NETWORK TIME

DISPLAY USER

MANUAL

Brandywine Communciations
Time & Frequency Solutions Ltd
25 Eastways
Witham
Essex
UK CM8
3AL

Telephone: +44 (0) 1376 514114
Fax: +44 (0) 1376 516116
email: support@timefreq.com

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brandywine communications

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WARNINGS AND CAUTIONS

WARNING...

(1) DANGEROUS VOLTAGES EXIST IN THIS EQUIPMENT. DO NOT ATTEMPT ANY REPAIR WITHOUT FIRST SWITCHING OFF POWER TO THE SYSTEM, AT THE FRONT PANEL SWITCH, AND REMOVING THE POWER INPUT CONNECTOR.

(2) NICKEL, CADMIUM AND COBALT HYDROXIDE ARE TOXIC SUBSTANCES AND POTASSIUM HYDROXIDE IS A CORROSIVE SUBSTANCE. THE NICKEL CADMIUM BATTERY, FITTED WITHIN THIS UNIT, IS DANGEROUS IF BROKEN OR DISMANTLED. IF ANY BATTERY CHEMICALS COME INTO CONTACT WITH SKIN, WASH WITH COPIOUS AMOUNT OF WATER, AND SEEK MEDICAL ATTENTION AS REQUIRED. IF THE BATTERY IS SWALLOWED SEEK IMMEDIATE MEDICAL ATTENTION. RETURN ANY FAULTY BATTERIES TO THE MANUFACTURER, PROPERLY PACKAGED, FOR DISPOSAL.

(3) MOST BOARD ASSEMBLIES CONTAIN TANTALUM CAPACITORS OR ELECTROLYTIC CAPACITORS. BOTH TYPES CAN EXPLODE UNDER FAULT CONDITIONS. TAKE APPROPRIATE PRECAUTIONS WHEN WORKING WITH THE UNIT WITH THE LID REMOVED.

Caution...

a) This unit should only be worked on by qualified personnel, no user serviceable parts inside.

b) Care must be taken in handling the system. When lifting the system, standard procedures appropriate for the weight of the item must be used. All equipment and Board Assemblies must be transported in packaging that will ensure its safe and undamaged transit.

c) Several Board Assemblies contain static sensitive devices. Appropriate procedures must be used when handling these items.

INTRODUCTION

Aim of Manual

This manual gives the procedures required for the installation and operation of various M350 and M355 Network Time Display Units.

General Overview

The Network Time Display Units provide a four or six digit time or date display

An Integral Power Supply and CPU unit provides all the Power, Processing and Memory requirements to drive the LED display. A non volatile memory holds configuration data. An optional light sensor allows for the display brightness to react to ambient lighting conditions. Some display models obtain their power over the Ethernet Cabling (PoE IEEE 802.3)

A network connection allows for unit configuration using a standard HTTP browser and allows the unit to obtain time through the Network Time Protocol. Optional front buttons allow for additional control of brightness.

Network Connection

Connection to a 100BaseT network is made by the RJ45 lead fitted to the rear of the unit. This may also provide the power to the unit through Power over Ethernet (PoE). The unit is delivered with default values which may not match the required network settings. It is suggested that initial unit configuration is performed via a HTTP browser (Internet Explorer 5, Netscape Navigator 4.7 or above) using a PC directly connected only to the Unit, or by use of an IP Setup Utility (consult the factory).

EQUIPMENT OPERATION

The Digital Time Display provides a display of time or date obtained from periodically polling an external Network Time Protocol (NTP) server. The unit runs and phase locks its own internal clock to the NTP data, which provides for an improved free running accuracy should the NTP servers become unavailable.

Since NTP conveys only UTC time, local time has to be defined by configuring a UTC offset and by defining the start and stop of any Daylight Savings Time.

When power is applied, the Unit tries to reach the first NTP server. If successful, the top LED before or above the hours digit lights. Subsequently if an NTP poll is not replied to, or does not contain valid data, the LED extinguishes until a reply is received. If the NTP poll is unsuccessful 3 times the Unit switches to try another NTP server, if defined. If the other NTP server does not poll successfully then the Unit switches back to the original to repeat the process.

Until valid NTP data is initially received the display is blank, if NTP synchronization is subsequently lost the colons flash. If the difference between the display's internal clock and the last Reference Time received from the NTP server is two times the polling interval, the colons flash. In this way the display can indicate it is synchronized to a NTP server which itself has not recently synchronized to its source.

