

# Nyx-Hemera Technologies Inc.

## PLCnext system time instability after enabling daylight-saving

Doc Rev.	Date	Résumé	Auteur
01	2022-03-22	Final test procedure and result	Frederic Blanchard, P.Eng

### Procedure

1) Factory Reset

2) Install OS 2022.0.3 LTS twice with WBM

3) Read the actual clock Syst & HW

```
root@axcf2152:~# date; date -u; hwclock
Tue Mar 22 08:31:07 UTC 2022
Tue Mar 22 08:31:07 UTC 2022
Tue Mar 22 08:31:08 2022 0.000000 seconds
```

4) Set time zone

```
root@axcf2152:~# ln -sf /usr/share/zoneinfo/EST5EDT /etc/localtime
root@axcf2152:~# date; date -u; hwclock
Tue Mar 22 04:35:52 EDT 2022
Tue Mar 22 08:35:52 UTC 2022
Tue Mar 22 08:35:53 2022 0.000000 seconds
```

5) Set system clock

```
root@axcf2152:~# date --set "Tue Mar 21 09:37:35 EDT 2022"
Mon Mar 21 09:37:35 EDT 2022
```

```
root@axcf2152:~# date; date -u; hwclock
Mon Mar 21 09:38:09 EDT 2022
Mon Mar 21 13:38:09 UTC 2022
Tue Mar 22 08:38:24 2022 0.000000 seconds
```

6) Synch the hardware clock

```
root@axcf2152:~# hwclock -w --utc
root@axcf2152:~# date; date -u; hwclock
Mon Mar 21 09:39:10 EDT 2022
Mon Mar 21 13:39:10 UTC 2022
Mon Mar 21 13:39:10 2022 0.000000 seconds
```

7) Reboot (optional, will not change final result)

```
root@axcf2152:~# reboot
```

8) Check clocks evolution over time

```
root@axcf2152:~# date; date -u; hwclock
Mon Mar 21 09:41:44 EDT 2022
Mon Mar 21 13:41:44 UTC 2022
Mon Mar 21 13:41:45 2022 0.000000 seconds
```

```
root@axcf2152:~# date; date -u; hwclock
Mon Mar 21 09:57:15 EDT 2022
Mon Mar 21 13:57:15 UTC 2022
Mon Mar 21 08:57:16 2022 0.000000 seconds ---> Fail
```

9) After Quick Power toggle => clocks drifted (got late)

```
root@axcf2152:~# date; date -u; hwclock
Mon Mar 21 09:43:50 EDT 2022
Mon Mar 21 13:43:50 UTC 2022
Mon Mar 21 13:43:51 2022 0.000000 seconds
```

```
root@axcf2152:~# date; date -u; hwclock
Mon Mar 21 09:53:43 EDT 2022
Mon Mar 21 13:53:43 UTC 2022
Mon Mar 21 08:53:44 2022 0.000000 seconds ---> Fail
```

//-----

10) Set the /etc/timezone and repeat the process (without factory reset)

```
root@axcf2152:/opt# cat /etc/timezone
```

```
Universal
```

```
root@axcf2152:/opt# echo -e "EST5EDT" > /etc/timezone
```

```
root@axcf2152:~# cat /etc/timezone
```

```
EST5EDT
```

```
root@axcf2152:~# date --set "Tue Mar 21 10:19:25 EDT 2022"
```

```
Mon Mar 21 10:19:25 EDT 2022
```

```
root@axcf2152:~# hwclock -w --utc
```

```
root@axcf2152:~# date; date -u; hwclock
```

```
Mon Mar 21 10:19:55 EDT 2022
```

```
Mon Mar 21 14:19:55 UTC 2022
```

```
Mon Mar 21 14:19:55 2022 0.000000 seconds
```

```
root@axcf2152:~# reboot
```

```
root@axcf2152:~# date; date -u; hwclock
```

```
Mon Mar 21 10:22:53 EDT 2022
```

```
Mon Mar 21 14:22:53 UTC 2022
```

```
Mon Mar 21 14:22:54 2022 0.000000 seconds
```

```
root@axcf2152:~# date; date -u; hwclock
```

```
Mon Mar 21 10:33:08 EDT 2022
```

```
Mon Mar 21 14:33:08 UTC 2022
```

```
Mon Mar 21 09:33:09 2022 0.000000 seconds ---> Fail
```

//-----

11) Install a PlcApp to set the system datetime

```
root@axcf2152:~# date; date -u; hwclock
```

```
Tue Mar 22 10:58:38 EDT 2022
```

```
Tue Mar 22 14:58:38 UTC 2022
```

```
Tue Mar 22 14:58:39 2022 0.000000 seconds
```

```
root@axcf2152:~# date; date -u; hwclock
Tue Mar 22 11:12:47 EDT 2022
Tue Mar 22 15:12:47 UTC 2022
Tue Mar 22 10:12:48 2022 0.000000 seconds ---> Fail
```

//-----

12) Use the PLCnext Engineer IDE to set the system datetime

```
root@axcf2152:~# date; date -u; hwclock
Tue Mar 22 11:18:12 EDT 2022
Tue Mar 22 15:18:12 UTC 2022
Tue Mar 22 15:18:12 2022 0.000000 seconds
```

```
root@axcf2152:~# date; date -u; hwclock
Tue Mar 22 11:32:27 EDT 2022
Tue Mar 22 15:32:27 UTC 2022
Tue Mar 22 10:32:28 2022 0.000000 seconds ---> Fail
```

//-----

End Of Tests

## Conclusion

After my investigation, it appears that setting the PLCnext system timezone to something else than UTC will lead to the quick corruption of its hardware clock (RTC).

Furthermore, if a power toggle occurs after that corruption, the system time will not be restored correctly after powerup, and all-out time-based control system will then fail on client site.

See the blog link: <https://www.plcnext-community.net/forum/#/discussion/2682/apparent-time-instability-after-enabling-daylight-saving>

Martin from Phoenix was able to reproduce the problem. He transferred it to the development staff.