Technical Manual

LAN Board

Model 7270

ENGLISH

Version: 07.00 – 08.03.2007

Valid for Devices 7270 with FIRMWARE Version: 07.xx
Version number (Firmware / Description)

The first two digits of the version number of the technical description and the first two digits of the firmware version must **comply with each other**.

The digits after the point in the version number indicate corrections in the firmware / description that are of no significance for the function.

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Homepage:  [http://www.hopf.com](http://www.hopf.com)

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Symbols and Characters

![Operational Reliability](image)

**Operational Reliability**

Disregard may cause damages to persons or material.

![Functionality](image)

**Functionality**

Disregard may impact function of system/device.

![Information](image)

**Information**

Notes and Information.
Safety regulations

The safety regulations and observance of the technical data serve to ensure trouble-free operation of the device and protection of persons and material. It is therefore of utmost importance to observe and comply with these regulations.

If these are not complied with, then no claims may be made under the terms of the warranty. No liability will be assumed for any ensuing damage.

Safety of the device

This device has been manufactured in accordance with the latest technological standards and approved safety regulations.

The device should only be put into operation by trained and qualified staff. Care must be taken that all cable connections are laid and fixed in position correctly. The device should only be operated with the voltage supply indicated on the identification label.

The device should only be operated by qualified staff or employees who have received specific instruction.

If a device must be opened for repair, this should only be carried out by employees with appropriate qualifications or by hopf Elektronik GmbH.

Before a device is opened or a fuse is changed all power supplies must be disconnected.

If there are reasons to believe that the operational safety can no longer be guaranteed the device must be taken out of service and labelled accordingly.

The safety may be impaired when the device does not operate properly or if it is obviously damaged.

CE-Conformity

This device fulfils the requirements of the EU directive 89/336/EWG "Electromagnetic compatibility" and 73/23/EWG "Low voltage equipment".

Therefore the device bears the CE identification marking (CE=Communauté Européenne)

CE = Communautés Européennes = European communities

The CE indicates to the controlling bodies that the product complies with the requirements of the EU directive - especially with regard to protection of health and safety for the operator and the user - and may be released for sale within the common markets.
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1 General information

LAN Board 7270 is a Network Time Server (NTS) for hopf GPS and DCF77 System 7001 and Base System 68xx (6842, 6850 and 6855) for 19” or ½ 19” (3U) racks.

It can be used for synchronizing PC or SPS networks with the accurate time and can be installed at any point in the network.

The board supports the world wide used time protocol NTP (Network Time Protocol) version 1, 2 and 3 (RFC 1305) und SNTP (Simple NTP, RFC 2030) as well as the special industrial Ethernet protocol 'SINEC H1 time datagram'.

The LAN Board 7270 is available with network interface 10 Base-T or 10/100 Base-T.

Extensive parameters are provided to suit the conditions of individual applications by means of a variety of access / configuration channels.

The configuration of the LAN Board 7270 is via the keypad of the hopf System 7001 or 68xx.

Ethernet Remote control of the board 7270 using a text based menu via Telnet is possible. Furthermore the LAN board 7270 supports a basic SNMP functionality.

A variety of management and monitoring functions are available (e.g. SNMP traps, Syslog messages).
2 LAN Board 7270 Construction

This chapter describes the hardware components of the LAN Board 7270

2.1 LAN Board 7270 Front Panel

The LAN Board 7270 has a 3U/4HP front panel for 19” systems. It is equipped with the following components:

[Diagram of the LAN Board 7270 front panel]
2.1.1 LED Status and Error Codes

There are 5 LEDs for status or error messages on the front panel.

2.1.1.1 Send LED

<table>
<thead>
<tr>
<th>SEND LED</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flashing</td>
<td>Normal case. Access to the internal bus is displayed. The LAN Board 7270 is correctly connected to the system 7001.</td>
</tr>
<tr>
<td>Permanently off</td>
<td>Error on another board. No further bus access is possible.</td>
</tr>
<tr>
<td>Permanently lit</td>
<td>Error on the LAN Board 7270</td>
</tr>
</tbody>
</table>

2.1.1.2 Network Status LEDs 1-4

<table>
<thead>
<tr>
<th>LED 1</th>
<th>LED 2</th>
<th>LED 3</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lit</td>
<td>Off</td>
<td>Off</td>
<td><strong>Synchronization</strong> of LAN possible with LAN Board 7270.</td>
</tr>
<tr>
<td>Off</td>
<td>Flashing</td>
<td>Off</td>
<td><strong>No synchronization</strong> of LAN possible with LAN Board 7270 e.g.:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• system 7001 not synchronised,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• or LAN Board 7270 is not implemented, it becomes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>no time information from system 7001.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LED 4</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lit</td>
<td>Network connection is <strong>correctly</strong> via RJ45</td>
</tr>
<tr>
<td>Off</td>
<td>Network connection is <strong>incorrect</strong> via RJ45</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LED 1-4</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>al off</td>
<td>al lit</td>
</tr>
<tr>
<td>initial flashing</td>
<td></td>
</tr>
<tr>
<td>different flashing of al LEDs</td>
<td><strong>Error behaviour</strong> (continuous)</td>
</tr>
</tbody>
</table>

Telnet-configurations-mode:
LED 3 of LAN board 7270 is flashing into configuration mode. e.g. with **Telnet** or through **system 7001**.
2.1.2 SUB-D, connector X1

**X1** (9-pole SUB-D connector)

<table>
<thead>
<tr>
<th>Pin no.</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Minute pulse of defined length (isolated to GND1)</td>
</tr>
<tr>
<td>2</td>
<td>Receiving cable RxD1 (RS232)</td>
</tr>
<tr>
<td>3</td>
<td>Transmission cable TxD1 (RS232)</td>
</tr>
<tr>
<td>4</td>
<td>free</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>+12 V DC, max. 50mA (isolated to GND1)</td>
</tr>
<tr>
<td>7</td>
<td>reserved</td>
</tr>
<tr>
<td>8</td>
<td>reserved</td>
</tr>
<tr>
<td>9</td>
<td>GND1 (isolated) for minute pulse</td>
</tr>
</tbody>
</table>

