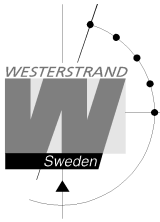
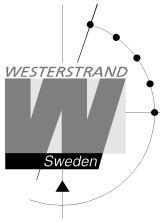


Option Ethernet Marine Master Clock



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General

The Ethernet module makes it possible to connect a Master Clock to a LAN (Ethernet Local Area Network). The module can be built into a Marine Master Clock.

The module can be used for Master Clock remote control, programming of relay outputs, alarm distribution, supervision and for distribution of correct time. The module can be configured to work as a NTP server or NTP client.

For transmission of correct and accurate time the NTP (Network Time Protocol) is used. NTP is a part of the protocol family UDP/IP.

When using the Ethernet module for time distribution the Master Clock can act as a NTP primary server or as a NTP client.

Units connected to the LAN, supporting NTP, can receive correct time from the Master Clock via the network module.

Included with the Ethernet module is NyToP, Westerstrand NTP-client for Windows XP/7/8/10.

To configure the different parameters such as IP-address, work mode etc. a normal web browser is used.

The front panel of the Marine Master Clock has a Link indicator LED.

Link indicator LED ON = Link activated. The Master Clocks is connected to a network.

LED OFF = No link activated. The Master Clock is not connected to a network.

Technical data

Article number:	123383-01
Supports application protocols: (For time distribution)	NTP version 1, 2, 3 and 4, RFC5905, SNTPv4, RFC 4330 Daytime Protocol (RFC867), Time Protocol (RFC 868)
Other supported protocols:	SNMP v2c, MIB II (RFC1155, RFC1157, RFC1213), HTTP, HTTPS.
Transport protocol:	TCP, UDP/IP, ICMP
Internet protocol:	IPv4, (IPv6 ready)
IP-address assignment	Dynamic, using DHCP, or fixed IP address.
VLAN support:	IEEE standard 802.1Q. The Ethernet port and can be configured to use one VLAN ID.
Compatibility:	Ethernet version 2/IEEE 802.3
Ethernet:	Supports 10/100BASE-T (RJ45) connections
Device Management:	Web-Based (requires web browser)
NTP client software:	NyToP, freeware, manual 1672
Application software:	QW3Control art. no. 123396-00, manual 1739

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Configuration

Most of the configuration parameters are set via an external PC by using a **Web-browser**, but some of the settings can also be done from the Master Clock.

The following parameters can be set from the Master Clock by using the special function *setup*.

- IP address

The following parameters can be viewed from the Master Clock by using the special function *status*.

- IP address

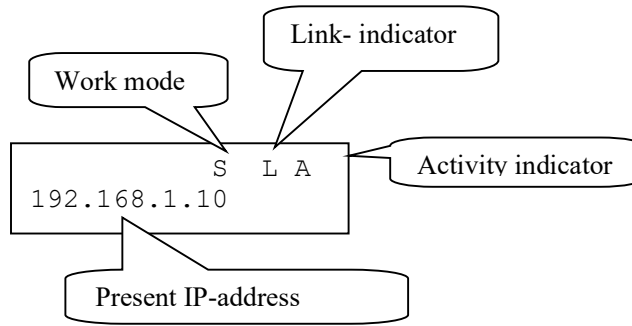
Setup IP

Example:

Give the module IP-address 192.168.1.66

MON 14 OCT 2021 09:07:00 LTW	Select function by using ↓ .
SPEC.-FUNCTIONS	Accept using YES. Press NO until wished function is displayed.
SPEC.-FUNCTIONS SETUP	Accept using YES.
SETUP IP	Press NO until the text IP is displayed. Accept using YES.
IP 192.168.001.066?	Set, by using the arrows, the IP-address 192.168.001.066. Accept using YES.
SETUP IP	Return to running mode by using ←.
SPEC.-FUNCTIONS SETUP	←
SPEC.-FUNCTIONS	←
MON 14 OCT 2021 09:07:00 LTW	

Status IP



Work mode S = Server. The Master Clock works as a NTP time server.
C = Client. The Master Clock works as a NTP time client.

Link indicator L = Link activated. The Master Clocks is connected to a network.
= No link activated. The Master Clock is not connected to a network.

Activity indicator A = Showing the network traffic from / to the Master Clock.

