SNMP-VIEW-BASED-ACM-MIB, RFC1213-MIB, IF-MIB, IP-MIB, IP-FORWARD-MIB, TCP-MIB, UDP-MIB, HOST-RESOURCES-MIB, HOST-RESOURCES-TYPES, DISMAN-EVENT-MIB, NOTIFICATION-LOG-MIB, UCD-SNMP-MIB, NET-SNMP-MIB, NET-SNMP-TC

SNMP V2c,V3:
DTS-COMMON   (File: DTS-COMMON-MIB.TXT)
  General DTS definition, always required
DTS4128   (DTS4128-MIB.TXT)
  Device specific DTS definitions

SNMP V1:
DTS-COMMON   (File: DTS-COMMON-MIBv1.TXT)
  General DTS definition, always required
DTS4128   (DTS4128-MIBv1.TXT)
  Device specific DTS definitions

The MIB files can be copied from the DST 4128 with FTP (For FTP use, see Chapter "7.4 FTP Connection"):
DTS-MIB: /etc/snmp/mibs/
Standard MIBS: /usr/share/snmp/mibs/

9.2 Device configuration with SNMP

If one or several variables are set with *Put* in a configuration group, the variable *dts4128????ConfigCmd* must be set at the end to 1 in the corresponding group. The values of the entire configuration group are assumed from the DTS with this command (1=accept).

As long as the accept command has not been set, the changed variables can be restored to the old values by setting the *dts4128????ConfigCmd* variable to 2 (2=undo, restore).

After sending the accept command, a dts4128ConfigChanged *Notification* is sent.

The definitions of the available variables can be taken from the MIB files.

Example:

Management-System		**DTS**
Put dts4128FTPMode=1	→	Variable is set to 1 internally
Put dts4128NetServicesConfigCmd=1	→	Configuration group is assumed
	←	Sends dts4128ConfigChanged *Notification*
		with the new time dts4128NetConfigChangedTime

9.3 DTS subagent SNMP notification

Protocol: SNMPv2c Notification

For *Notifications* to be sent out, SNMP must be switched on. In addition, at least one receiver system must be configured.

9.3.1 Start up [dts4128StartUp]

Sent out when the subagent for the DTS is started.

This *Notification* is always sent out, as soon as SNMP is activated and a destination address is configured.

9.3.2 Shutdown [dts4128Shutdown]

Sent out when the subagent for the DTS is stopped.

This *Notification* is always sent out, as soon as SNMP is activated and a destination address is configured.

9.3.3   Status changed   [dts4128StatusChanged]

Sent out when the subagent detects a status change in the DTS application process. The following variables are monitored for changes:

dts4128SysStatus, dts4128SysTimeSource, dts4128SysStratum, dts4128SysMasterMode

This *Notification* is always sent out, as soon as SNMP is activated, and a destination address is configured.

The *Notification* sent out contains the following data:

Field	Type	Size	Description	Example
dts4128SysStatus	Unsigned Int	4 Bytes	Contains the internal system status	`66309`
dts4128SysOffset	Integer	4 Bytes	Actual time offset of the system [us]	`-1523` → `-1.523ms`
dts4128SysTimeSource	Byte	1 Byte	Actual time source	`2`
dts4128SysStratum	Byte	1 Byte	Actual system stratum level	`1`
dts4128SysMasterMode	Byte	1 Byte	Master/slave mode	`1`

9.3.4   Configuration changed   [dts4128ConfigChanged]

Sent out when the subagent detects a configuration change in the DTS application processes.

This *Notification* is always sent out, as soon as SNMP is activated and a destination address is configured.

The *Notification* sent out contains the following data:

Field	Type	Size	Description
dts4128SysConfigChangedTime	TimeTicks	4 Bytes	Contains the TimeTicks value of the last change in 1/100th seconds
dts4128NetConfigChangedTime	TimeTicks	4 Bytes	
dts4128TSConfigChangedTime	TimeTicks	4 Bytes	
dts4128RedOpConfigChangedTime	TimeTicks	4 Bytes	
dts4128RelayConfigChangedTime	TimeTicks	4 Bytes	
dts4128MailConfigChangedTime	TimeTicks	4 Bytes	
dts4128SnmpConfigChangedTime	TimeTicks	4 Bytes	
dts4128NTPConfigChangedTime	TimeTicks	4 Bytes	
dts4128OutLineDCFConfigChangedTime	TimeTicks	4 Bytes	
dts4128OutLineTZServerConfigChangedTime	TimeTicks	4 Bytes	
dts4128NetServicesConfigChangedTime	TimeTicks	4 Bytes	

The *ConfigChangedTime* variables show the time of the last change of the relevant configuration group. The management system can decide on the basis of these time values, which configurations need to be reloaded.

