DaylightSavingWithNTP

A Function Block (FB) to take account of Daylight Saving (DLS) time according to Month and 'Week number in Month' rules. The FB provides a Local Date/Time for Daylight Saving rules and the PLC Real Time Clock (RTC). The local date/time is set sorward by 1 hour at 'HourFwd' on the Sunday set in MonthFwd/WeekNoFwd setting – to Summertime clock setting. At hour 'HourBack' on the Sunday set in MonthBack/WeekNoBack the clock will be put back by 1 hour.

The lightweight FB is written in ladder and can be used in CP1L/H, CJ1/CS1/NSJ (V3 upwards) and all CJ2 PLC's.

For correct operation, this FB should always be 'Enabled' (so detection is made correctly). It is provided with two inputs that will allow manual increment and decrement of the RTC by 1 hour.

As a minimum the FB must be running on the Sunday in MonthFwd/WeekNoFwd at hour HourFwd and on the last <u>Saturday</u> in MonthBack/WeekNoBack from 23:59:59 to Sunday at hour HourBack.

Function Block Parameter Name	Data Type	Details of function
Inputs into Function Block		
EN	BOOL	Always On (P_On)
MonthFwd	UINT	Month number (1-12) to move forward by 1hour
WeekNoFwd	UINT	Week number in MonthFwd to move forward by 1 hour Set 1-4 or 0 for last week in month
HourFwd	UINT	Hour number (1-23) on the Sunday in WeekNoFwd to move forward
MonthBack	UINT	Month number (1-12) to move backward by 1hour
WeekNoBack	UINT	Week number in MonthBack to move back by 1 hour Set 1-4 or 0 for last week in month
HourBack	UINT	Hour number (1-23) on the Sunday in WeekNoBack to move backward

Function Block Parameter Name	Data Type	Details of function
IncHour	BOOL	Manual increment of RTC by 1 hour upon rising edge. HourForward flag is Set.
DecHour	BOOL	Manual decrement of RTC by 1 hour upon rising edge. HourForward flag is Reset.
Outputs from Function Block		
ENO	BOOL	Unused
HourForward	BOOL	Flag to signify RTC has moved forward by 1 hour (in Summer Time) Note this flag is only set automatically on Sunday in MonthFwd/WeekNoFwd & MonthBack/WeekNoBack). Use Manual IncHour/DecHour to set initially.
LocalDT_mmss	WORD (BCD)	Local Date Time value with DLS applied. Mins:Secs as BCD
LocalDT_ddhh	WORD (BCD)	Local Date Time value with DLS applied. Day:Hour as BCD
LocalDT_yyMM	WORD (BCD)	Local Date Time value with DLS applied. Year:Month as BCD
Precations		
Make sure EN input set all the time to enable edge detection monitoring. The RTC 'Day of Week' must be set correctly. (0=Sun, 6=Sat) Test fully in own code to ensure correct operation.		

Example use of Function block, used within ladder:-

For European Daylight saving (shown below)
MonthFwd=3, WeekFwdNo=0, HourFwd=2 (Last Sunday in March at 2am)
MonthFwd=10, WeekFwdNo=0, HourBack=3 (Last Sunday in October at 3am)

For USA Daylight saving
MonthFwd=3, WeekFwdNo=2, HourFwd=2 (Second Sunday in March at 2am)
MonthFwd=11, WeekFwdNo=1, HourBack=2 (First Sunday in November at 2am)

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0 [Program Name : DaylightSavingSampleUsingNTP]

[Section Name : DaylightSavingWithNTP]

Daylight saving (DLS) FB for PLC Real Time Clock that is updated periodically by an NTP Server.
Move forward and back by 1 hour at specified Month/Week/Hour.
Used to compensate for Daylight Saving (summer time) hour changes according to local rules.

