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spectracom

TECHNICAL NOTE:
GPS Week Number Rollover

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 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

SecureSync 1200 Time and Frequency Reference System

The SecureSync 1200 Time and Frequency Reference System is still in production. Testing on the SecureSync 1200 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.

PRISMA VelaSync High-Speed Time Server

The PRISMA VelaSync High-Speed Time Server is still in production. Testing on the PRISMA VelaSync 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.

VersaSync Rugged GPS Time and Frequency Reference

The VersaSync Rugged GPS Time and Frequency Reference is still in production. Testing on the VersaSync 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.

VersaPNT Assured PNT Solution

The VersaPNT Assured PNT Solution is still in production. Testing on the VersaPNT 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.

NetClock 948x GPS Time Server / Master Clock

The NetClock 948x GPS Time Server / Master Clock is still in production. Testing on the NetClock 948x 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.

EPSILON EC20S Master Clock

The EPSILON EC20S GPS Master Clock is still in production. Testing on the EPSILON EC20S 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.

TSync Bus-Level Timecode Processors

The TSync family of Bus-Level Timecode Processors (PCIe, VPX, cPCI, PCI-104, PMC) are still in production. Testing on the TSync family has shown that the units are 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.

TSAT Bus-Level Timecode Processors

The TSAT family of Bus-Level Timecode Processors (PCI, cPCI, PC-104, PC, VME, S-BUS) are no longer in general production except for the PCI form factor. Testing on the TSAT family with all receivers has shown that the units are 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.