Configuration group table

Configuration group	Variable
dts4128SysConfigChangedTime	dts4128Language dts4128Timezone dts4128PowerSupply
dts4128NetConfigChangedTime	dts4128IP4Addr dts4128IP4Mask dts4128IP4Gateway dts4128IP4Nameserver dts4128Hostname dts4128Domain dts4128DHCPMode dts4128EthernetLinkMode
dts4128NetServicesChangedTime	dts4128TelnetMode dts4128FTPMode dts4128SSHMode
dts4128TSConfigChangedTime	dts4128TSType dts4128TSStratumMode dts4128TSStratumErrorLimit dts4128TSTimeout dts4128TSStratumTimeout1 dts4128TSOffsetPerStratum dts4128TSMaxOffsetForTimeValid dts4128TSDCFAdjusment dts4128TSAdjusmentMode dts4128TSMaxAdjusmentSpeed dts4128TSQuartzType dts4128TSOffsetSynchOnly dts4128TSLeapSecMode dts4128TSLeapSecDate
dts4128RedOpConfigChangedTime	dts4128RedOpMode dts4128RedOpSwitchOverStratum dts4128RedOpMaxOffsetSlaveTimeSource dts4128RedOp2ndDTSIPAddress dts4128RedOp2ndDTSIPPort
dts4128NTPConfigChangedTime	dts4128NTPBroadcastAddr1 dts4128NTPBroadcastInterval1 dts4128NTPBroadcastTTL1 dts4128NTPBroadcastAddr2 dts4128NTPBroadcastInterval2 dts4128NTPBroadcastTTL2 dts4128NTPSourceTable (Address, min/max poll, mode, prefer)
dts4128RelayConfigChangedTime	dts4128RelayAlarmMask
dts4128MailConfigChangedTime	dts4128MailMode dts4128MailAlarmMask dts4128MailServerIPAddress dts4128MailServerPort dts4128MailAddrDestination1 dts4128MailAddrDestination2 dts4128MailAddrReply dts4128MailAddrFrom
dts4128SnmpConfigChangedTime	dts4128SnmpMode dts4128SnmpAlarmMask dts4128SnmpROCommunity dts4128SnmpTrapMode dts4128SnmpTrapAlarmMask dts4128SnmpTrapCommunity dts4128SnmpTrapListenerIPAddress1 dts4128SnmpTrapListenerPort1 dts4128SnmpTrapVersion1 dts4128SnmpTrapListenerIPAddress2 dts4128SnmpTrapListenerPort2 dts4128SnmpTrapVersion2 dts4128SnmpTrapAliveMsgInterval
dts4128OutLineDCFConfigChangedTime	dts4128OutLineDCFMode dts4128OutLineDCFTimezone

dts4128OutLineTZServerConfigChangedTime	dts4128OutLineTZServerMode
	dts4128OutLineTZServerMCastAddr
	dts4128OutLineTZServerMCastPort
	dts4128OutLineTZServerNTPInterval
	dts4128OutLineTZServerTTL
	dts4128OutLineTZServerTableInterval
	dts4128OutLineTZServerEntryInterval
	dts4128OutLineTZServerTable
	(TZ entry number)

9.3.5 Alive notification   [dts4128Alive]

Sent out in a configurable interval.

This *Notification* is always sent out, as soon as SNMP and the alarm traps are activated and a destination address is configured.

