

# Leap Second Application Anomaly

## Affected products

The following models will not properly apply the leap second coming 31 December 2016.

Model 1084A/B/C  
Model 1088A/B  
Model 1092A/B/C

Model 1093A/B/C  
Model 1094B  
Model 1095B/C

Model 1133A

## What is a leap second?

A leap second is the second added to or subtracted from the UTC time reference when the difference between UTC and UT1 approaches 0.9 seconds. By adding an additional second to the time count, clocks are effectively stopped for that second to give Earth the opportunity to catch up with atomic time.

## What does this mean, UTC, UT1, et cetera?

There are many time references in use. There is time based on atoms. There is time based on the Earth's rotation. Then there is time that we civilians use.

- International Atomic Time (TAI). TAI is a statistical atomic time scale based on a large number of clocks operating at standards laboratories around the world with the unit interval of the SI second.
- Universal Time (UT1). UT1 is also known as Astronomical Time and is the non-uniform time based on the Earth's rotation.
- Coordinated Universal Time (UTC) is a widely used standard for international timekeeping of civil time and differs from TAI by the total number of leap seconds.
- Global Positioning System (GPS) Time is the atomic time scale implemented by the atomic clocks in the GPS ground control stations and the GPS satellites themselves. GPS time was zero at 0h 6 January 1980 and does not include leap seconds.

## Incorrect leap second application in the above models.

The display and timing outputs will indicate time as:

23:59:58  
23:59:59  
00:00:00  
00:00:01  
00:00:02  
00:00:03  
00:00:04  
00:00:05  
00:00:05  
00:00:06

IRIG-B with control function enabled (IEEE 1344) may not provide any indication of Leap Second Pending (LSP) and Leap Second Direction (LSD) indication from 23:59:01 through 23:59:60.

## Correct leap second application.

The display and timing outputs will indicate time as:

23:59:58  
23:59:59  
23:59:60  
00:00:00  
00:00:01  
00:00:02  
00:00:03  
00:00:04  
00:00:05  
00:00:06

IRIG-B with control function enabled (IEEE 1344) will provide Leap Second Pending (LSP) and Leap Second Direction (LSD) indication from 23:59:01 through 23:59:60.

## Resolution

Update to the latest firmware. Request a firmware upgrade with our web page contact form or send an email to sales@arbiter.com. We require the model, serial number, and shipping information. International orders are subject to shipping fees.

## References:

<http://tycho.usno.navy.mil/leapsec.html>  
<http://tycho.usno.navy.mil/systime.html>  
<https://www.timeanddate.com/time/leapseconds.html>  
[https://en.wikipedia.org/wiki/Leap\\_second](https://en.wikipedia.org/wiki/Leap_second)