Single dots between the digit groups shows the unit is displaying date. Choice of Time or Date display is made through the HTTP interface but is only implemented on a reset by power cycle or change of IP address.

If the unit has two buttons the manual brightness option is fitted. Pressing the left button reduces the brightness, pressing the right increases the brightness. Pressing both together will change the display between time and date, for 5 seconds. If the unit has a single button the automatic brightness option is fitted. Pressing this button changes the display between date or time for 5 seconds.

Other aspects of the Unit's configuration and status reporting is obtained through the HTTP interface. The unit is delivered with default values as given in the table below:

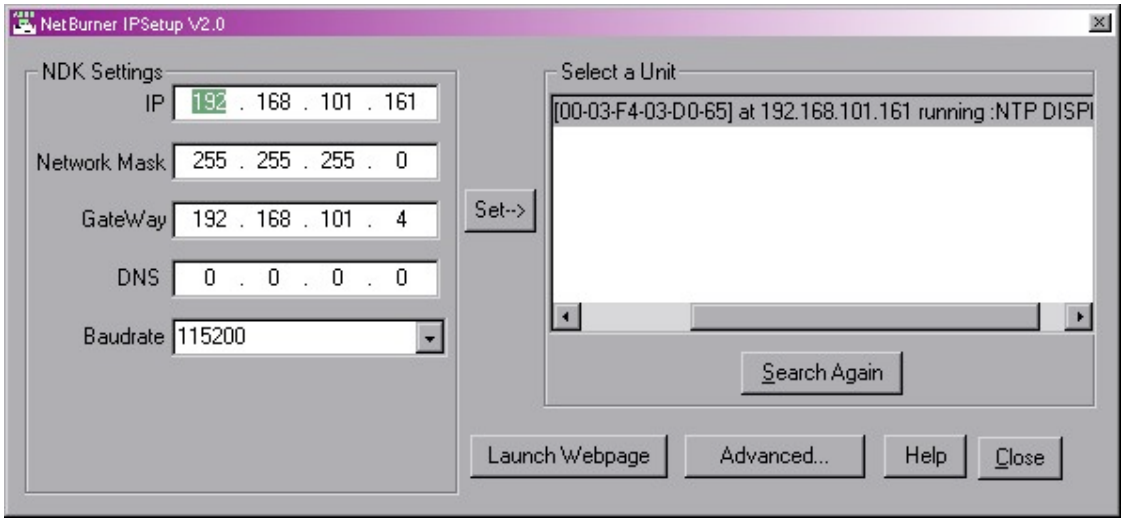
IP Address	192.168.101.152
NTP Server Address	192.138.101.154
Netmask	255.255.255.0
Gateway	192.168.101.101
Poll Interval	4s
UTC offset	+0:00 hours
DST on time	As for 2006
DST off time	see Appendix 1
Display Type	Time Display

UNIT STATUS and CONFIGURATION

Unit status and configuration is obtained by using an HTTP browser 'pointed' towards the unit. Ensure that network settings and cables on the host computer are appropriate to allow access to the Unit; this can easily be established by using a 'PING' utility. The browser has to support JavaScript and Frames. For initial setup this may mean that the host computer sits away from a network and has a single connection (either direct with a crossover cable, or through a hub) with the unit.

