4000x Series Digital Clock

Operating and Installation

Instruction Issue 2.5

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Trademarks

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Statutory Notices

Warning - To prevent fire or shock hazard, do not expose the internals of the unit to rain or moisture.

Disposal of Lithium battery - This equipment has a built-in Lithium (Li) battery which in normal operation should have a service life greater than 10 years.

CAUTION - Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions. You can return your unwanted Lithium batteries to the manufacturer or their agent. Note: In some areas disposal of Lithium batteries in household or business waste may be prohibited. Caution: Do not handle damaged or leaking Lithium batteries. To remove battery at end of product's life, unscrew backplate from case body to remove (top rail in case of double sided unit), locate Lithium battery on main driver board and remove. Battery should be disposed of as per local legislations.

End of Life - At the end of product's life, do not dispose of your device in the regular domestic/household waste. Return your device to your supplier who will dispose of it correctly.

Electromagnetic Compatibility & Safety

For Customers in Europe:

4000x series digital clocks, when used in accordance with our recommendations, complies with the European Community Electromagnetic Compatibility Directive 2004/108/EC and the European Community Low Voltage Directive 2006/95/EC and conforms to the following standards:

EN 61000-6-1 EN 61000-6-3 EN 60950

For Customers in the USA

The equipment has been designed to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. The equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- Re-orientate or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

Warranty

The 4000x series digital clocks are fully guaranteed, on a return to works basis, against failure due to faulty parts or workmanship for 24 months from date of purchase. In the event of failure, either within or outside the warranty period, please pack the unit with care and return to the manufacturer, or their agent, for examination and repair.

In no event shall the manufacturer, or their agent be liable for any direct, incidental or consequential damages of any nature, or losses or expenses resulting from any defective product or the use of any product, irrespective of whether the manufacturer, or their agent, has advance notice of the possibility of such damages.

Product Development

In the interests of improving design, operational function, and/or reliability, Wharton Electronics Ltd reserves the right to make changes to the products described in this document without notice.

This manual version 2.5 applies to units operating with software version n5-7c or later, unless otherwise stated.

1 - Introduction

The 4000x series of digital clocks provide a precise and elegant display of time using red, green, yellow/amber, blue or white LED display characters with an unrivalled flexibility of operation in the most demanding timekeeping and stopwatch applications.

All units can be used in stand-alone applications, while 4000N & 4000NE products are primarily intended to be synchronised via NTP/SNTP from a remote time server located on the customer's TCP/IP Ethernet network. 4000Nx units can be configured for over 10 different types of secondary clock operation, including GPS, IRIG or EBU timecode synchronisation when fitted with the appropriate option module or connected to an external receiver. The 4000EP version is intended to synchronise from MOBALine or 24V alternate polarity impulses.

The 4000N & 4000NE series digital clocks can display static time display, alternating time and date, alternating time and temperature, or alternating time, date and temperature. (Please note, temperature display is only available on 4000NE series units and requires connection of a 406 temperature sensor.)

All of the digital clocks also have the ability to operate as a multi-range programmable stopwatch using supplied infrared remote control or, for 4000NE units only, using an external stopwatch control panel or user supplied voltage free contact closure or switch.

Simple Operation

All 4000x digital clocks are supplied with an infrared remote control to allow for easy setup and control of stopwatch functions. The units are simple to configure and will automatically adjust themselves for seasonal daylight savings time changes (as required).

Operating Features

The 4000x series digital clock displays offer the following operating features.

- 83 preset location codes - The digital clock may be user programmed to display the time in one of 83 different preset locations.
- User programmable time zone - To allow for custom time zones or future changes in legislation.
- Automatic or manual brightness - The display may be programmed to one of seven preset display brightness levels. Alternatively, the unit may be programmed for automatic display brightness where the display illumination level is reduced as the ambient light level decreases.
- Multi-function Stopwatch - The display can be configured to operate as a count-up or count-down stopwatch with the display freely switchable between operating modes or fixed to either stopwatch or clock display.

2 - Installation and Operation

Power Supply Connection

The 4000x series digital clocks are fitted with either universal mains power supplies (enabling operation at voltages from 100 to 240V AC 50/60Hz without adjustment), low voltage DC power supplies or Power-over-Ethernet (PoE) power supplies, as specified at time of order.

Units are supplied with a 2m mains cable preterminated with a UK style moulded plug (units for supply to the USA or Canada are supplied with a 2m captive mains cable preterminated with a US style moulded plug).

A connection to the earth line must be made to ensure safe operation and compliance with EMC regulations.

To ensure conformance with EN60950:

A. For installations where the 4000x series digital clock is to be permanently connected into the mains power circuit, a readily accessible disconnect device should be incorporated in the fixed wiring.

B. For installations where the 4000x series digital clock is to be plugged into the mains power circuit, a socketed outlet should be installed near the equipment and should be easily accessible.

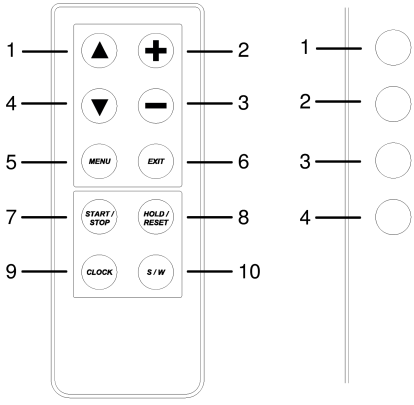
All installation work should be performed in accordance with current Building Regulations and the Seventeenth Edition of the IEE Wiring Regulations, or equivalent local standard.

The power supply is fitted with an internal fuse. In case of fault the fuse should only be replaced with a fuse of the same rating, by a suitably qualified engineer after disconnection from the mains power supply and correction of the fault condition.

