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## FIELD SERVICE BULLETIN

**FSB #: 098-50620-004**

**DATE: November 20, 2008**

**System:** XL-GPS Time and Frequency Receiver

**Issue:** Potential one second time error during the 90 day period prior to a scheduled leap second event

<b>Product Code:</b>	<b>Description:</b>	<b>CLEI Code: N/A</b>
1530-602	XL-GPS Time and Frequency Receiver	

**Technical Support: Worldwide 1-408-428-7907 (1) (1) or USA toll free 1-888-367-7966 (1) (1)**  
**Customer Relations: Worldwide 1-408-428-7907 (2) (1) or USA toll free 1-888-367-7966 (2) (1)**

**NOTE: Find a copy of this FSB in the Support section on the Symmetricom website:**  
<http://www.symmetricom.com/support/online-support/ttm-product-support/field-service-bulletins/>

**General Behavior:**

XL-GPS Time and Frequency Receivers manufactured prior to November 1, 2008 may develop a one second time of day error due to improper leap second handling. The time error is the result of an improper leap second insertion three months before a scheduled leap event. Clocks of affected XL-GPS units will be one second behind UTC until the day after the scheduled leap second takes place or the XL-GPS is rebooted.

**December 31, 2008 Leap Second Event**

A leap second insertion is scheduled for December 31, 2008. Affected XL-GPS units operating during the September – October month rollover will experience an improper leap second insertion on October 1, 2008 at 00:00:00 UTC resulting in the XL-GPS clock being one second behind UTC.

XL-GPS Clock	UTC
Sept 30 23:59:58	Sept 30 23:59:58
Sept 30 23:59:59	Sept 30 23:59:59
Sept 30 23:59:59	Oct 1 00:00:00
Oct 1 00:00:00	Oct 1 00:00:01
Oct 1 00:00:01	Oct 1 00:00:02

The one second time error will persist until the GPS system provides updated information on the day after the scheduled leap second occurs on December 31, 2008. *A reboot of the XL-GPS will clear the time error and insure that the leap second insertion is properly handled on December 31 without any further action by the user*

**Cause:**

The time error is due to improper processing of the leap second information passed from the internal GPS Receiver Module (87-8028-2) to the XL-GPS CPU.

**Recommended Actions:****Immediate Solution:**

## System Reboot

Units that exhibit this problem can be rebooted to reinstate the proper UTC time upon re-acquisition and lock to GPS. The XL-GPS can be rebooted by cycling power or using the **F100 KILL command**. A reboot of the XL-GPS will clear the time error and properly handle the leap second insertion when it is scheduled. *The XL-GPS clock will maintain UTC synchronization up until 90 days before the next leap second is scheduled without any further user action.*

**Long Term Solution:**

## Field Upgrade (Recommended)

Symmetricon is developing a field upgradeable software solution which is anticipated to be available in December 2008. When available, a Product Change Notice (PCN) will be posted on [www.symmetricon.com](http://www.symmetricon.com). This software update will insure properly handling of future leap second events without user intervention.

## Factory Upgrade

A factory upgrade to the internal GPS Receiver Module (87-8028-2) and the XL-GPS software is expected to be available in December 2008 which will insure proper handling of future leap seconds events.

**Additional Information:****XL-GPS Software Versions and Leap Second Performance**

The combination of XL-GPS system and GPS Receiver Module software versions impact how leap seconds are managed by the XL-GPS. The following information is provided to allow customers to determine the XL-GPS system and GPS Receiver Module software versions and respective leap second performance.

To verify the installed XL-GPS system and GPS Receiver Module software versions, use commands F18 and F119 (respectively), via Keypad, Telnet, or RS-232 port as described in the XL-GPS User Guide (<http://www.symmetricon.com/media/files/support/ttm/product-manual/997-01530-01.pdf>).

F18: The XL-GPS software version is identified with the last three characters following the PROJ REV # x.xx. For example: PROJ REV #1.82.1.9 identifies XL-GPS software version 1.82.1.9.

## F119 S

The GPS Receiver Module software version is identified in the last three digits of the number following SOFTWARE. For example: SOFTWARE 230-01510-04v1.18 identifies software version 1.18.

The chart below details the XL-GPS clock performance per the combination of the XL-GPS system and GPS Receiver Module software versions related to the scheduled leap second event of December 31, 2008.

XL-GPS Software Version (F18)	GPS Receiver Module Software (F119)  Version 1.18	GPS Receiver Module Software (F119)  Version 1.20
<b>Version 1.82.1.9 or earlier</b>	<p>A one second error manifests in the XL-GPS clock on October 1, 2008 at 00:00:00 UTC.</p> <p>Requires XL-GPS system reboot (power cycle or F100 kill command) to restore synchronization to UTC. After reboot, the XL-GPS will correctly handle the leap second insertion on December 31, 2008.</p> <p><i>If no action is taken (i.e. no reboot), the XL-GPS clock will be one second behind UTC from Oct 1 through Jan 1. The XL-GPS clock will resynchronize to UTC when the GPS system transmits the new leap second information on Jan 1. The XL-GPS clock will then continue to maintain synchronization with UTC until 3 months prior to the next scheduled leap second when the above clock behavior will repeat, if no upgrades have been applied.</i></p>	<p>A one second error manifests in the XL-GPS clock on October 1, 2008 at 00:00:00 UTC.</p> <p>Requires XL-GPS system reboot (power cycle or F100 kill command) to restore synchronization to UTC. After reboot, the XL-GPS will correctly handle the leap second insertion on December 31, 2008.</p> <p><i>If no action is taken (i.e. no reboot), the XL-GPS clock will be one second behind UTC from Oct 1 through Jan 1. The XL-GPS clock will resynchronize to UTC when the GPS system transmits the new leap second information on Jan 1. The XL-GPS clock will then continue to maintain synchronization with UTC until 3 months prior to the next scheduled leap second when the above clock behavior will repeat, if no upgrades have been applied.</i></p> <p>A field upgrade to XL-GPS software project version 2-0 is recommended when available in December 2008.</p>
<b>Version 2-0</b>  <i>(To be released December 2008)</i>	<p>Properly maintains the XL-GPS clock and synchronization to UTC before, during and after the leap second event of December 31, 2008 and future leaps events.</p>	<p>Properly maintains the XL-GPS clock and synchronization to UTC before, during and after the leap second event of December 31, 2008 and future leaps events.</p> <p>This configuration of XL-GPS system and GPS Receiver Module software is expected to begin shipping in December 2008.</p>

**Related Information:  
IERS and Future Leap Second Notifications**

The International Earth Rotation and Reference Systems Service (IERS) determines when leap seconds are to be introduced into the UTC time scale. The IERS issues Bulletin C every 6 months (January and July) which advises if a leap second will be introduced in the next following date (i.e. end of June 30 or December 31). The latest Bulletin C is available at: <http://hpiers.obspm.fr/iers/bul/bulc/bulletinc.dat>.

**USNO Time Service**

The U.S. Naval Observatory's time service can be accessed by telephone. The phone numbers are 719-567-6742 (Colorado Springs), 202-762-1069 or 202-762-1401. The time announced by USNO can be used to visually confirm the time displayed on the XL-GPS front panel is synchronous with UTC(USNO).

**Contact Information**

E-mail Support: [support@symmetricom.com](mailto:support@symmetricom.com)

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