WOODWARD

Application Note 51598
(Revision A, 10/2018)

Original Instructions

Datalog Timestamping

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Introduction

Woodward has released AppManager 3.11 which includes improved datalog timestamping capabilities. This release adds new timestamping features and resolves known time zone issues to address common customer requests.

This guide will assist users with configuring AppManager 3.11 to implement accurate datalog timestamping. Historically, this has often been a source of questions from users, so this guide will address the most common concerns and provide examples of suggested configurations.

Figure 1 shows a brief example of the new datalog formats. These datalogs were collected in the time zone UTC-7 with Daylight Savings Time (DST) active. The first datalog shows a time zone of UTC-6 due to the +1 hour shift applied by DST. The second log was captured with the UTC string option enabled, so the time printed in UTC time and ignored shifts applied by the local time zone and DST. However, the Windows timestamp is correct and localized in both cases and the same UTC time, 19:35, is referenced in both cases.

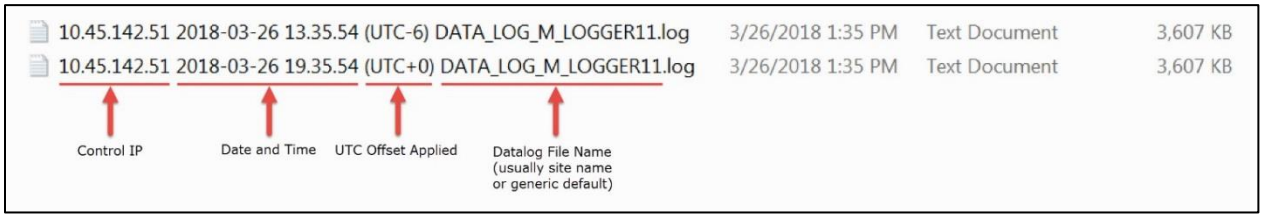

Figure 1. AppManager 3.11 Datalog Naming Convention

For users looking for a simple setup procedure, the default recommendation is listed below. Advanced users who desire a higher degree of control should continue reading.

1. For the HMI computer using AppManager 3.11 to collect datalogs, set the correct time zone, correct local time, and leave the DST option enabled.
2. For the control system, set the internal clock (RTC block) to the correct time zone and local time.
   a. If DST is active, add 1 to the time zone before setting the local time.
   b. If an SNTP server is used to set the control system clock, only the control time zone needs to be configured. The clock should typically sync up to the server in about 5 minutes.
3. Enable the AppManager “Localize Timestamps” option.
4. Leave the “UTC time string” option disabled.
5. If DST is used at site, be sure to use the correct local time zone when DST is inactive and increase it by one when DST is active. For instance, EST is UTC-5 and users should use -5 when DST is inactive and -4 when DST is active.

Universal Time Coordinated (UTC)

In order to understand timestamping, knowledge of Universal Time Coordinated is key. This is the standard term for GMT, the standardized time at 0° longitude. This is the time that is broadcast by time servers, such as SNTP. UTC time is typically read in “military time”, so 1:00 pm = 13:00.

To determine the local time based on UTC time, the time zone must be applied. The time zone is the number that must be added to/subtracted from UTC to determine local time. For instance, if UTC is 19:00 then Eastern Standard Time (UTC-5) would be 19:00 - 5:00 = 14:00.

> **Note**: UTC is a standardized time that is not adjusted for Daylight Savings Time. This adjustment must be done during the time localization procedure. Woodward controls do not currently support automatic DST adjustment, so this must be done manually by increasing the time zone by 1 when DST is active. For instance, Eastern Standard Time (EST) is UTC-5 while Eastern Daylight Time (EDT) is UTC-4. -5 increased by 1 is -4, therefore this is the correct time zone modifier to use when DST is active.