Remote Control and Rear Switches

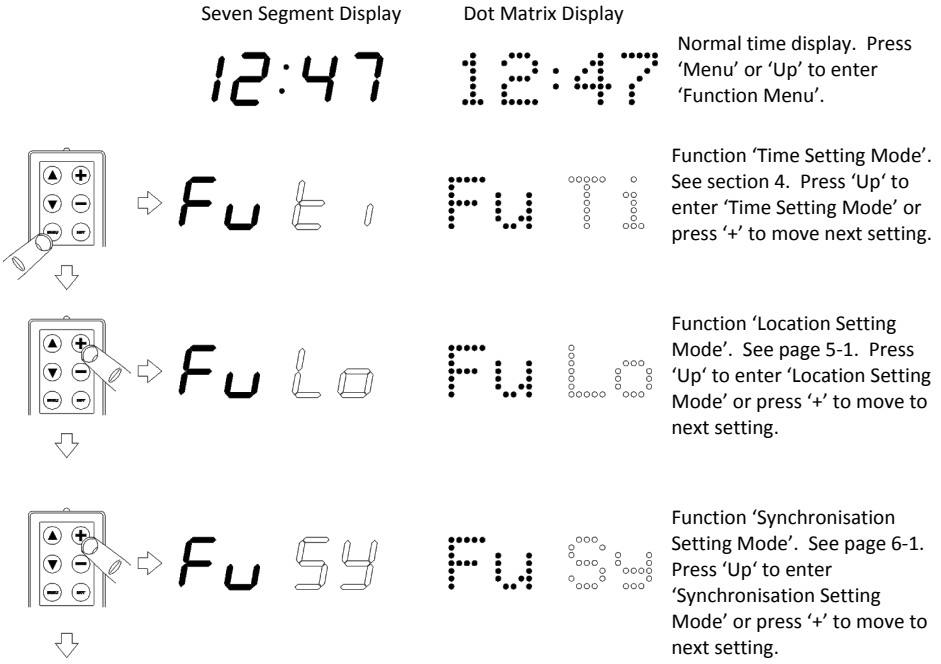
In addition to the rear setting switches, the 4000x series digital clock displays are supplied with an Infrared Remote Control to allow for easy setting of the unit.

1 'Up' - Used to navigate up through setting menus or access Function Menu when time is displayed.
2 '+' - Used to increment setting options.
3 '-' - Used to decrement setting options.
4 'Down' - Used to navigate down through setting menus.
5 'Menu' - Used to access Function Menu on clock.
6 'Exit' - Used to exit from any clock setting menu to normal clock display.
7 'Start/Stop' - Only used in Stopwatch Mode. See Section 9 for further information
8 'Hold/Reset' - Only used in Stopwatch Mode. See Section 9 for further information.
9 'Clock Mode' - Used to place clock into Clock Mode. See Section 9 for further information.
10 'Stopwatch Mode' - Used to display Stopwatch Mode. See Section 9 for further information



3 - Function Programming

The 4000x digital clocks have a user friendly programming interface based around a series of function menus, accessed using the supplied Infrared remote control or four switches located on the right hand rear of the display. The function menus may be accessed as detailed in the drawing below. This drawing illustrates the menu display for both seven segment and dot matrix display units.

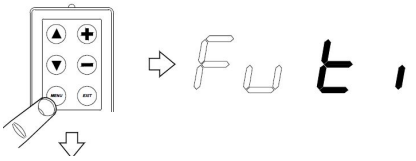


The other function menu options are detailed in the table below.

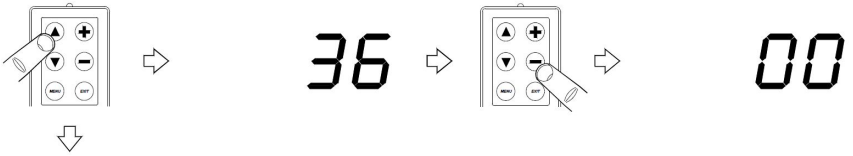
Function Menu Options	Function	Section
Ti	Time and Date Setup - Manually set time and date on unit.	4
Lo	Location Code Setup - Select UTC offset and seasonal time change rules.	5
Sy	Synchronisation Mode Setup - Select synchronisation mode.	7
Nt	Ethernet Setup - Select network settings.	6
Cl or Di	Calendar / Date format Setup - Select calendar/date format.	8
SS	Stopwatch Setup - Select stopwatch settings.	9
Et	External Interface Setup - Select operating mode of external interface. (NE units)	10
St	System Setup - Select brightness level (br) and 12/24 hour display format.	11

4 - Time and Date Setting

The 4000x series digital clocks can be configured to automatically adjust for daylight savings changes, however if the unit is run in Standalone mode of operation (i.e. unsynchronised), you may occasionally need to manually adjust the time. Please refer to the diagram below for further information.



Function 'Time Setting Mode'. Press 'Up' to enter 'Time Setting Mode' and set the seconds count.



Seconds Setting Mode. Press '+' to increment seconds, '-' to set to zero. Press 'Up' to set minutes count.

Minutes Setting Mode. Press '+' or '-' to increment or decrement minutes. Press 'Up' to set the hours count. Complete time setting process detailed in table below.

Fu Ti Function	**Time and Date settings Display Type**		**Description**	**'Up' button function**
	hh:mm	**hh:mm:ss**		
Second	**36**	12 47 **36**	Set second (minus button sets seconds to zero).	Select minutes
Minute	12 **47**	12 **47** 36	Set minute.	Select hours
Hour	**12** 47	**12** 47 36	Set hour.	Select year
Year	**20 14**	**20 14**	Set year.	Select month
Month	26 **06**	26 **06** 14	Set month.	Select day of month
Day of Month	**26** 06	**26** 06 15	Set day of month.	Exit to Time Display

5 - Location Setup

The 4000x series digital clocks provide advanced time zone functionality where the display may be user programmed to automatically indicate the time in one of 83 preset locations. Incorporating 'Set Once' technology, the 4000x series digital clock displays will automatically calculate future seasonal time changes for all preset time location code settings.

Setting the Location

If you wish to alter the time zone displayed on your 4000x series digital clock, rather than manually adjusting the time, the location code should be adjusted as detailed in the table below.

The location settings are accessed from the function menu as detailed in section 3.