Work mode (NTP Server or Client)

The network module kan work in two different modes

Server:

The Master Clock works as a NTP time server answering to NTP requests from NTP clients.

Client/Server:

The Master Clock is both NTP client and NTP server.

The work mode is set from the Master Clock, SPEC.-FUNKTIONEN / SETUP / SYNC.SOURCE.

SYNC.SOURCE = NTP CLIENT

The Master Clock acts as a NTP-client receiving its time from an external NTP server.

SYNC.SOURCE = GPS, RDS, DCF etc.;

The Master Clock acts as a NTP server providing connected external clients with correct time.

Configuration using a WEB browser

Login

It is possible to login as administrator or guest. The administrator has the rights to read and to write/change configuration. A guest can read only.



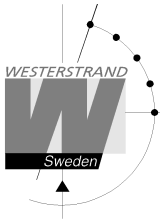
A login dialog box with a blue title bar containing a question mark and a close button. The main area has a light yellow background. At the top left is an icon of two keys. Below it, the text 'User name:' is followed by a dropdown menu showing a user icon and a small 'v' arrow. Below that, the text 'Password:' is followed by a text input field. Under the password field is a checkbox labeled 'Remember my password'. At the bottom are two buttons: 'OK' and 'Cancel'.

User name

admin or guest.

Password

Enter a password. Default password is *password*.
After login a menu is displayed:



Status

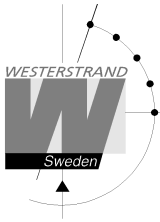
Status	Network	NTP	Remote	General
Name	Marine Master Clock			Refresh
UTC	2021-08-17 09:20:21, week 33 Tue			
LT	2021-08-17 11:20:21, week 33 Tue			
Timezone	UTC+02:00, no DST (MLT)			
IP	192.168.13.74 (Static)			
Netmask	255.255.240.0			
Gateway	192.168.1.1			
DNS	192.168.1.13			
MAC	00-07-09-10-29-28			
Status	Synchronized			
NTP	NTP Server			
Alarms	No alarms			
Uptime	16 min, 5 sec			
Firmware	MEC-B115 (Aug 16 2021). BOOTK64-X151			

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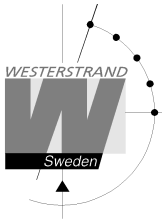
Name	Symbolic name of the Master Clock. This is set in function <i>General</i> .
UTC/LT	Current time, UTC and Local Time
Timezone	Time zone offset to UTC
IP	Shows the IP address of unit
Netmask	Shows the netmask setting
Gateway	Shows the IP address of the gateway
DNS	Shows the IP address of the DNS server
MAC	Shows the MAC address of the unit in format 00-07-09-xx-xx-xx
NTP	Work mode NTP Server = The Master Clock is working as NTP Server only. NTP Client + Server = The Master Clock is working as both Server and Client.
Status	<i>Not Synchronised</i> The Master Clock has never been synchronised. <i>Synchronised</i> The Master Clock has been synchronized at some point, either through manual timing or via an external time source. <i>Synchronized in holdover</i> The main clock works as an NTP client and has received time from an external time server but has lost contact with the server and has therefore switched to using its built-in oscillator as a reference.

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	<i>Synchronized: (192.168.3.7), Stratum=1, Answers=16</i> The Master Clock is synchronized and gets its time from an NTP server with IP address 192.168.3.7. This NTP server has stratum level 1 and the main clock has received responses to 16 NTP requests.
Alarms	Shows if the Master Clock has any alarms. Example: <i>No Alarms</i> = The Master Clock is OK. <i>No Radio</i> = The watch has lost synchronization for a long time. <i>5-minute limit</i> = Received time message is more than 5 minutes incorrect in relation to the clock's internal time. The message is not accepted. <i>Authentication</i> = MD5 authentication failed. See also section Alarm further down in this document
Uptime	Uptime for the Master Clock since last power failure
Firmware	Program version