The purpose of this guide is to assist users with correctly maintaining the UTC time reference on both the HMI computer and control system. If either of these references is incorrect, this will cause offsets in timestamping. Windows computers typically have this automatically managed should not be modified as long as the time and time zone are configured properly and the DST option is enabled.

The control system clock is often incorrectly configured at sites, so care must be taken to enter the time and time zone properly. The method for checking the time is to take the local time in the RTC block and subtract the time zone. This value should equal UTC time, which can be referenced on the internet. For instance, if UTC time is 19:00 and the control is located in EST (UTC-5), then the control should be set to 14:00. 14:00 - -5:00 = 19:00, so the time is correctly entered. Note that the control system could also be set to 19:00 with a time zone of 0 and the UTC time reference would still be correct because 19:00 – 0:00 = 19:00. The downside of this approach is that the internal datalog timestamp would be listed in UTC time instead of local time. This will be covered in more detail in later sections of the guide.

AppManager Datalog Timestamp Options

In order to understand AppManager datalog timestamping, users must first be aware of the 3 separate timestamps that apply to every datalog.

1. Time printed in datalog file name
2. Windows Date Modified listed in the Windows File Explorer
3. Internal timestamp (only viewable in Control Assistant)

AppManager controls the first two time stamps and the control system clock (RTC block) controls the internal timestamp because it feeds into the time input of the DATA_LOG_M block in the Gap. This means that the options in AppManager control the first two time stamps, while the third can only be controlled through the Gap. In the Gap, this feeds directly from the RTC clock block, so the RTC time and time zone settings determine this value. The guide will start by focusing on the two primary options AppManager has for controlling timestamps, detailed in the following two sections.

