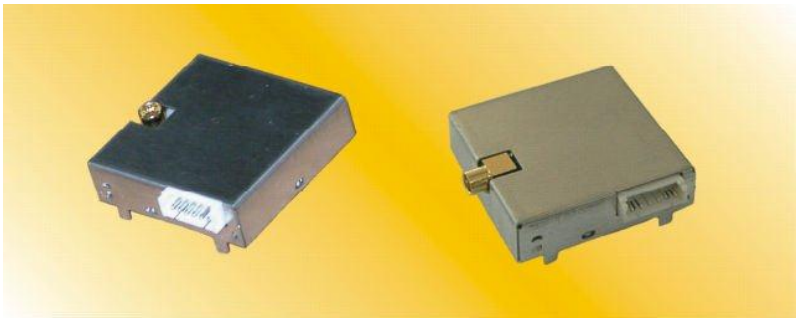
# *TTL Interface GPS Module*
# *Model: SR-87*

## ***Product Introduction:***

The ProGin SR-87 series GPS modules incorporates high sensitivity, high performance SiRF StarIII chipset solution in a compact design. The module tracks up to 20 satellites at a time while offering fast time -to-first-fix and 1Hz navigation update.
The unit is very suitable for broad applications such as Handheld, PDA, PPC or other battery operated navigation system.



## ***Main Features:***

High sensitivity SiRF StarIII chipsets.
High performance receiver tracks up to 20 satellites.
TTL output for GPS command interface.
Low power consumption.
Average Cold Start time under 42 seconds.
On-chip 1Mb SRAM.
Reacquisition time 0.1 second.
Support accurate 1PPS output signal aligned with GPS timing.
Support Standard NMEA-0183 and SiRF Binary protocol.
Multi-path mitigation hardware.
Built-in a lithium battery enables fast positioning.
Compact size (25.4×25.4×7 mm3) for easy integration into hand-held devices.
The SR-87 design utilizes the latest surface mount technology and high level circuit integration to achieve superior performance while minimizing dimension and power consumption. This hardware capability combined with software intelligence makes the board easy to be integrated and used in all kinds of navigation applications or products. The module communicates with application system via RS232 (TTL level) with NMEA-0183 protocol.

# 2. Technical Specifications

## 2.1. Electrical Characteristics

### 2.1.1 General

| | |
|---|---|
| Frequency | L1, 1575.42 MHz |
| C/A code | 1.023 MHz chip rate |
| Channels | 20 channels all in view tracking |

### 2.1.2 Sensitivity

| | |
|---|---|
| Tracking | -159 dBm typical |

### 2.1.3 Accuracy (Open Sky)

| | |
|---|---|
| Position | < 10 meters, 2D RMS<br>< 7 meters 2D RMS, WAAS corrected<br>1-5 meters, DGPS corrected |
| Time | 1 microsecond synchronized to GPS time |

### 2.1.4 Datum

| | |
|---|---|
| Default | WGS-84 |

### 2.1.5 Acquisition Rate

| | |
|---|---|
| Hot start | 1 sec, average |
| Warm start | 38 sec, average |
| Cold start | 42 sec, average |
| Reacquisition | 0.1 sec, average |

### 2.1.6 Dynamic Conditions

| | |
|---|---|
| Altitude | < 18,000 meters (60,000 feet) |
| Velocity | < 515 meters/sec (1000 knots) |
| Acceleration | < 4 G |
| Jerk | 20 meters/sec max |

### 2.1.7 Power

| | |
|---|---|
| Main power input | 3.0 ~ 5.5 VDC input. |
| Supply Current | < 40 mA |
| Backup Power | 3V rechargeable Lithium battery,<br>up to 500 hours discharge |

### 2.1.8 RF Interface

| | |
|---|---|
| Antenna connector type | MMCX |

### 2.1.9 Serial Port

| | |
|---|---|
| Electrical interface | Two full duplex serial communication, via RS232, TTL interface. |
| Protocol message | NMEA-0183. |
| Default NMEA | GGA, GSA, GSV, RMC, (GLL, VTG, and ZDA optional).<br>4800 baud rate (other rate optional).<br>8 bits data, 1 stop bit, no parity. |
| Antenna Status sentence | ZANTAX /ZANTA(Optional) |

| | |
|---|---|
| **2.1.10 Time** | 1PPS Pulse, Pulse duration 1μs.<br>Time reference at the pulse positive edge.<br>Synchronized to GPS time, ± 1μs. |
| **2.1.11 Weight** | < 8g |