The *Notification* sent out contains the following data:

Field	Type	Size	Description	Example
dts4128SysStatus	Unsigned Int	4 Bytes	Contains the internal system status	`66309`
dts4128SysAlarms	Byte Array	8 Bytes	64 Bit Alarm flags 1.Byte Bit 0..7 2.Byte Bit 8..15 :: 8.Byte Bit 56..63	FFF870FF.FFFFFFFF ¦ ¦ ¦ ¦ ¦ 5.Byte ¦ 2.Byte 1.Byte

9.3.6 Alarm notification   [dts4128Alarm]

Sent out if alarm status changes, i.e. *Notification* is sent out when an alarm flag is set or deleted.

This *Notification* is always sent out, as soon as SNMP and the alarm traps are activated and a destination address is configured.

The *Notification* sent out contains the following data:

Field	Type	Size	Description	Example
dts4128TrapAlMsgErrorNr	Byte	1 Bytes	No. of the alarm bit (0..63)	3
dts4128TrapAlMsgErrorState	Byte	1 Bytes	0 = alarm bit was deleted 1 = alarm bit was set	1
dts4128TrapAlMsgErrorTime	Unsigned Int	4 Bytes	PC-time in seconds since 01.01.1970 00:00:00	946684805
dts4128TrapAlMsgErrorText	Text	59 Bytes	Error text	Failure supply 1

A   Connection diagrams

A.1   Front connections
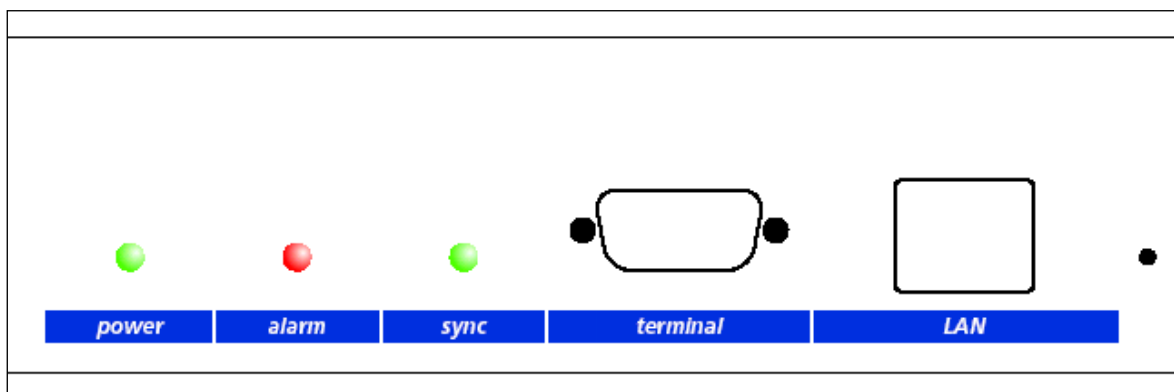
PC - Terminal Connection:

Type of connector:	Sub-D 9p connector (male)
Interface:	RS232
Baud rate:	38400 Bauds
Data Bits:	8
Parity:	no
Stop Bit:	1
Flow control:	no

Cable DTS 4128 – PC:	Crossed cable, female – female connectors (null modem)
(DTE-DTE)	Max. length of the connection 3m

Connections between female connector 1 (SUB-D 9 / 1) and female connector 2 (SUB-D 9 / 2)

	SUB-D 9 / 1	SUB-D 9 / 2	
Receive Data *	2	3	Transmit Data
Transmit Data *	3	2	Receive Data
Data Terminal Ready	4	1 & 6	Data Set Ready & Carrier Detect
System Ground *	5	5	System Ground
Data Set Ready & Carrier Detect	1 & 6	4	Data Terminal Ready
Request to Send	7	8	Clear to Send
Clear to Send	8	7	Request to Send

* At least needed connections.

LAN Connection:

Plug:	RJ45
Interface:	Ethernet, 10/100Mbit half or full duplex

Use only shielded cables!