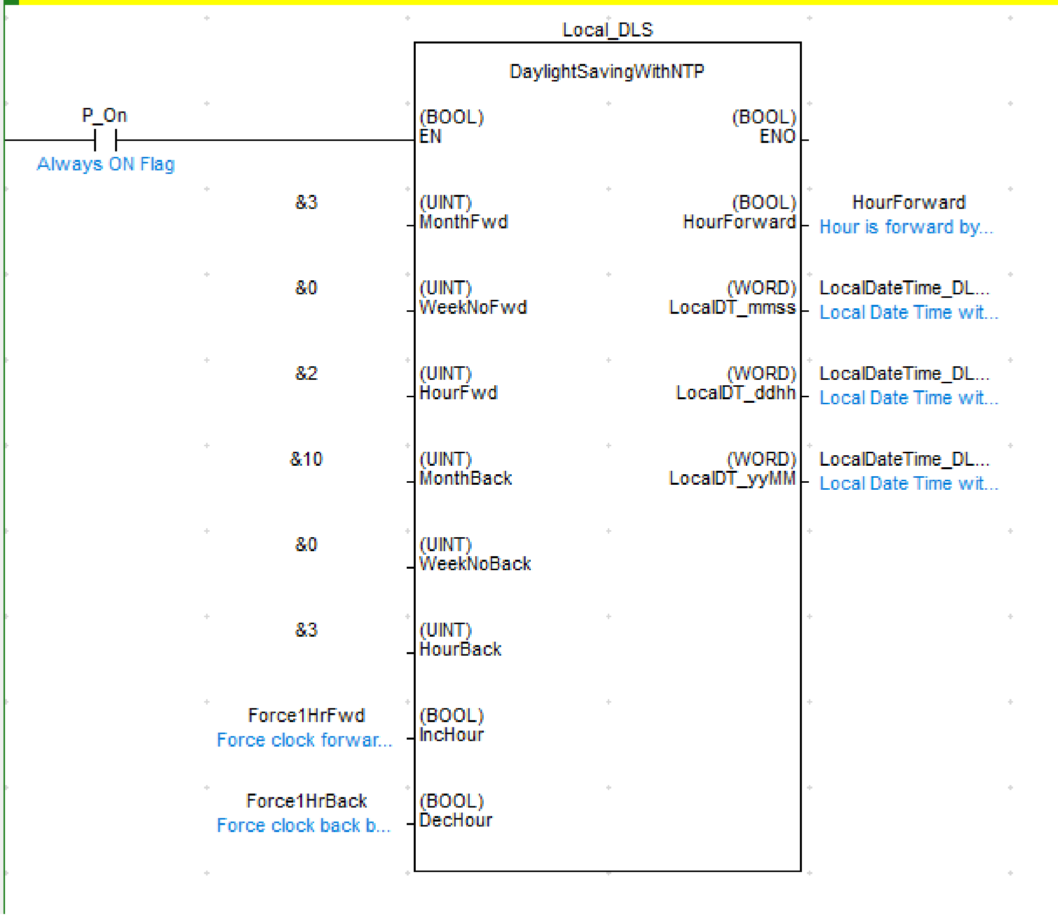
NB this FB must be running at the time DST changes.
(i.e. at HourFwd on Month/Week Fwd and midnight to HourBack on Month/Week Backward)
If FB started and DLS incorrect, then use IncHour or DecHour to manually force DLS setting until
next automatic DLS change.

Monitor the PLC Real Time Clock and provide a LocalDateTime that is compensated forward by
one hour (to Summer Time) in MonthFwd/WeekNoFwd/HourFwd (Sunday) and back by one hour on the Sunday
specified in MonthBack/WeekNoBack/HourBack.
MonthXXX = 1 to 12
WeekNoXXX = 1 to 4 (Week No in Month) or 0 for Last Sunday.
HourXXX = 1 to 23 (Hour on Sunday to move)

Examples...
For European Daylight saving
MonthFwd=3, WeekFwdNo=0, HourFwd=2 (Last Sunday in March at 2am)
MonthFwd=10, WeekFwdNo=0, HourBack=3 (Last Sunday in October at 3am)

For USA Daylight saving
MonthFwd=3, WeekFwdNo=2, HourFwd=2 (Second Sunday in March at 2am)
MonthFwd=11, WeekFwdNo=1, HourBack=2 (First Sunday in November at 2am)