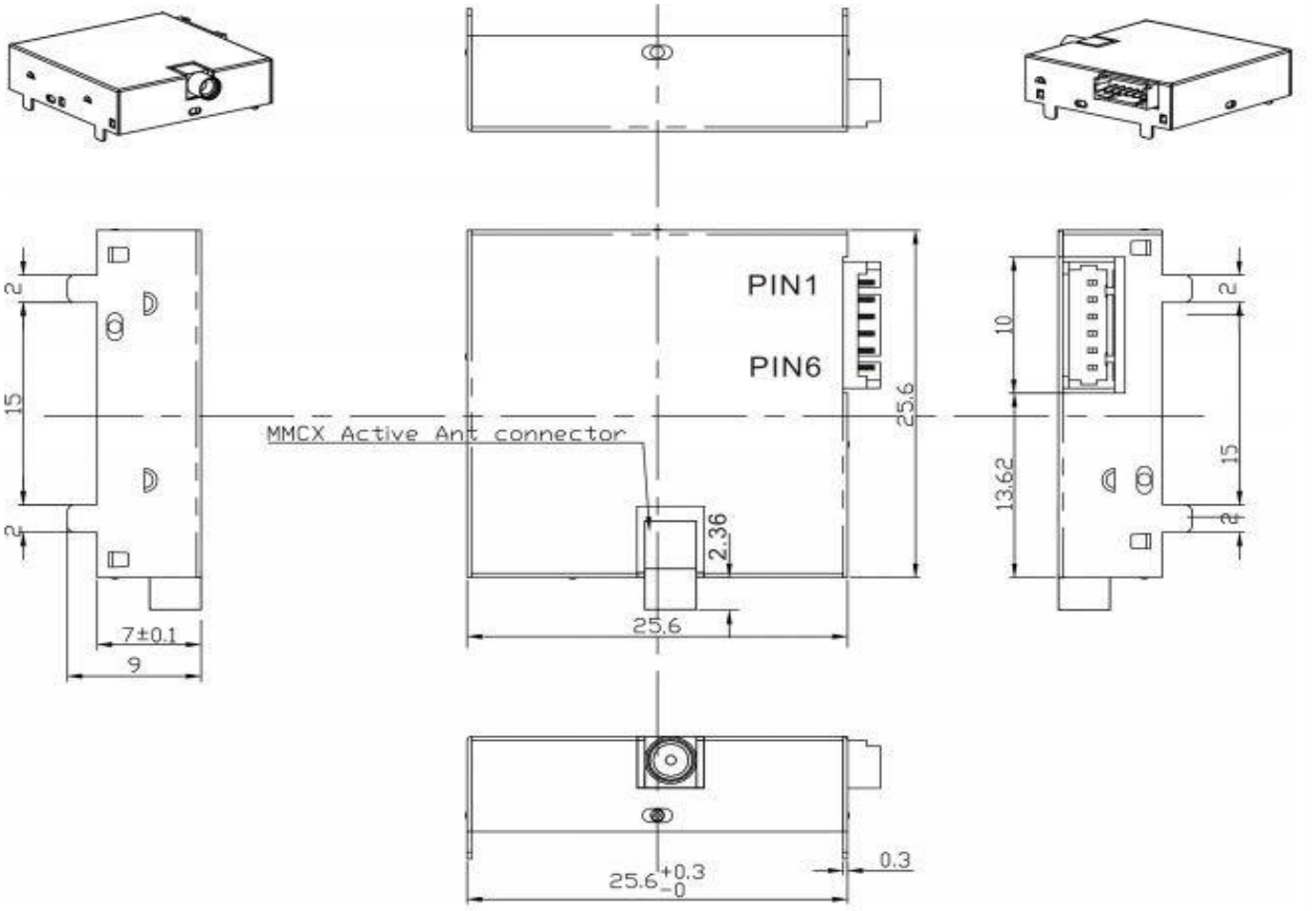
### 2.1.12 Recommended External Antenna Specification

| | | |
|---|---|---|
| Gain | 20 dB min (cable loss included) | |
| Noise figure | 1.5 dB typical | |
| Current | 10 mA typical | |
| Operating Voltage | Confirmed to spec | 3.3 ~ 5.5 V |
| | Survival | 3.0 ~ 3.3 V |