A.2   Connections (rear view)

24V DC +20/-10%
max: 10W

Column labels (left to right): 1 DC in / 2 GND ; 3 DCF in+ / 4 DCF in- / 5 VB+ / 6 GND / 7 DCF out+ / 8 DCF out- ; 9 Alarm / 10 Alarm ; DTS Link TX RX
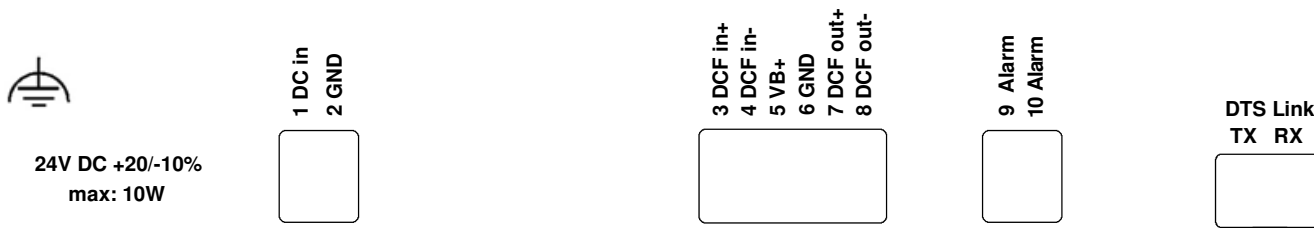
DTS 4128.timeserver connections
For technical data see in Appendix "F Technical data"

Clamp	Connection	Description
⏚	Earth connection	
1	DC in power supply +	Input for external DC supply
2	DC in power supply GND	Ground
3	DCF input +	DCF input, e.g. for connection of a GPS 4500– or DCF– receiver with current loop output.
4	DCF input -	
5	DC output +	DC output for GPS 4500
6	DC output GND	DC in voltage -2V, max. 400mA
7	DCF output +	DCF output, current loop passive,
8	DCF output -	Umax= 30VDC, I_{on} = 10..15mA, I_{off} < 1mA @20VDC
9	Alarm relay	Alarm contact, open when alarm is active
10	Alarm relay	Switching load: 30 W (125 VDC or 1 A), e.g. 1 A @ 30 VDC or 60 VA (150 VAC or 1 A), e.g. 0.5 A @ 120 VAC
	DTS link	Optical connection to a 2nd DTS 4128.timeserver Mini GBIC plug-in

A.3   Plug-in spring terminals

multiple contact strip 100% protected against wrong plug;
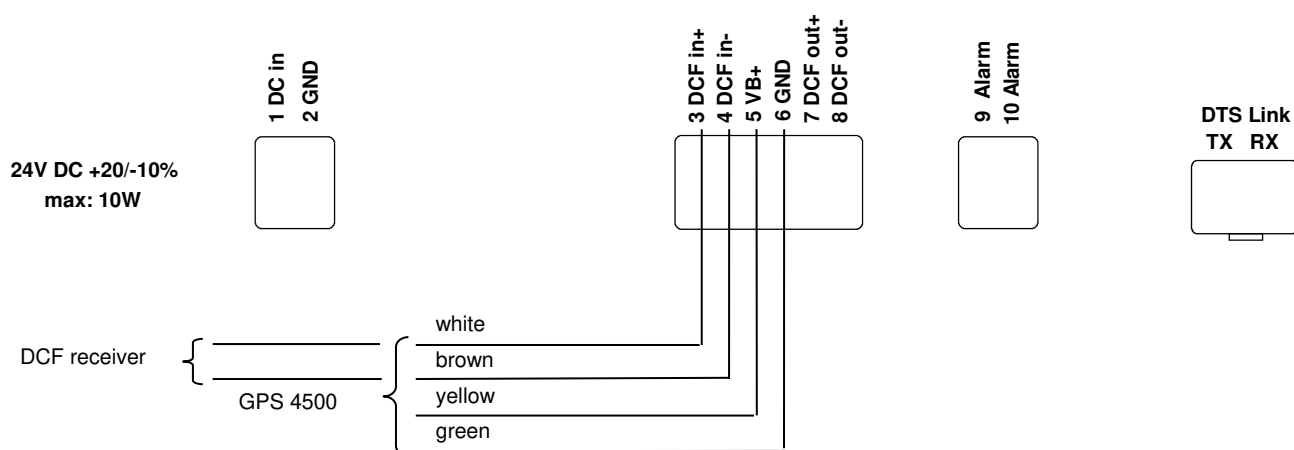WAGO CAGE CLAMP®-connection
Cross section of 0,08 mm² to 1,5 mm² (from AWG 28 to AWG 14)
Voltage CSA 300 V / current CSA 10 A
Rated voltage: EN 250 V
Rated surge voltage: 2,5 kV
Nominal current: 10 A
Strip length: 7 mm (0,28 in)

Pulled off spring terminal with operation tool:

2 operation tools are delivered with the accessory bag.