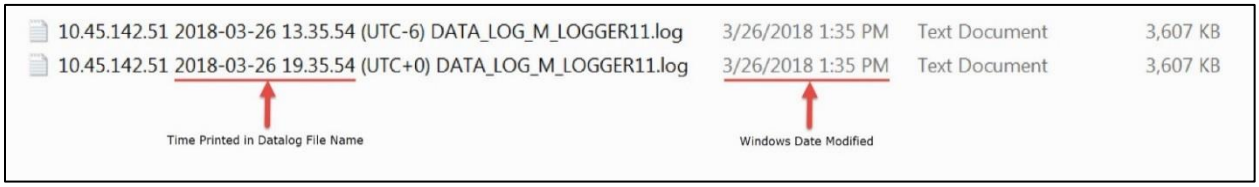

Figure 2. AppManager Controlled Timestamps

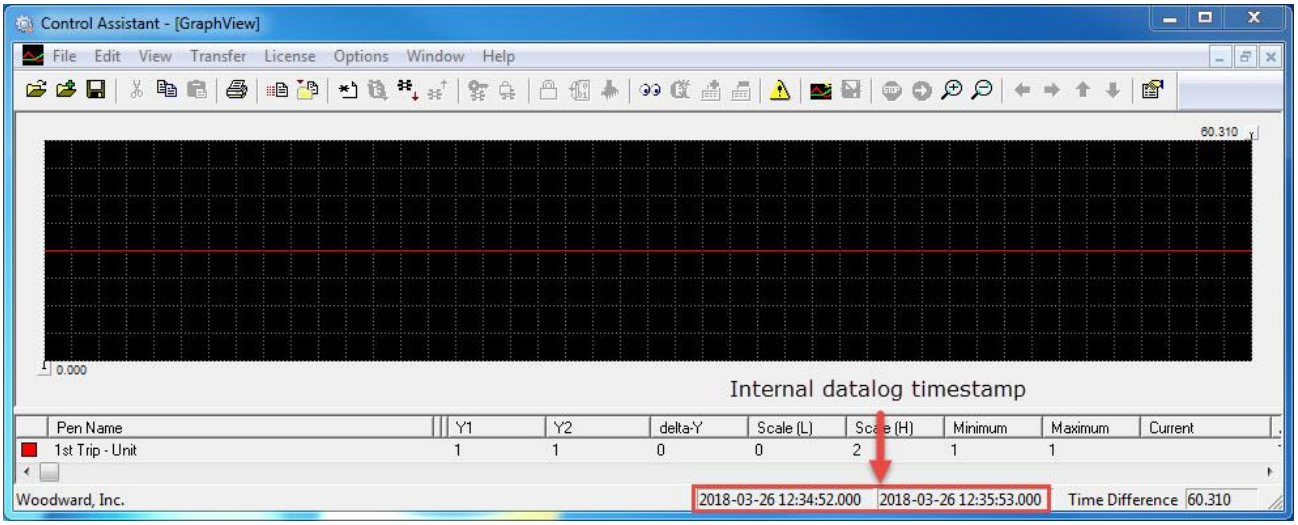

Figure 3. Internal Datalog Timestamp

Localize Timestamps

Enable the Localize Timestamps option when the control system time is set correctly. In this case, correctly means that the control system time (RTC block) is set to reflect UTC time, with or without a time zone being entered. This means that if the time is 13:00 in the UTC-5 time zone, the RTC clock block could either be set to 18:00 with a time zone of 0 or 13:00 with a time zone of -5. Both of these choices will result in the same time stamp for file name and Windows Date Modified, but will affect the Control Assistant time stamp, reading 18:00 or 13:00 respectively. This means that the choice to enter a time zone in the Gap RTC clock should be based on the customer's preference for internal datalog timestamps.

Disable Localize timestamps if the control time is set incorrectly (not recommended). Incorrectly means that the control system time (RTC block) is set to local time with a time zone of zero. This means that if the local time is 13:00 in the UTC-5 time zone, the RTC clock block would be set to 13:00 with a time zone of zero.

