Revised: March 6, 2013

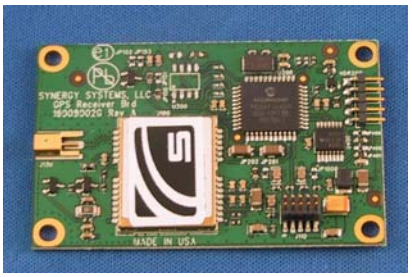
RoHS Compliant

Model SSR-Series High Performance GPS Precision Timing Receivers with SBAS *

(Adding GLONASS, BeiDou, QZSS and Galileo timing when announced by u-Blox)

Introduction:

This 4th Generation GPS Precision Timing Receiver is available in either a ROM or Flash based version. the design is based on the state-of-the-art u-Blox 50-channel, SBAS enabled, LEA-6T series miniature GPS timing module.



Features:

- **Designed specifically for precision timing applications**
- **u-Blox Binary and NMEA messages (9600 baud)**
- **Motorola binary message emulation (9600 baud)**
- **Super-Fast TTFF and State-of-the-Art Sensitivity**
- **User Configurable PPS Output - (two on ROM version)**
- **Anti-Jamming Performance in EMI Environments**
- **Jamming Signal Indicator (u-Blox mode only)**

Physical Characteristics:

Built on the popular 60 mm x 40 mm form factor, the receiver dimensions, mounting hole locations, connector types and positions are all the same as Synergy's legacy SS-12 Sony based GPS board, Motorola M12x receivers and various clones.

Electrical Characteristics:

The high performance ROM based SSR-6Tr and Flash based SSR-6Tf are based on the popular u-Blox LEA-6 Series GPS modules. Full performance specifications and features are listed at **http://www.u-blox.com** . The SSR-Tr includes an on-board microprocessor to generate Motorola binary emulation messages. The emulation processor is remotely programmable so additional Motorola binary commands, or customer required custom binary commands, can be flashed in during production or remotely in the field. SSR-6T receivers incorporate antenna over current protection and is usable with both +3V and +5V active GPS antennas.

On-board microprocessor:

The PIC microprocessor, if not used for message emulation, can be user programmed for custom message handling

Note: u-Blox only versions feature the full functionality and I/O speeds of the LEA-6T u-Blox GPS engine

* Satellite Based Augmentation System

PHYSICAL CONSTRUCTION	
Dimensions	40mm x 60mm x 4.5mm
Weight	12 grams
Data/Power Header	10 Pin, 2x5 header, 1.27mm pitch
Antenna Connector	MMCX end-Launch jack

OPERATIONAL CHARACTERISTICS - u-Blox Mode	
Architecture	50 channels with over 2 million correlators
Acquisition Channels	32 channels
Tracking Channels	16 channels (12 channels for Motorola M12x compatibility)
Frequency	1575.42 MHz, C/A code
Acquisition Time:	
Hot Start	< 1s
Warm Start	< 1s
Cold Start	26 seconds typical
SBAS*	Supports RTCM-104 DGPS, WAAS, EGNOS, MSAS
Position Accuracy	<2.5m Autonomous - <2.0m SBAS - <2.0m RTCM-104
Sensitivity	-148 dBm at cold start
	-162 dBm while tracking (-160 dBm Reacquisition)
Power Supply	2.7-3.6 VDC 80 mA @ 3.0 VDC Max
Backup Power	+3.0 - 3.3V
Temperature Range	-40 Degrees to + 85 Degrees (-20/+60 with battery)
Storage Temperature	-40 Degrees to + 85 Degrees (-20/+60 with battery)
Humidity	95% over dry bulb range of +38°C to +85°C

1PPS Timing Pulse	
Accuracy of 1PPS	within 15 nsec to GPS/UTC (1 Sigma)
	<5 nsec with quantization error removed

COMMUNICATIONS INTERFACE	
Default Protocol	u-Blox binary and NMEA-0183 v3.0 at 9600 baud
Additional Protocols	Motorola 12 channel Binary emulation at 9600 baud
Baud Rate Option	u-Blox 4800 and 9600 baud (to 230.4kBit/s in u-Blox version)
Update Rate	1Hz default, 2 Hz option (user selectable)

Note: Refer to u-Blox LEA-6T User's Guide for full module technical and performance specifications and u-Blox binary and NMEA message details here: http://www.ublox.com. Refer to Motorola's M12x User's Guide for Motorola binary message details.

An external backup voltage may power the RTC on pin 6 of the I/O header if required during power-off. Optional versions are available with an on-board 11 mAh rechargeable battery to operate the RTC when the receiver is powered down.