A.4   Connection GPS 4500 or DCF 450

B   Time zone table

Time zone entries in the standard season table (version 10.2).

No.	City / State	UTC Offset	DST	Standard → DST	DST → Standard
00	UTC (GMT), Monrovia	0	No		
01	London, Dublin, Lisbon	0	Yes	Last Sun. Mar. (01:00)	Last Sun. Oct. (02:00)
02	Brussels, Amsterdam, Berlin, Bern, Copenhagen, Madrid, Oslo, Paris, Rome, Stockholm, Vienna, Belgrade, Bratislava, Budapest, Ljubljana, Prague, Sarajevo, Warsaw, Zagreb	+1	Yes	Last Sun. Mar. (02:00)	Last Sun. Oct. (03:00)
03	Athens, Helsinki, Riga, Tallinn, Sofia, Vilnius	+2	Yes	Last Sun. Mar. (03:00)	Last Sun. Oct. (04:00)
04	Bucharest	+2	Yes	Last Sun. Mar. (03:00)	Last Sun. Oct. (04:00)
05	Pretoria, Harare, Kaliningrad	+2	No		
06	Amman	+2	Yes	Last Thu. Mar. (23:59)	Last Fri. Oct. (01:00)
07	UTC (GMT)	0	No		
08	Istanbul, Kuwait City, Minsk, Moscow, Saint Petersburg, Volgograd	+3	No		
09	Praia, Cape Verde	-1	No		
10	UTC (GMT)	0	No		
11	Abu Dhabi, Muscat, Tbilisi, Samara	+4	No		
12	Kabul	+4.5	No		
13	Adamstown (Pitcairn Is.)	-8	No		
14	Tashkent, Islamabad, Karachi, Yekaterinburg	+5	No		
15	Mumbai, Kolkata, Chennai, New Delhi, Colombo	+5.5	No		
16	Astana, Thimphu, Dhaka, Novosibirsk	+6	No		
17	Bangkok, Hanoi, Jakarta, Krasnoyarsk	+7	No		
18	Beijing, Hong Kong, Singapore, Taipei, Irkutsk	+8	No		
19	Tokyo, Seoul, Yakutsk	+9	No		
20	Gambier Island	-9	No		
21	South Australia: Adelaide	+9.5	Yes	1st Sun. Oct (02:00)	1st Sun. Apr. (03:00)
22	Northern Territory: Darwin	+9.5	No		
23	Brisbane, Guam, Port Moresby, Vladivostok	+10	No		
24	Sydney, Canberra, Melbourne, Tasmania: Hobart	+10	Yes	1st Sun. Oct. (02.00)	1st Sun. Apr. (03:00)
25	UTC (GMT)	0	No		
26	UTC (GMT)	0	No		
27	Honiara (Solomon Is.), Magadan, Noumea (New Caledonia)	+11	No		
28	Auckland, Wellington	+12	Yes	Last Sun. Sep. (02:00)	1st Sun. Apr. (03:00)
29	Majuro (Marshall Is.), Anadyr	+12	No		
30	Azores	-1	Yes	Last Sun. Mar. (00:00)	Last Sun. Oct. (01:00)
31	Middle Atlantic	-2	No		
32	Brasilia	-3	Yes	3rd Sun. Oct. (00:00)	3rd Sun. Feb. (00:00)
33	Buenos Aires	-3	No		
34	Newfoundland	-3.5	Yes	2nd Sun. Mar. (02:00)	1st Sun. Nov. (02:00)
35	Atlantic Time (Canada)	-4	Yes	2nd Sun. Mar. (02:00)	1st Sun. Nov. (02:00)
36	La Paz	-4	No		
37	Bogota, Lima, Quito	-5	No		
38	New York, Eastern Time (US & Canada)	-5	Yes	2nd Sun. Mar. (02:00)	1st Sun. Nov. (02:00)
39	Chicago, Central Time (US & Canada)	-6	Yes	2nd Sun. Mar. (02:00)	1st Sun. Nov. (02:00)