2.1.3 RJ-45 Socket X2

**X2** (RJ-45 bush, with shield, 10/100 Base-T connector)

<table>
<thead>
<tr>
<th>Pin no.</th>
<th>Allocation</th>
</tr>
</thead>
</table>
| 1       | positive transmission line  
          |  
          | Tx+         |
| 2       | negative transmission line 
          |  
          | Tx-         |
| 3       | positive receiving line     
          |  
          | Rx+         |
| 4       | unassigned               
          | -            |
| 5       | unassigned               
          | -            |
| 6       | negative receiving line    
          |  
          | Rx-         |
| 7       | unassigned               
          | -            |
| 8       | unassigned               
          | -            |
2.2  Overview of LAN Board 7270 (3U/4HP) Assembly

Position drawing of LAN Board 7270

2.2.1  Additional connectors, jumpers and measuring points

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST1</td>
<td>hopf Elektronik GmbH service connector</td>
</tr>
<tr>
<td>X2</td>
<td>hopf Elektronik GmbH diagnosis connector</td>
</tr>
<tr>
<td>J1</td>
<td>hopf Elektronik GmbH service jumper</td>
</tr>
<tr>
<td>MP3</td>
<td>Operating voltage measuring points (5V DC)</td>
</tr>
</tbody>
</table>
### 2.2.2 DIP switch block 1 (DS1)

<table>
<thead>
<tr>
<th>No.:</th>
<th>Function</th>
</tr>
</thead>
</table>
| 8    | LAN configuration via system keyboard allow / not allow  
  (see *chapter 5 Configuration of the LAN Board 7270*) |
| 7    | for 7001 / 68xx system bus specification  
  (see *chapter 3.2 Selection of hopf Base System 68xx or 7001*) |
| 6, 5 | configuration of the length of the minute pulse (in msec)  
  (see *chapter 9 Configuration of the Minute pulse*) |
| 4-1  | board identification in System 7001 / 68xx  
  (see *chapter 3.3 Setting the System Board Number*) |

### 2.2.3 DIP switch block 2 (DS2)

<table>
<thead>
<tr>
<th>No.:</th>
<th>Function</th>
</tr>
</thead>
</table>
| 8    | reserved for *hopf* Elektronik GmbH, the setting must not be changed!  
  (ought to set off) |
| 7-3  | unassigned  
  (ought to set on) |
| 2    | SINEC H1 time datagram transmission point at the same second (default) / 1 second subsequent  
  (see *chapter 8 Transmission Point of the SINEC H1 time Datagram*) |
| 1    | Configuration of the transmitted time telegram depending on the Base System Status  
  (see *chapter 7 Status of time datagram dependent on System Status*) |
3 Implementing LAN Board 7270 in a hopf Base System

All Function Boards are parameterised individually from within the Base System.

Each LAN Board 7270 is uniquely identified in a hopf Base System via an assigned Board number.

The following steps are required for the purpose of implementation:

- Free slot available in the Base System (bus bridge)
- Not more than 1 LAN Board (System 68xx) or 7 LAN Boards (System 7001) already implemented
- Set the Base System in which the Board is to be implemented via the DIP switch on Board 7270
- Set a Board number that is not yet assigned in the Base System via the DIP switch on LAN Board 7270
- Switch the Base System off
- Remove the Bus Bridge Board from the Base System
- Insert the LAN Board 7270
- Switch the System on
- Select the LAN Board 7270 setting menu in the Base System (LAN x / x = set Board number)
- Set the desired LAN parameters (IP, network mask and gateway) via the menu

3.1 LAN Board 7270 Base Parameters (factory setting)

The LAN Board 7270 is supplied in the following configuration:

<table>
<thead>
<tr>
<th>Base Parameters</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Address:</td>
<td>192.168.017.XXX</td>
</tr>
<tr>
<td>(XXX= Board number)</td>
<td></td>
</tr>
<tr>
<td>Gateway:</td>
<td>000.000.000.000 - no gateway set</td>
</tr>
<tr>
<td>Network Mask:</td>
<td>8 (255.255.255.000)</td>
</tr>
<tr>
<td>Control byte</td>
<td>0000 0010</td>
</tr>
<tr>
<td>Password:</td>
<td>No password activated for Telnet access</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NTS Parameters</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenna Type:</td>
<td>hopf 6021 (must not be changed)</td>
</tr>
<tr>
<td>SNMP Manager IP Address:</td>
<td>000.000.000.000 - not set</td>
</tr>
<tr>
<td>Syslog IP Address:</td>
<td>000.000.000.000 - not set</td>
</tr>
<tr>
<td>Encryption:</td>
<td>not activated</td>
</tr>
<tr>
<td>SINEC H1 time datagram:</td>
<td>not activated</td>
</tr>
<tr>
<td>SNTP Ref. Identifier:</td>
<td>&quot;hopf&quot;</td>
</tr>
<tr>
<td>UDP Port:</td>
<td>not activated</td>
</tr>
</tbody>
</table>
3.2 **Selection of hopf Base System 68xx or 7001**

Selection can be made to operate the LAN Board 7270 in Base System 7001 or Base Systems 6842, 6850 or 6855 by means of switch SW7 on dip switch bank **DS1**.

<table>
<thead>
<tr>
<th>DS1 / SW7</th>
<th>hopf Base System Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>on</td>
<td>Base System 7001</td>
</tr>
<tr>
<td>off</td>
<td>Base System 68xx</td>
</tr>
</tbody>
</table>

LAN Board 7270 will only operate properly if this setting is correct.

3.3 **Setting the System Board Number**

The boards must be coded to a System Board number in order to enable the various LAN Boards to be administered and configured in the Base System.

**Under no circumstances** may two LAN Board 7270 with the same Board number be integrated into one Base System. This leads to unspecified faults on these two Boards!

The coding of the Board number takes place on LAN Board 7270 via DIP switch bank (DS1).