Fu Lo	Location settings			
Function	**Display Type**		**Description**	**'Up' button function**
	hh:mm	**hh:mm:ss**		
Location	L **01**	L **01**	Set time zone location code.	Exit to Time Display

The table below details the time displayed for each location code.

Time Zone Locations

Code	Time Zone / City / Location	UTC Offset	Seasonal Time Change
00	UTC+0 (ZULU) UTC, GMT	0	No
01	WET/WEST GMT/BST London, Lisbon	0	Yes
02	UTC+1 (ALPHA) WAT Luanda, Angola	1	No
03	CET/CEST MEZ/MESZ Brussels, Frankfurt	1	Yes
04	UTC+2 (BRAVO) SAST Jo'burg, Pretoria, S Africa	2	No
05	EET/EEST Greece - Athens, Ukraine - Kiev	2	Yes
06	IST/IDT Israel - Tel Aviv	2	Yes
07	MSK-1 Russia - Kaliningrad	3	No
08	UTC+3 (CHARLIE) AST Iraq - Baghdad, S Arabia - Riyadh	3	No
09	MSK Russia - Moscow	4	No
10	IRST/IRDT Iran - Tehran	3	Yes
11	UTC+4 (DELTA) GST UAE - Dubai, Abu Dhabi	4	No
12	AZT/AZST Azerbaijan - Baku +4 hours offset	4	Yes
13	AFT Afghanistan - Kabul	4 1/2	No
14	UTC+5 (ECHO) TMT Turkmenistan - Ashgabat	5	No
15	PKT Pakistan - Islamabad	5	No
16	YEKT, MSK+2 Russia - Yekaterinburg	6	No
17	IST India - New Delhi, Mumbai	5 1/2	No
18	UTC+6 (FOXTROT) BST Bangladesh - Dhaka	6	No
19	OMST, MSK+3 Russia - Omsk	7	No
20	MMT Myanmar - Naypyidaw	6 1/2	No
21	UTC+7 (GOLF) WIB Indonesia - Jakarta	7	No
22	KRAT, MSK+4 Russia - Krasnoyarsk	8	No
23	UTC+7.5	7 1/2	No
24	UTC+8 (HOTEL) CST - Beijing, WITA - Central Indonesia, WST Australia - Perth	8	No
25	IRKT, MSK+5 Russia - Irkutsk	9	No
26	UTC+9 (INDIA) JST Japan - Tokyo, WIT - Eastern Indonesia	9	No
27	YAKT, MSK+6 Russia - Yakutsk	10	No
28	CST Australia - Darwin	9 1/2	No
29	CST/CDT Australia - Adelaide	9 1/2	Yes
30	UTC+10 (KILO) EST Australia - Brisbane, ChST Guam	10	No
31	EST/EDT Australia - Sydney, Tasmania - Hobart	10	Yes
32	VLAT, MSK+7 Russia - Vladivostok	11	No
33	UTC+10.5	10 1/2	No
34	UTC+11 (LIMA) SBT Solomon Is. - Honiara	11	No
35	MAGT, MSK+8 Russia - Magadan	12	No

36	UTC+12 (MIKE) MHT Marshall Is. - Majuro, Kwajalein	12	No
37	NZST/NZDT New Zealand - Wellington, Auckland	12	Yes
38	TKT Tokelau - Fakaofo	13	No
39	LINT Line Is.- Kiritimati	14	No
40	UTC-13	-13	No
41	UTC-12 (YANKEE)	-12	No
42	UTC-11 (X-RAY) Midway Is.	-11	No
43	UTC-10 (WHISKEY) HAST Hawaii - Honolulu	-10	No
44	UTC-9 (VICTOR)	-9	No
45	AKST/AKDT US - Alaska, Anchorage	-9	Yes
46	UTC-8 (UNIFORM) PST US - Pitcairn Is.	-8	No
47	PST/PDT US - Pacific, L.A.	-8	Yes
48	UTC-7 (TANGO) US - Arizona, Phoenix	-7	No
49	MST/MDT US - Mountain, Denver	-7	Yes
50	UTC-6 (SIERRA) Costa Rica - San Jose	-6	No
51	EST/CST Mexico - Mexico City	-6	Yes
52	CDT/CST US - Central, Chicago	-6	Yes
53	UTC-5 (ROMEO) PET Peru - Lima	-5	No
54	EST/EDT US - Eastern, New York	-5	Yes
55	VET Venezuela - Caracas	-4 1/2	No
56	UTC-4 (QUEBEC) BOT Bolivia - La Paz	-4	No
57	CLT/CLST Chile - Santiago	-4	Yes
58	ADT/AST US - Atlantic	-4	Yes
59	PYT/PYST Paraguay - Asuncion	-4	Yes
60	UTC-3.5	-3 1/2	No
61	NST/NDT US - Newfoundland	-3 1/2	Yes
62	ART/BRT - Argentina - Brazil	-3	No
63	Legacy BRT/BRST - N/A	-3	Yes
64	WGT/WGST Greenland (West) - Nuuk	-3	Yes
65	PMST/PMDT US - Pierre & Miquelon	-3	Yes
66	UYT/UYST Uruguay - Montevideo	-3	Yes
67	UTC-2.5	-2 1/2	No
68	UTC-2 (OSCAR)	-2	No
69	UTC-1 (NOVEMBER) CVT Cape Verdi - Praia	-1	No
70	AZOT/AZOST Portugal - Azores	-1	Yes
71	EGT/EGST Greenland (East) - Ittoqqortoormiit	-1	Yes
72	Morocco - Rabat, Casablanca	0	Yes
73	WT/WST Western Sahara - El Aaiún	0	Yes
74	Namibia - Windhoek	1	Yes
75	Egypt - Cairo	2	No
76	Gaza - Gaza	2	Yes
77	Jordan - Amman	2	Yes
78	Lebanon - Beirut	2	Yes
79	Syria - Damascus	2	Yes
80	West Bank - Bethlehem	2	Yes
81	NPT Nepal - Kathmandu	5 3/4	No
82	FJT/FJST Fiji - Suva	12	Yes
83	SST Samoa - Apia	13	Yes
96	Stopwatch display (47xx world time zone display only)		
98	Custom location code		
99	Blank display (47xx world time zone display only)		

User Programmable Time Zone

To allow for custom time zones and future changes in legislation, setting the unit to location code 98 enables the user to program a 6 byte code representing the local time offset and seasonal time change-over dates for that zone. Please contact your local distributor for further details of this function.