Network

Enter general network parameters

Status	Network	NTP	Remote	General
DHCP				
Use DHCP	<input type="radio"/>			
Fallback	<input type="text" value="192.168.3.10"/>			
Static IP				
Use static IP	<input checked="" type="radio"/>			
Address	<input type="text" value="192.168.13.101"/>			
Subnetmask	<input type="text" value="255.255.240.0"/>			
Gateway	<input type="text" value="192.168.1.1"/>			
DNS 1	<input type="text" value="192.168.1.13"/>			
DNS 2	<input type="text"/>			
VLAN				
Enable VLAN	<input type="checkbox"/>			
VLAN tag (0-4094)	<input type="text" value="0"/>			
VLAN prio (0-7)	<input type="text" value="0"/>			
Utilities				
Syslog	<input type="text"/> <input type="checkbox"/>			
Identity access	<input type="text" value="Normal"/>			
Telnet	<input type="checkbox"/>			
HTTP	<input checked="" type="radio"/>			
HTTPS	<input type="radio"/>			
SNMP				
Enable SNMP	<input checked="" type="checkbox"/>			
Read community	<input type="text" value="public"/>			
Read/write community	<input type="text" value="private"/>			
Trap address 1	<input type="text"/>			
Trap address 2	<input type="text"/>			
Trap address 3	<input type="text"/>			
Trap type	v1 <input type="radio"/> v2 <input checked="" type="radio"/>			
<input type="button" value="Save"/>				

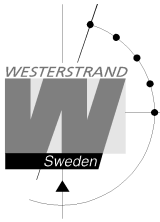
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DHCP

Use DHCP

Unchecked – Static IP address according to static IP below.

Checked – DHCP IP address with fallback according to IP fallback below.

Fallback

If DHCP is activated this will be the DHCP fallback address.

Static IP

Use static IP

To be checked if static IP address is used.

Address

Enter the static IP-address.

Subnetmask

Enter the subnetmask. Default 255.255.255.0

Gateway

Gateway IP address.

DNS

IP address of DNS server. Two different addresses can be entered, DNS1 and DNS 2.

VLAN

Virtual Local Area Network.

The Ethernet port and can be configured to use one IEEE 802.1q VLAN ID

Enable VLAN

VLAN is enabled if checked

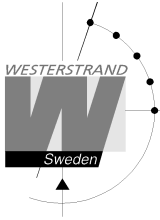
VLAN tag

A 12-bit value specifying a VLAN ID to which a port belongs. VLAN tags from 0-4094 can be entered here.

The selected tag is inserted into the data area of an Ethernet packet.

VLAN prio

Priority Values 0 (default, lowest priority) to 7 (highest priority) which can be used to prioritize network traffic for different types of data.



Utilities

Syslog

Syslog server IP address. Send syslog messages if checked.

Identity access

Identify access is used in combination with application software Wunser. Wunser is a PC program that is used for finding and doing light configuration on Westerstrand Ethernet products. Firmware updates are also handled by Wunser.

Wunser uses UDP port 9999 when communicating with other Westerstrand products and UDP port 69 when downloading new firmware. These ports can be open, closed or prepared for encrypted communication.

Identify access = Normal ; port 9999 and port 69 is open.

Identify access = Password ; port 9999 and port 69 are using AES encryption. The password used is the same as the administrator login password.

Identify access = Disabled ; port 9999 and port 69 is closed.

Telnet

Enable Telnet. Telnet enabled if checked.

Web server

Use of web-browser via HTTP or HTTPS allowed if checked.

HTTP

Use of HTTP (web-browser) if checked

HTTPS

Use of secure communication protocol HTTPS (web-browser) if checked.

SNMP

The Simple Network Management Protocol (SNMP) is used in network management systems to monitor status of devices. This function is used to activate the SNMP, enter the address of one or more SNMP servers and to define the SNMP community.

Trap address. The IP address can be specified as an IP address or as a full domain name. Up to three SNMP server addresses can be entered.

Enable

SNMP is enabled if checked

Read community

Default public

Read/write Community

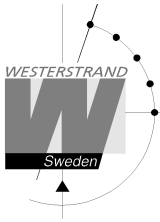
Default private

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Trap type

This function is used to choose SNMP trap version.

Trap type v1 = Trap according to SNMPv1

Trap type v2 = Trap according to SNMPv2

NTP

NTP settings

General description

Westerstrand NTP Servers has several features to achieve a reliable and accurate time service. The configuration of the different facilities is flexible, and the features can be selected or deselected depending on each customer's individual needs.

The Server can work as NTP Server only or as both NTP Server and NTP Client.

When working as NTP Client the unit has three different ways to determine the most accurate and reliable candidates to synchronize the system clock. Which model that is used depends on the specific installation and the customer requirements. The NTP client has also a server list where up to 5 different time servers can be entered.