Ordering Information:

Part Number	Model	Configuration Description
16052222G	SSR-6Tf	Flash based, w/PIC, Extra Flash, Mot Bin/UBX Bin, NMEA, No Bat
16052223G-2	SSR-6Tf	Flash based, w/PIC, Mot Bin/UBX Bin, NMEA, No Bat (cost-down)
16062133G-1	SSR-6Tr	ROM based, w/PIC, Mot Bin, UBX Bin, NMEA, No Battery
16062152G	SSR-6Tru	u-Blox only - ROM based, w/PIC, UBX Bin and NMEA, No Bat
16062162G	SSR-6Tru	u-Blox only - ROM based, no PIC, UBX Bin and NMEA, No Bat

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

SYNERGY SYSTEMS, LLC
Time proven products and support

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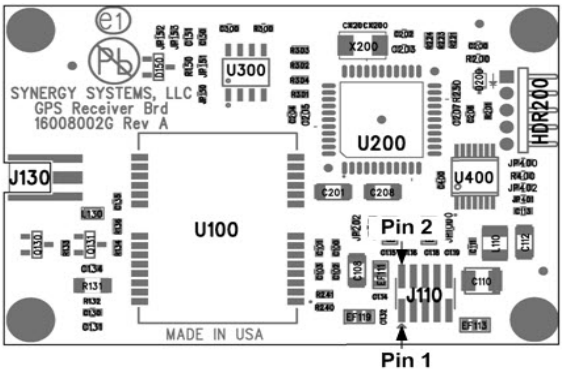
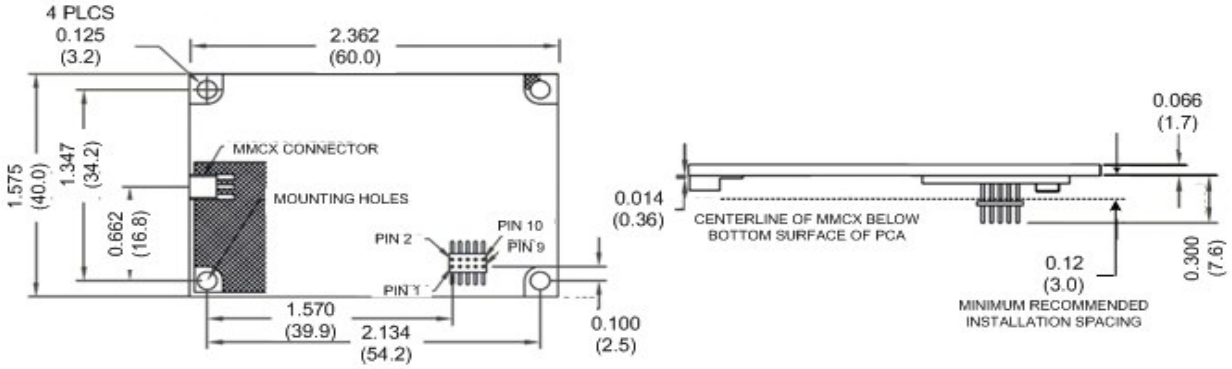
Component Layout



J110 Pin-Out Detail

Pin #	Signal Name	Description
1	TxD	Transmit Data
2	Rxd	Receive Commands
3	Power	Regulated 3.0-3.3 volts
4	1PPS	1PPS Output
5	Ground	Signal/Power Ground
6	Battery	Backup Battery Input
7	No Connect	No Connect
8	RTCM In	RTCM Data Input
9	Ant. Bias	3.0-5.0 Ant. Bias Voltage
10	1PPS-2	.25Hz to 10MHz

SSR Series board layout and connector position detail



Note: 1. The basic SSR-6xxx PCB outlined above is used for several OEM precision timing and navigation boards. The precision timing versions do not use RTCM input on pin 8.

2. An external backup voltage may be applied to pin 6 to run the Real Time Clock (RTC) if required during power-off periods. Optional SSR versions are available with an on-board 11 mAh rechargeable battery to operate the RTC for 5 - 10 days when the receiver is powered down. Rechargeable LiOn Battery life is 5 - 10 years depending on many factors including temperature extremes encountered, number of charge cycles, etc.). The on-board battery reduces the normal SSR board operating and storage temperature range from -40°c to +85°c to -20°c to +60°c.

3. When an on-board back-up battery is not used, connect pin 6 to ground (typical).

4. Programming connector, 5 pin HDR200, is not needed for firmware updates. When firmware versions 1.73 and higher are installed, updates for the microprocessor are made through the serial port using HyperTerminal.

5. For interface to Motorola legacy 8 channel form factor, for example the VP, GT+ and UT+ Oncore, specify the Synergy Adaptor Board P/N 10001450G-3

6. Form factor options designed and quoted on request

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