6 - Network Setup

The 4000N and 4000NE series digital clocks are fitted with a 10/100Base-T Ethernet network interface and designed to synchronise to a remote NTP (Network Time Protocol) time server across a TCP/IP computer network.

Upon initial installation, the unit's IP address, subnet mask, gateway and NTP time server IP address shall be automatically assigned by a DHCP server (if available). Alternatively, the unit's IP address, subnet mask, gateway and NTP time server IP address can be statically assigned.

The table below details the available network parameters. Please contact your network administrator for details of network configuration & addresses that will allow the clocks to be used on your network.

Fu Nt	**Network settings**			
Function	**Display Type**		**Description**	**'Up' button function**
	hh:mm	**hh:mm:ss**		
DHCP Setting	dh **Fu**	dh **Full**	Full DHCP mode. Automatic assignment of IP, Subnet and Gateway by customer's DHCP server. Automatic assignment of NTP servers via DHCP option 42.	Exit to Time display
	dh **Ye**	dh **Yes**	DHCP mode. Automatic assignment of unit's IP, Subnet and Gateway by customer's DHCP server. User setting of NTP server addresses.	Exit to Time display
	dh **No**	dh **No**	Static assignment of IP, Subnet and Gateway addresses by user. User setting of NTP server addresses.	Select IP Byte 1
IP Byte 1	I **010**	I **010**	IP Address setting 1st Byte / Octet Range 0 - 254	Select IP Byte 2
IP Byte 2	I **001**	I **001**	IP Address setting 2nd Byte / Octet Range 0 - 255	Select IP Byte 3
IP Byte 3	I **000**	I **000**	IP Address setting 3rd Byte / Octet Range 0 - 255	Select IP Byte 4
IP Byte 4	I **100**	I **100**	IP Address setting 4th Byte / Octet Range 0 - 255	Select Subnet Byte 1
Subnet Byte 1	S **255**	S **255**	Subnet Address setting 1st Byte / Octet Range 0 - 255	Select Subnet Byte 2
Subnet Byte 2	S **255**	S **255**	Subnet Address setting 2nd Byte / Octet Range 0 - 255	Select Subnet Byte 3
Subnet Byte 3	S **000**	S **000**	Subnet Address setting 3rd Byte / Octet Range 0 - 255	Select Subnet Byte 4
Subnet Byte 4	S **000**	S **000**	Subnet Address setting 4th Byte / Octet Range 0 - 255	Select Gateway Byte 1
Gateway Byte 1	G **010**	G **010**	Gateway Address setting 1st Byte / Octet Range 0 - 254	Select Gateway Byte 2
Gateway Byte 2	G **001**	G **001**	Gateway Address setting 2nd Byte / Octet Range 0 - 255	Select Gateway Byte 3
Gateway Byte 3	G **000**	G **000**	Gateway Address setting 3rd Byte / Octet Range 0 - 255	Select Gateway Byte 4
Gateway Byte 4	G **001**	G **001**	Gateway Address setting 4th Byte / Octet Range 0 - 255	Exit to Time display

7 - Synchronisation Setup

The 4000x series digital clocks have a standalone accuracy of better than 0.1 sec/day @ 20-25ºC. However, for applications where an increased level of accuracy is required, units may be synchronised to a range of different synchronisation methods.

The synchronisation settings are accessed from the function menu as detailed in section 3.

Fu Sy	**Synchronisation settings**			
Sync Mode	**Description**			**Available on version**
	Mode	**Range**	**Option Description**	
None			Stand alone operation.	N, NE, EP
NTP			NTP synchronisation on 10/100Base-T Ethernet TCP/IP network.	N, NE
	DHCP		Clock is set to 'Full DHCP' mode (see Network Setup). NTP server IP address is obtained from the customer's DHCP server.	
Byte 1	n **010**	1->254	Clock is set to 'No' or 'Yes' mode (see Network Setup). 1st Byte/Octet of NTP server's IP address.	
Byte 2	n **000**	0->255	2nd Byte/Octet of NTP server's IP address.	
Byte 3	n **000**	0->255	3rd Byte/Octet of NTP server's IP address.	
Byte 4	n **000**	0->255	4th Byte/Octet of NTP server's IP address.	
GPS			GPS satellites synchronisation. (requires 488HS4 or 488HS4-GLONASS receiver)	NE, EP
48x0			High precision UTC synchronisation code from existing 5200 or 4860 series master clock.	NE, EP
482			w482 Time code from existing 5200, 4860 or 482D series master clock.	NE, EP
	Zo	1->F	w482 time code zone that unit will use.	
DCF			DCF77 Radio time code synchronisation from legacy 484.03/484.02 radio receiver	NE
MOBA			MOBA*Line* time code from ETC or DTS series master clock. Offset in minutes of input MOBALine time signal to UTC (in winter time)	NE, EP
1PPS			Contact your local distributor for information.	
SER			RS232 or RS485 serial ASCII time synchronisation	N232 or N485
	St	WF1, WF2, LUL1, LUL2, LUL3, GPZDA	Time synchronisation from specific format serial message.	
	Ba	12 -> 57	Baud rate from 1200 - 57,600 baud	
	Bit	7, 8	7 or 8 data bits	
	Par	Non, Eve, Odd	Parity: None, Even or Odd	
IRIG			1KHz Amplitude Modulated IRIG-B	NIRIG
EBU			24, 25, 29.97 & 30 fps EBU/SMPTE LTC timecode	NEBU
Opt			Fiber optic time synchronisation - Contact factory for more info.	
AirT			AirTime Radio synchronisation (Requires AirTime RF module)	NAIRT
Imp			24V Alternate polarity impulse support	EP
	in	1sec, 30s, 1min	1 second, half minute or 1 minute impulses	

NTP Client

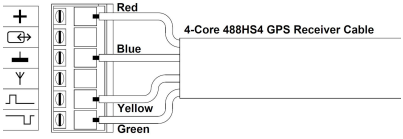
4000N & 4000NE products are primarily intended to be synchronised via NTP/SNTP from a remote time server located on the customers TCP/IP Ethernet network. Up to 4 remote NTP time servers can be specified either fully automatically using DHCP option 42 configured on your company's DHCP server or manually by the user.

