

Technical Manual

NTP / SINEC H1 LAN Board 7270

for DIN Rail

Model 7270 DIN Rail

ENGLISH

Version: 01.00 - 02.11.2005





Symbols and Characters



Operational Reliability

Disregard may cause damages to persons or material.



Functionality

Disregard may impact function of system/device.



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 compliance 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



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

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Therefore the device bears the CE identification marking (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

LAN Board 7270 is a Network Time Server (NTS). This Board supports the following synchronization protocols:

- NTP versions 1, 2 and 3
- SNTP (Simple NTP)
- SINEC H1 for LAN (protocol for SINEC H1 LAN Bus)

NTP LAN Board 7270 delivers Stratum 1 time information to NTP client computers when the GPS Module 6875 receives highly precise time information by GPS or when, by manual configuration, "Sync / Radio" time status is activated in the module.



NTP clients synchronized with Board 7270 are unable to detect whether the radio status in the GPS module is simulated. As a result, in this mode, the client adopts time deviations arising from drift during quartz operation (freewheel) or from manual time / date setting (including false but plausible data).

2 Front Panel Elements



LEDs

(*Chapter 3 Status LEDs* defines the status of the light diodes)

Serial RxD	Yellow
1	Yellow
2	Yellow
3	Green
4	Green

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X1 (9 pin SUB-D male connector)

	Pin No.	Assignment
X1 ()	1	Control input (serial adapter)
	2	Reception line RxD (RS232)
	3	Transmission line TxD (RS232)
	4	External reset via keys (serial adapter)
	5	GND
	6	Not assigned
\gtrsim	7	Not assigned
\bigcirc	8	Not assigned
	9	Not assigned

X2 (RJ-45 socket, screened, 10 or 10/100 Base-T connection)

X2	Pin No.	Assignment	
	1	Positive transmission line	Tx+
	2	Negative transmission line	Tx-
	3	Positive reception line	Rx+
	6	Negative reception line	Rx-
	4, 5, 7, 8	Not assigned	

3 Status LEDs

LED Serial RxD	Flashes	without serial adapter on X1 Flashes every second provided that the GPS Module has "Sync / Radio" time status.
	Flickers	with serial adapter on X1 Flickers when serial data is being sent from the terminal (PC) to the Board 7270.
LEDs 1-4	Flash simultane	Initialization phase (After Power ON / Reset /
	ously	pressing key on serial adapter)
LED 1	Lights	Board 7270 is being supplied with valid, highly precise time information.
LED 2	Flashes	Board 7270 is not receiving time information from the GPS Module.
LED 3		
LED 4	Lights	Network connection created

4 Configuration of the NTP LAN Board 7270

As standard, all NTP LAN Board 7270 configurations in this equipment version are carried out via LAN by means of a Telnet connection. If the current IP address of Board 7270 is not known, configuration can also take place via the equipment's X1 serial interface.



4.1 NTP LAN Board 7270 Base Parameters (factory setting)

Base Parameters	
IP Address:	192.168.017.001
Gateway:	000.000.000.000 - no gateway set
Network Mask:	16 (255.255.000.000)
Password:	No password activated for Telnet access

The NTP LAN Board is supplied in the following configuration:

NTS Parameters	
Antenna Type:	<i>hopf</i> 6021 (must not be changed)
SNMP Manager IP Address:	000.000.000.000 - not set
Syslog IP Address:	000.000.000.000 - not set
Encryption:	not activated
SINEC H1:	not activated
SNTP Ref. Identifier:	"hopf"
UDP Port:	not activated

4.2 Access to the NTP LAN Board via LAN Interface

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







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 a selection menu appears.



Figure 4: Selection menu



4.2.1 Menu (0) - Basic Configuration

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

```
🖏 Telnet 192.168.17.1
                                                                                                                                                                                                                                                                                  *** NTS ***
Serial Number 6301604 MAC address 00:20:4A:63:06:44
Software version 04.6b1 <020320>
  Press Enter to go into Setup Mode
 *** basic parameters
Hardware: Ethernet Autodetect
IP addr 192.168.17.1, no gateway set,netmask 255.255.000.000
*** NTS parameters
Antenna type: Hopf 6021
SNTP Ref.Identifier: "hopf"
Encryption is disabled
UDP datagram disabled
SINEC H1 Datagram disabled
Change Setup :

Ø Basic configuration

1 NIS configuration

7 Factory defaults

8 Exit without save

9 Save and exit

Your choice ? Ø

IP Address : (192) .(168) .(017) .(001)

Set Gateway IP Address (N) N

Netmask: Number of Bits for Host Part (Ø=default) (16)

Change telnet config password (N) N
 *** basic parameters
Hardware: Ethernet Autodetect
IP addr 192.168.17.1, no gateway set,netmask 255.255.000.000
**** NTS parameters
Antenna type: Hopf 6021
SNTP Ref.Identifier: "hopf"
Encryption is disabled
UDP datagram disabled
SINEC H1 Datagram disabled
Change Setup :
Ø Basic configuration
1 NTS configuration
7 Factory defaults
8 Exit without save
9 Save and exit
Your choice ? _
```

Figure 5: "Basic configuration" menu

4.2.1.1 IP Address

An IP address is a 32 bit value which is divided into four 8 bit numbers. The standard way of presenting this is by 4 decimal numbers (in the range 0...255) separated by dots (dotted guad notation).

Example: 192.002.001.123

The IP address is made up of a network ID followed by a host ID. In order to cover a variety of needs, four common network classes have been defined. Depending on the network class, the last one, two or three bytes define the host whilst the remaining bytes define the network (network ID).