UNIT IP ADDRESS CONFIGUTAION USING IPSETUP UTILITY

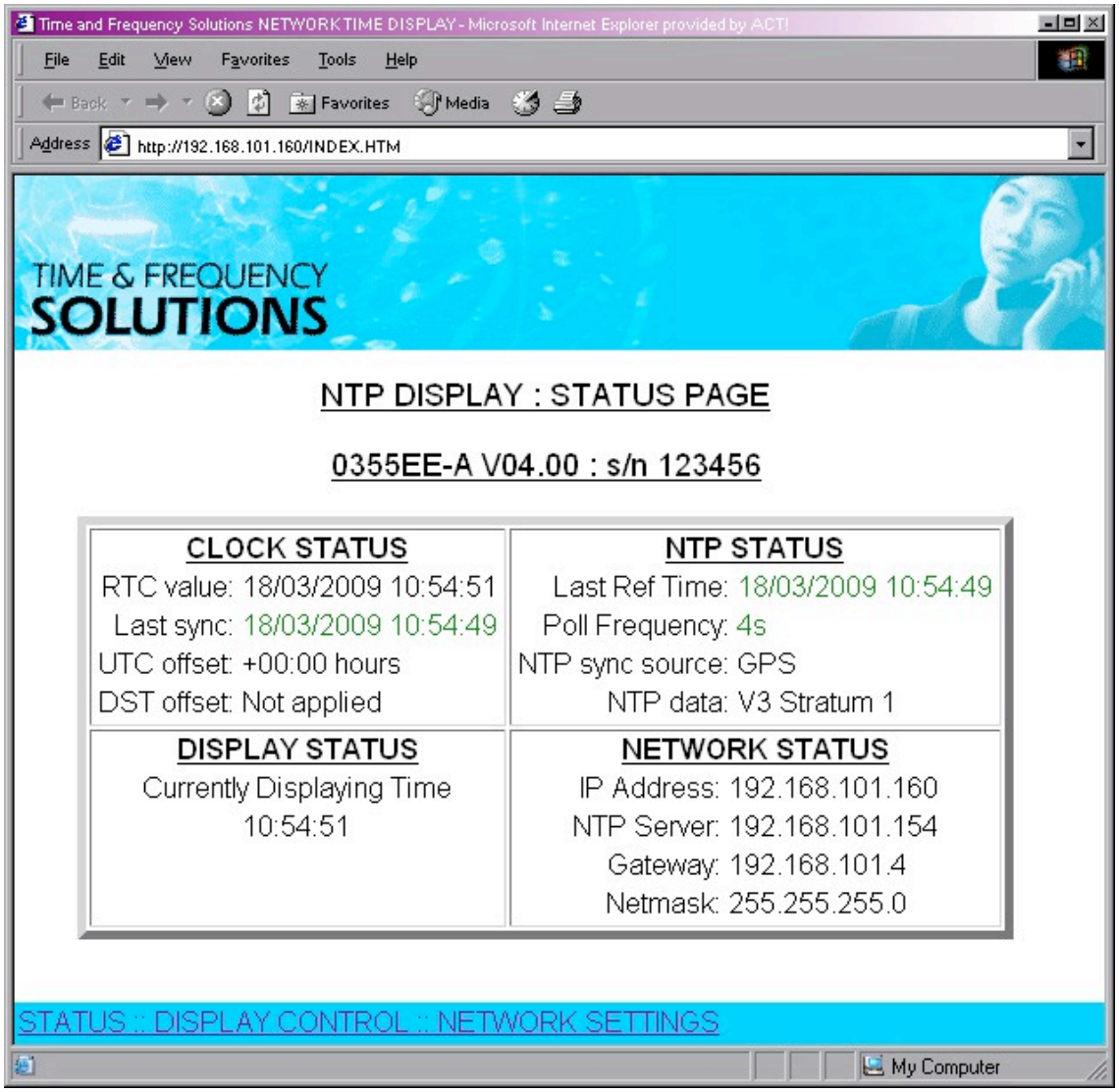
This is a third party PC utility which will allow the unit's IP parameters to be set irrespective of its current setting, as long as the unit sits on the same subnet as the interrogating PC. It uses UDP Port 20034 for operation so IP packets on this port should be allowed access the network and PC. Run the Utility on a PC. It should detect available units. Obtain from a network administrator the IP settings for the unit.



Select the required unit and alter the IP settings in the left hand pane to the required parameters (DNS and Baudrate are not needed). Click Set when complete and the unit is reset with these parameters. Once the unit's IP address is on the same subnet as the PC click 'Launch Webpage' to go to the unit.

STATUS PAGE

URL '[http://]<unit's ip address>[/][index.html]'. The following page will be displayed.



CLOCK STATUS

RTC value – A snap shot of the Real Time Clock value. This is UTC time when the Unit is synchronizing through NTP.
Last sync – The time from the last valid NTP packet to which the Unit last synchronized. If this time is behind the RTC value by more than the Poll Frequency then this is displayed in orange. If no valid packet has been received nothing is shown.
UTC offset – The basic local offset applied to the RTC (See Display Control Page)

DST offset – Not applied if the RTC is not within the DSTon – DSToff boundaries. Applied if the RTC is within the DSTon-DSToff boundaries. The DST offset is +1hr. (See Display Control Page)

NTP STATUS

Last Ref Time - The time from the last valid NTP packet received at which the NTP Server synchronized to its time source. If this time is behind the RTC value by more than two times the Poll Frequency then it is displayed in orange. If the NTP server is reached but valid NTP time has not been received 'No valid time' in seen in orange. If the NTP server is not reached then 'Server not reached' is shown in red.
Poll Frequency – The Interval between polls of the NTP Server for time. This is in orange if no valid NTP data has yet been received. This is not shown if the NTP server is not yet reached.
NTP sync source – The Reference Identifier from the last valid NTP packet received. This may also be an IP address. It shows the time source of the NTP Server
NTP data – The NTP version number and Stratum level from the last valid NTP packet received.