If manual configuration of the NTP time servers is required, the first server's IPv4 address can be programmed using the IR remote or clock switches as detailed below. Up to 3 more time server addresses can be programmed into the digital clock using the cMon clock management software.

Clock configuration	
1	Press 'Menu' or 'Up' button to access the clock settings menu.
2	Press '+' button until 'Fu Sy' is displayed.
3	Press 'Up' button to access the Synchronisation menu.
4	Press '+' button until 'NTP' is displayed.
5	Press 'Up' button. If Clock is set to 'Full DHCP' mode the display will show DHCP and the 'Up' arrow should be pressed again to return to the time display. If clock is to 'DHCP' or 'Static' modes the 4 bytes of the first NTP time server address can be programmed in the same manner as detailed for the IP address in Section 6.
6	Press '+' & '-' buttons until each of the 4 address bytes is displayed.
7	Press 'Up' to return to time display.

GPS and GLONASS Synchronisation

The 4000NE series digital clocks can be configured to synchronise to GPS or GLONASS time code when connected to either the 488HS4 GPS Receiver or 488HS4-GLONASS Receiver (supplied separately) as follows.



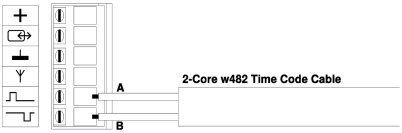
Clock configuration	
1	Press 'Menu' or 'Up' button to access clock settings menu.
2	Press '+' button until 'Fu Sy' is displayed.
3	Press 'Up' button to access Synchronisation menu.
4	Press '+' button until 'GPS' is displayed.
5	Press 'Up' button to select GPS synchronisation.

The status of the GPS/GLONASS receiver is shown via the LED on the receiver as follows.

488HS4 GPS receiver status LED		
Red LED	On	Receiver is powered.
Orange LED	Flash	Receiver is searching for satellites.
	On	Receiver is locked to three or more satellites and receiving time information.
Green LED	Flash	GPS receiver locked.

48x0 and w482 Time Code Synchronisation

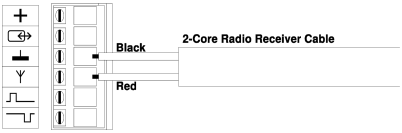
The 4000NE and 4000EP series digital clocks can be configured to synchronise to 48x0 or w482 time code from a suitable master clock (supplied separately) as follows.



Clock configuration	
1	Press 'Menu' or 'Up' button to access clock settings menu.
2	Press '+' button until 'Fu Sy' is displayed
3	Press 'Up' button to access Synchronisation menu.
4	Press '+' button until either '48x0' or '482' is displayed.
5	Press 'Up' button to enter required w482 time zone number (not required for 48x0).
6	Press '+' button until required w482 time zone number is selected (not required for 48x0).
7	Press 'Up' button to select either 48x0 or w482 synchronisation.

DCF and Radio Time Code Synchronisation

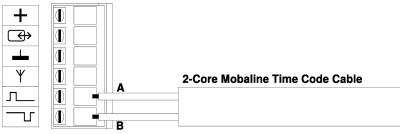
The 4000NE series digital clocks can be configured to synchronise to legacy DCF radio time codes when connected to the 484.03 DCF Radio Receiver



Clock configuration	
1	Press 'Menu' or 'Up' button to access clock settings menu.
2	Press '+' button until 'Fu Sy' is displayed
3	Press 'Up' button to access Synchronisation menu.
4	Press '+' button until 'DCF' is displayed
5	Press 'Up' button to select DCF synchronisation

MOBA*Line* Time Code Synchronisation

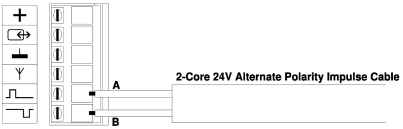
The 4000NE and 4000EP series digital clocks can be configured to synchronise to MOBA*Line* time code from a suitable master clock (supplied separately) as follows.



Clock configuration	
1	Press 'Menu' or 'Up' button to access clock settings menu.
2	Press '+' button until 'Fu Sy' is displayed
3	Press 'Up' button to access Synchronisation menu.
4	Press '+' button until 'MOBA' is displayed.
5	Press 'Up' button to select MOBALine synchonisation

24V Alternate Polarity Impulse Synchronisation

The 4000EP series digital clocks can be configured to synchronise to 24V alternate polarity impulses from a suitable master clock (supplied separately) as follows.

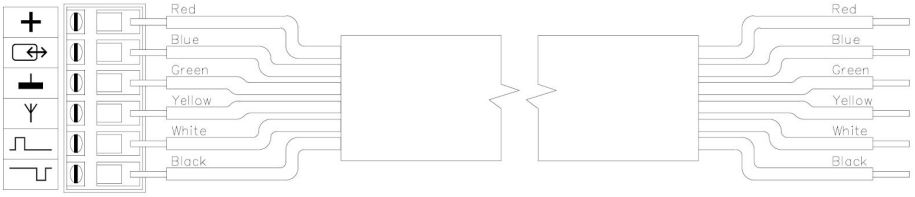


Clock configuration	
1	Press ‘Menu’ or ‘Up’ button to access clock settings menu.
2	Press ‘+’ button until ‘Fu Sy’ is displayed
3	Press ‘Up’ button to access Synchronisation menu.
4	Press ‘+’ button until ‘IMP’ is displayed.
5	Press ‘Up’ button to set required impulse type.
6	Press ‘+’ button until required impulse type is displayed.
7	Press ‘Up’ button to select Impulse synchronisation.
8	Set Impulse time on clock as per Time Setting instructions.