The three different ways are:

1. FIRST Always use the first server in the list if available. If not available, take next one.

This suits installations where it is more important to know exactly from where the clients get time than to have the most accurate time. The other NTP servers in the list will then be more of backup servers.

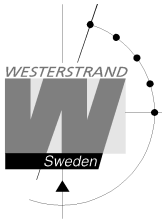
2. STRATUM Use the NTP server with best stratum. The software sends a request to all servers in the list and uses the time from the one with best stratum. If same stratum it will use the one that is first in the server list.

This suits installations where it is important that the time is coming from a time server high up in the pyramid.

3. MEDIAN Send a request to all servers in the list and use the median value (the NTP server that is in the middle). This will filter out all misleading time messages.

In addition to these rules there are some more features such as synchronization limits and a special clock adjusting algorithm where the speed of internal oscillator is increased or decreased depending on the difference between the internal clock and the NTP message. All of this to avoid false and inaccurate time and to give a, when needed, smooth time adjustment without time jumps.

A clock discipline algorithm is also included. This algorithm measures the oscillators drift over a longer period and makes compensations for the drift.



Status	Network	NTP	Remote	General
DHCP option 42 <input type="checkbox"/>				
Broadcast <input type="checkbox"/>				
Multicast <input type="checkbox"/>				
NTP 1		<input type="text" value="ntp.se"/>		
NTP 2		<input type="text"/>		
NTP 3		<input type="text"/>		
NTP 4		<input type="text"/>		
NTP 5		<input type="text"/>		
Interval		<input type="text" value="1"/>	minutes	
<input type="button" value="Save"/>				
NTP Advanced				

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NTP mode

This parameter defines if the unit shall work as an NTP Server only or both NTP Client and NTP Server.

DHCP option 042

Ask for time using the server IP addresses received from the DHCP server (DHCP option 0042). Maximum 2 NTP servers are set automatically by option 0042. Network DHCP must also be activated to enable this feature.

Broadcast

Accept broadcast/multicast time messages. Broadcast address: 255.255.255.255

Multicast

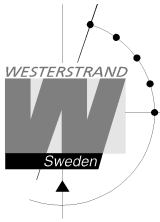
Accept multicast time messages. Multicast address: 224.0.1.1

NTP server

Select NTP servers, e.g. *192.168.1.237* or as an URL *ntp.se*. Also see DHCP option 042 above
Up to five different NTP servers can be entered. If the first one fails it will automatically go to the next one and so on.

Interval

Interval in seconds between NTP requests.



NTP Advanced

Advanced NTP settings

Status	Network	NTP	Remote	General
Server				
Server Mode	---	Interval	1	minutes
Stratum when no external sync	1			
Clogging prevention	<input type="checkbox"/>			
My ID	0	Key		
Client				
Client Mode	First			
5 minute limit	<input type="checkbox"/>			
Only accept Stratum 1	<input type="checkbox"/>			
Authentication	<input type="checkbox"/>			
Server 1 ID	0	Key		
Server 2 ID	0	Key		
Server 3 ID	0	Key		
Server 4 ID	0	Key		
Server 5 ID	0	Key		
<div>Save</div>				
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Server

Server mode

With this function activated will the server broadcast/multicast NTP messages according to the chosen interval. The server will still answer NTP requests from NTP clients.

Broadcast address: 255.255.255.255

Multicast address: 224.0.1.1

Interval(s)

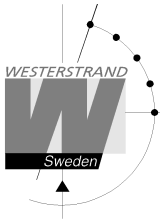
NTP broadcast interval in seconds. This function is used if broadcast/multicast server is activated. See above.

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Stratum when no external sync.

With this function it is defined which stratum level the NTP server shall adopt when it has been synchronized but now is working standalone. Synchronized means that the master clock / time central has received correct time, either from an external sync source, GPS or similar, or that the time is set manually.

If the NTP server has never been synchronized it will have stratum value 16 and LI-bits of the NTP message is set to 3 (clock unsynchronized).

Clogging prevention

The NTP server support access control with a call-gap function and can send kiss-o'-death packets if needed. If this function is activated clients asking for time too often, interval less than 1 second, will be denied and a kiss-o'-death packet will be sent.

My ID / Key

The NTP Server authentication data. Use for MD5 authentication.

Client

Client mode

FIRST. Always use the first server in the list if available. If not available, take next one.