40	Tegucigalpa, Honduras	-6	No		
41	Phoenix, Arizona	-7	No		
42	Denver, Mountain Time	-7	Yes	2nd Sun. Mar. (02:00)	1st Sun. Nov. (02:00)
43	Los Angeles, Pacific Time	-8	Yes	2nd Sun. Mar. (02:00)	1st Sun. Nov. (02:00)
44	Anchorage, Alaska (US)	-9	Yes	2nd Sun. Mar. (02:00)	1st Sun. Nov. (02:00)
45	Honolulu, Hawaii (US)	-10	No		
46	Midway Islands (US)	-11	No		
47	Mexico City, Mexico	-6	Yes	1st Sun. Apr. (02:00)	Last Sun. Oct. (02:00)
48	Adak (Aleutian Is.)	-10	Yes	2nd Sun. Mar. (02:00)	1st Sun. Nov. (02:00)
49	UTC (GMT)	0	No		
50	UTC (GMT)	0	No		
51	UTC (GMT)	0	No		
52	UTC (GMT)	0	No		
53	UTC (GMT)	0	No		
54	Ittoqqortoormiit, Greenland	-1	Yes	Last Sun. Mar. (00:00)	Last Sun. Oct. (01:00)
55	Nuuk, Qaanaaq,Greenland	-3	Yes	Last Sat. Mar. (22:00)	Last Sat. Oct. (23:00)
56	Not used				
57	Western Australia: Perth	+8	No		
58	Caracas	-4.5	No		
59	CET standard time	+1	No		
60	Not used				
61	Not used				
62	Baku	+4	Yes	Last Sun. Mar. (04:00)	Last Sun. Oct. (05:00)
63	UTC (GMT)	0	No		
64	UTC (GMT)	0	No		

In countries where the DST switch date changes annually (e.g. Iran, Israel), the time zone has to be defined manually in the user time zone table (entries 80 – 99).

Legend:
UTC: Universal Time Coordinate, equivalent to GMT
DST: Daylight Saving Time
DST Change: Daylight Saving Time changeover
Standard → DST: Time change from Standard time (Winter time) to Summer time
DST → Standard: Time change from Summer time to Standard time (Winter time)

Example:
2nd last Sun. Mar. (02:00)   Switch over on the penultimate Sunday in March at 02.00 hours local time.

Important: The Time Zone Table is usually updated as needed. The current table is available for download under the following address: *www.mobatime.com* ➔ *Customer Area* ➔ *Customer Support* ➔ *Support Resources* ➔ *Time Zone Table*. In case your device is equipped with a newer version than shown in this manual, the current time zone settings should be checked.

Modifications / updating the time zone table:

The time zone tables are filed in the */etc/mbsn.tbl* (standard table) and */etc/usersn.tbl* (user table) files.
The user table can be changed with Moser-Baer AG software such as, e.g. ETCW.
If not changed using MOBA-NMS, it must be copied onto the DTS 4128 in accordance with the update instructions (Chapter"7.3 Updating Applications and Configurations").

Important: The file names **mbsn.tbl** and **usersn.tbl** must be written in small letters.

C Alarm list

Number	Error message	Description / Action
0	Reboot DTS	DTS 4128 restarted, no intervention required
1	Error bit1	Not used
2	Supply voltage too low	Power failure (internally measured) -> support
3	Error bit3	Not used
4	Error bit4	Not used
5	Error bit5	Not used
6	Error bit6	Not used
7	Error bit7	Not used
8	Wrong time zone DCF	Check DCF configuration
9	Error bit9	Not used
10	Error bit10	Not used
11	Error bit11	Not used
12	Error bit12	Not used
13	Error bit13	Not used
14	Error bit14	Not used
15	Error bit15	Not used
16	Time source lost	Stratum too high: check time source
17	Failure time source TO	No time information from the selected time source within the configured timeout: Check time source. In slave mode: check link.
18	No valid time	20 min after starting no valid time -> Check time source
19	NTP synch. lost	Check NTP source
20	Software trimming	Quartz error or poor source quality
21	NTP not working	Check NTP configuration
22	Offset source (slave)	Only as slave: check source
23	Syn only diff too great	Check synchronization and source
24	Mail config. wrong	Check e-mail configuration
25	SNMP not working	Check SNMP and trap configuration
26	Error bit26	Not used
27	Error bit27	Not used
28	Error bit28	Not used
29	Error bit29	Not used
30	No opt. link	No connection via DTS link (optical link) in redundant operation. Check connection.
31	No link (LAN)	No connection via LAN link in redundant operation. Check LAN connection.
32	Switch over slave -> master	Switch over slave -> master is occurred. Check ev. the time source of current slave.
33	Difference between slave and local time source too large	In slave mode only: check time sources
34	Local time source lost	In slave mode only: check time sources
35	Error bit35	Not used