Special cabling for ceiling suspended and IP65 cases

The ceiling suspended and IP65 cased 4000E and 4000NE series digital clocks are supplied with a 3 metre length of six core cable. This is to allow the user easy access to the connections normally found on the rear mounted 6-way terminal block on a standard 4000E and 400NE units.

This cable is wired internally as detailed below:



8a - Display Setup - 4200x, 4010x and 4900x series digital clocks

4010 & 4200 digital clocks can be configured to display time of day, alternating time & date and continuous date in a number of different display formats as detailed in the table below.

Fu Di	Display Setup			
Function	**Display Type**		**Description**	**'Up' button function**
	hh:mm	**hh:mm:ss**		
Display Style	**ti**	ds **ti**	Standard time display.	Exit to Time display
	gb	ds **gb**	Alternating time and date in ddmmyy (4010) or ddmm (4200) format.	Display hold time
	us	ds **us**	Alternating time and date in mmddyy (4010) or mmdd (4200) format.	Display hold time
	eu	ds **eu**	Alternating time and date in yymmdd (4010) or yymm (4200) format.	Display hold time
	cgb	ds **cgb**	Continuous date in ddmmyy (4010) or ddmm (4200) format.	Exit to Time display
	cus	ds **cus**	Continuous date in mmddyy (4010) or mmdd (4200) format.	Exit to Time display
	ceu	ds **ceu**	Continuous date in yymmdd (4010) or yymm (4200) format.	Exit to Time display
	jday	ds **jday**	Continuous day of year.	Exit to Time display
Display hold	dh **xx**	dh **xx**	Number of seconds that clock holds between alternating display formats - between 1 and 20 seconds.	Exit to Time display

8b - Calendar Setup - 4500x and 4600x series digital calendar clocks

The 4500x series digital calendar clocks either dot matrix alpha-numeric date displays or seven segment numeric date displays. Each of the two display types allow for different date formats as follows.

The 4500x series dot matrix style digital calendar clocks can be configured to display the date in 6 different formats and in one of 22 different languages.

Fu Cl	Calendar Setup			
Function	**Option**	**Format**	**Description**	**'Up' button function**
Calendar Hold Time	ch **xx**		Calendar hold time 00 - 30 seconds. If set to 00 only display first calendar mode	Calendar 1 Mode
Calendar 1 Mode	M1 **01**	THU 26 JUN	Alpha-numeric display of calendar	Calendar 1 Lang.
	M1 **02**	177 26 JUN	Julian day of year and calendar	Calendar 1 Lang.
	M1 **03**	W26 26 JUN	Week number and calendar	Calendar 1 Lang.
	M1 **04**	26 06 14	Numeric date, ddmmyy (GB/UK) format	Calendar 1 Lang.
	M1 **05**	06 26 14	Numeric date, mmddyy (US) format	Calendar 1 Lang.
	M1 **06**	14 06 26	Numeric data yymmdd (EU/ISO) format	Calendar 1 Lang.
Calendar 1 Language	C1 **GB**		Calendar 1 Language as per language table below.	Calendar 2 Mode
Calendar 2 Mode	M2 **xx**		As mode settings for Calendar 1 above	Calendar 2 Lang.
Calendar 2 Language	C2 **xx**		Calendar 2 Language as per language table below.	Calendar 3 Mode
Calendar 3 Mode	M3 **xx**		As mode settings for Calendar 1 above	Calendar 3 Lang.
Calendar 3 Language	C3 **xx**		Calendar 3 Language as per language table below.	Exit to Time display

Please refer to the diagram and table below for further information.

Calendar Language Setup for dot-matrix calendar displays					
Code	**Language**	**Code**	**Language**	**Code**	**Language**
CA	Catallonian	GB	English	RU	Russian
CR	Czech	H	Hungarian	S	Swedish
D	German	HR	Croatian	SF	Finnish
DK	Danish	I	Italian	SK	Slovakian
E	Spanish	N	Norwegian	SL	Slovenian
F	French	NL	Dutch	W	Welsh
FO	Faroese	P	Portuguese		
GA	Galician	PL	Polish		

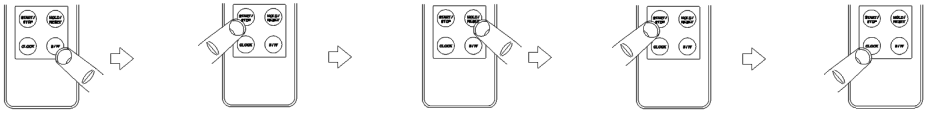
The 4500x series seven segment style digital calendar clocks can be configured to display the date in 4 different formats.

Fu Cl	**Calendar Setup**			
Function	**Option**	**Format**	**Description**	**'Up' button function**
Calendar 1 Mode	M1 **01**	26 06 14	Numeric date, ddmmyy (GB/UK) format	Exit to Time display
	M1 **02**	06 26 14	Numeric date, mmddyy (US) format	Exit to Time display
	M1 **03**	14 06 26	Numeric data yymmdd (EU/ISO) format	Exit to Time display
	M1 **04**	1 77	Numeric Julian day-of-year ddd format	Exit to Time display

9 - Stopwatch Setup

The 4000x series digital clocks can be configured to operate as a multi function stopwatch controlled via the supplied IR remote control. The clock can be switched between clock and stopwatch modes by pressing the 'Clock' and 'S/W' buttons respectively. The 'Start/Stop' and 'Hold/Reset' buttons will control the stopwatch operation as per the below table.

4011x, 4012x, 4201x and 4202x clock and stopwatch displays do not use 'Clock' and 'S/W' buttons. See model specific documentation for further details.