DISPLAY STATUS

Currently Displaying Time/Date – indicates the current display mode followed by a snap shot of the current display. The time or date displayed is RTC+Offset[+DSToffset].

NETWORK STATUS

IP Address – The IP address of the unit.
Gateway – The IP address of the network segment gateway that the Unit is on.
Netmask – The Netmask of the network segment is on.
NTP Server – The IP address of the current NTP server being polled.

The unit may access NTP Servers away from the network segment that it is on. This requires the Gateway and Netmask to be correctly set. The route to the NTP Server then must also be obtainable by the Gateway.

The unit may also reside on a different network segment from which the HTTP browser is situated. Again the Gateway and Netmask have to be correctly set, as does the route to the HTTP browser from the Unit.

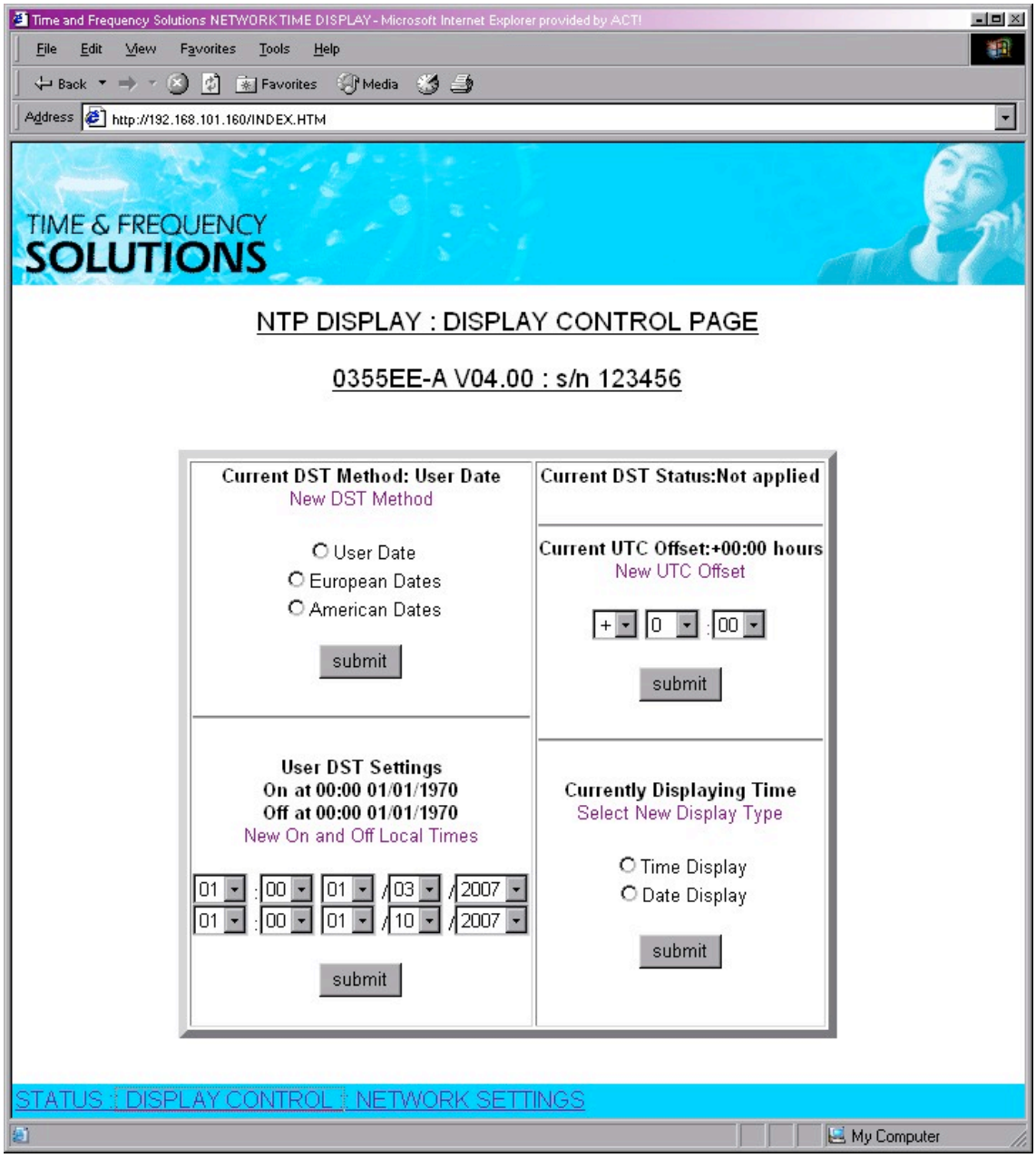
Contact a Network Administrator if there are doubts.