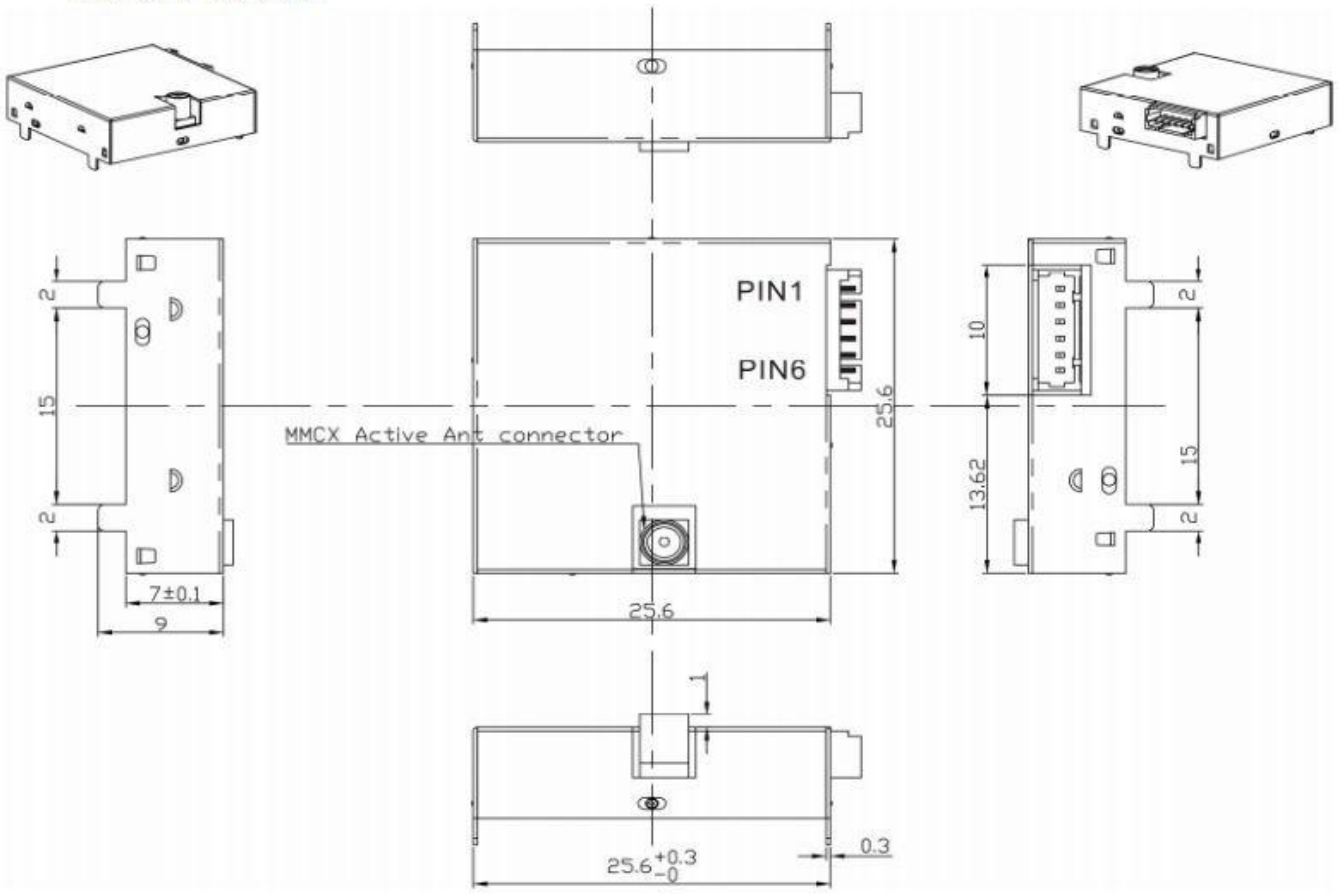
## 2.2. Environmental Characteristics

| | |
|---|---|
| Operating temperature range | -40 °C to +85 °C |
| Storage temperature range | -45 °C to +100 °C |

