

## RoHS Compliant

### Model SSR-6Tf+ High Performance GPS Precision Timing Receiver

Tested to demanding Telecom Industry Standards

**Introduction:**

Shipping since 2011, the SSR-6T Precision Timing receiver embeds the state-of-the-art u-Blox 50 channel, SBAS enabled, LEA-6T Flash based, GPS precision timing module.

**Features:**

- Designed specifically for precision timing applications
- u-Blox Binary and NMEA messages
- Motorola binary message emulation at 9600 baud for backward compatibility with legacy Motorola 6, 8 and 12 channel receivers
- Super-Fast TTFF and State-of-the-Art Sensitivity
- Two User Configurable PPS Outputs
- Anti-Jamming Performance in EMI Environments
- Jamming Signal Indicator (u-Blox mode only)
- User selectable Motorola binary or u-Blox mode

**Physical Characteristics:**

SSR Series receivers use the popular, industry standard, 60 mm x 40 mm form factor, mounting hole locations, connector types and positions. These are common with Synergy's legacy 12 channel SS-12 Sony based receiver, Synergy's u-Blox based SSR-4S and SSR-5H and also Motorola's legacy M12+ receivers.

**Electrical Characteristics:**

The high performance Flash based SSR-6Tf uses the popular u-Blox LEA-6T Flash based GPS module. Full performance specifications and features are listed at <http://www.u-blox.com>. SSR Series receivers with on-board microprocessors generate 6, 8 and 12 channel 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 under current and over current protection and accept both 3V and 5V antennas.

Note: The Part Number listed is for the basic SSR OEM board assembly. Dash numbers (e.g. -1) document firmware versions and may vary by user application.

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
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 123 mW @ 3.0 V
Backup Power	+1.4 to +3.6V at 22 uA Max
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

\* SBAS - Satellite Based Augmentation System

1PPS Timing Pulse	
Accuracy of 1PPS	30 ns RMS, <60 ns 99%
Granularity	21 ns
Compensated	<15 ns (Quantization Error Applied)

COMMUNICATIONS INTERFACE	
Default Protocol	User defined - Motorola binary or u-Blox binary/NMEA
Motorola Protocol	Motorola 12 channel Binary emulation at 9600 baud
u-Blox Protocol	u-Blox binary and NMEA-0183 v3.0 at 57600 baud
Update Rate	1Hz default, 2 Hz option (user selectable)

Refer to Synergy's SSR Integration Guide and u-Blox LEA-6T User's Guide for full module technical and performance specifications. The "u-Blox u-Blox6\_Receiver Description Protocol Spec" is copyright u-Blox and available here:

<http://www.u-blox.com>. u-Center software required. Refer to Motorola's M12x User's Guide for Motorola binary message details. For Motorola messages, find SynTAC, WinOncore and SiRF Oncore here: <http://www.synergy-gps.com>

**SSR-6Tf+ OEM Precision Timing Board Ordering Information:**

Part Number	Configuration Description
16054423G-1	SSR-6Tf w/UBX Bin & NMEA and Motorola 6, 8 and 12 Chan bin

Power-On default condition: Outputs messages as when powered-down

Custom configurations, including Custom firmware commands quoted on request (minimum quantity may apply).

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



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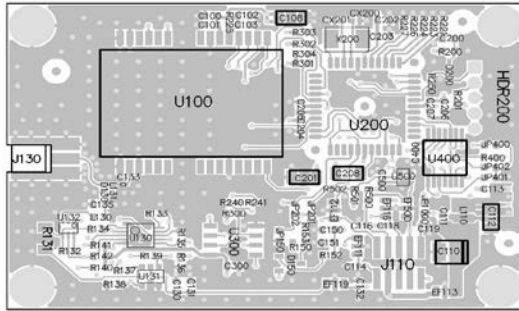
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Model SSR-6T+, RoHS Compliant, GPS Precision Timing Receiver

Component Layout

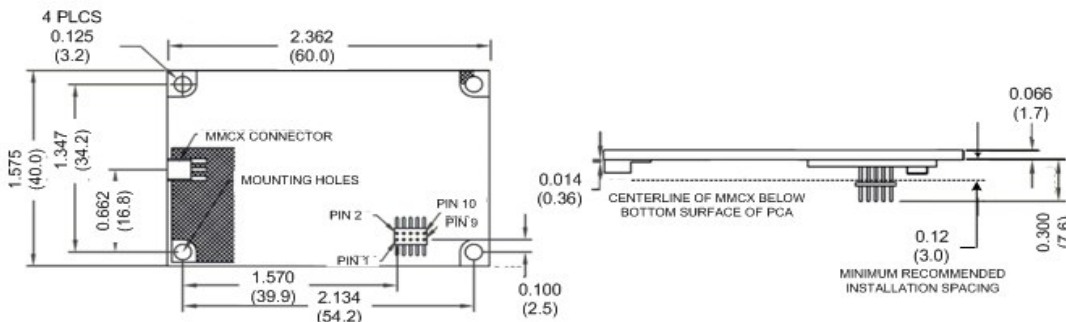


J110 Pin-Out Detail

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

\* RTCM Correction Input Special Order as of 1 January 2018

SSR Series board layout and connector position detail



**Note: 1. PC Board** - The basic SSR-xxx PCB outlined above is used for several OEM precision timing and navigation boards. Precision timing boards do not use RTCM input on pin 8. The SSR-6T+ with 128K emulation processor, and Legacy 64K versions, also provide full u-Blox LEA-6 binary and NMEA messages at various baud rates. The user selectable Motorola binary or u-Blox binary/NMEA protocol is maintained through a power cycle.

**2. Real-Time Clock (RTC)** - 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 1 - 2 weeks when the receiver is powered down. Rechargeable LiOn Battery life is specified at 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. When an on-board back-up battery is not used, connect pin 6 to ground.

**3-A. With firmware versions 1.73 and higher** - the 128K (and legacy 64K) emulation processor is re-programmable through the serial port using HyperTerminal, SynTAC, Tac32Plus or custom software.

**3-B. SSR-6T Series with 128K Motorola emulation processor** - This product provides a robust means for remotely re-programming both the emulation processor and the u-Blox module. Remote re-programming of the u-Blox module and/or the on-board emulation processor can continue even after a power interruption.

**4. Backward Compatibility** - For interface to Motorola legacy 6 and 8 channel form factor, for example the VP, GT+ SL and UT+ Oncore, contact Synergy for assistance on specifying the proper Adaptor Board configuration.

**5. Custom SSR board Shapes and functions** - Form factor options and custom firmware designed and quoted on request. For example, a single board (no Adaptor Board) SSR design to plug into VP Oncore and UT+ Oncore slots with a form factor of 2.00 x 3.25 x 0.64 inches (50.8 x 82.6 x 16.3 mm) are quoted for volume requirements.

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



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