36	Error bit36	Not used
37	Error bit37	Not used
38	Error bit38	Not used
39	Error bit39	Not used
40	Error bit40	Not used
41	Error bit41	Not used
42	Error bit42	Not used
43	Error bit43	Not used
44	Error bit44	Not used
45	Error bit45	Not used
46	Error bit46	Not used
47	Error bit47	Not used
48	Error bit48	Not used
49	Error bit49	Not used
50	Error bit50	Not used
51	Error bit51	Not used
52	Error bit52	Not used
53	Error bit53	Not used
54	Error bit54	Not used
55	Error bit55	Not used
56	Error bit56	Not used
57	Error bit57	Not used
58	Error bit58	Not used
59	Error bit59	Not used
60	Error bit60	Not used
61	Error bit61	Not used
62	Error bit62	Not used
63	Error bit63	Not used

D   Troubleshooting

	Error	→	→	Solution / possible cause
1	DTS does not accept time	Does the reading change (approx. every 3 sec) *Sec counter DCF* in *Status → Source →*TIME SOURCE INFORMATION?	No, but 20 min. have not yet passed since the last reboot.	After new installation or powers supply failure, it may take up to 20 min. until the GPS receiver (e.g. GPS 4500) sends out valid telegrams. Wait for this time to pass.
2			No, for more than 20 minutes.	• Check DCF reception LED • Check polarity cabling to GPS. • Check positioning of the GPS receiver
3		Error-Bit 23 (*Syn only diff too big*) in *Status → Alarm status* set		The deviation to the received time is beyond the maximal allowed time correction. In the menu *Configuration→Time administration → Time-keeping configuration →* TIME ADJUSTMENT CONFIGURATION, set the parameter *synch. only offset* (4) to 0 (=deactivated). The time is now adjusted independently of the deviation's extend. It is however recommended to set a limit in normal operation (default 800ms).
4		*Offset to source* in *Status →Time→* TIME INFORMATION AND STATUS always shows the same offset		• If Error-Bit 23 set, see point 3 • The deviation is that big, that offset changes cannot be seen due to the displayed resolution.
5		Configuration has just been changed		In the case of configuration changes, particularly if the time configuration is concerned, it can take several minutes for the change to appear correctly.
6	Error-Bit 16 set (*time source fail stratum*)			See 1
7	Error-Bit 17 set (*time source fail TO*)			See 1
8	Error-Bit 23 set (*Syn only diff too big*)			See 1
9	Drift (ppm) of quartz too high	The drift displayed in the menu *Status →Time →*TIME INFORMA-TION AND STATUS is bigger than stated in the data sheet.		• The quartz drift is measured and corrected continuously. After initial operation, it may take up to 24 hours until optimal accuracy is reached (with GPS reception). • Very large temperature change (outside the specification) • Time correction was carried out manually.
10	Needed information to contact your MOBATIME service			**Device type, part number, production number and serial number:** Details are given on the adhesive type label. **The following files must be provided for the analysis:** **All files (in .zip folders, separate for each device)** from the directories /**var/log**/ and /**etc**/ and the file: /**ram/trim.log**. To copy this files use FTP, e.g. Windows Explorer with ftp://[IP address], see chapter 7.4 . **If the log files cannot be copied, please read out the current software version:** The software version can be queried in the menu `1 STATUS/9 Versions of the software`. **Place and date of purchase and of commissioning of the device.** **Most comprehensive possible details of the malfunction:** Describe the problem, possible causes, measures taken, the system environment / operating mode and configuration, etc.

