

Support Bulletin

2019 GPS Week Number Rollover (WNRO) Compatibility Statement

S0311-01

March 11, 2019

The industry is now worrying about another date rollover problem (similar to Y2K) that could potentially create significant issues in certain time-oriented systems, as they may not be able to calculate time stamps correctly, but that should not affect location (navigation) or timing applications. A GPS Week Number Rollover will occur at the end of the GPS day on April 6 2019, at which time the GPS week will transition from week 1023 to 1024 of the second GPS epoch. However, because the GPS message structure broadcasted by the satellites uses a 10-bit value to report the week number, the GPS messages will indicate that the week has changed from 1023 to week 0, potentially sending the date calculation back to August 1999, unless the receiver manufacturer has included extra calculations to carry over.

The potential problem

Some GPS receivers may malfunction on or after April 6 2019 due to the GPS Week Rollover. This has been a known issue caused by the way the old GPS L1 defined to handle the week element in the navigation messages. GPS used a 10-bit field to encode the week number in each GPS time message. This means that a maximum of 1024 weeks can be handled. This period is called an epoch. At the end of each epoch, the receiver resets the week number to zero and starts counting again. The current epoch started on 1 August 1999 and lasts for about 20 years. The next GPS rollover is 6 April 2019 when the receiver will revert to week number zero and start counting up to 1023 again. If the receiver's firmware was not done correctly, it may start calculating and outputting dates from the past, affecting task that are time-stamp dependent.

However, that's not necessarily the end of the story. Many receiver manufacturers program the receivers to run a full epoch from the date of their firmware (not the original GPS epoch). So they run correctly for the next 20 years, covering the lifetime of their products. Multiband receivers (L2C, L5) accepting modern GPS signals using 13-bit week encoding do not suffer from the 1024 week epoch issue. The GPS WNRO does not affect any of the other (newer) GNSS constellations either.

Is there a need to panic? Although this may be the first GPS Week Rollover for civilian/commercial applications, the system had gone through one rollover in 1999 already, so it is safe to say this should have not taken any manufacturer by surprise.

No Impact Expected to VeEX's Products

VeEX uses two reputable suppliers of GNSS receivers, SiRF StarIII (GPS only) and [uBlox®](#) NEO M8T (timing-oriented GNSS). Both has been checked for compliance using [ReceLogic's](#) LabSat3 2019 GPS Week Rollover scenario.

VeEX P/N	Description	Receiver Module	Comments
Z99-99-008P	GPS Receiver	SSF1513 SiRF StarIII 7989	No GPS WNRO problem found
Z99-99-017P	High Precision Timing GNSS Receiver	uBlox NEO-M8T	No GPS WNRO problem found

Note: No firmware update required. Nonetheless, we continue to recommend keeping our test sets up-to-date, to take advantage of all improvements we continuously work on.

Should you have more questions or for more up-to-date information, please visit the Support section at www.veexinc.com or contact us at customercare@veexinc.com