



ENGINEERING CHANGE NOTIFICATION FORM

ECN: 80200580	REV: 1.0	ISSUE DATE: 2/25/2020							
TYPE OF CHANGE: Firmware Modification									
DETAILED DESCRIPTION OF CHANGE: The v1.24 firmware release for the CLAW GPS Simulator, RSR Transcoder, and Micro Transcoder includes several functionality improvements and bug fixes.									
REASON FOR CHANGE: Feature improvements and bug fixes									
PRODUCTS AFFECTED:									
<table border="1"><thead><tr><th>Firmware Version</th><th>Model</th></tr></thead><tbody><tr><td rowspan="4">Firmware v1.15a and previous versions</td><td>CLAW GPS Simulator</td></tr><tr><td>RSR Transcoder</td></tr><tr><td>RSR Transcoder with CSAC</td></tr><tr><td>Micro Transcoder</td></tr></tbody></table>			Firmware Version	Model	Firmware v1.15a and previous versions	CLAW GPS Simulator	RSR Transcoder	RSR Transcoder with CSAC	Micro Transcoder
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	RSR Transcoder								
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Notes:									
AVAILABILITY:									
<table border="1"><thead><tr><th>MILESTONE</th><th>DATE</th></tr></thead><tbody><tr><td>ECN release for hardware change and firmware release files</td><td>2/25/2020</td></tr></tbody></table>			MILESTONE	DATE	ECN release for hardware change and firmware release files	2/25/2020			
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<p>Firmware release 1.24 for the CLAW GPS Simulator, RSR Transcoder, and Micro Transcoder provides the following improvements:</p> <p>Issue 1: Older RSR Transcoders with rev 1.0 circuit board do not support 10Hz NMEA input on the external GPS port.</p> <p>Resolution: Version 1.24 adds 10 Hz NMEA input support on RSR Transcoder with rev 1 board (units without CSAC only). RSR Transcoders with rev 2 board and CLAW Simulators were not affected and had support for 10 Hz NMEA input since version 1.15. Very few Transcoder boards were shipped with revision 1.0 hardware boards.</p> <p>Issue 2: Under some conditions the GPS auto-detection would not complete and prevent starting of Transcoding state.</p> <p>Resolution: Version 1.24 corrected the auto-detection to properly enter Transcoding mode when NMEA, uBlox or Rockwell GPS receiver types are detected under various conditions.</p> <p>Issue 3: With dynamic position transcoding, the position filter required additional tuning to optimize position accuracy.</p> <p>Resolution: Version 1.24 adds additional filter parameters for the DYNAMIC position filtering while in TRANSCODE mode. The additional parameters are the input and output velocity filter constants (VIN and VOUT) and output position filter constant (POUT) configurable with the commands:</p> <p style="padding-left: 40px;">SIMulation:POSition:FILTer:VIN float [0.0,1.0] SIMulation:POSition:FILTer:VOUT float [0.0,1.0]</p>									

SIMulation:POSition:FILTer:POUT float [0.0,1.0]

In most situations, optimal performance can be achieved with the default settings:

SIM:POS:FILT:VIN 1.0

SIM:POS:FILT:VOUT 0.15

SIM:POS:FILT:POUT 0.025

Issue 4:

Running subsequent simulations using NMEA sync source mode (SYNC:SOUR:MODE NMEA) would result in millisecond-level timing jumps causing problems for the target to receiver to acquire satellites.

Resolution:

Version 1.24 adds a 100ms error threshold before the simulation timing is resynchronized to the NMEA source. This allows the simulation timing to continue with the unit's high stability TCXO or CSAC oscillator without timing jumps between simulation runs or periods of Transcoding. For more precise timing, using an external or GPS 1PPS is recommended (SYNC:SOUR:MODE EXT or SYNC:SOUR:MODE GPS).

Issue 5:

Providing an external 1PPS input with the NMEA sync source mode (SYNC:SOUR:MODE NMEA) resulted in incorrect disciplining of the oscillator.

Resolution:

Version 1.24 corrects the issue by disabling oscillator disciplining while in NMEA sync source mode.

Issue 6:

Using a "noisy" 1PPS reference results in poor oscillator disciplining and poor simulation target receiver performance. A 1PPS reference is considered noisy with > 200 ns variation.

Resolution:

Version 1.24 adds a HOLDOVER sync source mode (SYNC:SOUR:MODE HOLDOVER) to allow synchronization with a noisy 1PPS reference at the start of transcoding, while relying on the holdover performance of the unit's high stability TCXO or CSAC oscillator.

Issue 7:

An unnecessary 2-minute warmup delay after power on before entering Transcoding state increased the total delay before the target receiver could obtaining a 3D fix.

Resolution:

Version 1.24 removes the 2-minute delay after power on allowing the unit to enter Transcoding state within seconds after power on. The RSR Transcoder with CSAC still allows the CSAC to obtain an atomic lock before entering Transcoding state to avoid discontinuities in the simulated GPS RF carrier and code frequencies when the CSAC achieves atomic lock several minutes after power-on. Prior to atomic lock the internal TCXO is free-running and generating the GPS RF frequency. The TCXO is phase-locked to the CSAC frequency output when it achieves atomic lock.

Issue 8:

The Rate of Right Ascension (Omega dot) parameter for the synthesized constellation (SIM:LNAV:SEL SYNTH) was outside the normal range so that some target receivers would issue a warning.

Resolution:

Version 1.24 corrects the Rate of Right Ascension parameter to be within the normal range expected for the GPS constellation.

Issue 9:

Transcoding requires both the GGA and RMC NMEA messages from the external GNSS receiver or other PVT source. However, some PVT sources support the ZDA message, but not the RMC message.

Resolution:

Version 1.24 adds support for either the GPRMC or GPZDA messages along with the GPGGA message to enter Transcode state.

Issue 10:

Recovery from holdover resulted in larger than necessary transient in timing stability.

Resolution:

Version 1.24 corrects recovery from holdover by properly initializing the disciplining loop.

Issue 11:

Under some conditions, the subframe 4 and 5 page number were momentarily incorrect.

Resolution:

Version 1.24 corrects the calculations used to determine the subframe 4 and 5 page number.

REFERENCE DOCUMENTS/ATTACHMENTS:

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PLEASE CONTACT JACKSON LABS TECHNOLOGIES, INC. WITH ANY QUESTIONS