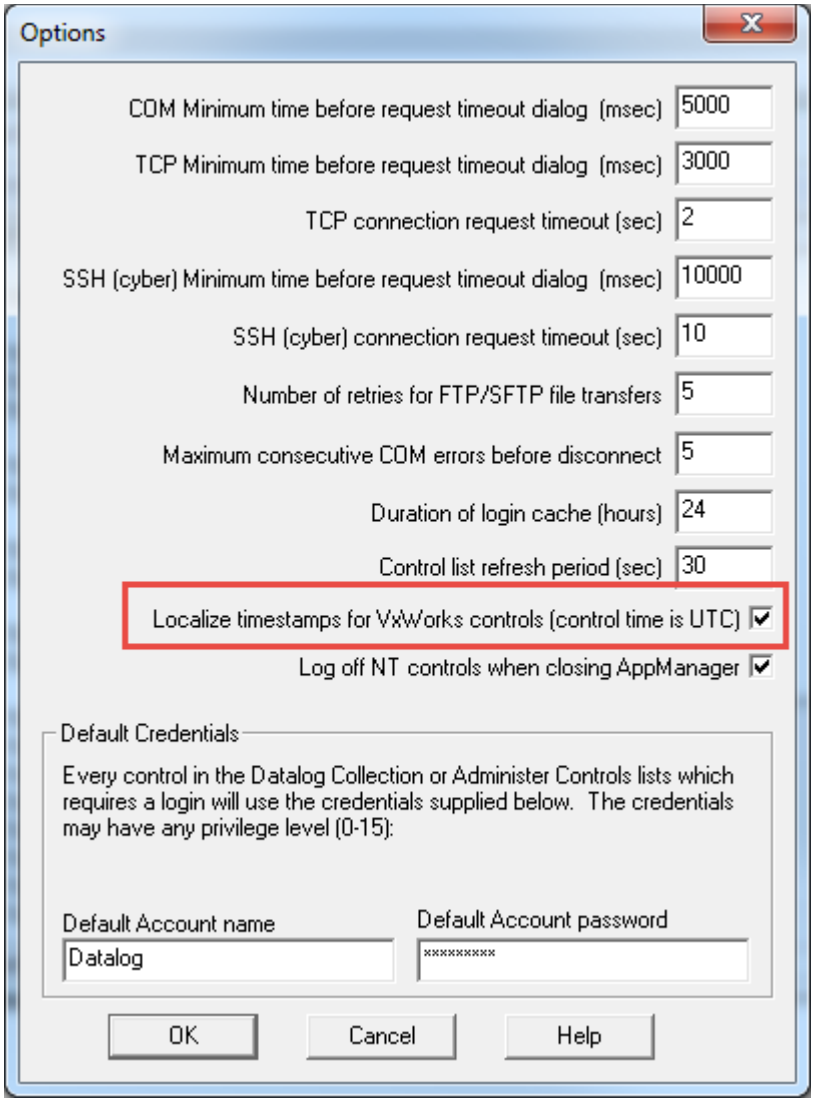

Figure 4. AppManager Localize Timestamps Option in the Options Menu

Write datalog Filename Using Non-Localized UTC Time Strings

This option modifies the file name printed by AppManager to print in UTC time, but does not affect the Windows Date Modified or Control Assistant timestamp. Note that the determination of UTC time is based on the datalog collection computer's time zone, so it must be set correctly for this feature to work properly.

If this option is left disabled, the file name will reflect the local time with the local time zone listed, such as "(UTC -5)". If enabled, the time zone will be printed as "(UTC +0)" to reflect the fact that the timestamp is printed in UTC time with no time zone offset. This is not expected to be a common user need, but may help bring consistency to certain applications, such as sites that prefer UTC time references or mobile systems such as ships.