This suits installations where it is more important to know exactly from where the clients get time than to have the most accurate time. The other NTP servers in the list will then be more of backup servers.

STRATUM. Use the NTP server with best stratum. The software sends a request to all servers in the list and uses the time from the one with best stratum. If same stratum it will use the one that is first in the server list.

This suits installations where it is important that the time is coming from a time server high up in the pyramid.

MEDIAN. Send a request to all servers in the list and use the median value (the NTP server that is in the middle). This will filter out all misleading time messages.

5 minute limit *

With this feature, the acceptance of incorrect time messages can be limited. The reason for this limitation is to avoid "time jumps" in the event of functional disturbances. If the time message coming from the NTP server differs more than 5 minutes compared to the clocks internal time, this time message will be rejected.

The default setting is no limit.

Check box = Off; No restriction, accept all messages.

Check box = On; Only accept messages with a maximum time difference of 5 minutes.

* Please note that the Time Central has a general sync. limit feature that affects all modules. See Special functions, section Sync. Limits. If this feature is activated it overrides the 5 minute limit setting.

Only accept Stratum 1

This function makes it possible to synchronise to Stratum 1 time servers only.

Check box = Off ; synchronise to time server independent of stratum level.

Check box = On ; synchronise only if time server is operating on Stratum 1 level.

Authentication

If authentication is activated: Use MD5 authentication.

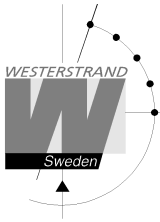
Server ID/Key: Authentication data for the external NTP servers configured in the NTP server list.

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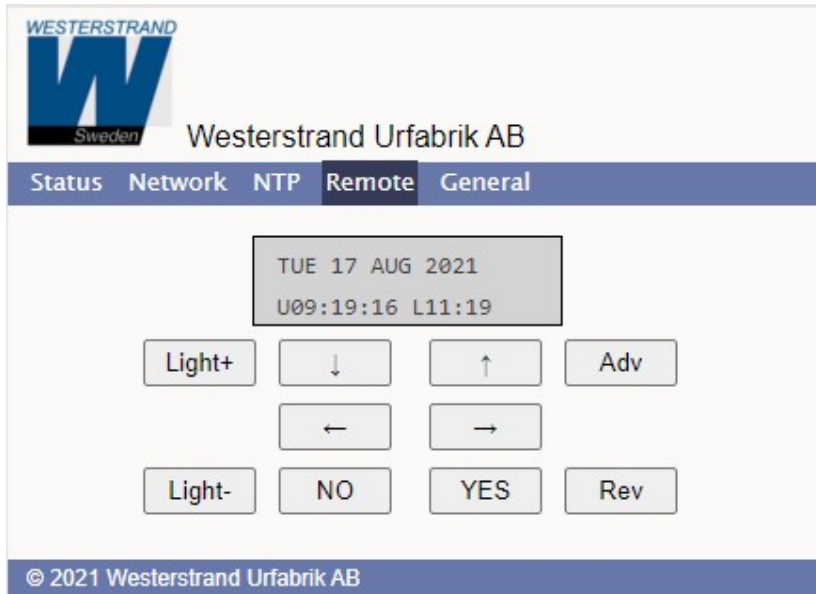
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Remote Remote control

Remote control of the Master Clock

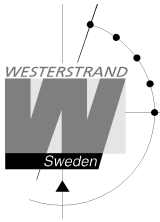


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General

Used to configure general parameters.

Status Network NTP Remote General			
Name	<input type="text" value="Marine Master Clock"/>		
Contact	<input type="text"/>		
Location	<input type="text"/>		
Password			
admin	<input type="password" value=".."/>	Repeat	<input type="password" value=".."/>
guest	<input type="password" value=".."/>	Repeat	<input type="password" value=".."/>
Miscellaneous			
Firmware	MEC-B115 (Aug 16 2021). BOOTK64-X151		
Firmware Download	<input type="checkbox"/>		
Restart Program	<input type="checkbox"/>		
<input type="button" value="Save"/>			
Backup/Restore			
Filename	<input type="text" value="Marine Master Clock.txt"/>	<input type="button" value="Backup"/>	
	<input type="button" value="Välj fil"/> Ingen fil har valts	<input type="button" value="Restore"/>	Program restarts!
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Name

Symbolic name, maximum 64 characters. This name is shown in the status menu.