## SR-87H outline

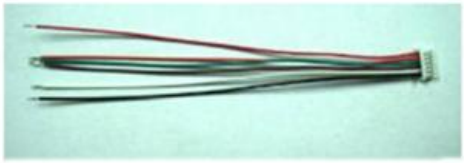


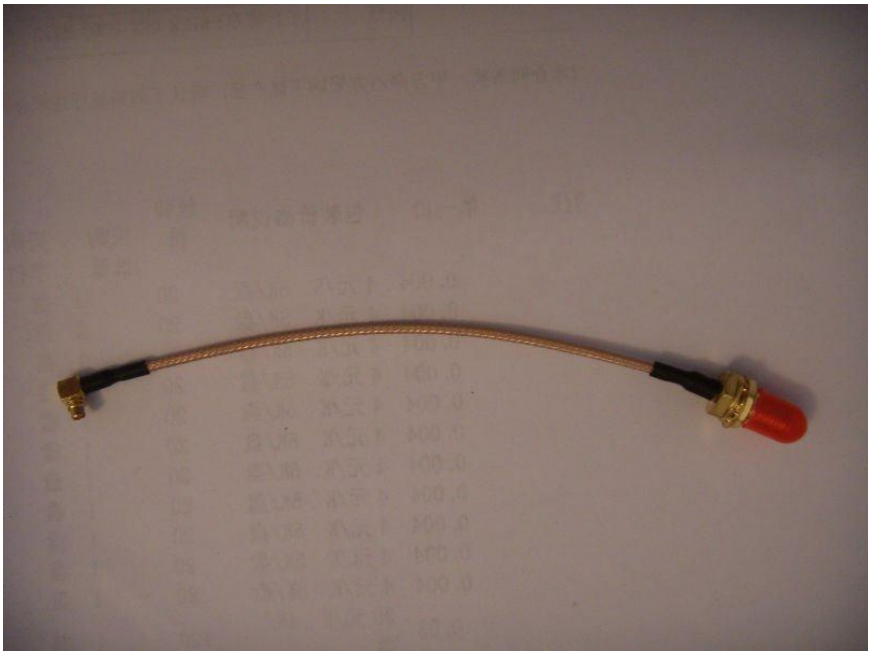

## SR-87V outline



Pin assignment

| | | |
|---|---|---|
| Pin1 | VDD | 3.0 ~ 5.5 VDC input |
| Pin2 | UART Tx | NMEA serial data output |
| Pin3 | UART Rx | Serial data input |
| Pin4 | NC | Not connect, must be floating for normal operation |
| Pin5 | GND | Ground |
| Pin6 | TIMEMARK/<br>RESET/<br>GPS STATUS | TIMEMARK: 1PPS Time mark output (Pulse duration 1μs)/<br>RESET: Reset Input (Active Low)/<br>For GPS status (LED) indication |





The 3910D GPS antenna has one of the industry's lowest noise figures. It features ESD circuit protection, an innovative very low noise LNA and a high rejection SAW filter. It also features a precisely tuned custom ceramic patch element that minimizes detuning effects caused by adjacent objects. The 3910D is ideal for Fleet Management, Asset Tracking and Precision Agriculture as well any application with poor signal reception area.

The 3910D provides consistent, clear GPS signal reception while minimizing loss-of-lock in high-RF fields. Housed in a weatherproof magnetic or screw mount enclosure, the 3910D GPS antenna is ideal for demanding vehicle mounted GPS applications.

### Features

- Low noise: 0.5 dB
- Low current: 8mA
- Superior out-of-band rejection
- Wide voltage input range (2.7 - 5 VDC)
- Robust IP67 housing built for various weather conditions

## RF/Electrical Specifications

| Center Frequency | Nominal Gain | Polarization | Current Draw |
|---|---|---|---|
| 1575.42 MHz ± 10 MHz | 3 dBic @ 90°<br>-2 dBic @ 20° | Right Hand Circular | 8 mA @ 3.3V |

## Mechanical Specifications

| Antenna Dimensions | Weight | Shock | Vibration |
|---|---|---|---|
| 1.77" x 2.01" x .47"<br>(45 x 51 x 12 mm) | .29 lbs<br>(130 g) | Vertical axis 50G,<br>other axes 30G | 3 axis, sweep = 15 min<br>10 – 200 Hz log sweep: 3G |

| Cable | Connector | Mounting Method |
|---|---|---|
| 9.8' (3 meters) highly-flexible 174 sized cable | Male SMA standard | Magnetic (5 lb lift-off force) or permanent (pre-threaded for 3 x M2.5 screws) |

## Environmental Specifications

| Temperature Range | Ingress Protection |
|---|---|
| -40°C to +85°C operating | IP67 |

*Made in China*