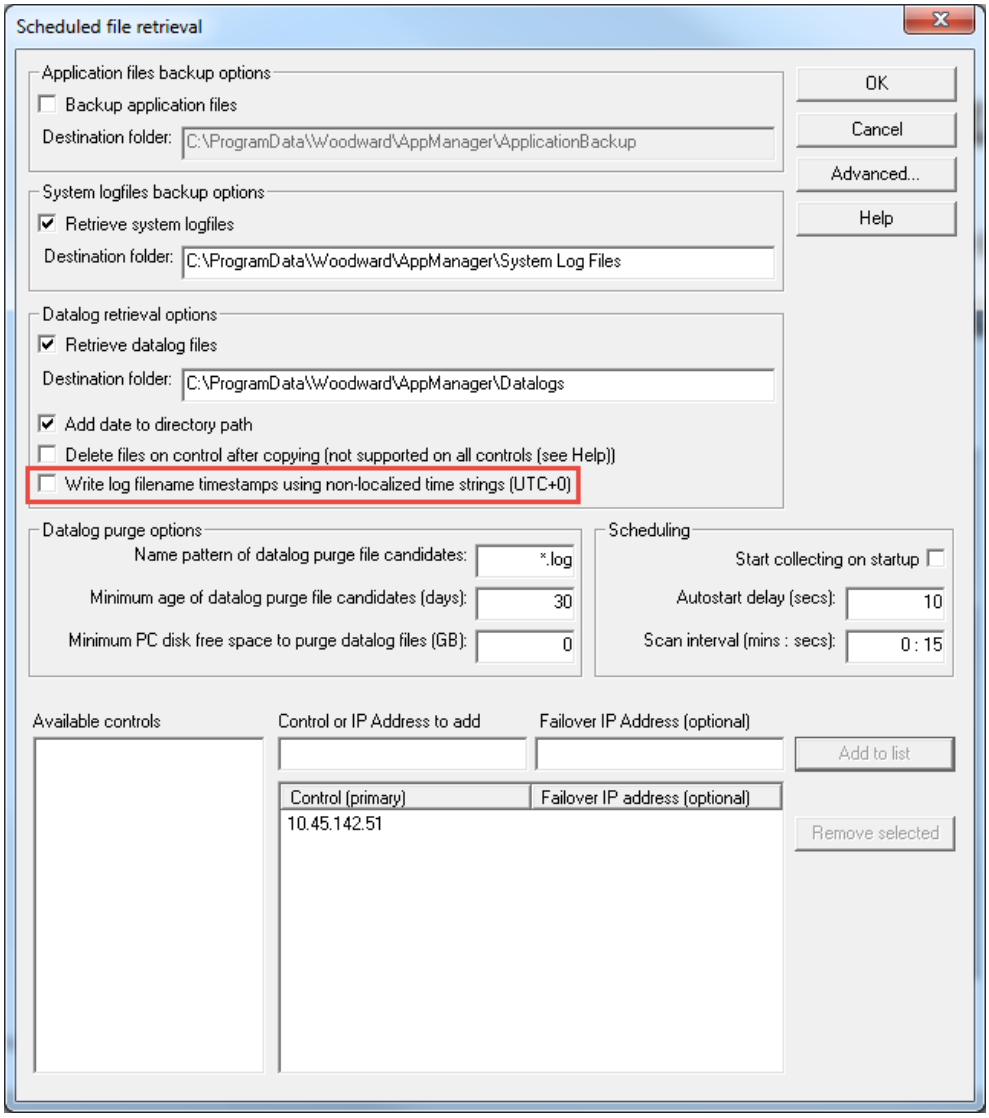

Figure 5. AppManager UTC Timestamp Option in the Automated File Collection Configuration Menu

HMI and Control Time Configuration

This section provides examples to setup proper time configuration. For a Windows HMI, the time can be verified by selecting the clock on the taskbar. Once in the calendar pop-up, select the “Change date and time settings…” option. Windows 7 is used for this example, but the process is similar in other versions.

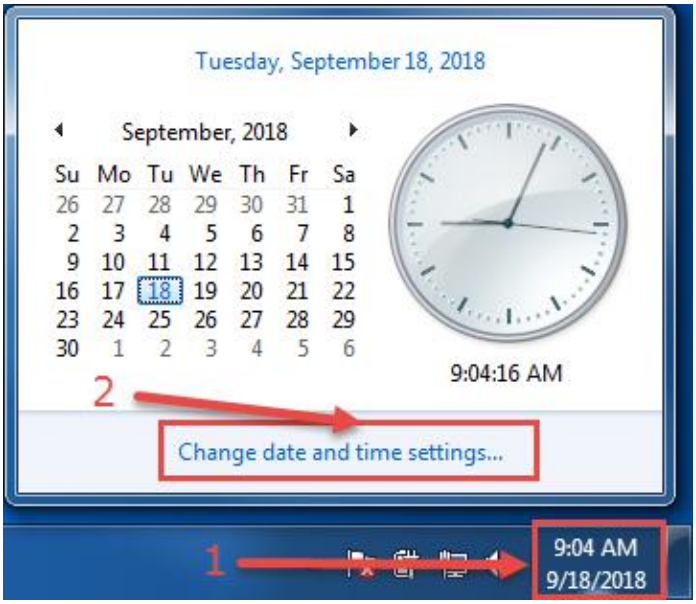

Figure 6. How to open the Date and Time Windows dialog

In the “Date and Time” dialog, verify that the time and time zone are set correctly. Also verify that DST is enabled.