3.3.1 **Setting the Board Number for Base System 7001**

A maximum of 8 LAN Boards of different types (e.g. Board 7270 and Board 7271) can be configured in System 7001. The Board number is set via the DIP switch bank (DS1 / SW1-4) for unique identification in the Base System.

The LAN Boards can be parameterised in the Base System menu from LAN 1 (Board number 1) to LAN 8 (Board number 8).

<table>
<thead>
<tr>
<th>DS1</th>
<th>Board No.:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>on</td>
<td>on on on on</td>
</tr>
<tr>
<td>on</td>
<td>on on off</td>
</tr>
<tr>
<td>on</td>
<td>on off on</td>
</tr>
<tr>
<td>on</td>
<td>on off off</td>
</tr>
<tr>
<td>on</td>
<td>off on on</td>
</tr>
<tr>
<td>on</td>
<td>off on off</td>
</tr>
<tr>
<td>on</td>
<td>off off on</td>
</tr>
<tr>
<td>on</td>
<td>off off off</td>
</tr>
</tbody>
</table>

*Only these Board numbers set with the DIP switch are allowable in System 7001. System 7001 is unable to configure Board numbers which are set outside the range of the system (1-8).*
3.3.2 Setting the Board Number for Base System 68xx

A maximum of 2 LAN Boards of different types (e.g. Board 7270 and Board 7271) can be configured in the System 68xx. The Board number is set via the DIP switch bank (DS1 / SW1-4) for unique identification in the Base System.

The LAN Boards can be parameterised in the Base System menu with LAN 1 (Board number 1) and LAN 2 (Board number 2).

<table>
<thead>
<tr>
<th>DS1</th>
<th>Board No.:</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIP 4</td>
<td>DIP 3</td>
</tr>
<tr>
<td>on</td>
<td>on</td>
</tr>
<tr>
<td>on</td>
<td>on</td>
</tr>
</tbody>
</table>

Only those Board numbers set with the DIP switch are allowable in System 68xx. System 68xx is unable to configure Board numbers which are set outside the range of the system (1-2).

3.4 Creating the Network Connection

Ensure that the network parameters of the LAN Board are configured in accordance with the local network before connecting the LAN Board to the network (see Chapter 4 LAN Board 7270 Network Configuration via the Base System).

Connecting a network to an incorrectly configured LAN Board (e.g. duplicated IP address) may cause interference in the network.

Request the required network parameters from your network administrator if you do not know them.

The network connection is made via a LAN cable with RJ45 plug (recommended cable type: CAT5 or better).
LAN Board 7270 Network Configuration via the Base System

LAN Board 7270 is configured via the keyboard of the respective Base System. The necessary network parameters are configured such as IP address, gateway address, network mask and a general control byte.

The Technical Description of the respective Base System is the basis for configuration. The following covers only the Board-specific menus of the respective Base System.

After they have been entered fully, the LAN parameters configured through the system menu are transferred to the control board by pressing the \textbf{ENT} key. In order for the LAN parameters to be transferred from the control board to the LAN Board and to be stored there it is necessary to exit the menu by pressing the \textbf{BR} key.

The Base System does not accept LAN parameters which are subsequently changed via the Ethernet and thus they are no longer displayed correctly. For this reason the assignment of LAN parameters via the Base System is recommended.

4.1 IP Address (IPv4)

An IP address is a 32 bit value divided into four 8 bit numbers. The standard presentation is 4 decimal numbers (in the range 0...255) separated from each other by dots (dotted quad notation).

Example: 192.002.001.123

The IP address consists of a leading network ID followed by the host ID. Four common network classes were defined in order to cover different requirements. Depending on the network class, the last one, two or three bytes define the host while the rest define the network (network ID) in each case.

In the following text the "x" stands for the host part of the IP address.

Class A Networks
IP addresses 001.xxx.xxx.xxx to 127.xxx.xxx.xxx

There is a maximum of 127 different networks in this class. This allows the possibility to connect a very high number of devices (max. 16.777.216 )

Example: 100.000.000.001, (Network 100, Host 000.000.001)

Class B Networks
IP addresses 128.000.xxx.xxx to 191.255.xxx.xxx

Each of these networks can consist of up to 65534 devices.

Example: 172.001.003.002 (Network 172.001, Host 003.002)

Class C Networks
IP addresses 192.000.000.xx to 223.255.255.xxx

These network addresses are the most commonly used. Up to 254 devices can be connected.
Class D Networks
The addresses from 224.xxx.xxx.xxx - 239.xxx.xxx.xxx are used as multicast addresses.

Class E Networks
The addresses from 240.xxx.xxx.xxx - 254.xxx.xxx.xxx are designated as "Class E" and are reserved.

4.2 Gateway Address
The gateway or router address is required in order to be able to communicate with other network segments. The standard gateway must be set to the router address which connects these segments. This address must be within the local network.

4.3 Network Mask
The network mask is used to partition IP addresses outside of network classes A, B and C. When entering the network mask it is possible to designate the number of bits of the IP address to be used as the network part and the number to be used as the host part, e.g.:

<table>
<thead>
<tr>
<th>Network Class</th>
<th>Network Part</th>
<th>Host Part</th>
<th>Network Mask Binary</th>
<th>Network Mask Decimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>8 Bit</td>
<td>24 Bit</td>
<td>11111111.00000000.00000000.00000000</td>
<td>255.0.0.0</td>
</tr>
<tr>
<td>B</td>
<td>16 Bit</td>
<td>16 Bit</td>
<td>11111111.11111111.00000000.00000000</td>
<td>255.255.0.0</td>
</tr>
<tr>
<td>C</td>
<td>24 Bit</td>
<td>8 Bit</td>
<td>11111111.11111111.11111111.00000000</td>
<td>255.255.255.0</td>
</tr>
</tbody>
</table>

The number of bits for the host part is entered in order to calculate the network mask:

<table>
<thead>
<tr>
<th>Network Mask</th>
<th>Host Bits</th>
</tr>
</thead>
<tbody>
<tr>
<td>255.255.255.252</td>
<td>2</td>
</tr>
<tr>
<td>255.255.255.248</td>
<td>3</td>
</tr>
<tr>
<td>255.255.255.240</td>
<td>4</td>
</tr>
<tr>
<td>255.255.255.224</td>
<td>5</td>
</tr>
<tr>
<td>255.255.255.192</td>
<td>6</td>
</tr>
<tr>
<td>255.255.255.128</td>
<td>7</td>
</tr>
<tr>
<td>255.255.255.000</td>
<td>8</td>
</tr>
<tr>
<td>255.255.254.000</td>
<td>9</td>
</tr>
<tr>
<td>255.255.252.000</td>
<td>10</td>
</tr>
<tr>
<td>255.255.248.000</td>
<td>11</td>
</tr>
<tr>
<td>255.128.000.000</td>
<td>23</td>
</tr>
<tr>
<td>255.000.000.000</td>
<td>24</td>
</tr>
</tbody>
</table>

Example:
Desired network mask: 255.255.255.128
Value to be entered: 7
4.4 Input Functions of Base Systems 6842, 6850 and 6855

After they have been entered fully, the LAN parameters configured through the system menu are transferred to the control board by pressing the ENT key. In order for the LAN parameters to be transferred from the control board to LAN Board 7270 it is necessary to exit the respective menu by pressing the BR key.

4.4.1 Inputting the Static IPv4 Address

The IP address mode are entered via the following selection frames:

Set LAN 1
ADR. Y/N

or

Set LAN 2
ADR. Y/N

After entering Y the display changes to the input frame (LAN 1 in this case):

LAN 1 >

Static IPv4 Address

The IPv4 address is entered in 4 groups of digits configurable from 000 to 255. They are separated by a dot (.). Input must be in the form of 3 digits (e.g.: 2⇒002).

An example of a complete entry would be as follows:

LAN 1 > 192.168.017.001<

This example shows the supplied factory setting of IP address 192.168.017.001 (see chapter 4.1 IP Address (IPv4))

In the case of an implausible entry (such as 265), an INPUT ERROR is sent and the complete entry is rejected.
4.4.2 Inputting the Gateway Address

The gateway address is entered via the following selection frames:

```
SET LAN 1
GATEWAY ADR. Y/N
```

or

```
SET LAN 2
GATEWAY ADR. Y/N
```

After entering [Y] the display changes to the input frame:

```
G.W 1 >
```

The gateway address can now be entered in the same way as the IP address (see Chapter 4.4.1 Inputting the Static IPv4 Address).

A demarcation arrow follows the last group of figures “<” (see Chapter 4.2 Gateway Address).

4.4.3 Inputting the Network Mask

The network mask is entered via the following selection frames:

```
SET LAN 1
NET-MASK. Y/N
```

or

```
SET LAN 2
NET-MASK. Y/N
```

After entering [Y] the display changes to the input frame:

```
NET-MASK LAN 1 >
```

The network mask can now be entered in the range from 0-31. A demarcation arrow follows the last group of figures (see Chapter 4.3 Network Mask).
4.4.4 Inputting the Control Byte

Various settings can be made with the control byte.

The control byte is entered via the following selection frames:

```
SET LAN 1
CNTRL.-BYTE Y/N
```

or

```
SET LAN 2
CNTRL.-BYTE Y/N
```

After entering Y the display changes to the input frame.

For editing purposes, the individual bits of the new byte are entered on the second line with "0" and "1".

The bits of the parameter byte are numbered consecutively in descending order:

```
BIT 7 6 5 4 3 2 1 0
```

e.g.:

```
0 0 0 0 0 1 0 0
```

(standard setting for NTP)

The entry must be concluded by pressing the [ENT] key.

The function of the control byte see in chapter 4.6 Control byte.
4.5 Base System 7001 Input Functions

The input and display functions are called up by means of the menu header **BOARDS:3** under **BOARD 7270 / 7271 / 7272**.

The following LAN Board menu appears:

<table>
<thead>
<tr>
<th><strong>No:</strong></th>
<th>1</th>
<th><strong>CB:</strong></th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th><strong>IP:</strong></th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NEW</strong></td>
<td>&gt;</td>
<td>&gt;</td>
<td>&gt;</td>
<td>&gt;</td>
<td>&gt;</td>
<td>&gt;</td>
<td>&gt;</td>
<td>&gt;</td>
<td>&gt;</td>
<td>&gt;</td>
<td>&gt;</td>
<td>&gt;</td>
<td>&gt;</td>
<td>&gt;</td>
<td>&gt;</td>
<td>&gt;</td>
<td>&gt;</td>
<td>&gt;</td>
<td>&gt;</td>
<td>&gt;</td>
<td>&gt;</td>
</tr>
</tbody>
</table>

The first input expected under **No:** is the System Board Number (1-8) of the LAN Board to be configured (in this case Board number 1) and this is confirmed with the **ENT** key.

After the Board number has been entered, the current configuration of the selected LAN Board is displayed on the first menu line.

The new parameters can be entered on the second line. It is possible to change to the next menu header without making a new entry by pressing the **ENT** key.

After they have been entered fully, the LAN parameters configured through the system menu are transferred to the control board by pressing the **ENT** key. In order for the LAN parameters to be transferred from the control board to LAN Board 7270 and to be stored there it is necessary to exit the respective menu by pressing the **BR** key.

4.5.1 Inputting the Control Byte

Various settings can be made with the control byte (CB:).

| **No:** | 1 | **CB:** | 0 | 0 | 0 | 0 | 0 | 0 | **IP:** | 1 | 9 | 2 | 1 | 6 | 8 | . | 0 | 1 | 7 | 0 | 0 | 1 |
|--------|---|---------|---|---|---|---|---|---|---------|---|---|---|---|---|---|---|---|---|---|---|---|
| **NEW** | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > |

The individual bits of the control byte are configured by entering 0 and 1. The complete entry is completed by pressing the **ENT** key. The new control byte appears on the top line.

The function of the control byte see in chapter 4.6 Control byte.