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F   Technical data

Dimensions	19" Rack, 1HE x 28TE (H x W x D [mm]) = 483 x 44 x 125
Weight	approx. 1.2 kg
Ambient temperature	0 to 60ºC, 10-90% relative humidity, without condensation
Operation	Serial interface (via RS 232) or Telnet/SSH (via LAN) In addition, operation is also possible with SNMP.

Accuracy	GPS (DCF input) to NTP server:	typical < +/- 100 µs
	GPS (DCF input) to DCF output:	typical < +/- 10 µs
	NTP to internal time	typical < +/- 100 µs

Important: NTP reception (DTS 4128 as client or as server to external clients) can be influenced by the network traffic load and network devices (Hub, Switch, Router, Firewall...). If many clients request simultaneously, the typical accuracy may not be reached.

Time keeping (internal)	- Synchronized with GPS: +/-10 µs to UTC

	- Holdover (free run):
	After at least 12 hours synchronization from the time source
	< +/- 0.01 sec. / day (< 0.1ppm)
	            (measured over 24 h), at 20°C +/- 5°C.
	< +/- 1 ms / day (< 0.01ppm)
	            (measured over 24 h), at constant temperature.

	- After reboot without synchronization: < +/- 0.25 sec. / day (< 2.5ppm) (measured over 24 h), at 20°C +/- 5°C.
Redundant operation	- Master to slave (optical DTS link): typical < +/- 1 µs
Time server	NTP V4 (fully V3 compatible), RFC 1305 (Port 123) SNTP (UDP), RFC 2030 (Port 123) TIME (TCP/UDP), RFC 868 (Port 37) DAYTIME (TCP/UDP), RFC 867 (Port 13) Max. number of NTP and SNTP client requests: > 250 requests / sec.
NTP Mode	Server, Peer, Broadcast, Multicast
NTP-slave clock lines:	1 line with up to 15 different time zone entries. Communication through multicast: -RFC 3376: Internet Group Management Protocol, Version 3 -RFC 1112: Host extensions for IP multicasting -RFC 4601: Protocol Independent Multicast - Sparse Mode (PIM-SM) -RFC 3973: Protocol Independent Multicast - Dense Mode (PIM-DM)
Time zones (see App. B)	Up to 80 predefined, 20 programmable entries (PC Software Tool)

Network interface	10BaseT / 100BaseTX (IEEE 802.3) Data transmission rate: Auto-negotiation / manual Connection: RJ-45 Only shielded cables permitted.
IP Configuration	DHCP, Static IP
Serial interface	D-Sub 9: (38400, 8, n, 1, no flow control) Cable length max. 3m.
DCF Input	DCF77 or DCF from GPS, active current loop Time zone selectable Nominal 28 VDC, max. 32mA, response threshold 8mA
DCF Output	DCF time code corresponding to DCF77, time zone selectable Max. time deviation with GPS source: +/- 10 μs, jitter < 10 μs - DCF time code, passive current loop interface: Vmax = 30 VDC, I_{on} = 10..15 am, I_{off} < 0.1 mA @20VDC
Alarm contact	Opening relay contact (Alarm active ➜ contact open). Switching load: 30 W (125 VDC or 1 A), e.g. 1 A @ 30 VDC or 60 VA (150 VAC or 1 A), e.g. 0.5 A @ 120 VAC
DTS Link	Plug-in position for mini GBIC module (**G**iga**B**it **I**nterface **C**onverter)) 1000Mbps, 3,3V (with LC connector) e.g. D-Link DEM-311GT, SX 850 nm, 1.25 Gbps/MM/3.3 V Maximal cable length depends on type of cable: -Multimode fiber with a diameter of 50 μm: max. 550 m -Multimode fiber with a diameter of 62.5 μm: max. 275 m With LX standard longer cables can be achieved.
DC power supply	24 VDC +20% / -10% / max. 10 W
Power supply output	DC in voltage -2 V, max. 400 mA

G   Index

H   Connection table (to fill in)

Line	Type	Description

Example:

Line	Type	Description
DCF	DCF out	*DCF for master clock ETC1*