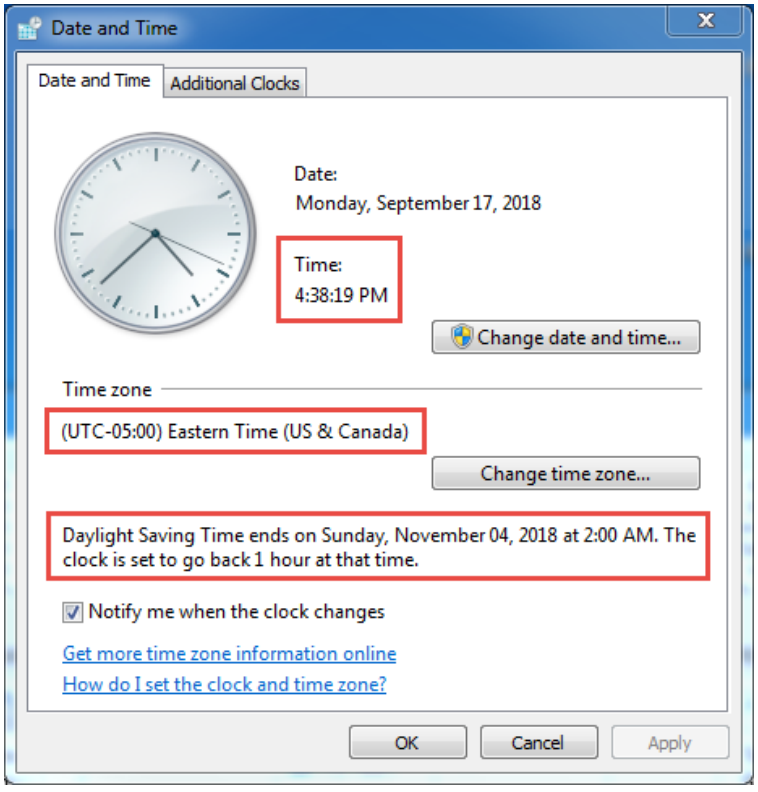

Figure 7. Verifying Windows Date and Time Settings

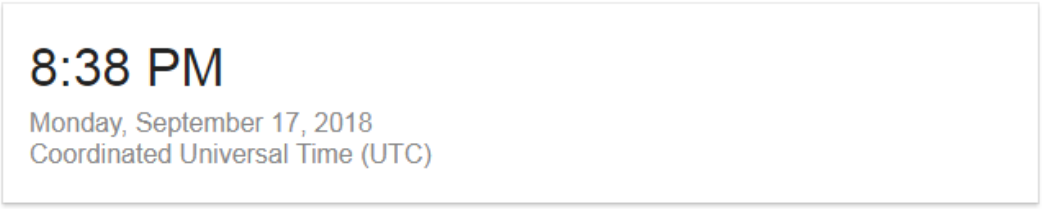

Figure 8. UTC Time Capture at the Same Time as Figure 7

In Figures 7 and 8, the UTC time can be seen as 8:38 pm or 20:38. The computer shows 4:38 pm or 16:38 EDT. 16:38 + 5:00 (EST) – 1:00 (DST offset) = 20:38, so this can be confirmed as the correct time. With the HMI time confirmed, the control system time must be verified.

In the control system, the RTC block controls the system time. Launch the Gap program and navigate to the RTC block using the Find command. Enable Monitor Gap to view the current time and time zone used by the RTC block.