NAVIGATION BAR

Will move between this, the DISPLAY CONTROL and NETWORK SETTINGS pages.

DISPLAY CONTROL PAGE

Arrived at by clicking the DISPLAY CONTROL link at the bottom of the home page.



Current DST Method

Daylight Saving Time offsets are often locally applied. The unit has three methods for determining whether the one hour offset is to be applied. The User Date option allows the DST on and off times to be directly specified. The European Date option allows the display to use an internally defined lookup table to determine the on and off times for the current year. The American Date option does the same, but with a different lookup table. The lookup table dates are given in Appendix 1. Click Submit to enter a new value.

USER DST Settings

This determines the on and off times for application of a User defined DST offset. The current settings are given first followed by drop down boxes for on and off times respectively. The time of change refers to the Local Time at which the offset change will be made (i.e. RTC+UTCoffset time). Click Submit once the required time and date have been selected. To prevent DST from occurring select the same time and date for both on and off times. If the RTC+UTCoffset time lies between the DSTon and DSToff times then the DST offset of +1 hour is applied to the RTC+UTCoffset time when displaying time or date. Click Submit to enter new values. This setting will need amending every year, and can accommodate both Northern and Southern Hemisphere operation.

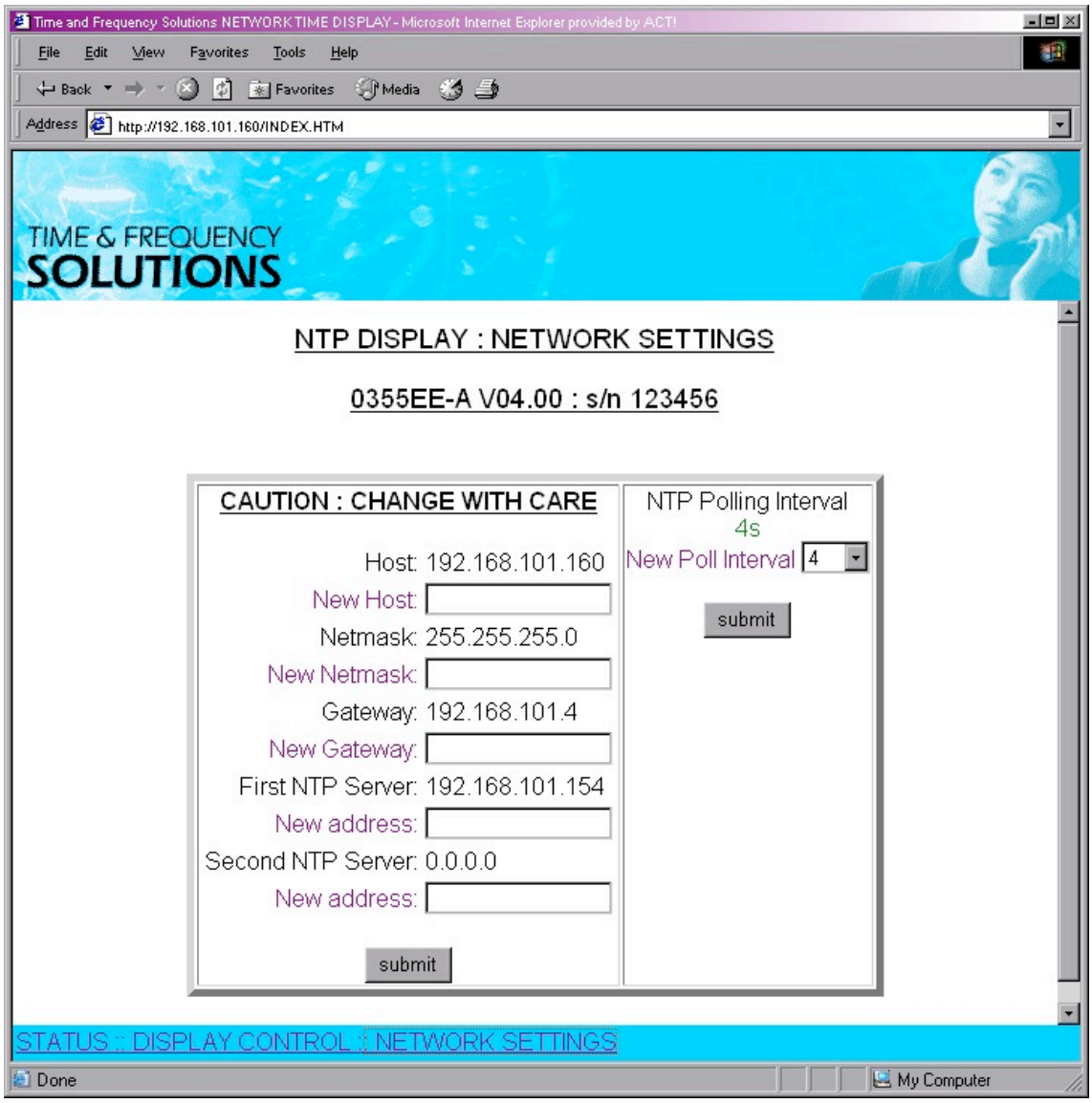
UTC Offset Setting

This determines the hours and minute offset to apply the RTC to get the local time. The current value is given followed by drop down boxes for selection of a new value. Click Submit to enter a new value.

Display Type Setting

This determines whether Time or Date is displayed. The current setting is shown followed by radio button selection of a new value. Click Submit to enter a new value. The change is effected by either a power cycle or by changing the IP address, which causes a soft reset.

NETWORK SETTINGS PAGE



IP ADDRESSES