4.5.2 Inputting the Static IPv4 Address

The currently valid IP address appears on the top line.

| **No:** | 1 | **CB:** | 0 | 0 | 0 | 0 | 0 | 0 | **IP:** | 1 | 9 | 2 | 1 | 6 | 8 | . | 0 | 1 | 7 | 0 | 0 | 1 |
|--------|---|---------|---|---|---|---|---|---|---------|---|---|---|---|---|---|---|---|---|---|---|---|
| **NEW** | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > | > |

The IPv4 address is entered in 4 groups of digits each separated by a dot ( . ). The entry must take place in 3 digits in the value range from 000 - 255.

The entry is completed by pressing the **ENT** key. The new address appears on the top line. In the case of an incorrect entry this menu header is exited and an error message is sent.

This example shows the supplied factory setting of IP address 192.168.017.001 (see chapter 4.1 IP Address (IPv4))
4.5.3 Inputting the Network Mask
The currently valid network mask appears on the top line.

```
No:  1   NM:  00   GW:  192.168.017.152
NEW   >   _   _   _   >   .   .   .   .   .   .   <
```

The input range for the network mask lies between 0-31.

The entry is completed by pressing the ENT key. The new network mask appears on the top line. In the case of an incorrect entry this menu header is exited and an error message will be displayed (see Chapter 4.3 Network Mask).

4.5.4 Inputting the Gateway Address
The next menu header to appear concerns the editing of the gateway or router address.

```
No:  1   NM:  16   GW:  192.168.017.152
NEW   >  16   _   _   _   >   .   .   .   .   .   .   <
```

The gateway address can now be entered in the same way as the IP address (see Chapter 4.4.1 Inputting the Static IPv4 Address).

See also Chapter 4.2 Gateway Address.

4.6 Control byte
Various functions can be configured via the control byte.

4.6.1 Bit 7, reserved for hopf Elektronik GmbH

<table>
<thead>
<tr>
<th>Bit 7</th>
<th>Standard setting (reserve for hopf Elektronik GmbH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Must not be changed</td>
</tr>
</tbody>
</table>

4.6.2 Bit 6, Output of NTP Protocol or SINEC H1 time datagram

<table>
<thead>
<tr>
<th>Bit 6</th>
<th>Output time protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>NTP protocol</td>
</tr>
<tr>
<td>1</td>
<td>SINEC H1 time datagram</td>
</tr>
</tbody>
</table>
4.6.3 Bit 5/4, MAC- Broadcast-Adresse für SINEC H1 time datagram

Configuration of the required SINEC H1 time datagram MAC address or Broadcast address.

<table>
<thead>
<tr>
<th>Bit 5</th>
<th>Bit 4</th>
<th>MAC address 1</th>
<th>MAC address 2</th>
<th>Broadcast address</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>09 00 06 03 FF EF</td>
<td>09 00 06 01 FF EF</td>
<td>FF FF FF FF FF FF</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>MAC- address 2</td>
<td>MAC- address 1</td>
<td>FF FF FF FF FF FF</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>Broadcast- address.</td>
<td>Broadcast- address.</td>
<td>FF FF FF FF FF FF</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>FF FF FF FF FF FF</td>
<td>FF FF FF FF FF FF</td>
<td>FF FF FF FF FF FF</td>
</tr>
</tbody>
</table>

When NTP protocol is set these bits are irrelevant.

4.6.4 Bit 3/2, Transmission intervals for SINEC H1 time datagram

Configuration of the required transmission intervals for SINEC H1 time datagram.

<table>
<thead>
<tr>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Transmission intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>1 sec.</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>10 sec.</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>60 sec.</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>60 sec.</td>
</tr>
</tbody>
</table>

When NTP Protocol is set the bits are irrelevant.

4.6.5 Bit 1/0, Time basis for NTP and SINEC H1 time datagram

Configuration of the time basis for NTP and SINEC H1 time datagram.

<table>
<thead>
<tr>
<th>Bit1</th>
<th>Bit0</th>
<th>Time basis for NTP and SINEC H1 time datagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>Local time</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>Local standard time (CET)</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>UTC</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>Local standard time (CET) with details of summer and winter time in the time status</td>
</tr>
</tbody>
</table>
5 Configuration of the LAN Board 7270

There are a limited configuration with Ethernet via Telnet possible.

To use the configuration via Telnet the configuration via the system keypad of the radio-controlled clock should not be used. This is activated with switch no.: 8 DIP switch block 2 (DS2).

<table>
<thead>
<tr>
<th>DS1 / SW8</th>
<th>Configuration of LAN board 7270 via the system keypad</th>
</tr>
</thead>
<tbody>
<tr>
<td>on</td>
<td>allow (Default).</td>
</tr>
<tr>
<td>off</td>
<td>not allow.</td>
</tr>
</tbody>
</table>

In the Base System 7001 / 68xx, the changed LAN configuration is only stored in the Board’s flash memory and is ALWAYS overwritten when a new value is entered.

Data changed via the LAN is not updated in the Base System and thus is no longer displayed correctly after the change. For this reason it is recommended to configure the network mask via the Base System.

The connection is built via Telnet by entering the IP address of LAN-Board 7270; access is via port 9999.

![Figure 1: Telnet](image)
Confirm the entry (Figure 1) with the ENTER key.

Figure 2: Select the NTP LAN Board 7270

The dialogue is aborted after 5 seconds if the ENTER key is not pressed.

Figure 3: Telnet interruption

After pressing the ENTER key in time a selection menu appears.

Figure 4: Selection menu
5.1 Menu (0) - Basic Configuration / Telnet password

Select the "Basic configuration" menu by entering 0 followed by ENTER.

![Figure 5: "Basic configuration" menu](image)

A password can be set for the Telnet connection to prevent unauthorized access to the configuration menu via the LAN interface.

![Figure 6: Telnet Password](image)
5.2  Menu (1) - NTS Configuration

Select the "NTS configuration" menu by entering 1 followed by ENTER.

![Figure 7: "NTS configuration" menu]

5.2.1  Antenna Type Setting

The time source for LAN Board 7270 is selected in this menu. The standard setting is hopf 6021.

