

GPS WEEK NUMBER ROLLOVER ISSUES

On April 7 of 2019, the GPS Week Number will roll over, potentially causing issues with calculations done inside GPS receivers. Spectracom products with GPS receivers may be impacted by this issue.

Description of the Vulnerability

GPS satellites transmit the GPS Week Number every 30 seconds. The GPS Week Number is a ten-bit value that ranges from 0-1023. The GPS Week Number can be used to set the current date in GPS receivers as well as for other calculations. GPS Week Number 0 marks the beginning of a GPS epoch and the start of time for GPS. There are 1,024 weeks in a GPS epoch, which calculates out to be approximately 20 years. The most recent GPS epoch started in August of 1999, meaning that the week number value will roll over in April of 2019. When this occurs, the calculations that receivers or the host systems are making based on this value can become incorrect. This can affect the direct processing of time or other time-related functions like leap seconds.

Different GPS receivers may react differently to the GPS week rollover. Older GPS receivers may experience the issue when the GPS week rollover occurs. Some GPS receivers adjust their calculations based on their manufacture or firmware dates, extending their operational period past the GPS week rollover date. Other GPS receivers have mechanisms to continually update their calculations to allow for continuous operations regardless of GPS week rollovers.

Risk Analysis and Recommendation

Each GPS receiver type can be impacted differently by this issue, and generally, older receivers will be impacted sooner than ones purchased more recently. Spectracom recommends updating to newer products with newer GPS receivers like our NetClock 9483 Time Server/master clock and SecureSync Time and Frequency Reference System. The current u-Blox GPS receiver that has been used in Spectracom products since April of 2016 has the capability to continually update calculations to allow for continuous operation, regardless of GPS week rollovers.

Product Specific Analysis

NetClock 9483 GPS Time Server / Master Clock

The NetClock 9483 GPS Time Server/master clock Time and Frequency Reference System is still in production. Testing on the NetClock 9483 has shown that the unit is not affected by the GPS week rollover in April of 2019 and will continue to provide the correct UTC time and process leap seconds properly systems.

NetClock 928x/938x GPS Time Server / Master Clock

The 928x/938x GPS Time Server / master clock is no longer in production **or software supported**. Testing on the 928x/938x has shown that the unit will not immediately be affected by the GPS week rollover in April of 2019. However, it will no longer be able to correctly process leap seconds. During and immediately after the leap second, the unit will not have the correct time. If connected to GPS, the time will correct itself after a few seconds, but the leap second behavior and the correction may cause issues with downstream devices. The announcement of any pending leap second is decided within six months of the leap second occurrence. Spectracom recommends replacing all 928x/938x installations with our NetClock 9483 GPS/GNSS Time Server / master clock to provide continuous accurate time within your critical systems.

NetClock 918x GPS Master Clock

The 918x GPS master clock is no longer in production **or software supported**. Testing on the 918x has shown that the unit is not affected by the GPS week rollover in April of 2019 and will continue to provide the correct UTC time and process leap seconds properly. However, it was determined during testing that the 918x units will stop processing time correctly after August 14, 2021. Spectracom recommends replacing all 918x installations with our NetClock 9483 GPS/GNSS Time Server / master clock to provide continuous accurate time within your critical systems.

NetClock 819x Ageless Oscillator

The 819x Ageless Oscillator is no longer in production. Testing on the 819x has shown that the unit is not affected by the GPS week rollover in April of 2019 and will continue to provide the correct UTC time and process leap seconds properly. Spectracom still recommends replacing all 819x installations with our SecureSync 1200 Time and Frequency Reference System to provide continuous accurate time within your critical systems.

NetClock 818x GPS Master Clock

The 818x GPS master clock is no longer in production **or software supported**. Testing on the 818x has shown that the unit is not affected by the GPS week rollover in April of 2019 and will continue to provide the correct UTC time and process leap seconds properly. Spectracom recommends replacing all 928x/938x installations with our NetClock 9483 GPS/GNSS Time Server / master clock to provide continuous accurate time within your critical systems.