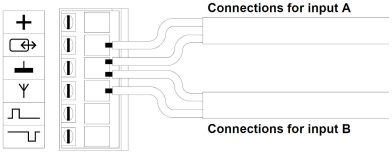
Fu SS	**Stopwatch settings**			
Function	**Display Type**		**Description**	**'Up' button function**
	hh:mm	**hh:mm:ss**		
Stopwatch Mode	**Std**	SS **Std**	Display can be freely switched between clock & stopwatch mode using IR remote control.	Select count direction
	Off	SS **Off**	Stopwatch mode is disabled.	Exit to Time display
	Only	SS **Only**	Clock mode is disabled.	Select count direction
Count Direction	SA **01**	SA **01**	Up from zero. Reset sets count to zero.	Select hold mode

Fu SS	**Stopwatch settings (continued)**			
Function	**Display Type**		**Description**	**'Up' button function**
	hh:mm	**hh:mm:ss**		
Count	SA **02**	SA **02**	Down from pre-programmed start time & stop at zero.	Select hold mode
Direction	SA **03**	SA **03**	Down from pre-programmed start time & then up from zero.	Select hold mode
	SA **04**	SA **04**	Down from pre-programmed start time & automatically restart countdown.	Select hold mode
	SA **05**	SA **05**	Up to time & stop.	Select hold mode
	SA **06**	SA **06**	Up to time & restart from zero.	Select hold mode
	SA **07**	SA **07**	Up from pre-programmed time. Reset sets count to pre-programmed time.	Select hold mode
	SA **08**	SA **08**	Tally count up. Each press increments the count by 1.	Select hold mode
Hold Mode	SB **01**	SB **01**	Single, start/stop, start/stop count action. No hold function.	Select display resolution
	SB **02**	SB **02**	Start/stop, start/stop count action. Hold action displays accumulated split time.	Select display resolution
	SB **03**	SB **03**	Start/stop, start/stop count action. Hold action displays incremental split time.	Select display resolution
	SB **04**	SB **04**	Start/stop, start/stop count action. First hold action displays accumulated split time, second rejoins ongoing count.	Select display resolution
	SB **05**	SB **05**	Start/stop, start/stop count action. First hold action displays incremental split time, second rejoins ongoing count.	Select display resolution
Display resolution	SC **01**	SC **01**	4200 display - Minutes & seconds 4010 display - Minutes, seconds & 1/100th sec.	Countdown duration seconds.
	SC **02**	SC **02**	4200 display - Hours & minutes 4010 display - Hours, minutes & seconds.	Countdown duration seconds.
	SC **03**	SC **03**	4200 display - Minutes & seconds up to 59 minutes, 59 seconds, then Hours & minutes 4010 display - Minutes, seconds & 1/100th sec. up to 59 minutes, 59 seconds, then Hours, minutes & seconds.	Countdown duration seconds.
	SC **04**	SC **04**	4200 display - Minutes only 4010 display - Minutes, seconds only.	Countdown duration seconds.
Countdown duration	**00**	00 01 **00**	Set seconds, range 0-59.	Countdown duration minutes.
	00 **01**	00 **01** 00	Set minutes, range 0-59.	Countdown duration hours.
	00 01	**00** 01 00	Set hours, range 0-98.	External input A function 1 setup.
External input function setup	EA **0**0	EA **0**0	External input A function 1 setup. See Function 1 table below.	External input A function 2 setup.
	EA 0**0**	EA 0**0**	External input A function 2 setup. See Function 2 table below.	External input B function 1 setup.
	EB **0**0	EB **0**0	External input B function 1 setup. See Function 1 table below.	External input B function 2 setup.
	EB 0**0**	EB 0**0**	External input B function 2 setup. See Function 2 table below.	Factory mode.
	EC **0**0	EC **0**0	Factory mode.	Factory mode.
	EC 0**0**	EC 0**0**	Factory mode.	Exit to time.

Stopwatch input from voltage free switch contacts

In addition to the stopwatch configuration and control being made via the supplied RC100 infrared remote control, the Start/Stop and Hold/Reset stopwatch functions on the 4000E and 4000NE series digital clocks can be controlled by either the connection of a 496E stopwatch controller or by connection of a pair of external, voltage free, momentary switch contacts.

Connections to the six-way terminal block to voltage free switch contacts should be as follows:



Connections to the six-way terminal block to 496E stopwatch switch panel should be as follows:

The behaviour of the 496E stopwatch switch panels or voltage free switch contacts connected to the six-way terminal block can be configured as follows:

Function 1	Action
0	Standard operation as per Function 2. Can be used with Function 2 all options.
1	Stopwatch count is reset before Function 2 is run. Can only be used with Function 2 option 3.
2	Switch from clock display to stopwatch display. Can only be used with Function 2 options 1 and 7.
3	Switch from stopwatch display to clock display. Can only be used with Function 2 options 5 and 8.

Function 2	Action
0	Switch has no function.
1	Start count only.
2	Stop stop only.
3	Stopwatch counts only when contact is closed.
4	Stopwatch counts only when contact is open.
5	Reset count.
6	Hold count.
7	Start/stop count.
8	Hold/reset count.
9	Switch between clock and stopwatch.
A	Stop/reset and restart count.

10 - External interface setup

The external interface of the 4000x series clocks can be used for connection of a 406 temperature (supplied separately) or to provide a Local Master synchronisation output.

Fu Et	**External Interface Setup**			
Function	**Display Type**		**Description**	**'Up' button function**
	hh:mm	**hh:mm:ss**		
External Interface	**O ff**	Et **O ff**	External interface disabled (required for use with external stopwatch switches).	Exit to time display
	Ta lt	Et **Ta lt**	Display alternating time and temperature display. See 406 documentation for further settings.	Exit to time display
	Tc nt	Et **Tc nt**	Display continuous temperature display. See 406 documentation for further settings.	Exit to time display
	Lo cl	Et **Lo cl**	Enable Local Master synchronisation output (can provide synchronisation to a maximum 5 4000NE units). See Local Master documentation for further details.	Exit to time display

11 - System setup

The system setup menu contains general setup options for the 4000x series digital clock displays as follows.

Fu St	**System Setup**			
Function	**Display Type**		**Description**	**'Up' button function**
	hh:mm	**hh:mm:ss**		
Display Brightness	Br **A**	Br **A**	Display brightness can be automatically set (A) or set to one of seven fixed levels (1-7)	Select time format
Time Format	**24 hr**	**24 hr**	Display time in either 24 hour (military) or 12 hour format.	Display F/W version
Firmware version	05 7c	05 7c	Firmware version clock is running.	Engineering menu
Factory mode	Eg **00**	Eg **00**	Factory mode, not user accessible	Exit to time display.