The IP addresses are utilized at power on to provide network connection. The values on next power on are provided, and these can be changed in this section. Type in the new IP address(es) to be changed and Click Submit. If the NTP Sever addresses are changed the effect is immediate. If any of the other addresses are changed the unit is reset. In this case a redirect page should appear with a link to click to reach the new address. If this redirection does not happen enter the home page URL with the New Host address. Note that if the new IP address is not on the same subnet as the PC then the device may become unreachable until a correct hardware and network path exists between the PC and the unit.

NTP Polling Interval

This is the period between polls of the NTP server for time. Select the required period and click on ‘Submit’ to enter the new value. The new value takes effect from after the next poll.

FAULT FINDING

First Checks

If the unit does not show any sign of working when connected up, check that the mains or PoE supply is functioning. If fitted, check the fuse located on the PSU/CPU module adjacent to the mains input connector. Note that the unit does not display until time has been obtained over the network.

No NTP Synchronization

Check all network settings on the Unit. Contact a Network Administrator to confirm the route to the NTP server is correctly configured.

No HTTP functionality

Ensure that all cabling is intact. Confirm that the route to the Unit is known. Confirm that the Unit responds to a PING request. Confirm the Unit's IP values. Ensure that the HTTP browser is Frames and JavaScript Enabled.

Appendix 1

	European DST Table:Change at 1am		*American DST Table:Change at 2am*	
Year	**On date**	**Off date**	**On date**	**Off date**
2006	26/03	29/10	02/04	29/10
2007	25/03	28/10	11/03	04/11
2008	30/03	26/10	09/03	02/11
2009	29/03	25/10	08/03	01/11
2010	28/03	31/10	14/03	07/11
2011	27/03	30/10	13/03	06/11
2012	25/03	28/10	11/03	04/11
2013	31/03	27/10	10/03	03/11
2014	30/03	26/10	09/03	02/11
2015	29/03	25/10	08/03	01/11
2016	27/03	30/10	14/03	07/11
2017	26/03	29/10	13/03	06/11
2018	25/03	28/10	12/03	05/11
2019	31/03	27/10	11/03	04/11
2020	29/03	25/10	09/03	02/11
2021	28/03	31/10	08/03	01/11
2022	27/03	30/10	14/03	08/11
2023	26/03	29/10	13/03	07/11
2024	31/03	27/10	11/03	05/11
2025	30/03	26/10	10/03	04/11
2026	29/03	25/10	09/03	03/11
2027	28/03	31/10	08/03	02/11
2028	26/03	29/10	13/03	08/11
2029	25/03	28/10	12/03	07/11
2030	31/03	27/10	11/03	06/11
2031	30/03	26/10	10/03	05/11
2032	28/03	31/10	08/03	03/11
2033	27/03	30/10	14/03	02/11