Example: Central Master Clock ICC

Password

Login password.

Admin = Administrator password. The administrator has the rights to read and to write/change configuration.

Default password = **password**.

To switch off the password functionality enter password = **nopassword**

Guest = Guest password. A guest can read only. The button [Save] is deactivated for guest users.

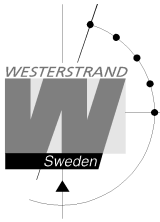
Default password = **password**.

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Lost password

If the password has been lost network card has to be cold started (FULL RESET). Contact Westerstrand for details.

Firmware Download

Function to enable firmware download. See also section *Firmware Download*.

Restart

Restart the network card.

Backup/Restore

Backup

Save the clock configuration to a file. The clock suggests the Name field as filename (here WDP_Y2 19_1HE.txt)

Click [Backup].

Passwords are not saved.

Backup/Restore

Filename

Ingen fil är vald. Program restarts!

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Restore

Select file ([Välj fil]). Here file *WDP_Y2 19_1HE.txt* was selected.

Click [Restore].

The clock restarts. Refresh the page.

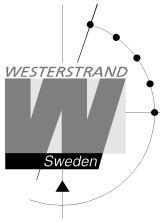
The MAC- and IP-address never are restored.

Backup/Restore

Filename

WDP_Y2 19_1HE.txt Program restarts!

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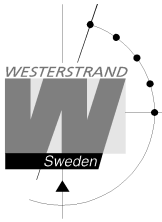
Firmware Download / Wunser

General

The Master Clock has support for firmware upgrade via the network. The utility program Wunser is used for firmware upgrade. Wunser can be downloaded from Westerstrand.se

If checkbox Firmware Download is clicked, then the application jumps to a boot-loader. If no firmware upgrade take place within 60 seconds, then the old application is restarted again with the current firmware. When the program is in boot-loader mode, then the clock will answer on PING only.

For details of the download procedure, see Wunser manual, 4296.



Alarm

The master clock is equipped with several supervision facilities to detect functional disturbances. Via the web browser status tab it is possible to see the Master Clock status including alarm (error) messages. The following alarm messages are available:

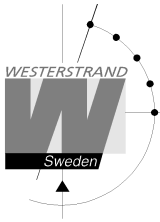
Type of alarm	Alarm code	Priority level	Indication	Reason for alarm	Action
RESET	12	-	SNMP trap sent	See action	The firmware in the network controller was restarted
WATCHDOG	16	-	SNMP trap sent	See action	This is not an alarm. It is a alive signal transmitted each 24 hour to tell connected SNMP management systems that the Sub Master Clock is alive.
NO RADIO	30	2	Red alarm LED lit. Alarm relay activated. SNMP trap sent.	The Sub Master Clock has not been synchronised for a longer period.	Check the network settings and connection to the NTP server (Central Master Clock). If OK, clear the alarm.
COMM	41	3	SNMP trap sent.	This is a general alarm for different types of network related errors such as: - NTP server address is incorrect or can not be found. - No response to NTP request. - Internal Communications errors on the network module.	-Verify the network connections. -Check network settings. -Check the NTP server
STRATUM	44	3	SNMP trap sent	Present NTP server has wrong stratum level.	Check the NTP server.
RESOLVE	46	3	SNMP trap sent	Fail to resolve an URL name	-Verify the network connections. -Check network settings. -Check the NTP server
UF LOW	52	1	Red alarm LED lit. Alarm relay activated SNMP trap sent	Impulse voltage below alarm limit.	Check the load on the impulse output. If OK, clear the alarm.
SHORT CIRCUIT	53	1	Red alarm LED lit. Alarm relay activated. SNMP trap sent	Short circuit on impulse output	Remove the short circuit. If OK, clear the alarm.

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CURRENT LOW	61	1	Red alarm LED lit. Alarm relay activated SNMP trap sent	Impulse current below alarm limit.	Check the load on the impulse output. If OK, check that the alarm limit is correctly configured. If OK, clear the alarm.
CURRENT HIGH	71	1	Red alarm LED lit. Alarm relay activated SNMP trap sent	Impulse current above alarm limit.	Check the load on the impulse output. If OK, check that the alarm limit is correctly configured. If OK, clear the alarm.
POWER DOWN	77	1	Alarm relay activated	By some reason the power to the master clock has been switched off.	Check the mains.