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

Class A Networks

IP address 001.xxx.xxx to 127.xxx.xxx

There is a maximum of 127 different networks in this class. This makes it possible 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 address 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 address 192.000.000.xxx to 223.255.255.xxx

These are the most commonly used network addresses. Up to 254 devices can be connected.

Class D Networks

Addresses from 224.xxx.xxx to 239.xxx.xxx are used as multicast addresses.

Class E Networks

Addresses from 240.xxx.xxx to 254.xxx.xxx are identified as "Class E" and are reserved.

4.2.1.2 Gateway IP 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 that connects these segments. This address must be within the local network.

4.2.1.3 Network Mask

The network mask is used to sub-divide IP addresses external to network classes A, B and C. By entering the network mask it is possible to specify how many bits of the IP address are used as the network part and how many as the host part, for example:

Standard Class A	8 Bit Network	24 Bit Host Part	Network Mask: 255.000.000.000
Standard Class B	16 Bit Network	16 Bit Host Part	Network Mask: 255.255.000.000
Standard Class C	24 Bit Network	8 Bit Host Part	Network Mask: 255.255.255.000



	Network Mask	Host Bits		
	255.255.255.252	2		
	255.255.255.248	3		
	255.255.255.240	4		
	255.255.255.224	5		
	255.255.255.192	6		
	255.255.255.128	7	◀	
	255.255.255.000	8		
	255.255.254.000	9		
	255.255.252.000	10		
	255.255.248.000	11		
	255.128.000.000	23		
	255.000.000.000	24		
Exam	ple:			
Netwo	ork mask required:		255.255.255.128	
Value	to be entered for "Num	ber of Bits for	Host Part": 7	

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

4.2.1.4 Telnet Password

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



4.2.2 Menu (1) - NTS Configuration

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



Figure 7: "NTS configuration" menu

4.2.2.1 Antenna Type Setting

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



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

4.2.2.2 SNMP Setting

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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).



4.2.2.3 Syslog Setting

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



Figure 8: Syslog

4.2.2.4 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.



Figure 9: Encryption



4.2.2.5 SINEC H1 Setting

Board 7270 can be configured to operate as a time transmitter in a SINEC H1 LAN. For this purpose the Board 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 protocol can then be set for the broadcast mode:

- 01 second
- 10 seconds
- 60 seconds

🖼 Telnet 192.168.17.1	
Change Setup :	
U basic configuration	
7 Ractow defaults	
8 Exit without save	
9 Save and exit	
Your choice ? 1	
Antenna Type :	
0=DCF77	
1=Trimble	
2 = T RAK	
3=Hopf6021	
4=Spectracom	
5=Unused	
b=Arbiter	
?=NMEH/Irimble	
8=NNEH/GNG Calastication (CO)	
Selection: (05)	
1. Swing IP addy (N) N	
Foable encounting (N) N	
Send SINEC H1 blocks (N) Y	
Select MAC address:	
0: 09 00 06 03 FF EF 1: 09 00 06 01 FF EF 2: Broadcast	
Enter number (0)	
Select H1 interval: 0=1sec./1=10sec./2=60sec. (0)	
Change SNTP Ref.Identifier "hopf" (N) N	
Enter UDP Port (hex 0000), 0 to disable	
1	
*** basic parameters	
Hardware: Ethernet Hutodetect	
17 addr 172.106.17.1, no gateway set, netmask 255.255.000.000	
Antenna tune Long 6021	
SNTP Ref Identifier: "honf"	
Forewation is disabled	
UDP datagram disabled	
Send SINEC H1 block to MAC: 09 00 06 03 FF EF	
H1 Time interval: 01 sec.	
1	· · · · · · · · · · · · · · · · · · ·

Figure 10: SINEC H1

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4.2.2.6 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

4.2.2.7 UDP Setting

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

4.2.3 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 4.1 NTP LAN Board 7270 Base Parameters (factory setting)*, in order to ensure the correct operation of this equipment.



4.2.4 Menu (8) - Exit without save

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



Figure 12: Discard settings

4.2.5 Menu (9) - Save and Exit

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



Figure 13: Saving the settings

4.3 Access to the NTP LAN Board via serial interface

Access via the X1 serial interface to the NTP LAN Board 7270 is only required when the user does not know the current IP address of the NTP LAN Board 7270.

The serial adapter, which is included in the scope of supply, and the programming cable are required for access via a serial interface:

- The adapter is plugged in to the 9 pin SUB-D X1 male connector.
- After the connection has been made the LED "Serial RxD" ceases to flash every second.
- The programming cable produces a connection between the adapter and a free PC interface (COM-port).



- The selected COM-port is accessed and the interface is set to the following parameters with the aid of a terminal program:
 - o Baud rate 9600
 - o Data bits 8
 - Stop bits 1
 - o no parity

In order to produce the connection, the red key on the adapter must be pressed for a short time. LEDs 1-4 flash after activation. After the flashing has finished, the character \mathbf{x} must be sent to the NTP LAN Board three times within one second, using the terminal program.



The easiest way to guarantee the correct timing to achieve access to this menu is to hold down the \mathbf{x} key, then press the red key on the adapter and only release the \mathbf{x} key after the configuration menu has started to load in the terminal program.

On successful execution of the procedure described, the identical menu (with identical menu navigation) to that when accessing via the LAN interface is generated in the terminal program.



Figure 14: Access via serial interface

If "**xxx**" is not entered with the correct timing, the key on the adapter must be activated again and the transmission of "**xxx**" repeated.

Configuration takes place via the same menus as for configuration via LAN.



The adapter must be disconnected from connector X1 after configuration has taken place, since otherwise time information from the GPS Module 6875 is not supplied to the NTP LAN Board.