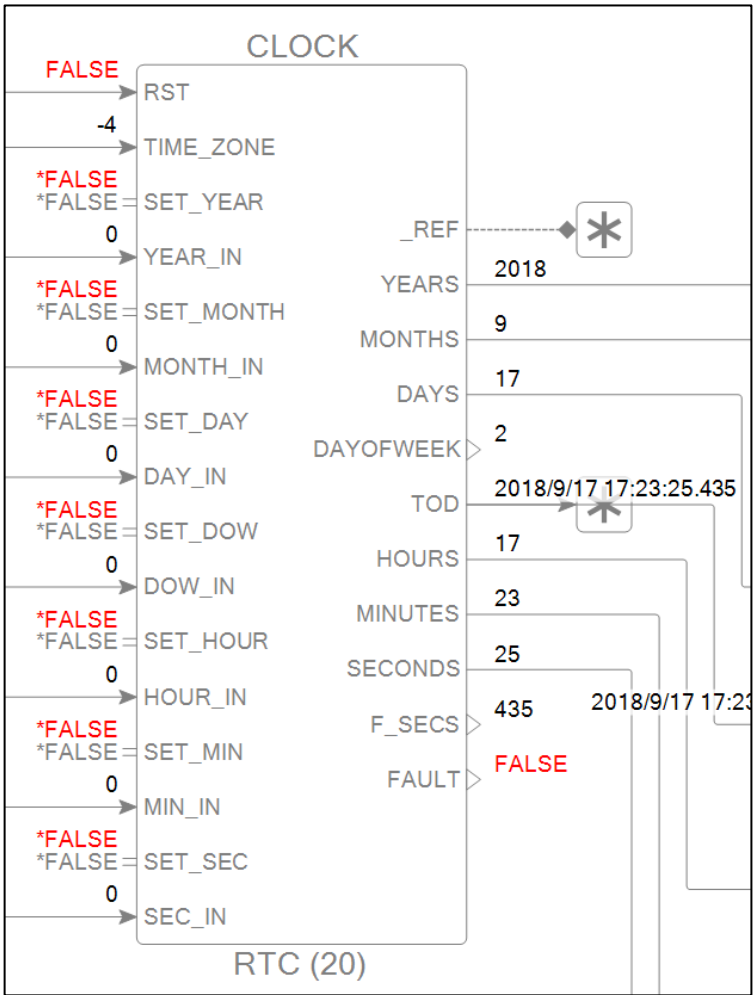

Figure 9. Verifying Control System Time and Day Settings

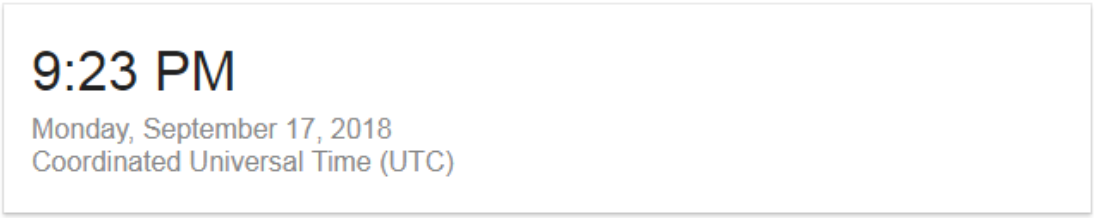

Figure 10. UTC Time Capture at the Same Time as Figure 9

In figures 9 and 10, the UTC time can be seen as 9:23 pm or 21:23. The control time shows as 17:23 with a -4 time zone (EDT). 17:38 + 4:00 (EDT offset) = 21:23, so this can be confirmed as the correct time.

If the time or time zone was not correct, the appropriate field would need to be updated. Below is a list of the possible ways to correctly configure the control system time.

1. Set the time zone = 0 in the control system and set the RTC to UTC time. Then adjust the time zone to match the correct time zone.
2. Set the time zone in the control system to the correct non-DST time zone and then set the RTC to the non-DST time.
3. Set the time zone in the control system to the time zone +1 to adjust for DST and then set the RTC to the DST time.
4. Set the time zone = 0 in the control system and set the RTC to UTC time. Do not adjust the time further. The internal datalog timestamp as viewed in Control Assistant will be in UTC with this configuration.

In all 4 cases, the time minus the time zone offset should equal UTC time. After correct time configuration, Daylight Savings Time can be adjusted for by increasing/decreasing the time zone by 1 hour. When enabling DST, the time zone would be increased by 1 hour and when disabling DST it would be decreased by 1 hour. As an example for Eastern Standard Time, when DST is inactive the time zone would be the standard value of -5. When DST is active, the time zone would be increased by 1 and would then equal -4.

If the time is set correctly to UTC in both the CPU and computer, the timestamps should read correctly, whether or not DST is configured correctly. Only the internal timestamp visible in Control Assistant will have a 1 hour offset if the time zone is not updated properly.

