SYNERGY SYSTEMS, LLC
Time proven products and support®

6 March 2020

SSR Series OEM GPS and Multi-GNSS Boards vs. LEA and NEO Series modules from u-Blox (and other chips and modules available from various manufacturers)

Summary - GPS and Multi-GNSS chips and modules are ideally suited for the majority of today's high volume, Surface-Mount, PC Assembly manufacturing processes that produce low cost products on simple motherboards, especially products of commercial and consumer grades. SSR Series OEM boards are industrial quality OEM boards designed for a smaller set of applications requiring one, some or all of the SSR Series receiver characteristic listed below.

Background - SSR Series OEM boards were originally designed in 2005 to provide a much better performing replacement receiver for users of Motorola's original M12 Series, 12 channel GPS receivers. With an Adaptor Board, SSR receivers also provide a backward compatible solution for Motorola's older 6 and 8 channel receivers which have already reached their 1024 Week Roll-Over point (A single board, lower cost solution is planned of introduction during the 2nd quarter of 2020).

Common features - All SSR OEM board designs incorporate the following features:

1. **An onboard microprocessor** - Provides the conversion from u-Blox binary protocol to an emulated version of Motorola's legacy binary protocol. This "Motorola mode" provides a replacement receiver for the tens of thousands of Motorola GPS receivers in precision timing and navigation products that have reached their 1024-week roll-over point.

2. **User Access to Microprocessor -** If the Motorola binary emulation feature is not used, the free, on-board microprocessor capacity is available to embed user code for precision timing, navigation or custom functions such as hardware sawtooth correction (e.g. for more precise timing). In some designs, the availability of processor space for user code eliminates the need for a separate motherboard based processor.

3. **Dual Protocol Mode** - All SSR OEM board products provide a "pass-through" mode, from Motorola binary mode, to access the more complete set of u-Blox binary and NMEA command\reply messages. The Motorola, or u-Blox choice, is remembered through a power cycle (or user code if Motorola binary emulation is not used). This pass-through feature provides a means for users to migrate from the legacy Motorola binary format to the more complete u-Blox binary and NMEA command\reply message set while retaining Motorola's industry standard 40 mm x 60 mm board formfactor (other formfactors quoted on request).

For configuration assistance, order placement and technical support call or Email:

SYNERGY SYSTEMS, LLC
Time proven products and support®

Phone: (858) 566-0666 - Fax (858) 566-0768
Email: mailto:oeminfo@synergy-gps.com
Web: www.synergy-gps.com

4. **Much Better Antenna Control System** - SSR Series boards provide a more robust Antenna Power Management System (APMS) than the antenna control circuits provided within many GPS and Multi-GNSS modules including the LEA\NEO-6 and LEA\NEO-M8 Series modules. These, and other stand-alone GPS and Multi-GNSS modules, as delivered, either do not perform well, or fail with higher current timing antennas (e.g. burn-out of internal Bias-T). Proper antenna management is especially important for antenna systems with high in-rush currents operating over long lengths of coax cable which are typical in fixed location, precision timing applications.

5. **Rugged Design** - SSR Series OEM boards incorporating u-Blox modules have been shipping since 2008. They have been tested multiple times against various industry standards, including those specified for the u-Blox modules themselves. Tests have included CE Mark, EU Radio Equipment Directive (RED) and various EN requirements, in addition to MIL-416, IEC, JCA, AREMA, FCC, Industry Canada and select customer test specifications. Shock and vibration tests either meet or exceed Telecom and railroad standards. Long-term stress testing to hot and cold temperature extremes has been completed multiple times, successfully without failures (some to -55 to + 105).

6. **Local or remote firmware updates** - Both the u-Blox module and the on-board microprocessor are programmed to accept firmware updates through the serial port. The firmware update process can be continued if interrupted by a power failure.

7. **Reliability** - Most SSR OEM boards shipped to date, far exceed the test specifications for the equipment or product they are plugged into. SSR Series OEM boards are best suited to applications requiring high quality, high reliability and long-term operation in remote, or inaccessible locations and where potential damage to the product (e.g. lightning striking the antenna) means changing just the receiver instead of an expensive motherboard.

8. **Superior Support** - Based on GPS experience dating from 1986, Synergy provides a level of application consultation, pre-sale product selection and after sale technical support not available from chip and module distributors or manufacturers for lower volume applications.

For configuration assistance, order placement and technical support call or Email:

SYNERGY SYSTEMS, LLC
Time proven products and support®

Phone: (858) 566-0666 - Fax (858) 566-0768
Email: mailto:oeminfo@synergy-gps.com
Web: www.synergy-gps.com