LAN Board 7270 can only achieve Stratum 1 output accuracy with the hopf 6021 setting. LAN Board 7270 is unable to evaluate time information supplied on any other setting.

5.2.2  SNMP Setting

Up to two IP addresses can be set per SNMP manager. These serve as target addresses for both SNMP enquiries and SNMP traps.

After setting the IP address for the first SNMP manager, a second IP address can also be set for a second SNMP manager (Figure 7).
5.2.3 Syslog Setting

Up to two Syslog IP addresses can be set. "Local0" to "Local7" can be selected for the output.

![Image of Syslog settings]

Figure 8: Syslog

5.2.4 Encryption Setting

For NTP, authentication can be activated optionally via DES and MD5. In this case it should be noted that a telegram requires 40 msec. for authentication. Various keys can be set with up to eight characters. The characters are entered in hexadecimal notation.

![Image of Encryption settings]

Figure 9: Encryption
5.2.5 SINEC H1 time datagram setting

LAN Board 7270 can be configured to operate as a time transmitter in a SINEC H1 time datagram LAN. For this purpose the LAN Board 7270 can be set to two different MAC addresses or it can distribute the time information in broadcast mode.

- MAC address 1: 09 00 06 03 FF EF
- MAC address 2: 09 00 06 01 FF EF
- Broadcast

The transmission interval for the SINEC H1 time datagram protocol can then be set for the broadcast mode:

- 01 second
- 10 seconds
- 60 seconds

For configuration of SINEC H1 time datagram via Telnet the function "transmission point of the SINEC H1 datagram" must always be configured specially via the System. See chapter 8 Transmission Point of the SINEC H1 time Datagram.
5.2.6 **SNTP Ref. Identifier**

Under this menu heading, any desired sequence of up to four characters can be set as the SNTP Ref. Identifier.

Figure 11: SNTP Ref. Identifier

5.2.7 **UDP Setting**

This setting is not used for NTP and SINEC H1 time datagram and is disabled as standard.

5.3 **Menu (7) - Factory Defaults**

In this equipment version, this menu leads to an incorrect base configuration. Therefore, it must not be used. If, in spite of this, this menu has been activated, the original supply condition is to be reproduced as described in *Chapter 3.1 LAN Board 7270 Base Parameters (factory setting)*, in order to ensure the correct operation of this equipment.
5.4 **Menu (8) - Exit without save**

Discard all changes made in this session by entering **8** followed by **ENTER**.

Figure 12: Discard settings

5.5 **Menu (9) - Save and Exit**

Save the settings by entering **9** followed by **ENTER**.

Figure 13: Saving the settings
6 Remote monitoring via SNMP (read only)

For further information regarding the set-up of applications with remote monitoring via SNMP please contact hopf Elektronik GmbH.

6.1 SNMP Traps of LAN Board 7270

(There is a software for the reception and evaluation of the SNMP Traps required which is not included in the delivery volume of LAN Board 7270).

SNMP Traps after switch-on of the clock system, after synchronisation and loss of the synchronisation signal (Picture 8)

Line 1: SNMP Trap after switch-on of the clock system

Line 2: SNMP Trap after successful synchronisation of the clock system (system status = R (radio))

Line 3: SNMP Trap after loss of synchronisation (system status = C (crystal))

Line 4: SNMP Trap after resynchronisation of the clock system (system status = R (radio))

Line 5: SNMP Trap after a RESET of the clock system

Line 6: SNMP Trap after successful synchronisation of the clock system (system status = R (radio))
6.2 Possible Query of SNMP Information of LAN Board 7270

(There is a software for query of SNMP Information required which is not included in the delivery volume of LAN Board 7270).

Possible query of data (Picture 10):

- sysDescription
- sysOID
- sysUptime
6.3 SNMP MIB in ASN.1 Format for LAN Board 7270

LTX-NTS-MIB DEFINITIONS ::= BEGIN

IMPORTS
enterprises, IpAddress, Counter, TimeTicks
FROM RFC1155-SMI
OBJECT-TYPE
FROM RFC-1212
DisplayString
FROM RFC-1213;

pronet OBJECT IDENTIFIER ::= { enterprises 1723 }
software OBJECT IDENTIFIER ::= { pronet 1 }
ntp OBJECT IDENTIFIER ::= { software 6 }

-- NTP SERVER MIB
-- Parameters (Prefix Par)

ntpAntennaType OBJECT-TYPE
SYNTAX INTEGER (0)
ACCESS read-only
STATUS mandatory
DESCRIPTION
"a value which indicates the antenna type of the NTP-Server:

0 - DCF77 antenna          (used in Germany)
1 - Trimble GPS antenna    (worldwide)
2 - Trak GPS antenna       (worldwide)
3 - Hopf6021 GPS antenna   (worldwide)
4 - Spectracom GPS antenna (worldwide)
5 - not in use yet
6 - Arbiter antenna        (used in USA)
7 - NMEA/Trimble
8 - NMEA/CMC"::= { ntp 1 }

ntpVersionNumber OBJECT-TYPE
SYNTAX DisplayString (SIZE (0..40))
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The version number of the currently running firmware."
::= { ntp 2 }
ntpSerialNumber OBJECT-TYPE
SYNTAX DisplayString (SIZE (0..40))
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The serial number of the NTP server."
 ::= { ntp 3 }

ntpMAC OBJECT-TYPE
SYNTAX DisplayString (SIZE (0..40))
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The hardware address or MAC which is unique for every network device."
 ::= { ntp 4 }

ntpMessageString OBJECT-TYPE
SYNTAX DisplayString (SIZE (0..40))
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The state of the NTP server which could be:
- NTS startup  Startup message after reset or powerup.
- NTS synch'ed  Network time is synchronized.
- NTS unsynch'ed  Network time not synchronized.
- NTS sig. lost  Time source is lost no data."
 ::= { ntp 5 }

END
6.4 Summary from the complete MIB-2 of LAN Board 7270

Not all parameters are supported. Non-set parameters are set to "0".

