2015 Iridium Time Epoch Change ITN0018 ISU Considerations

Version 1.2

Iridium Communications Inc.
1750 Tysons Boulevard, Suite 1400
McLean, VA 22102
USA

Document Revision History

Rev	Date	Author(s)	Description
1	12-Sept-2013	Jeremy Lavine	Original Copy
1.2	22-Oct-2015	Itz.I	Update for 2015 Re-epoch

Contents

1 Introduction

The Iridium L-Band frame count, also referred to as Iridium network time or Iridium time, is a 32-bit unsigned number used throughout the Iridium system. It is incremented by one on every 90-millisecond L-band frame, and universally broadcast from the satellite constellation to earth terminals (i.e. ISUs) once every six L-band frames (i.e. once every 540 milliseconds). The Universal Time Coordinated (UTC) time corresponding to the Iridium time value of zero is referred to as the Iridium time epoch. In order to convert from Iridium time to UTC, the Iridium time value multiplied by the 90-millisecond frame period is added to the current Iridium time epoch. The epoch itself is not broadcast over the Iridium L-band air interface, and so it must be fixed into ISUs. The epoch is currently March 8, 2007, 03:50:21.00 GMT, known as "Era1". Iridium plans, on ***March 3rd, 2015 at 18:00:00 UTC to change the L-Band downlink broadcast from ERA1 to ERA2. The UTC date and time epoch of the new Iridium Time era (era2) will be May 11, 2014, at 14:23:55.*** This will be seen as a sudden, one-time, large decrease in Iridium time corresponding to the difference between the old and new epochs, followed by the normal steady incrementing on each 90-millisecond frame. This will render invalid all mechanisms used for converting Iridium time to UTC or local time based on the old epoch.

2 Effect on AT Commands

2.1 AT-MSGEO, AT-MSGEOS, AT-MSSTM, AT+CRISX

These commands provide the Iridium time value in hexadecimal format. After the epoch change, this value will match the valid Iridium time with the new, later epoch. The ISU AT Command Reference section for command AT-MSSTM warns about possible future epoch change and warns not to rely on this value for the current time. Any algorithm in the field application that converts this value using the old Iridium time epoch will generate an invalid result after the epoch change. Any algorithm in the field application that compares the value of subsequent calls to this AT command in order to determine time difference will generate a one-time invalid result immediately after the epoch change.

2.2 AT+CCLK

This command provides the current UTC time derived from the ISU's local time and hard-coded Iridium time epoch corresponding to GPS time 03:50:35 8th March 2007. After the epoch change, this command will provide an invalid response and should not be used.

2.3 AT+SBD… and Exponential Back-Off (i.e. Traffic Management)

Iridium had originally intended to reset ERA 2 to a time in 2010. Based on this, we determined that 9602 units running firmware release TA11002 and 9602-SB and 9603 units running firmware release TA12003 that are in valid SBD exponential back-off (also referred to as "traffic management") mode at the moment of the epoch change would be placed in the error condition of being stuck in lockout for an excessive period. We included this as a warning in the partner notification on the epoch change.

Since then, the planned new epoch date has been changed to May 2014. With this later new epoch, we no longer believe that ISUs in valid SBD exponential backoff mode at the moment of the epoch change would be placed in the error

condition and no longer believer that there is risk of those ISUs being stuck in lockout for an excessive period. For affected units, there will be a grace period of four years after the epoch change date during which any SBD communication attempt will bring the unit out of lockout.

3 Reliance on AT-MSSTM and Iridium L-Band Broadcast Downlink

Iridium performed this epoch change from Era1 to Era2 in July 2014. This caused the decimal representation of the Iridium time reported in response to AT command AT-MSSTM (and other commands noted above) to drop below eight digits. The new date for the epoch change from Era1 to Era2 is such that the Iridium time reported in response to AT-MSSTM will remain eight digits. Iridium strongly recommends that partner applications and solutions not rely on the Iridium L-Band Broadcast Downlink as the number is can change without notice and the number of characters in the response to AT-MSSTM is not predictable.

4 Conclusion

To ensure continuity of service and to prepare for the epoch change, Iridium requires that all data partners complete the following:

- Read the attached document that fully describes the upcoming epoch change event as well as instructions regarding potential changes required for interpreting Iridium time.

- Complete the attached 3-minute survey. (Note that the respondent to the survey should be familiar with the AT Commands used in your application/device and understand how the device/application interacts with the Iridium network.)

- Consider testing your Iridium application at our Testing and support center in Chandler Arizona. If you would like to test your Iridium solution under the ERA2 L-Band broadcast downlink prior to the 2015 re-epoch event please contact ian.itz@iridium.com before November 15th 2014 in order to schedule a time and date for your visit and testing.

While Iridium anticipates that nearly all devices on the network will be unaffected, it is imperative that partners complete the above in preparation for this event. Over the coming weeks more information will be provided regarding the exact dates and times of the epoch change operations, in addition to monthly Iridium WebEx Q&A sessions in which engineering resources will be available to answer any questions.

In the event that you are using any of the AT commands mentioned in this document or if you feel that you may have issues with the upcoming Iridium Epoch change, Product Management will be conducting monthly WebEx Q&A sessions in which engineering resources will be available to answer any questions and address any concerns you may have concerning Iridium Time Epoch change. Additionally, you may direct any immediate questions you have regarding this event to datasupport@iridium.com