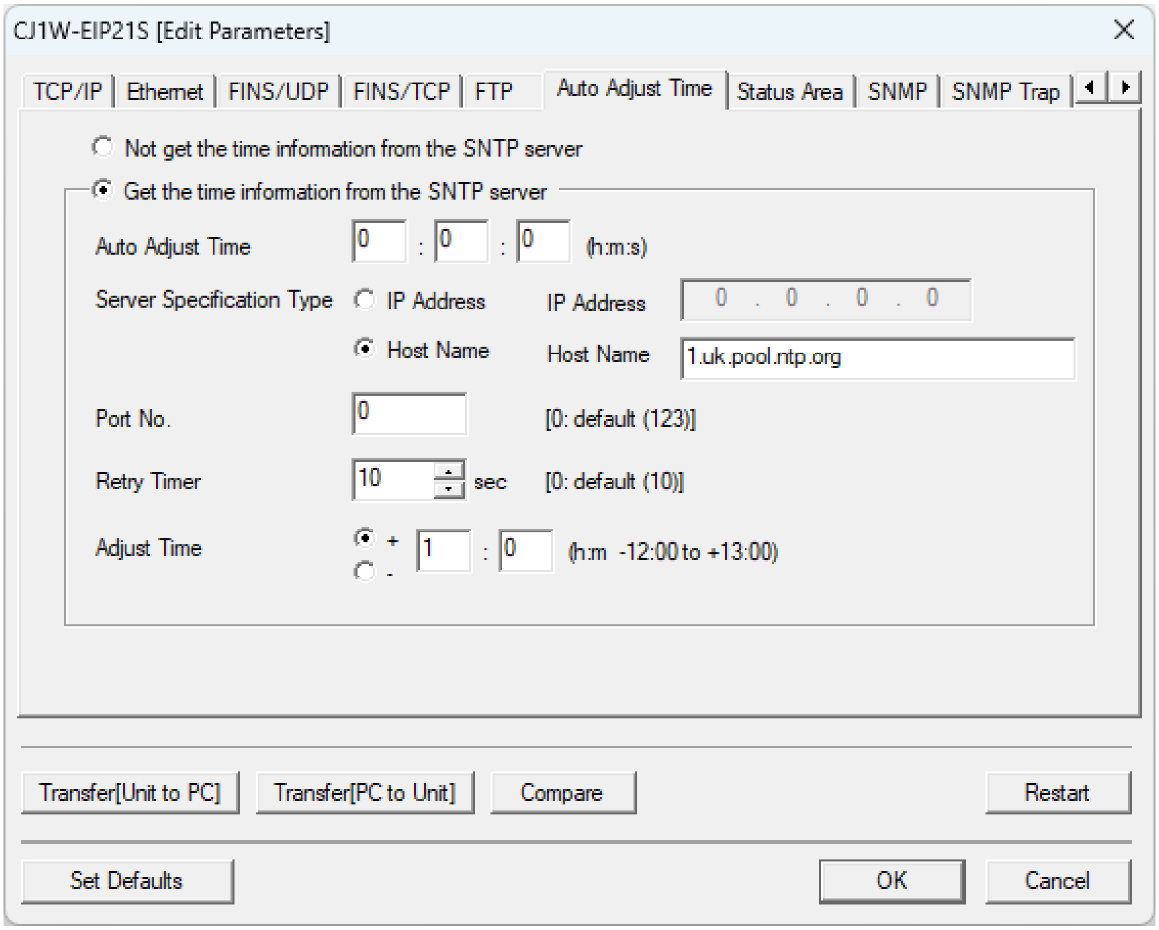
NB this FB should be enabled all the time for correct operation (i.e. P_On).
The LocalDateTime output is updated each 1s of the Real Time Clock.



This FB supports PLC CPUs that employ Ethernet Network Time Protocol (NTP) or SNTP (Simple NTP) to synchronise the PLC RTC with a time server each day. As the NTP server operation affects the RTC, the FB provides a local Date & Time.

Typical settings for NTP

NTP servers always set the time referenced to UTC+0



Where **Auto Adjust Time** = time each day when NTP operation is actioned.
Adjust Time = Time Zone adjustment. i.e. +1 will be set the RTC to UTC+1

Revision History		
V1.00	20 October 2025	Original Production based on DaylightSaving FB, but for use with NTP servers.