sysDescr.0  *** NTS ***  7252484 04.6b1 (020320)
sysObjectID.0 .1.3.6.1.4.1.1723.2.1.4
sysUpTime.0  273117
sysContact.0
sysName.0
sysLocation.0
sysServices.0  12
ifNumber.0  1
ifIndex.1  1
ifDescr.1  Network
ifType.1  6
ifMtu.1  1500
ifSpeed.1  10000000
ifPhysAddress.1  0x00 0x20 0x4A 0x72 0xCD 0x04
ifAdminStatus.1  up
ifOperStatus.1  up
ifLastChange.1  0
ifInOctets.1  241012
ifInUcastPkts.1  619
ifInNUcastPkts.1  1445
ifInDiscards.1  0
ifInErrors.1  0
ifInUnknownProtos.1  0
ifOutOctets.1  866175
ifOutUcastPkts.1  640
ifOutNUcastPkts.1  3
ifOutDiscards.1  0
ifOutErrors.1  0
ifOutQLen.1  2
ipForwarding.0  not-forwarding
ipDefaultTTL.0  31
ipInReceives.0  1277
ipInHdrErrors.0  0
ipInAddrErrors.0  0
ipInUnknownProtos.0  0
ipInDiscards.0  0
ipInDelivers.0  1283
ipOutRequests.0  0
ipOutDiscards.0  0
ipOutNoRoutes.0  0
ipReasmTimeout.0  0
ipReasmReqs.0  0
ipReasmOKs.0  0
ipReasmFails.0  0
ipFragOKs.0  0
ipFragFails.0  0
ipFragCreates.0  0
ipAdEntAddr.100.10.40.84  100.10.40.84
ipAdEntIfIndex.100.10.40.84  1
ipAdEntNetMask.100.10.40.84  255.255.0.0
ipAdEntBcastAddr.100.10.40.84  1
ipAdEntReasmMaxSize.100.10.40.84  0
icmpInM Toggle the rendering of the generated content.
icmpInErrors.0  0
icmpInDestUnreaches.0  0
icmpInTimeExcds.0  0
icmpInParmProbs.0  0
icmpInSrcQuenchs.0  0
icmpInRedirects.0  0
icmpInEchos.0  4
icmpInEchoReps.0  0
icmpInTimestamps.0  0
icmpInTimestampReps.0  0
icmpInAddrMasks.0  0
icmpInAddrMaskReps.0  0
icmpOutMsgs.0  4
icmpOutErrors.0  0
icmpOutDestUnreaches.0  5
icmpOutTimeExcds.0  0
icmpOutParmProbs.0  0
icmpOutSrcQuenchs.0  0
icmpOutRedirects.0  0
icmpOutEchos.0  0
icmpOutEchoReps.0  4
icmpOutTimestamps.0  0
icmpOutTimestampReps.0  0
icmpOutAddrMasks.0  0
icmpOutAddrMaskReps.0  0
udpInDatagrams.0  670
udpNoPorts.0  520
udpInErrors.0  5000
udpOutDatagrams.0  673
.1.3.6.1.4.1.1723.1.6.1.0  0
.1.3.6.1.4.1.1723.1.6.2.0
.1.3.6.1.4.1.1723.1.6.3.0
.1.3.6.1.4.1.1723.1.6.4.0
.1.3.6.1.4.1.1723.1.6.5.0
7 Status of time datagram dependent on System Status

The LAN board 7270 can be differently configured for the transmission of the time telegrams in dependence of the Base System Status.

7.1 Output of NTP Stratum dependent on System Status

By setting **DS2 Switch 1 = ON:**
- Output of NTP protocol with actual time and NTP status **Stratum 1** only when system status is radio ("r", "R").
- Timestamps in the NTP protocol are analysed as 0 and the NTP status **Stratum 0** (invalid / not defined) when the system status is crystal ("C"). Thus a synchronisation of other devices / systems is not possible by this LAN Board 7270 (NTP-server).

By setting **DS2 Switch 1 = OFF:**
- Output of the NTP protocol with actual time and **Stratum 1** takes place independent of the system status radio ("r", "R") or crystal ("C"). The basis system only needs to have a valid time, e.g. by manual time input.

<table>
<thead>
<tr>
<th>DS2 DIP1</th>
<th>NTP synchronization under system status</th>
<th>System Status</th>
<th>Output LAN Board 7270 NTP</th>
<th>NTP Reception Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>on</td>
<td>Radio-controlled operation &quot;R&quot; (default setting)</td>
<td>Not valid &quot;.&quot;</td>
<td>No time / Stratum 0</td>
<td>Stratum 16</td>
</tr>
<tr>
<td></td>
<td>Crystal operation &quot;C&quot;</td>
<td></td>
<td>No time / Stratum 0</td>
<td>Stratum 16</td>
</tr>
<tr>
<td></td>
<td>Radio reception &quot;r, R&quot;</td>
<td></td>
<td>System time / Stratum 1</td>
<td>Stratum 1</td>
</tr>
<tr>
<td>off</td>
<td>Radio-controlled operation &quot;R&quot;</td>
<td>Not valid &quot;.&quot;</td>
<td>No time / Stratum 0</td>
<td>Stratum 16</td>
</tr>
<tr>
<td></td>
<td>Quartz operation &quot;C&quot; (The radio status for NTP is simulated)</td>
<td></td>
<td>System time / Stratum 1</td>
<td>Stratum 1</td>
</tr>
<tr>
<td></td>
<td>Radio reception &quot;r, R&quot;</td>
<td></td>
<td>System time / Stratum 1</td>
<td>Stratum 1</td>
</tr>
</tbody>
</table>

NTP clients/servers that are synchronized with the LAN Board 7270 are not able to identify whether the simulation status is active. Time deviations arising in this mode, due to drift in the quartz operation (independent clock) or manual setting of the time/date in this way can be accepted by the NTP client/server and can occur to a **time leap**.
7.2 Output SINEC H1 time Datagram Output dependent on System Status