Datalog Timestamping Examples

The new AppManager 3.11 options were tested to create a reference chart for advanced users who may be looking for a specific configuration or want to have a deeper understanding of the time-stamping functionality. Options are shown for each test in Boolean format, with 1=True and 0=False.

Per the recommendations in this guide, the datalog collection computer was left at the correct local time and time zone for all tests. Only the control system RTC clock time and time zone were altered to meet the settings listed for each test. All tests were carried out in the Mountain Standard Time (MST=UTC-7) or Mountain Daylight Time (MDT=UTC-6) time zone.

For the “Control Time Incorrect” cases, the RTC clock time was updated to match the local time, including DST modifications. This would require customer intervention to update the RTC time each time DST is applied or removed.

Control Time Correct with Local Timestamping (Default Recommendation)

Settings: Localize = 1, UTC String = 0, ControlTimeCorrect = 1

Local Time = 12:14, DST = 0
RTC Time = 19:14, RTC Time zone= 0
File Stamp: 12.14 (UTC -7) Windows Stamp: 12:14 CA Stamp: 19:14

Local Time = 12:14, DST = 0
RTC Time = 12:14, RTC Time zone = -7
File Stamp: 12.14 (UTC -7) Windows Stamp: 12:14 CA Stamp: 12:14

Local Time = 12:14, DST = 1
RTC Time = 18:14, RTC Time zone = 0
File Stamp: 12.14 (UTC -6) Windows Stamp: 12:14 CA Stamp: 18:14

Local Time = 12:14, DST = 1
RTC Time = 12:14, RTC Time zone= -6
File Stamp: 12.14 (UTC -6) Windows Stamp: 12:14 CA Stamp: 12:14

Control Time Correct with Local Timestamping, UTC String

Settings: Localize = 1, UTC String = 1, ControlTimeCorrect = 1

Local Time = 12:14, DST = 0
RTC Time = 19:14, RTC Time zone = 0
File Stamp: 19.14 (UTC +0) Windows Stamp: 12:14 CA Stamp: 19:14

Local Time = 12:14, DST = 0
RTC Time = 12:14, RTC Time zone = -7
File Stamp: 19.14 (UTC +0) Windows Stamp: 12:14 CA Stamp: 12:14

Local Time = 12:14, DST = 1
RTC Time = 18:14, RTC Time zone = 0
File Stamp: 18.14 (UTC +0) Windows Stamp: 12:14 CA Stamp: 18:14

Local Time = 12:14, DST = 1
RTC Time = 12:14, RTC Time zone = -6
File Stamp: 18.14 (UTC +0) Windows Stamp: 12:14 CA Stamp: 12:14

Control Time Incorrect (Time zone = 0 and RTC = Local time) with Localize Timestamp Off

Settings: Localize= 0, UTC String=0, ControlTimeCorrect=0

Local Time= 12:14, DST=0
RTC Time = 12:14, RTC Time zone= 0
File Stamp: 12.14 (UTC -7) Windows Stamp: 12:14 CA Stamp: 12:14

Local Time= 12:14, DST=1
RTC Time = 12:14, RTC Time zone= 0
File Stamp: 12.14 (UTC -6) Windows Stamp: 12:14 CA Stamp: 12:14

Control Time Incorrect (Time zone = 0 and RTC = Local time) with Localize Timestamp Off, UTC String

Settings: Localize= 0, UTC String=1, ControlTimeCorrect=0

Local Time= 12:14, DST=0
RTC Time = 12:14, RTC Time zone= 0
File Stamp: 19.14 (UTC +0) Windows Stamp: 12:14 CA Stamp: 12:14

Local Time= 12:14, DST=1
RTC Time = 12:14, RTC Time zone= 0
File Stamp: 18.14 (UTC +0) Windows Stamp: 12:14 CA Stamp: 12:14

Released

We appreciate your comments about the content of our publications.

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