12 - Clock Status Display

The synchronisation status of the 4000x series digital clocks is confirmed by the status of the Colon LEDs. If the Colon LEDs are flashing, the unit is unsynchronised. When the clock successfully synchronises to the selected time source, the Colon LEDs remain statically illuminated.

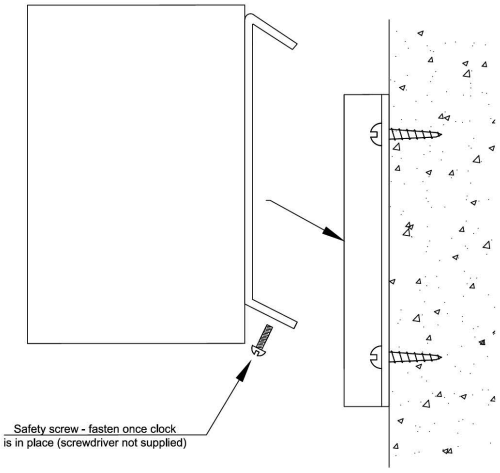
This operation does not apply when using Mobaline synchronisation. When the unit is unsynchronised the display will show only the colons, with the time only being displayed when the unit achieves synchronisation.

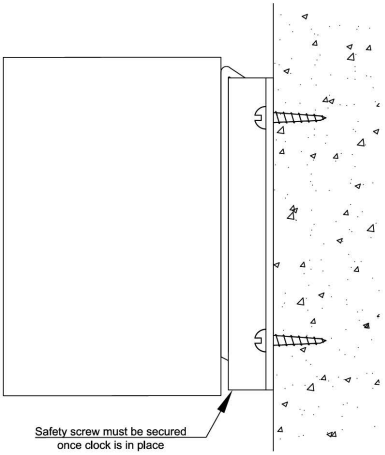
From the time display, the '+' button can be used to scroll through the following information:

Time > Date > Brightness > Network mode > IP address > Subnet mask > Gateway address > MAC address

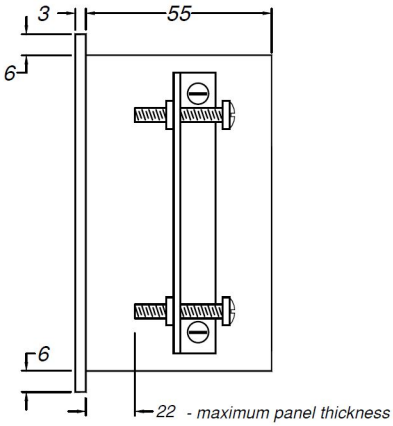
13 - Mounting Options

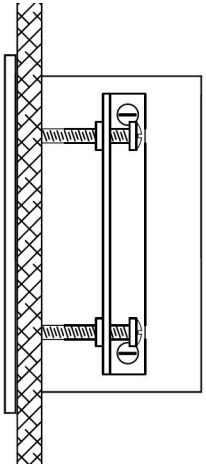
Wall Mounting (.S)





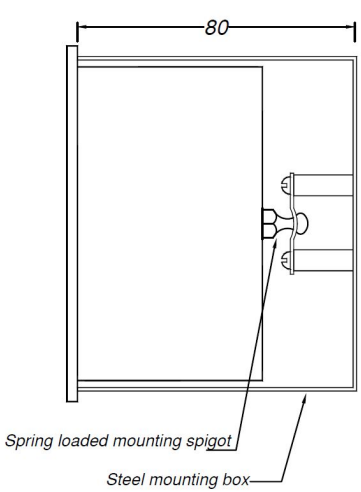
Flush Fitting Panel Case (.FP)

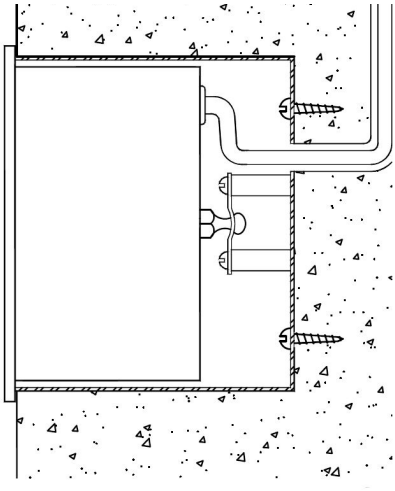




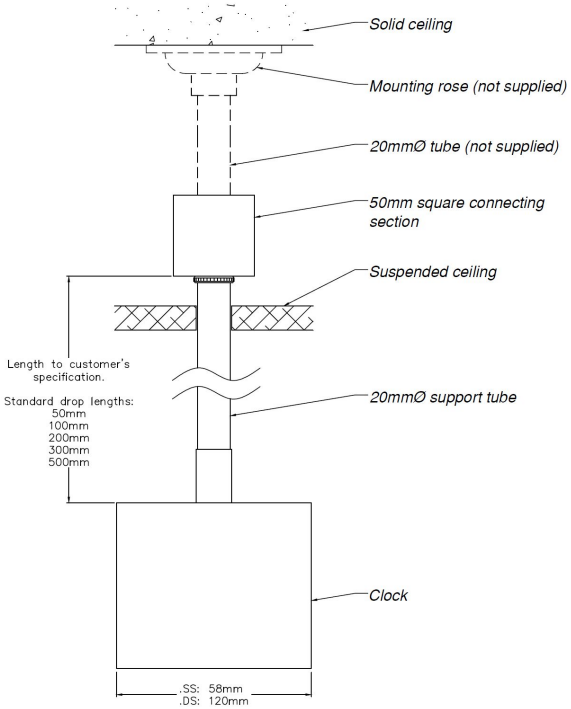
All dimensions in mm unless otherwise specified.

Flush Fitting Case with Mounting Box (.FB)





Single Sided Ceiling Suspended Case (.SS) and Double Sided Ceiling Suspended Case (.DS)



All dimensions in mm unless otherwise specified.