<table>
<thead>
<tr>
<th>DS2 SW1</th>
<th>System status</th>
<th>Output of SINEC H1 time datagram with actual time</th>
</tr>
</thead>
<tbody>
<tr>
<td>on</td>
<td>radio synchronous</td>
<td>and the time status “Synchronous.”</td>
</tr>
<tr>
<td></td>
<td>(&quot;r&quot;, &quot;R&quot;)</td>
<td></td>
</tr>
<tr>
<td>off</td>
<td>crystal (&quot;C&quot;)</td>
<td>but with time status “Synchronisation failed”</td>
</tr>
<tr>
<td></td>
<td>radio (&quot;r&quot;, &quot;R&quot;) or</td>
<td>and time status “Synchronous”</td>
</tr>
<tr>
<td></td>
<td>crystal (&quot;C&quot;).</td>
<td>(The status synchronous is simulated)</td>
</tr>
<tr>
<td></td>
<td>(The output is independent from system status radio. The basis system only needs to have a valid time, e.g. by manual time input.)</td>
<td></td>
</tr>
</tbody>
</table>

NTP clients/servers that are synchronized with the LAN Board 7270 are not able to identify whether the simulation status is active. Time deviations arising in this mode, due to drift in the quartz operation (independent clock) or manual setting of the time/date in this way can be accepted by the NTP client/server and can occur to a **time leap**.
8 Transmission Point of the SINEC H1 time Datagram

<table>
<thead>
<tr>
<th>DS2 SW2</th>
<th>The transmission of the SINEC H1 time datagram takes place at the broadcasted transmission point of the datagram…</th>
</tr>
</thead>
<tbody>
<tr>
<td>on</td>
<td>based on the time information of its transmission point. (Default)</td>
</tr>
<tr>
<td></td>
<td>e.g.: transmission point (UTC, absolute): with time information:</td>
</tr>
<tr>
<td></td>
<td>12:33:00,001</td>
</tr>
<tr>
<td>off</td>
<td>one second delayed.</td>
</tr>
<tr>
<td></td>
<td>e.g.: transmission point (UTC, absolute): with time information:</td>
</tr>
<tr>
<td></td>
<td>12:33:01,002</td>
</tr>
</tbody>
</table>

Activation of this function only if SINEC H1 time datagram output (see chapter 4.6 Control byte) is configured via system keypad!

9 Configuration of the Minute pulse

A potential free minute pulse of 12V DC is distributed on the 9-pole SUB-D male connector. The length of the pulse can be adjusted in 4 steps. The pulse lengths are set via the DIP switch block (DS1) as follows:

<table>
<thead>
<tr>
<th>DS1 / SW6</th>
<th>DS1 / SW5</th>
<th>Pulse length</th>
</tr>
</thead>
<tbody>
<tr>
<td>on</td>
<td>on</td>
<td>10 msec</td>
</tr>
<tr>
<td>on</td>
<td>off</td>
<td>100 msec</td>
</tr>
<tr>
<td>off</td>
<td>on</td>
<td>500 msec</td>
</tr>
<tr>
<td>off</td>
<td>off</td>
<td>1000 msec</td>
</tr>
</tbody>
</table>

The output is an "open emitter" with a current limiter. The external pull down load must be in a range of 120 to 600 Ohm.

The output must have a load of 20mA (RL < 600 Ω). Otherwise the slew rate will be to low.
## 10 Technical data

| **General** | Euro board 160 x 100 mm (4HP) for 19" or ½ 19" (3U) racks  
Function board for System 7001/68xx |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Voltage supply</strong></td>
<td>5V DC ± 5%</td>
</tr>
<tr>
<td><strong>Current</strong></td>
<td>typisch</td>
</tr>
<tr>
<td>with 10 Base-T Interface</td>
<td>200mA</td>
</tr>
<tr>
<td>with 10/100 Base-T interface</td>
<td>450mA</td>
</tr>
<tr>
<td><strong>Temperature range</strong></td>
<td>0 bis 50° C 0 to 50° C</td>
</tr>
<tr>
<td><strong>MTBF</strong></td>
<td>&gt; 285.000 Std.</td>
</tr>
</tbody>
</table>

| **Network interface** | 10 Base-T oder 10/100 Base-T |
| **Network Connections** | The network connection is made via a LAN cable and RJ45 plug (recommended cable type: CAT5 or better). |
| **Request per second** | max. 400 Requests |
| **Number of connectable clients** | Theoretically unlimited |
| **Ethernet compatibility** | Version 2.0 / IEEE 802.3 |
| **Network Protocols** | IPv4, UDP, TCP, SNMP (limited), ICMP, Telnet, FTP |
| **Time Protocols** | NTP versions 1, 2 and 3 (RFC 1305)  
SNTP (Simple NTP, RFC 2030)  
or  
SINEC H1 time datagram |

| **Minute pulse** | potential isolated, as current generator  
12V DC / min. 20mA, max. 100 mA  
ext. 12V DC voltage  
12V DC, max. 100mA, potential isolated  
 isolation min. 1000V DC |

| **CE compliant to EMC Directive 89/336/EC and Low Voltage Directive 73/23/EC** |
| **Safety / Low Voltage Directive** | DIN EN 60950-1:2001 + A11 + Corrigendum  
EN 61000-6-4 |
| **EMC (Electromagnetic Compatibility) / Interference Immunity** | EN 610000-4-2 /-3/-4/-5/-6/-11  
EN 61000-6-2  
Radio Interference Voltage  
EN 55022  
Radio Interference Emission  
EN 55022 Class B  
EN 55022 Class B |
11 Glossary

Broadcast address
The IP address is used for addressing all hosts in a network. As a rule this address corresponds to the network ID and the value 255 for each part of the host part of the IP address (e.g. 149.202.255.255 stands for all hosts in class B networks 149.202.0.0).

MAC address
Media Access Control address is a non-changeable 8 Byte hardware address of a network board.

SINEC H1 time datagram
Special Ethernet time protocol for industrial applications

NTP
Network Time Protocol, a network time protocol for synchronizing networks.

SNTP
Simple Network Time Protocol

SNMP
Simple Network Management Protocol

NTS
Network Time Server

MIB
Management Information Base

ASN.1
Abstract Syntax Notation One