ENGINEERING CHANGE NOTIFICATION FORM

ECN: 80200567	REV: 1	ISSUE DATE: 5/1/2018

TYPE OF CHANGE: Design Sensitivity Notification

DETAILED DESCRIPTION OF CHANGE:
RSR Transcoder and CLAW GPS Simulator external power supply recommendations for supply voltages >15V

REASON FOR CHANGE:
Hot Plugging modules into a power supply can potentially cause overvoltage damage.

PRODUCTS AFFECTED:

Products	Models
CSAC GPSDO, DROR-IIA, GPS Simulators, GNSS Transcoders, and other JLT products operating above 15V	CSAC GPSDO, DROR-IIA, RSR Transcoder, CLAW GPS Simulator

Notes:

AVAILABILITY:

MILESTONE	DATE
ECN release	5/1/2018

Issue: Damage due to Voltage Overstress on the input circuitry

Hot-plugging the above listed products and other JLT products into an external power supply with greater than ~15V can cause ringing on the power supply pins of the module caused by external wire inductance in combination with internal low-ESR bypassing. This ringing may cause excessive or even reverse-voltages to appear on the external power cables, which in turn can lead to irreparable power supply circuitry damage in the listed products.

Cause:

Hot-plugging can be caused by simply turning-on an external lab power supply through a switch for example, when high inrush currents into the low-ESR supply bypass capacitors on the module will cause large currents to flow. Hot-plugging voltage spikes can last for very short time-periods in the order of ns to us, and thus may not be visible on an oscilloscope. These voltages can reach levels of 2x or more of the actual steady-state supply DC voltage, and can even be of reverse-polarity. As the above mentioned units are operable at higher DC voltages than 28V, this could cause voltage spikes in excess of 60V to appear on the power supply pins, far exceeding the maximum voltage ratings of the devices (-0.5V to 36V or 40V absolute max. depending on the product). This excess voltage will cause irreparable damage to the input circuitry of the modules.

Solution:

A simple series resistor in-line with the positive supply voltage feed placed near the power connector of the JLT module will limit inrush currents, and thus prevent high voltage spikes and oscillation on the power supply wires due to wire inductance. The value of this inline resistor should be chosen depending on the operating voltage and required maximum DC currents, and can range from 1 Ohms (DROR-IIA DOCXO at 28V) to 4.7 Ohms or more (CSAC GPSDO operating at 28V). A resistor value should be chosen to minimize power losses in the resistor.

See Figure 9. in the below-linked Linear Technologies appnote for further details and example plots:

http://www.analog.com/media/en/technical-documentation/data-sheets/3502fd.pdf

Additional Protection:

A Transorb and Zener diode may also be added to the power supply wiring after the series resistor and near the JLT modules' power connector to absorb any voltage spikes from reaching the module and to provide reverse-voltage protection for the module.

REFERENCE DOCUMENTS/ATTACHMENTS:

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